RESOLUTION NO. 2014-206

A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF ELK GROVE CERTIFYING THE ENVIRONMENTAL IMPACT REPORT FOR THE CIVIC CENTER AQUATICS COMPLEX PROJECT NO. 13-003

WHEREAS, on June 16, 2004, the City Council adopted Resolutions 2004-142 and 2004-143, certifying an Environmental Impact Report for the Laguna Ridge Specific Plan and adopting the Laguna Ridge Specific Plan, which identified a future Civic Center; and

WHEREAS, in 2006, the City became the owner of the Civic Center property; and

WHEREAS, the City conducted various analysis and studies identifying potential future uses for the Civic Center property based upon market demand and resident needs; and

WHEREAS, in 2012, the City Council directed staff to prepare a Request for Qualifications and subsequently directed staff to prepare a Request for Proposals for a design/build/operate/finance project that identified the development and operations of an Aquatics Complex, which included competitive facilities and an outdoor water/adventure park (the "Project"); and

WHEREAS, the City is working with P3 International (and its related sub-consultants, hereinafter "Applicant") on Phase I work (design plan, job costing, feasibility study and private financing) for the Aquatics Complex Project; and

WHEREAS, the proposed Project is located on real property in the incorporated portions of the City of Elk Grove more particularly described as APNs: 132-1990-007, 009, 014, 017, 018, & 019; and

WHEREAS, the California Environmental Quality Act (CEQA), requires local agencies to consider the potential environmental impacts of their decisions prior to taking action; and

WHEREAS, in compliance with Public Resources Code §21080.4, a Notice of Preparation (NOP) was prepared by the City of Elk Grove and was distributed to the State Clearinghouse, Office of Planning and Research, responsible agencies and other interested parties on September 6, 2013 with the comment period ending on October 7, 2013; and

WHEREAS, the City of Elk Grove distributed a Notice of Availability for the Project's Draft Subsequent Environmental Impact Report (SEIR) on June 27, 2014, which started the 45-day public review period, ending on August 13, 2014; and

WHEREAS, the Draft SEIR, provided herein as Exhibit A, was filed with the State Clearinghouse (SCH No. 2000082139) and was distributed to public agencies and other interested parties for public review and comment; and

WHEREAS, the City of Elk Grove prepared a Final SEIR (provided herein as Exhibit B), which consists of: (1) Draft SEIR, (2) comments received on the Draft SEIR during the public review period, and (3) responses to comments received.

NOW, THEREFORE, BE IT RESOLVED by the City Council of the City of Elk Grove as follows:

1. **Certification of the Final EIR**

A. The City Council hereby certifies that the Final SEIR has been completed in compliance with the requirements of the California Environmental Quality Act.

B. The City Council hereby certifies that the Final SEIR was presented to the City Council and that the City Council reviewed and considered the information contained in the Final SEIR prior to taking action on the Project.

C. The City Council hereby certifies that the Final SEIR reflects the independent judgment and analysis of the City Council.

2. **Findings on Impacts**

The City Council finds that the Final SEIR identifies potentially significant impacts that cannot be mitigated to a less than significant level and are thus considered significant and unavoidable. The City Council makes the findings with respect to these significant and unavoidable impacts as set forth in Exhibit C, attached hereto and incorporated herein by reference.

3. **Findings on Alternatives**

The City Council finds that all alternatives analyzed in the Final SEIR **except Alternative 4** are rejected because the alternatives would not achieve the majority of the project objectives. The City Council makes the finding as set forth in Exhibit C, attached hereto and incorporated herein by reference.

Further, the City Council **hereby accepts Alternative 4 as the Project** based upon the findings set forth in Exhibit C, attached hereto and incorporated herein by reference.

4. **Statement of Overriding Considerations**

The City Council finds that there are no feasible mitigation measures or project alternatives that would mitigate or substantially lessen the impacts from the Project.

Despite the occurrence of these significant effects, however, the City Council chooses to approve the project because, in its view, the environmental, social, and other benefits of the project will render the significant effects acceptable as described in Statement of Overriding Considerations as set forth in Exhibit C, attached hereto and incorporated herein by reference.

5. Adoption of the Mitigation Monitoring and Reporting Program

A. The City Council hereby finds that the proposed mitigation measures described in the EIR and Findings are feasible, and therefore will become binding upon the City and on future Applicants. The Mitigation Monitoring and Reporting Program is included as Exhibit D, attached hereto and incorporated herein by reference.

B. The City Council hereby adopts the Mitigation Monitoring and Reporting Program, as set forth in Exhibit D, attached hereto and incorporated herein by reference.

PASSED AND ADOPTED by the City Council of the City of Elk Grove this 10th day of September 2014.

GARY DAVIS, MAYOR of the
CITY OF ELK GROVE

ATTEST:

JASON LINDGREN, CITY CLERK

APPROVED AS TO FORM:

JONATHAN P. HOBBS,
CITY ATTORNEY

EXHIBIT A

City of Elk Grove

Civic Center Aquatics Complex Project

Draft Subsequent
Environmental Impact Report

SCH# 2000082139

Prepared for:

City of Elk Grove
8401 Laguna Palms Way
Elk Grove, CA 95758

Prepared by:

PMC®

2729 Prospect Park Drive, Suite 220
Rancho Cordova, CA 95670

June 2014

City of Elk Grove
Civic Center Aquatics Complex Project
Draft Subsequent
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June 2014

EXECUTIVE SUMMARY

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ES Executive Summary

This section provides an overview of the Project and the environmental analysis. For additional detail regarding specific issues, please consult the appropriate technical section of this section (Section 4.1 through 4.9).

ES.1 PURPOSE AND SCOPE OF THE EIR

The California Environmental Quality Act (CEQA) requires the preparation of an environmental impact report (EIR) when there is substantial evidence that a project could have a significant effect on the environment. The purpose of an EIR is to provide decision-makers, public agencies, and the general public with an objective and informational document that fully discloses the potential environmental effects of the proposed Project. The term "proposed Project," as used in this Draft Subsequent EIR, refers to the development of the Civic Center Aquatics Complex Project, which consists of a competition venue and a water and adventure park, described below. The EIR process is specifically designed to describe the objective evaluation of potentially significant direct, indirect, and cumulative impacts of the proposed Project, to identify alternatives that reduce or eliminate the Project's significant effects, and to identify feasible measures that mitigate significant effects of the Project. In addition, CEQA requires that an EIR identify those adverse impacts determined to remain significant after mitigation. This Draft Subsequent EIR provides an analysis of the potential environmental effects associated with the implementation of the Civic Center Aquatics Complex Project, located in the City of Elk Grove.

This EIR has been prepared as a subsequent EIR pursuant to CEQA Guidelines Section 15162. The City will use this Draft Subsequent EIR (Draft SEIR) as a tool in evaluating the environmental impacts of the proposed Project. As the lead agency under the provisions of CEQA, the City of Elk Grove has discretionary approval authority and the responsibility to consider the environmental effects of the Project. This EIR is intended to evaluate the environmental impacts of the Project to the greatest extent possible. This EIR, in accordance with CEQA Guidelines Section 15126, should be used as the primary environmental document to evaluate all subsequent planning and permitting actions associated with the Project.

ES.2 PROJECT CHARACTERISTICS

The Project includes the following components:

COMPETITION VENUE

The competition venue would consist of a competition swimming pool (50 meters by 25 yards, 2-meter depth) and a dive pool (25 meters by 25 yards, 17-foot depth) with a signature 10-meter diving tower, a 3-meter springboard, and a 1-meter springboard. Additional facility components would include:

- Bleacher seating for approximately 1,100 people under a shade canopy
- Therapy spa seating for 12 to 20 athletes
- Team prep area
- Restrooms/showers
- Team equipment storage space
- Spectator restrooms
- Concessions and additional restrooms
- Scoreboard and flag display

The competition venue is anticipated to be home to multiple collegiate, high school, and regional club teams for practices and meets. The Project also includes the potential for expansion in the team prep area.

WATER AND ADVENTURE PARK

The proposed water park component of the Project would include, but would not be limited to, a lazy/adventure river, wave pool, slide attractions, a possible future children's aquatic play system, a family activity pool, and various water feature elements.

The proposed adventure park component of the Project would be woven throughout the water park and would include, but would not be limited to, adult and child ropes courses, zip lines, a family adventure sky trail, and various challenge and team building elements and activities. In addition, the adventure park would include a two-story, approximately 40,000-square-foot family entertainment center to include an arcade, laser tag, bowling alley, main kitchen/commissary, food and beverage service, group entertainment stage, rental lockers, and party rooms.

The proposed water and adventure park would also include support buildings including restrooms and food and beverage service areas as well as shade amenities/cabanas/pavilions and event staging areas.

ANCILLARY COMPONENTS

In addition to the above, the Project is anticipated to include the following ancillary components:

- Administration office
- Staff break room
- Lifeguard station
- First aid station
- Storage rooms
- Mechanical rooms
- Service road and loading/delivery area
- Drop-off/arrival plaza
- Pathways and trails
- Kiosks
- Wetland/nature area overlook
- Hardscape/landscape elements
- Screening and fencing
- Trash enclosures
- Parking

PROJECT OBJECTIVES

The City has established the following objectives for the Project for purposes of CEQA:

1) Develop an aquatics complex in the Laguna Ridge Specific Plan Area with competitive swimming and diving component, including an Olympic-size competition swimming pool, a warm up pool, and diving tower, that can host up to 2,000 swimmers for each meet and seating for approximately 1,100 spectators under a shaded structure.

2) Develop a facility that can support multiple aquatic team programs for schools and a variety of regional club teams for practices and meets, and regional, state, and national events.

3) Provide necessary amenities to support athletes and spectators, such as concessions, hot tub, locker rooms, meeting room, office space, and storage.

4) Develop a commercial recreation facility to entertain 250,000 guests annually with outdoor activities such as a water park, adventure theme park, and fun center with a family focus, targeted at both youth and adult guests.

5) Provide dining/concessions component including meals, snacks and beverages.

6) Provide landscaping, parking, lighting, and security, as required by City code.

ES.3 PROJECT ALTERNATIVES SUMMARY

CEQA Guidelines Section 15126.6 requires that an EIR describe a range of reasonable alternatives to the project, which could feasibly attain the basic objectives of the project and reduce the degree of environmental impact. Section 6.0, Project Alternatives, provides a qualitative analysis of two scenarios:

- No Project Alternative
- Modified Project Design Alternative
- Reduced Project Alternative
- Competition Venue Only Alternative

The Competition Venue Only Alternative would be the environmentally superior alternative.

ES.4 AREAS OF CONTROVERSY

The City of Elk Grove was identified as the lead agency for the proposed Project. In accordance with Section 15082 of the CEQA Guidelines, the City prepared and distributed a Notice of Preparation (NOP) of an EIR on September 6, 2013. This notice was circulated to the public, local, State, and federal agencies, and other interested parties to solicit comments on the proposed Project. The NOP is presented in **Appendix B**.

Concerns raised in response to the NOP were considered during the preparation of the Draft EIR. Comment letters are presented in **Appendix C**.

Issues raised in comment letters on the NOP include:

- Request to prepare a traffic impact study for the Project
- Request to acknowledge Project impacts related to overhead and/or underground transmission line easements, electrical load needs/requirements, energy efficiency, utility line routing, and climate change.
- Request for information associated with the embedded energy in the regional water supply.
- The Project will result in the need for new distribution facilities and require a minimum standard 12.5-foot overhead/ underground public utility easement along all streets throughout the development.

ES.5 SUMMARY OF ENVIRONMENTAL IMPACTS

Table ES-1 presents a summary of Project impacts and proposed mitigation measures that would avoid or minimize potential impacts. In the table, the level of significance of each environmental impact is indicated both before and after the application of the recommended mitigation measure(s). The proposed Civic Center Aquatics Complex Project is subject to the adopted mitigation measures described in the Mitigation Monitoring and Reporting Program (MMRP) for the Laguna Ridge Specific Plan EIR. In the table, the level of significance of each environmental impact is indicated for the Laguna Ridge Specific Plan and the proposed Project. The table also includes any additional mitigation for the proposed Project, if applicable, the resulting level of significance and a determination of whether the proposed project would result in a new of more severe impact from that disclosed in the previous EIR.

For detailed discussions of all Project impacts and mitigation measures, the reader is referred to the topical environmental analysis in Section 4.0.

TABLE ES-1
PROJECT IMPACTS AND PROPOSED MITIGATION MEASURES

Impact		Level of Significance		Mitigation Measure	Proposed Project Resulting Level of Significance	New Significant Impact or More Severe Significant Impact from Previous EIR?
		Previous EIR	Proposed Project with LRSP Mitigation			
4.1 Aesthetics, Light, and Glare						
4.1.1	The Project area is not located in the vicinity of a scenic vista or designated state scenic highway. There is no impact. The proposed Project would not result in a substantial increase in the severity of this impact. There are no new or substantially more severe significant impacts.	N	N	None required.	N	No
4.1.2	Implementation of the proposed Project would result in substantial changes to the existing visual character and quality of the site not consistent with the changes assumed in the LRSP EIR. The proposed Project would be one of the more intense uses allowed in the Community Park district, which would alter the type of use compared to that assumed in the LRSP EIR and result in an increase in the impact disclosed in the LRSP EIR. This is a new significant impact.	SU	SU	Implement mitigation measure MM 4.7.4.	SU	Yes
4.1.3	Implementation of the proposed Project would introduce new sources of light and glare in and around the area. The	SU/MM	SU/MM	Implement adopted LRSP mitigation measures MM 4.11.2a and MM 4.11.2b.	SU/MM	Yes

N – No impact LS – Less Than Significant LS/MM - Less Than Significant with Mitigation SU – Significant and Unavoidable SU/MM – Significant and Unavoidable even with Mitigation

LCC – Less Than Cumulatively Considerable LCC/MM – Less Than Cumulatively Considerable with Mitigation CCSU – Cumulatively Considerable and Unavoidable CCSU/MM – Cumulatively Considerable and Unavoidable Even With Mitigation – not analyzed in previous EIR, not applicable

Impact		Level of Significance		Mitigation Measure	Proposed Project Resulting Level of Significance	New Significant Impact or More Severe Significant Impact from Previous EIR?
		Previous EIR	Proposed Project with LRSP Mitigation			
	proposed Project would result in an increase in the severity of this impact, which was previously identified in the LRSP EIR as significant and unavoidable. This is a significant impact.					
4.1.4	Development of the proposed Project, when considered with other existing, proposed, approved, and reasonably foreseeable development in the viewshed of the LRSP, would contribute further development to an urbanizing area. The proposed Project would not result in a substantial increase in the severity of this impact. There is no new or substantially more severe contribution to the cumulative impact that would result from the proposed Project.	CCSU/MM	CCSU/MM	Implement adopted LRSP mitigation measures MM 4.11.2a and MM 4.11.2b.	LCCSU/MM	No
4.2 Air Quality						
4.2.1	Construction activities associated with the development of the proposed Project would result in a short-term increase in criteria air pollutants within the Laguna Ridge Specific Plan area. The proposed Project would result in an increase in the severity of this impact, which was previously identified in the LRSP EIR as significant and	SU/MM	SU/MM	Implement adopted LRSP mitigation measures MM 4.3.1a through MM 4.3.1g.	SU/MM	Yes

N – No impact LS – Less Than Significant LS/MM - Less Than Significant with Mitigation SU – Significant and Unavoidable SU/MM – Significant and Unavoidable even with Mitigation

LCC – Less Than Cumulatively Considerable LCC/MM – Less Than Cumulatively Considerable With MitigationCCSU – Cumulatively Considerable and Unavoidable CCSU/MM – Cumulatively Considerable and Unavoidable Even With Mitigation -- not analyzed in previous EIR, not applicable

Impact		Level of Significance		Mitigation Measure	Proposed Project Resulting Level of Significance	New Significant Impact or More Severe Significant Impact from Previous EIR?
		Previous EIR	Proposed Project with LRSP Mitigation			
	unavoidable.					
4.2.2	Implementation of the proposed Project would result in long-term increases in criteria air pollutants. The proposed Project would not result in a substantial increase in the severity of this impact, which was previously identified in the LRSP EIR as significant and unavoidable. There are no new or substantially more severe significant impacts	SU/MM	LS	LRSP mitigation measure MM 4.3.2 not required.	LS	No
4.2.3	Implementation of the proposed Project would contribute to localized concentrations of mobile-source CO that would exceed applicable standards. The proposed Project would not result in an increase in the severity of this impact, and there is not a new or substantially more severe significant impact.	LS	LS	None required.	LS	No
4.2.4	Implementation of the proposed Project would not result in increased exposure of sensitive receptors to toxic air contaminants. The proposed Project would not result in a substantial increase in the severity of this impact, which was previously identified in the LRSP EIR as less than significant. There are no new or substantially more severe	LS	LS	None required.	LS	No

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	Impact	Level of Significance		Mitigation Measure	Proposed Project Resulting Level of Significance	New Significant Impact or More Severe Significant Impact from Previous EIR?
		Previous EIR	Proposed Project with LRSP Mitigation			
	significant impacts.					
4.2.5	Implementation of the proposed Project would not result in increased exposure of sensitive receptors to substantial objectionable odors. As a result, the proposed Project would not result in an increase in the severity of this impact, and there is not a new or substantially more severe significant impact.	LS	LS	None required.	LS	No
4.2.6	Implementation of the proposed Project, in combination with growth throughout the air basin, will not exacerbate existing regional problems with ozone and particulate matter. The proposed Project would not result in a substantial increase in the severity of this impact, which was previously identified in the LRSP EIR as significant and unavoidable. There is no new or substantially more severe contribution to the cumulative impact that would result from the proposed Project.	SU/MM	LCC	LRSP mitigation measure MM 4.3.2 not required.	LCC	No
4.3 Biological Resources						
4.3.1	Implementation of Project-related activities would not result in substantial adverse effects, either directly or through habitat modification, to special-status plant species. The LRSP EIR	LS/MM	N	LRSP mitigation measures MM 4.8.2a and MM 4.8.2b not required.	N	No

N – No impact LS – Less Than Significant LS/MM - Less Than Significant with Mitigation SU – Significant and Unavoidable SU/MM – Significant and Unavoidable even with Mitigation

LCC – Less Than Cumulatively Considerable LCC/MM – Less Than Cumulatively Considerable With MitigationCCSU – Cumulatively Considerable and Unavoidable CCSU/MM – Cumulatively Considerable and Unavoidable Even With Mitigation – not analyzed in previous EIR, not applicable

Impact		Level of Significance		Mitigation Measure	Proposed Project Resulting Level of Significance	New Significant Impact or More Severe Significant Impact from Previous EIR?
		Previous EIR	Proposed Project with LRSP Mitigation			
	identified this impact as less than significant with mitigation. The proposed Project would result in no impact to special-status plant species and therefore would not result in a substantial increase in the severity of this impact.					
4.3.2	Implementation of Project-related activities would not result in substantial adverse effects, either directly or through habitat modifications, to giant garter snake. The LRSP EIR identified this impact as less than significant with mitigation. The proposed Project would result in no impact to giant garter snake and therefore would not result in a substantial increase in the severity of this impact.	LS/MM	N	LRSP mitigation measures MM 4.8.4a through MM 4.8.4e.	N	No
4.3.3	Implementation of Project-related activities could result in substantial adverse effects, either directly or through habitat modification, to conservancy fairy shrimp, vernal pool fairy shrimp, and/or vernal pool tadpole shrimp. The LRSP EIR identified this impact as less than significant with mitigation. The proposed Project would not result in a new impact or substantially increase the severity of a	LS/MM	LS/MM	Implement adopted LRSP mitigation measure MM 4.8.6.	LS/MM	No

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LCC – Less Than Cumulatively Considerable LCC/MM – Less Than Cumulatively Considerable with Mitigation CCSU – Cumulatively Considerable and Unavoidable CCSU/MM – Cumulatively Considerable and Unavoidable Even With Mitigation – not analyzed in previous EIR, not applicable

Impact		Level of Significance		Mitigation Measure	Proposed Project Resulting Level of Significance	New Significant Impact or More Severe Significant Impact from Previous EIR?
		Previous EIR	Proposed Project with LRSP Mitigation			
	previously identified significant impact.					
4.3.4	Implementation of Project-related activities could result in substantial adverse effects, either directly or through habitat modifications, to burrowing owl. The LRSP EIR identified this impact as less than significant with mitigation. The proposed Project would not result in a new impact or substantially increase the severity of a previously identified significant impact.	LS/MM	LS/MM	Implement adopted LRSP mitigation measures MM 4.8.8a through MM 4.8.8c.	LS/MM	No
4.3.5	Implementation of Project-related activities could result in substantial adverse effects, either directly or through habitat modifications, to Swainson's hawk, white-tailed kites, and other protected raptor species. The LRSP EIR identified this impact as less than significant with mitigation. The proposed Project would not result in a new impact or substantially increase the severity of a previously identified significant impact.	LS/MM	LS/MM	Implement adopted LRSP mitigation measures MM 4.8.7a through MM 4.8.7b, and MM 4.8.8a through MM 4.8.8c.	LS/MM	No
4.3.6	Implementation of Project-related activities could result loss of populations or essential habitat for special-status avian species. The LRSP EIR identified this impact as less than significant with mitigation. The	LS/MM	LS/MM	Implement adopted LRSP mitigation measures MM 4.8.7a through MM 4.8.7b, and MM 4.8.8a through MM 4.8.8c.	LS/MM	No

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Impact		Level of Significance		Mitigation Measure	Proposed Project Resulting Level of Significance	New Significant Impact or More Severe Significant Impact from Previous EIR?
		Previous EIR	Proposed Project with LRSP Mitigation			
	proposed Project would not result in a new impact or substantially increase the severity of a previously identified significant impact.					
4.3.7	Implementation of Project-related activities could result loss of populations or essential habitat for special-status bats. The LRSP EIR identified this impact as less than significant with mitigation. The proposed Project would not result in a new impact or substantially increase the severity of a previously identified significant impact.	LS/MM	LS/MM	Implement adopted LRSP mitigation measure MM 4.8.8a.	LS/MM	No
4.3.8	Implementation of Project activities could result in the loss of riparian vegetation, sensitive natural communities, and/or federally protected wetlands, which would be considered a potentially significant impact. The LRSP EIR identified this impact as less than significant with mitigation. The proposed Project would not result in a new impact or substantially increase the severity of a previously identified significant impact.	LS/MM	LS/MM	Implement adopted LRSP mitigation measure MM 4.8.3.	LS/MM	No
4.3.9	Implementation of the proposed Project would not interfere with the movement of native resident or migratory wildlife	–	N	No new or additional mitigation required.	N	–

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Impact		Level of Significance		Mitigation Measure	Proposed Project Resulting Level of Significance	New Significant Impact or More Severe Significant Impact from Previous EIR?
		Previous EIR	Proposed Project with LRSP Mitigation			
	species. The LRSP EIR did not evaluate this impact. The Project would result in no impact to the movement of native resident or migratory wildlife species.					
4.3.10	Development of the Project area could result in the loss of protected tree species and removal of Swainson's hawk habitat, which could conflict with the City's Municipal Code. The LRSP EIR identified this impact as less than significant with mitigation. The proposed Project would not result in a new impact or substantially increase the severity of a previously identified significant impact.	LS/MM	LS	LRSP mitigation measures not required.	LS	No
4.3.11	Implementation of the proposed Project would not conflict with the provisions of an adopted habitat conservation plan, natural community conservation plan, or other approved local, regional, or State habitat conservation plan. The LRSP EIR did not evaluate this impact. The Project would result in no conflicts with adopted conservation plans.	–	N	No new or additional mitigation required.	N	–
4.3.12	Implementation of the proposed Project would contribute to the loss of biological resources in the region, as well as ongoing urbanization in southern Sacramento County. The LRSP	CCSU/MM	CCSU/MM	Implement adopted LRSP mitigation measures MM 4.8.3, MM 4.8.2a, MM 4.8.2b, MM 4.8.6, MM 4.8.7a, MM 4.8.7b, MM 4.8.8a, MM 4.8.8b, and MM	CCSU/MM	No

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Impact	Level of Significance		Mitigation Measure	Proposed Project Resulting Level of Significance	New Significant Impact or More Severe Significant Impact from Previous EIR?
	Previous EIR	Proposed Project with LRSP Mitigation			
EIR identified this impact as significant and unavoidable. The proposed Project would not result in a new impact or substantially increase the severity of a previously identified significant and unavoidable impact.			4.8.8c. No new or additional mitigation available.		
4.4 Cultural Resources					
4.4.1 Construction of the proposed Project could adversely affect or result in the damage of potential or unknown cultural resources (i.e., prehistoric sites, historic sites, historic buildings/structures, and isolated artifacts) and human remains. The proposed Project would not result in a new impact or substantially increase the severity of a previously identified significant impact.	LS/MM	LS/MM	Implement adopted LRSP mitigation measure MM 4.10.1b. No new or additional mitigation required.	LS/MM	No
4.4.2 Development of the proposed Project could contribute to the cumulative disturbance of cultural resources (i.e., prehistoric sites, historic sites, historic buildings/structures, and isolated artifacts and features) and human remains. The proposed Project would not result in a substantial increase in the severity of this impact. There is no new or substantially more severe contribution to the cumulative impact	LCC/MM	LCC/MM	Implement adopted LRSP mitigation measure MM 4.10.1b. No new or additional mitigation required.	LCC/MM	No

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Impact		Level of Significance		Mitigation Measure	Proposed Project Resulting Level of Significance	New Significant Impact or More Severe Significant Impact from Previous EIR?
		Previous EIR	Proposed Project with LRSP Mitigation			
	that would result from the proposed Project.					
4.5 Greenhouse Gases and Climate Change						
4.5.1	Implementation of the proposed Project would result in a net increase in GHG emissions, but would not conflict with the goals of AB 32 or result in a significant impact on the environment. This impact was not addressed in the LRSP EIR, but would result in an impact that is not cumulatively considerable.	–	LCC	None required.	LCC	–
4.6 Hazards and Hazardous Materials						
4.6.1	Construction and/or operation of the proposed Project would involve the routine transport, use, storage, and disposal of hazardous materials including construction solvents, paints, adhesives, other construction-related materials, and pool maintenance chemicals, which could create a potential health hazard to the public or environment. Because the transport, use, storage, and disposal of these types of hazardous materials was not evaluated in the LRSP EIR, this represents a new less than significant impact.	-	LS/MM	Implement adopted LRSP mitigation measure MM 4.5.1. LRSP mitigation measures MM 4.5.2, MM 4.5.3a, MM 4.5.3b, MM 4.5.4a, and MM 4.5.4b are not required.	LS/MM	No

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Impact	Level of Significance		Mitigation Measure	Proposed Project Resulting Level of Significance	New Significant Impact or More Severe Significant Impact from Previous EIR?
	Previous EIR	Proposed Project with LRSP Mitigation			
4.6.2 The proposed Project involves the use, storage, and transport of hazardous materials that could involve accident conditions, resulting in the release of hazardous materials into the environment. Because the transport, use, storage, and disposal of these types of hazardous materials was not evaluated in the LRSP EIR, this represents a new less than significant impact.	–	LS	None required.	LS	No
4.6.3 The proposed Project is located within one-quarter mile of Elizabeth Pinkerton Middle School/Consumnes Oaks High School. Although hazardous materials would be stored and handled on the Project site, activities involving hazardous materials would be managed in accordance with existing federal and State regulations. The proposed Project would not result in an increase in the severity of this impact, and there is not a new or substantially more severe significant impact.	LS	LS	None required.	LS	No
4.6.4 The proposed Project is not located in a Fire Hazard Zone as indicated on the Fire Hazard Severity Zones map (Cal Fire 2007). The Project involves the use of hazardous materials that, if stored or	LS	LS	None required.	LS	No

N – No impact LS – Less Than Significant LS/MM - Less Than Significant with Mitigation SU – Significant and Unavoidable SU/MM – Significant and Unavoidable even with Mitigation

LCC – Less Than Cumulatively Considerable LCC/MM – Less Than Cumulatively Considerable with Mitigation CCSU – Cumulatively Considerable and Unavoidable CCSU/MM – Cumulatively Considerable and Unavoidable Even With Mitigation – not analyzed in previous EIR, not applicable

Impact	Level of Significance		Mitigation Measure	Proposed Project Resulting Level of Significance	New Significant Impact or More Severe Significant Impact from Previous EIR?
	Previous EIR	Proposed Project with LRSP Mitigation			
handled improperly, could result in a fire; however, compliance with existing federal and State regulations and local policies would minimize the risk of fire at the Project site. The proposed Project would not result in an increase in the severity of this impact, and there is not a new or substantially more severe significant impact.					
4.6.5 Cumulative development in the City would increase handling, storage, disposal, and transport of hazardous materials in the Project area. However, cumulative development, including the proposed Project, would be subject to applicable federal, State, and local regulations that would govern the handling, storage, disposal, and transport of hazardous materials. Therefore, the proposed Project would not result in a substantial increase in the severity of this impact. There is no new or substantially more severe contribution to the cumulative impact that would result from the proposed Project.	LCC	LCC	None required.	LCC	No

N – No impact LS – Less Than Significant LS/MM - Less Than Significant with Mitigation SU – Significant and Unavoidable SU/MM – Significant and Unavoidable even with Mitigation

LCC – Less Than Cumulatively Considerable LCC/MM – Less Than Cumulatively Considerable With MitigationCCSU – Cumulatively Considerable and Unavoidable CCSU/MM – Cumulatively Considerable and Unavoidable Even With Mitigation -- not analyzed in previous EIR, not applicable

Impact	Level of Significance		Mitigation Measure	Proposed Project Resulting Level of Significance	New Significant Impact or More Severe Significant Impact from Previous EIR?
	Previous EIR	Proposed Project with LRSP Mitigation			
4.7 Noise					
4.7.1 The proposed Project could generate construction noise at sensitive receptors. The proposed Project would result in an increase in the severity of this impact, which was previously identified in the LRSP EIR as less than significant. The Project's impact would be less than significant. There is not a new or substantially more severe significant impact.	LS/MM	LS/MM	Implement adopted LRSP mitigation measures MM 4.4.1a through MM 4.4.1e.	LS/MM	No
4.7.2 The proposed Project could generate construction vibration at sensitive receptors. The proposed Project would result in an increase in the severity of this impact, which was previously identified in the LRSP EIR as less than significant. This is considered a new potentially significant impact.	LS/MM	LS/MM	Implement adopted LRSP mitigation measure MM 4.4.2. **MM 4.7.2** Prior to the commencement of the use of vibratory rollers/compactors within 25 feet of adjacent land uses, an assessment of vibrations induced by vibratory rollers/compactors at the site shall be completed. During indicator vibratory rollers/compactor activities, vibrations shall be measured at regular intervals to determine the levels of vibration at various distances from vibratory rollers/compactor activities. The indicator vibratory rollers/compactor activities shall be conducted at locations at least 50 feet from any existing structures. After monitoring, methods of reducing the peak	LS/MM	No

N – No impact LS – Less Than Significant LS/MM - Less Than Significant with Mitigation SU – Significant and Unavoidable SU/MM – Significant and Unavoidable even with Mitigation

LCC – Less Than Cumulatively Considerable LCC/MM – Less Than Cumulatively Considerable with Mitigation CCSU – Cumulatively Considerable and Unavoidable CCSU/MM – Cumulatively Considerable and Unavoidable Even With Mitigation – not analyzed in previous EIR, not applicable

Impact	Level of Significance		Mitigation Measure	Proposed Project Resulting Level of Significance	New Significant Impact or More Severe Significant Impact from Previous EIR?
	Previous EIR	Proposed Project with LRSP Mitigation			
			ground velocities to less than 0.2 inches per second shall be determined and implemented. Methods to reduce vibrations, if needed, could include the use of alternative equipment. The vibration reduction techniques to be used shall be described in the construction plans for the Project to be reviewed and approved by the City prior to issuance of building permits. This requirement shall be included in all Project construction plans.		
4.7.3 Increased traffic noise could affect sensitive receptors. The proposed Project would not result in an increase in the severity of this impact, which was previously identified in the LRSP EIR as less than significant. There is not a new or substantially more severe significant impact.	LS	LS	None required.	LS	No
4.7.4 Average-hourly non-transportation noise levels would exceed the City's noise standard at residential land uses located along the eastern Project site property line. The proposed Project would result in an increase in the severity of this impact, which was previously identified in the LRSP EIR as less than significant. This is considered a new significant	LS/MM	SU/MM	Implement adopted LRSP mitigation measure MM 4.4.3.b. **MM 4.7.4** The following mitigation measures shall be implemented to mitigate non-transportation noise levels associated with the proposed Project: a. Solid barriers shall be installed, at a minimum, on the east-facing sides of	SU/MM	Yes

N – No impact LS – Less Than Significant LS/MM - Less Than Significant with Mitigation SU – Significant and Unavoidable SU/MM – Significant and Unavoidable even with Mitigation

LCC – Less Than Cumulatively Considerable LCC/MM – Less Than Cumulatively Considerable With MitigationCCSU – Cumulatively Considerable and Unavoidable CCSU/MM – Cumulatively Considerable and Unavoidable Even With Mitigation -- not analyzed in previous EIR, not applicable

Impact	Level of Significance		Mitigation Measure	Proposed Project Resulting Level of Significance	New Significant Impact or More Severe Significant Impact from Previous EIR?
	Previous EIR	Proposed Project with LRSP Mitigation			
impact.			the elevated slide and zip line towers and sufficient to block line-of-sight of patrons located on stairways and upper platform areas to adjacent residential land uses located along the eastern property line. Barriers on elevated structures shall be constructed of wood, or material of similar density, with no visible gaps between construction materials. b. The use of amplified public address/sound systems on elevated slide and zip line towers shall be prohibited. c. The installation of amplified public address/sound system speakers shall be prohibited within 50 feet of the eastern property line. Amplified public address/sound system speakers located within 200 feet of the eastern property line shall be installed to a maximum height not to exceed 12 feet and directed away from the eastern property line. d. A sound barrier shall be constructed to a minimum height of 12 feet above ground level along the eastern Project site property line. The sound barrier shall also extend along the southern Project site property line, to a		

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Impact	Level of Significance		Mitigation Measure	Proposed Project Resulting Level of Significance	New Significant Impact or More Severe Significant Impact from Previous EIR?
	Previous EIR	Proposed Project with LRSP Mitigation			
			distance of 360 feet from the eastern property line. The barrier constructed along the southern property line shall be constructed to a minimum height of 12 feet at the eastern property line and to a minimum height of 8 feet at the western terminus. Reductions in barrier height along the southern property line shall occur gradually. The sound barrier shall be constructed of masonry block, or material of similar density, with no visible gaps between adjoining barriers, construction materials, or at the base of the barrier. e. The use of stationary noise-generating equipment (e.g., public address/sound systems) shall be prohibited during the hours of 10 p.m. to 7 a.m.		
4.7.5 Maximum instantaneous non-transportation noise levels would exceed the City's noise standard at residential land uses located along the eastern Project site property line. Because maximum instantaneous noise levels from non-transportation noise sources were not evaluated in the LRSP EIR, this represents a new significant	–	SU/MM	Implement mitigation measure **MM 4.7.4.**	SU/MM	Yes

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Impact		Level of Significance		Mitigation Measure	Proposed Project Resulting Level of Significance	New Significant Impact or More Severe Significant Impact from Previous EIR?
		Previous EIR	Proposed Project with LRSP Mitigation			
	impact.					
4.7.6	The proposed Project could contribute to the cumulative traffic noise environment at nearby land uses. The proposed Project would not result in an increase in the severity of this impact, which was previously identified in the LRSP EIR as less than cumulatively considerable. There is not a new or substantially more severe significant impact.	LCC	LCC	None required.	LCC	No
4.7.7	Operation of the proposed Project could contribute to the noise environment at nearby land uses. Cumulative noise levels associated with non-transportation noise sources were not analyzed in the LRSP EIR. Therefore, this impact would constitute a new cumulative impact, and the proposed Project's contribution would be considerable. The impact would remain significant and unavoidable.	–	CCSU/MM	Implement mitigation measure **MM 4.7.4.**	CCSU/MM	Yes
4.7.8	The proposed Project would contribute to cumulative construction noise levels at nearby sensitive receptors. The proposed Project would result in an increase in the severity of this impact, and there is a more severe significant	CCSU/MM	CCSU/MM	Implement adopted LRSP mitigation measure MM 4.4.1. Implement mitigation measure **MM 4.7.2.**	CCSU/MM	Yes

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Impact	Level of Significance		Mitigation Measure	Proposed Project Resulting Level of Significance	New Significant Impact or More Severe Significant Impact from Previous EIR?
	Previous EIR	Proposed Project with LRSP Mitigation			
impact.					
4.8 Public Utilities					
4.8.1.1 Implementation of the proposed Project would increase demand for domestic water supply. However, the Sacramento County Water Agency has determined that sufficient water supplies are available to serve the proposed Project. The proposed Project would result in an increase in the severity of this impact, which was previously identified in the LRSP EIR as less than significant with mitigation. There are no new or substantially more severe significant impacts.	LS/MM	LS/MM	Implement adopted LRSP mitigation measures MM 4.6.1.1a and MM 4.6.1.1b.	LS/MM	No
4.8.1.2 Implementation of the proposed Project, in combination with other development within the SCWA's Zone 40, would increase demand for domestic water supply. The proposed Project's contribution to this impact would be less than cumulatively considerable. The proposed Project would result in an increase in the severity of this impact, which was previously identified in the LRSP EIR as less than significant with mitigation. However, the proposed Project's contribution to cumulative water supply impacts would be less	CCSU	LCC	None required.	LCC	No

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Impact	Level of Significance		Mitigation Measure	Proposed Project Resulting Level of Significance	New Significant Impact or More Severe Significant Impact from Previous EIR?
	Previous EIR	Proposed Project with LRSP Mitigation			
than cumulatively considerable. There are no new or substantially more severe significant impacts.					
4.8.2.1 Implementation of the proposed Project would result in the generation of wastewater, which would require conveyance to and treatment at the Sacramento Regional Wastewater Treatment Plant. There is adequate capacity within the SRCSD's existing treatment plant. The proposed Project would not result in a substantial increase in the severity of this impact, which was previously identified in the LRSP EIR as less than significant with mitigation. There are no new or substantially more severe significant impacts.	LS/MM	LS/MM	Implement adopted LRSP mitigation measures MM 4.6.2.1 and MM 4.6.2.2.	LS/MM	No
4.8.2.2 Implementation of the proposed Project, in combination with other development in the SRCSD service area, would generate significant new wastewater flows requiring conveyance and treatment. The proposed Project could increase in the severity of this impact, which was previously identified in the LRSP EIR as less than significant with mitigation. This impact would be cumulatively considerable.	LCC/MM	CCSU/MM	Implement adopted LRSP mitigation measures MM 4.6.2.1 and MM 4.6.2.2.	CCSU/MM	Yes

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Impact	Level of Significance		Mitigation Measure	Proposed Project Resulting Level of Significance	New Significant Impact or More Severe Significant Impact from Previous EIR?
	Previous EIR	Proposed Project with LRSP Mitigation			
4.8.3.1 Construction and operation of the proposed Project would generate solid waste, thereby increasing demand for waste collection and disposal services. The proposed Project would not result in a substantial increase in the severity of this impact, which was previously identified in the LRSP EIR as less than significant. There are no new or substantially more severe significant impacts.	LS	LS	None required.	LS	No
4.8.3.2 Implementation of the proposed Project, in combination with other development in the City, would generate solid waste, thereby increasing demand for hauling and disposal services. This impact would be less than cumulatively considerable. The proposed Project would not result in a substantial increase in the severity of this impact, which was previously identified in the LRSP EIR as less than significant. There are no new or substantially more severe significant impacts.	LCC	LCC	None required.	LCC	No
4.8.4.1 Implementation of the proposed Project would increase demand for electric, natural gas, and telephone services. The proposed Project would not result in a substantial increase in the severity of	LCC	LCC	None required.	LCC	No

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Impact	Level of Significance		Mitigation Measure	Proposed Project Resulting Level of Significance	New Significant Impact or More Severe Significant Impact from Previous EIR?
	Previous EIR	Proposed Project with LRSP Mitigation			
this impact, which was previously identified in the LRSP EIR as less than significant. There are no new or substantially more severe significant impacts.					
4.8.4.2 Implementation of the proposed Project, in combination with other development within the service areas of the providers, would increase demand for electric, natural gas, and telephone services. This impact would be less than cumulatively considerable. The proposed Project would not result in a substantial increase in the severity of this impact, which was previously identified in the LRSP EIR as less than significant. There are no new or substantially more severe significant impacts.	LCC	LCC	None required.	LCC	No
4.9 Transportation					
4.9.1 Implementation of the proposed Project would result in a decline in service at the Elk Grove Boulevard/I-5 SB Ramps intersection. This impact was identified in the LRSP EIR as significant and unavoidable. The proposed Project would result in a potential increase in the severity of this impact.	SU	SU	None available.	SU	Yes

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Impact		Level of Significance		Mitigation Measure	Proposed Project Resulting Level of Significance	New Significant Impact or More Severe Significant Impact from Previous EIR?
		Previous EIR	Proposed Project with LRSP Mitigation			
4.9.2	Implementation of the proposed Project would worsen existing unacceptable conditions along SR 99. The proposed Project would result in an increase in the severity of this impact, which was previously identified in the LRSP EIR as less than significant. This is a new significant and unavoidable impact.	LS	SU	None available.	SU	Yes
4.9.3	Implementation of the proposed Project would not result in inadequate emergency access within the Project area. This impact was not addressed in the LRSP EIR. This would be a new less than significant impact.	–	LS	None required.	LS	No
4.9.4	Implementation of the proposed Project would not disrupt or interfere with existing or planned bicycle, pedestrian, or transit facilities, which was previously identified in the LRSP EIR as less than significant. This impact would be less than significant.	LS	LS	None required.	LS	No
4.9.5	Implementation of the proposed Project, in combination with other planned, approved, and reasonably foreseeable projects, would result in a decline of service at six intersections in the study area. The proposed Project would result in an increase in the severity of this	See below	See below			

N – No impact LS – Less Than Significant LS/MM - Less Than Significant with Mitigation SU – Significant and Unavoidable SU/MM – Significant and Unavoidable even with Mitigation

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Impact	Level of Significance		Mitigation Measure	Proposed Project Resulting Level of Significance	New Significant Impact or More Severe Significant Impact from Previous EIR?
	Previous EIR	Proposed Project with LRSP Mitigation			
impact, which was previously identified in the LRSP EIR as significant. This Project's contribution to this impact would be cumulatively considerable.					
	–	Elk Grove Blvd/I-5 SB Ramps intersection: LCC	None required.	LS	No
	–	Elk Grove Blvd/Bruceville Rd intersection: LCC	None required.	LS	No
	–	Elk Grove Blvd (near SR 99/Elk Grove Blvd interchange CCSU	None available.	SU	Yes
	–	Elk Grove Blvd/Laguna Springs Dr intersection: LS/MM	**MM 4.9.5** Elk Grove Blvd/Laguna Springs Dr intersection. Provide right-turn overlap phasing for the northbound right-turn movement at the intersection or Elk Grove Boulevard and Laguna Springs Drive and prohibit westbound U-turn movements at the intersection.	LS	No
	–	Elk Grove	None required.	LS	No

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Impact	Level of Significance		Mitigation Measure	Proposed Project Resulting Level of Significance	New Significant Impact or More Severe Significant Impact from Previous EIR?
	Previous EIR	Proposed Project with LRSP Mitigation			
	–	Blvd/East Stockton Blvd intersection: LCC Civic Center/Big Horn Blvd intersection: CCSU	None available.	SU	Yes
4.9.6 Implementation of the proposed Project, in combination with other planned, approved, and reasonably foreseeable projects, would worsen existing unacceptable conditions along SR 99. The proposed Project would contribute to a new significant and unavoidable impact, which was previously identified in the LRSP EIR as less than significant. This Project's contribution to this impact would be cumulatively considerable.	LS	LCCSU	None available.	CCSU	Yes

N – No impact LS – Less Than Significant LS/MM - Less Than Significant with Mitigation SU – Significant and Unavoidable SU/MM – Significant and Unavoidable even with Mitigation

LCC – Less Than Cumulatively Considerable LCC/MM – Less Than Cumulatively Considerable With MitigationCCSU – Cumulatively Considerable and Unavoidable CCSU/MM – Cumulatively Considerable and Unavoidable Even With Mitigation – not analyzed in previous EIR, not applicable

1.0 INTRODUCTION

1.1 PURPOSE AND BACKGROUND

The City of Elk Grove (City; Elk Grove) is processing the Civic Center Aquatics Complex Project (proposed Project; Project) which involves approval of a Capital Improvement Project, uniform sign program, boundary line adjustment, grading permits, improvement plans, and final map. These entitlements would allow for the development and operation of a competition/training swim facility (competition venue) and recreation facility (water and adventure parks including an indoor family entertainment center) as well as various ancillary uses, parkland, and parking areas. See Section 2.0, Project Description, for a complete description of the proposed Project.

This EIR has been prepared in conformance with the California Environmental Quality Act (CEQA) of 1970 (as amended). CEQA requires the preparation of an environmental impact report prior to approving any project that may have a significant effect on the environment. For the purposes of CEQA, the term "project" refers to the whole of an action which has the potential for resulting in a direct physical change or a reasonably foreseeable indirect physical change in the environment (CEQA Guidelines Section 15378[a]). With respect to the proposed Project, the City of Elk Grove has determined that the proposed facility is a project within the definition of CEQA.

The City, acting as the lead agency, has prepared this EIR to provide the public and responsible and trustee agencies with information about the potential environmental effects of the proposed Project. As described in CEQA Guidelines Section 15121(a), an EIR is a public informational document that assesses potential environmental effects of the proposed Project, as well as identifies mitigation measures and alternatives to the proposed Project that could reduce or avoid its adverse environmental impacts. Public agencies are charged with the duty to consider and minimize environmental impacts of proposed development, where feasible, and are obligated to balance a variety of public objectives, including economic, environmental, and social factors.

1.2 TYPE OF DOCUMENT

The CEQA Guidelines identify several types of EIRs, each applicable to different project circumstances. As described in CEQA Guidelines Section 15162(a), "when an EIR has been certified . . . no subsequent EIR shall be prepared for that project unless the lead agency determines, on the basis of substantial evidence in the light of the whole record, that substantial changes are proposed in the project which will require major revisions of the previous EIR or negative declaration due to the involvement of new significant environmental effects or a substantial increase in the severity of previously identified significant effects." This EIR has been prepared as a Subsequent EIR to the Laguna Ridge Specific Plan (LRSP) EIR, pursuant to CEQA Guidelines Section 15162. The City determined that because the proposed Project requests changes to land uses previously analyzed for environmental effects in the LRSP EIR, a Subsequent EIR was necessary for the proposed Project.

1.3 INTENDED USES OF THE EIR

This EIR has been prepared in accordance with CEQA. The City will use this Draft Subsequent EIR (Draft SEIR) as a tool in evaluating the environmental impacts of the proposed Project. As the lead agency under the provisions of CEQA, the City of Elk Grove has discretionary approval authority and the responsibility to consider the environmental effects of the Project. This EIR is intended to evaluate the environmental impacts of the Project to the greatest extent possible. This EIR, in accordance with CEQA Guidelines Section 15126, should be used as the primary environmental document to evaluate all subsequent planning and permitting actions associated with the Project.

1.4 RELATIONSHIP TO THE ELK GROVE GENERAL PLAN AND LAGUNA RIDGE SPECIFIC PLAN

The City adopted the City of Elk Grove General Plan in November 2003. The General Plan is the City's overall guide for the use of the City's resources, expresses the development goals of the community, and is the foundation upon which all land use decisions are made. The General Plan EIR (SCH No. 2002062082) analyzed the environmental impacts associated with buildout of the City under the land uses and densities allowed by the General Plan. Where feasible, the City has adopted mitigation measures to reduce impacts to an acceptable level of significance. In addition, the City addressed significant and unavoidable impacts identified in the General Plan EIR, and a Statement of Overriding Considerations was adopted with the approval of the General Plan EIR.

The Project site is located within the Laguna Ridge Specific Plan area, and its development was addressed in the LRSP EIR (SCH No. 2000082139). The LRSP EIR assessed the environmental impacts resulting from the construction and operation of the Laguna Ridge Specific Plan. The City approved the Laguna Ridge Specific Plan and certified the Final EIR on June 16, 2004. The Laguna Ridge Specific Plan encompasses approximately 1,900 acres and consists of the development of residential, commercial, park, public school, and mixed-use land uses. The LRSP EIR identified significant and unavoidable impacts related to agricultural resources, transportation and circulation, air quality, noise, and visual resources, and the City approved a Statement of Overriding Considerations for these significant and unavoidable impacts. The LRSP EIR also identified impacts to hazards and hazardous materials, public services and utilities, hydrology and water quality, biological resources, geology and geotechnical hazards, and cultural resources. These impacts were reduced to a less than significant level with implementation of the LRSP EIR mitigation measures. A Mitigation Monitoring and Reporting Program (MMRP) was prepared and adopted with the Specific Plan. The MMRP is a binding document that runs with the land and would be applicable to the proposed Project. The Laguna Ridge Specific Plan MMRP is included as **Appendix A**.

Existing zoning and the Specific Plan designation provide for Community Park (CP) use on the 30-acre portion of the Project site located south of Civic Center Drive. The LRSP identified the approximately 27.3-acre parcel north of Civic Center Drive as the site for Civic Center land uses. See Section 3.0, Land Use and Planning, for further discussion of the site's existing land use designations and zoning.

1.5 EIR SCOPE AND ORGANIZATION

Sections 15122 through 15132 of the CEQA Guidelines identify the content requirements for Draft and Final EIRs. An EIR must include a description of the environmental setting, an environmental impact analysis, mitigation measures, alternatives, significant unavoidable environmental changes, growth-inducing impacts, and cumulative impacts. The environmental issues addressed in this program EIR were established through review of environmental documentation for nearby projects and responses to the Notice of Preparation (NOP).

Cumulative environmental effects of the proposed Project are generally based on information provided in the General Plan, General Plan EIR, LRSP, LRSP EIR, and environmental documentation for other relevant projects in the City, with identification of the Project's contribution to the cumulative conditions and updated information on the cumulative setting based on currently approved, proposed, and reasonably foreseeable development projects in Elk Grove and the region.

The City determined the scope for this EIR based on the Notice of Preparation, comments in response to the NOP, agency consultation, and review of the Project application. The NOP determined that the following issue areas would result in no impact and are therefore scoped out of this EIR:

- Seiche, Tsunami, and Mudflow – Based on the Project's location (inland, away from any water bodies) and topography (relatively flat), there would be no impacts related to seiche, tsunami, or mudflow. This impact will not be discussed in the EIR.

- Mineral Resources – The Project site is not used for mineral extraction, nor is it designated as an important mineral recovery site. Therefore, there would not be a significant impact on mineral resources, and this issue will not be discussed in the EIR.

- Airports, Airstrips, and Air Traffic Patterns – The airport nearest to the Project site is Sacramento Executive Airport, approximately 10 miles to the north. Because the Project site is not located in the vicinity of any airports, there would be no impacts associated with conflicts with airports or changes in air traffic patterns. This issue will not be discussed in the EIR.

- Use of Septic Systems – The Sacramento Area Sewer District is the agency responsible for providing sewer service in Elk Grove. A wastewater master plan is being developed for the Project. Because septic tanks or alternative wastewater disposal systems are not proposed, there would be no impact related to septic tanks or alternative wastewater disposal systems. Impacts related to septic tanks or alternative wastewater disposal systems will not be discussed in the EIR.

This Draft EIR is organized in the following manner:

SECTION ES – EXECUTIVE SUMMARY

This section summarizes the characteristics of the proposed Project and provides a concise summary matrix of the Project's environmental impacts and associated mitigation measures.

SECTION 1.0 – INTRODUCTION

Section 1.0 provides an introduction and overview describing the intended use of the EIR and the review and certification process.

SECTION 2.0 – PROJECT DESCRIPTION

This section provides a detailed description of the proposed Project, including intended objectives, background information, and physical and technical characteristics.

SECTION 3.0 – LAND USE AND PLANNING

Section 3.0 addresses the land use and planning implications of the Project and discusses potential inconsistencies with land use plans.

SECTION 4.0 – ENVIRONMENTAL SETTING, IMPACTS, AND MITIGATION MEASURES

Section 4.0 contains an analysis of environmental topic areas as identified below. Each subsection contains a description of the existing setting of the Project area, identifies standards of significance, identifies Project-related impacts, and recommends mitigation measures.

The following major environmental topics are addressed in this section:

- Aesthetics, Light, and Glare
- Air Quality
- Biological Resources
- Cultural and Paleontological Resources
- Greenhouse Gas Emissions and Climate Change
- Hazards and Hazardous Materials
- Noise
- Public Utilities
- Transportation

SECTION 5.0 – OTHER CEQA CONSIDERATIONS

This section contains discussions and analysis of various topical issues mandated by CEQA. These include significant environmental effects that cannot be avoided if the Project is implemented and growth-inducing impacts. The section also discusses the cumulative impacts associated with the Project. As required by CEQA Section 15130, an EIR shall discuss cumulative impacts of a project when the project's incremental effect is cumulatively considerable.

SECTION 6.0 –PROJECT ALTERNATIVES

CEQA Guidelines Section 15126.6 requires that an EIR describe a range of reasonable alternatives to the Project which could feasibly attain the basic objectives of the Project and avoid and/or lessen its environmental effects. This alternatives analysis provides a comparative analysis between the Project and the selected alternatives, which include:

- ***No Project Alternative:*** CEQA Guidelines Section 15126.6(e) requires that a "no project" alternative be evaluated in an EIR. Under this alternative, the Project would not be approved and current land use designations on the Project site would remain unchanged.

- ***Modified Project Design Alternative:*** The Modified Project Design Alternative would relocate the two easternmost water slides and zip line recreational features in the central portion of the Project Site.

- ***Reduced Project Alternative:*** The Reduced Project Alternative would include a water and adventure park, but at a reduced scale and situated in the central portion of the Project site. It would also include the aquatics center identical to the proposed Project in terms of its features and location, related amenities, and a slightly smaller on-site parking lot sized to serve the expected number of visitors and spectators.

- ***Competition Venue Only Alternative:*** The Competition Venue Only Alternative would include construction and operation of the competition venue, but the water and adventure park would not be constructed.

SECTION 7.0 – REPORT PREPARATION

This section lists all authors and agencies that assisted in the preparation of the report by name, title, and company or agency affiliation.

1.6 ENVIRONMENTAL REVIEW PROCESS

NOTICE OF PREPARATION

In accordance with Section 15082 of the CEQA Guidelines, the City prepared a Notice of Preparation of an EIR for the Project on September 6, 2013. This notice was circulated to the public, local, state, and federal agencies, and other interested parties to solicit comments on the Project. The NOP and comments sent in response to the NOP are presented in **Appendix B** and **Appendix C**, respectively. The City held scoping meetings on September 19, 2013, and September 26, 2013.

DRAFT EIR PUBLIC NOTICE/PUBLIC REVIEW

This document constitutes the Draft Subsequent EIR (Draft SEIR). The Draft SEIR contains a description of the Project, description of the environmental setting, identification of Project impacts, and mitigation measures for impacts found to be potentially significant. Upon completion of the Draft SEIR, the City will file the Notice of Completion (NOC) with the State Office of Planning and Research to begin the public review period (Public Resources Code Section 21161).

Concurrent with the NOC, the City will provide public notice of the availability of the Draft SEIR for public review and invite comment from the general public, agencies, organizations, and other interested parties. The public review and comment period should be no less than 30 days and no longer than 90 days. The review period in this case will be 45 days, beginning June 19, 2014 and ending August 4, 2014. Public comment on the Draft SEIR will be accepted both in written form and orally at public hearings. Although no public hearings to accept comments on the EIR are required by CEQA, the City expects to hold a public comment meeting during the 45-day review period prior to EIR certification. Notice of the time and location of the hearing will be published prior to the hearing. All comments or questions regarding the Draft SEIR should be addressed to:

City of Elk Grove
Planning Department
c/o Christopher Jordan, AICP
8401 Laguna Palms Way
Elk Grove, CA 95758

RESPONSE TO COMMENTS/FINAL EIR

Following the public review period, a Final EIR will be prepared. The Final EIR will respond to written comments received during the public review period and to oral comments made at public hearings regarding the Project.

CERTIFICATION OF THE EIR/PROJECT CONSIDERATION

The Elk Grove City Council will review and consider the Final EIR. If the Planning Commission finds that the Final EIR is "adequate and complete," the City Council will certify the EIR. A decision to approve the Project would be accompanied by written findings in accordance with CEQA Guidelines Section 15091 and, if applicable, a Statement of Overriding Considerations in accordance with Section 15093. A Mitigation Monitoring and Reporting Program (MMRP), as described below, would also be adopted for mitigation measures that have been incorporated into or imposed upon the Project to reduce or avoid significant effects on the environment. This MMRP will be designed to ensure that these measures are carried out during Project implementation.

MITIGATION MONITORING AND REPORTING PROGRAM

CEQA Section 21081.6(a)(1) requires lead agencies to adopt an MMRP to describe measures which have been adopted or made a condition of project approval in order to mitigate or avoid significant effects on the environment. The specific "reporting or monitoring" program required by CEQA is not required to be included in the EIR; however, it will be presented to the City Council for adoption. Throughout the EIR, mitigation measures are clearly identified and presented in language that will facilitate establishment of an MMRP. Any mitigation measures adopted by the City as conditions for approval of the Project will be included in the MMRP to verify compliance.

1.7 COMMENTS RECEIVED IN RESPONSE TO THE NOTICE OF PREPARATION

The City received comment letters on the Notice of Preparation for the proposed Project (see **Table 1.0-1**). A copy of each letter is provided in **Appendix C** of this Draft SEIR. The City received letters from the following agencies and interested parties.

TABLE 1.0-1
LIST OF NOP COMMENT LETTERS

Agency	Date	Comment
Governor's Office of Planning and Research, State Clearinghouse and Planning Unit	September 6, 2013	This is the Clearinghouse's standard letter notifying agencies of the release of the NOP and the opportunity to provide comments in response to the NOP.
California Department of Transportation (Caltrans)	October 7, 2013	• Recommends a Traffic Impact Study (TIS) to assess the impact of the Project on the State Highway System and adjacent roadway network. • Recommends that a trip distribution analysis be prepared. • Requests that Caltrans have the opportunity to review the scope of the TIS if it is determined that the Project would require one.
Central Valley Regional Water Quality Control Board (CVRWQCB)	September 20, 2013	Provides information on the types of permits that the Project will need to protect water quality.
Sacramento Municipal Utility District (SMUD)	October 7, 2013	• Requests that the EIR acknowledge Project impacts related to overhead and/or underground transmission line easements, electrical load needs/requirements, energy efficiency, utility line

Agency	Date	Comment
		routing, and climate change. • Suggests that the EIR consider providing information associated with the embedded energy in the regional water supply. • States that the Project will have an impact on SMUD's electrical system, and the estimated electrical demand would be approximately 2.4 megawatts. • States that the Project will result in the need for new distribution facilities and will require a minimum standard 12.5-foot overhead/ underground public utility easement along all streets throughout the development. • Notes the location of existing SMUD facilities in the area.

A traffic study was prepared for the proposed Project, as discussed in Section 4.9. The Project would not require any water quality permits but would require Section 401 certification. Water quality impacts are addressed in Section 4.7, Hydrology, of the LRSP EIR. Energy demand for the Project and related effects are discussed in Section 4.8, Utilities, and 5.0, Other CEQA Considerations of this Draft SEIR. Energy efficiency and climate change are also addressed in Section 4.5, Greenhouse Gases and Climate Change.

1.8 IMPACT TERMINOLOGY

This Draft SEIR uses the following terminology to describe environmental effects of the proposed Project:

- ***Standards of Significance:*** The criteria used by the lead agency to determine at what level or "threshold" an impact would be considered significant. Significance criteria used in this Draft SEIR include the CEQA Guidelines, factual or scientific information, regulatory performance standards of local, state, and federal agencies, and City goals, objectives, and policies.

- ***Less Than Significant Impact:*** A less than significant impact would cause no substantial change in the environment. No mitigation is required.

- ***Significant Impact:*** A significant impact would cause, or would potentially cause, a substantial adverse change in the physical conditions of the environment. Significant impacts are identified by the evaluation of Project effects using specified standards of significance. Mitigation measures are identified to reduce Project effects on the environment.

- ***Significant and Unavoidable Impact:*** A significant and unavoidable impact would result in a substantial change in the environment that cannot be avoided or mitigated to a less than significant level if the Project is implemented.

- ***Cumulatively Considerable Impact***: An impact would be considered cumulatively considerable when, in the context of reasonably foreseeable development in the surrounding area, the Project would result in a new substantial change in the environment.

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2.0 Project Description

This section provides a detailed description of the proposed Civic Center Aquatics Complex Project (Project), which consists of a competition venue and a water and adventure park with an indoor family entertainment center, described below. This section includes a depiction of the location of the Project both regionally and locally and a description of the Project site's existing conditions. The objectives sought by the Project applicant and a detailed list of the approvals required to implement the Project are also included. As the City of Elk Grove would make a number of decisions on the Project, all decisions subject to the California Environmental Quality Act (CEQA) are listed and the implementation process is described in the order that it would occur, including both actions the City would take now and actions that may be taken in the future.

For a description of the background, purpose, intended use, and type of EIR, please refer to Section 1.0, Introduction, of this document. This project description has been prepared in compliance with CEQA Guidelines Section 15124.

2.1 PROJECT LOCATION AND SETTING

The Project site is located east of the intersection of Civic Center Drive and Big Horn Boulevard within the Laguna Ridge Specific Plan area (**Figure 2-1**). The Project site consists of the 30-acre proposed Aquatics Complex and the 27.3-acre overflow parking site and has historically been used for agricultural purposes and is primarily undeveloped. At the time of NOP publication, the Project site contained three vacant residences, as well as ornamental landscaping, and outbuildings. A wetland preserve that contains marsh habitat, in the southern portion of the site, is currently restricted under a US Army Corps of Engineer (USACE) permit limiting the use of the property for wetlands only.

The General Plan designation for the Civic Center Aquatics Complex is Public Parks (PP), except for the open space portion, which is designated Public Open Space/Recreation (Pub Os/Rec). The Specific Plan designates the site Community Park (CP). The overflow parking area is designated Public/Quasi-Public (P/QP) in the General Plan and zoned Shopping Commercial (SC), which allows a full range of uses. The Laguna Ridge Specific Plan identifies the site as the future Civic Center.

SURROUNDING LAND USES

The Project site is located within the Laguna Ridge Specific Plan area. Immediately west of the Project site is Big Horn Boulevard, a four-lane separated roadway, with a single-family residential subdivision (The Grove) located farther to the west. Immediately south of the Project site is Lotz Parkway, a four-lane separated roadway, with Elizabeth Pinkerton Middle School/Cosumnes Oaks High School farther to the south. East of the Project site is an approved single-family residential subdivision (Allen Ranch) that has been graded, and construction and sales have begun. There is also a Sacramento County Water Agency facility located adjacent to the Project site, to the northeast. Immediately north of the Project site is vacant and is designated for future development as a civic center with a local park as well as business park and residential development.

2.2 PREVIOUS PLANNING AND ENVIRONMENTAL DOCUMENTATION

LAGUNA RIDGE SPECIFIC PLAN

The Laguna Ridge Specific Plan Environmental Impact Report (LRSP EIR) (SCH No. 2000082139) assessed the environmental impacts resulting from the construction and operation of the Laguna Ridge Specific Plan. The City of Elk Grove approved the Laguna Ridge Specific Plan and certified the Final EIR on June 16, 2004. The Laguna Ridge Specific Plan encompasses approximately 1,900 acres and consists of the development of residential, commercial, park, public school, and mixed-use land uses. The LRSP EIR identified significant and unavoidable impacts related to agricultural resources, transportation and circulation, air quality, noise, and visual resources. A Statement of Overriding Considerations was adopted for these significant and unavoidable impacts. The LRSP EIR also identified impacts to hazards and hazardous materials, public services and utilities, hydrology and water quality, biological resources, geology and geotechnical hazards, and cultural resources. These impacts were reduced to a less than significant level with implementation of the recommended mitigation measures. A Mitigation Monitoring and Reporting Program (MMRP) was prepared and adopted with the Specific Plan. The MMRP is a binding document that runs with the land and would be applicable to the proposed Project.

All documents associated with the LRSP are available for review at the following location: City of Elk Grove, Development Services – Planning, 8401 Laguna Palms Way, Elk Grove, CA 95758.

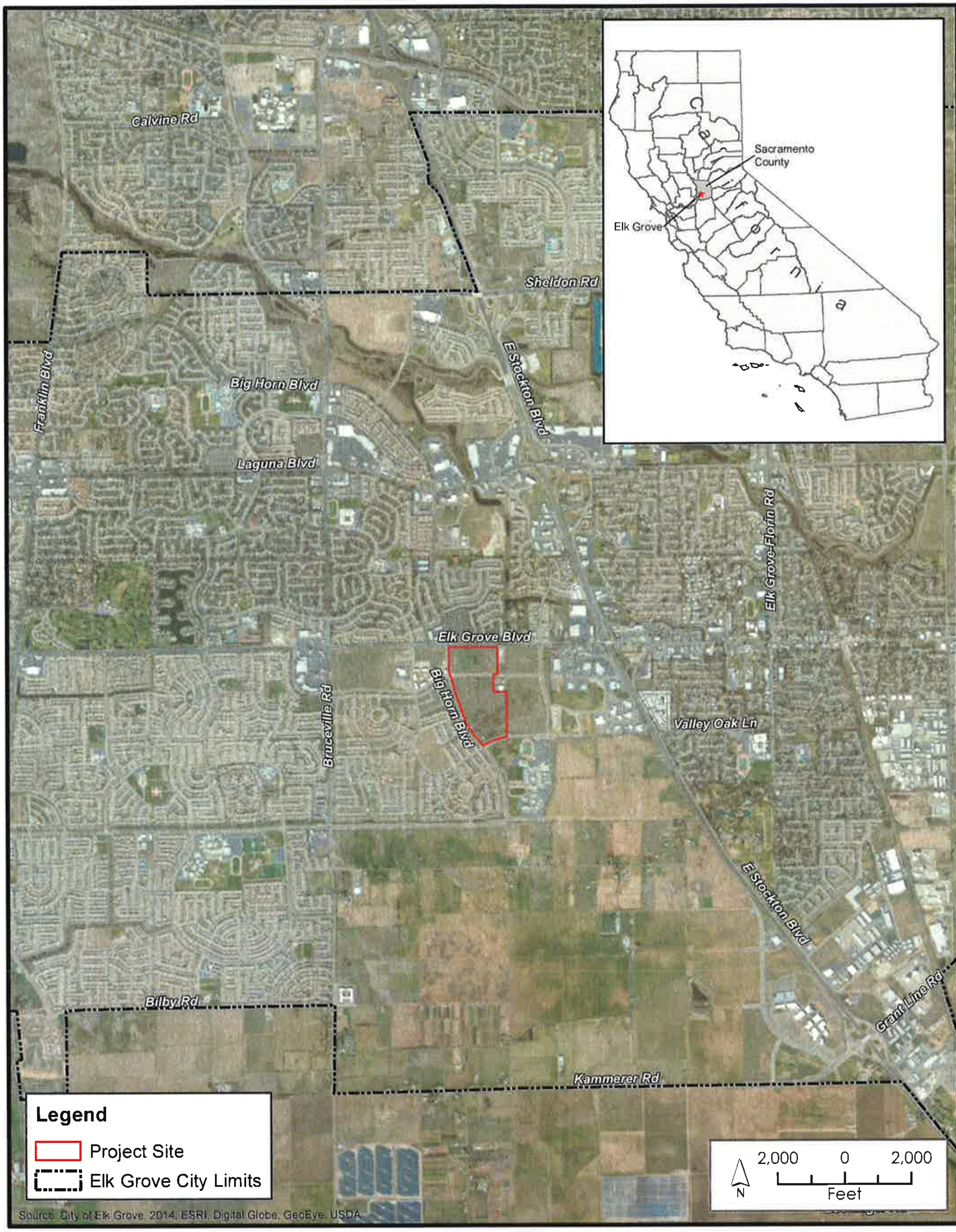
2.3 PROJECT OBJECTIVES

The City has established the following objectives for the Project for purposes of CEQA:

1) Develop an aquatics complex in the Laguna Ridge Specific Plan area with competitive swimming and diving components, including an Olympic-size competition swimming pool, a warm-up pool, and a diving tower, that can host up to 2,000 swimmers for each meet and seating for approximately 1,100 spectators under a shaded structure.
2) Develop a facility that can support multiple aquatic team programs for schools and a variety of regional club teams for practices and meets and for regional, state, and national events.
3) Provide necessary amenities to support athletes and spectators, such as concessions, hot tub, locker rooms, meeting room, office space, and storage.
4) Develop a commercial recreation facility to entertain 250,000 guests annually with outdoor activities such as a water park, adventure theme park, and fun center with a family focus, targeted at both youth and adult guests.
5) Provide dining/concessions component including meals, snacks, and beverages.
6) Provide landscaping, parking, lighting, and security, as required by City code.

2.4 PROJECT CHARACTERISTICS

The proposed Civic Center Aquatics Complex Project (proposed Project; Project) consists of 30 acres and includes the construction and operation of a competition/training swim facility (competition venue) and a water and adventure park, as well as ancillary uses, parkland, and parking. Each of these Project components is described in greater detail below. An overview of the Project is provided in **Figure 2-2**, while the proposed site plan for the Civic Center Aquatics Complex is provided as **Figure 2-3**.

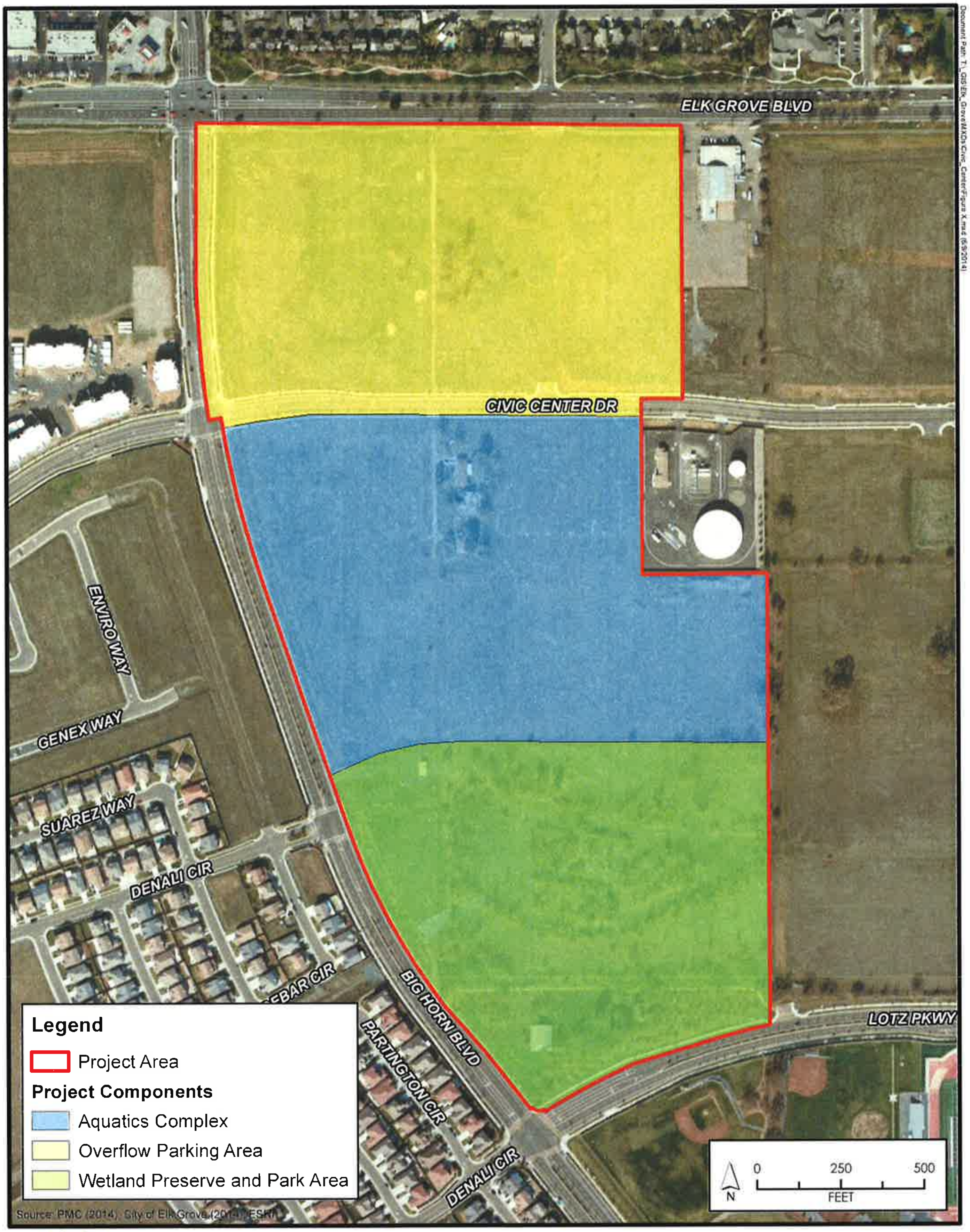


CITY OF ELK GROVE

City of Elk Grove
Development Services

Figure 2-1

Regional Vicinity



City of Elk Grove
Development Services

Figure 2-2

Overview of Project Components

City of Elk Grove
Development Services

FIGURE 2-3
Proposed Site Plan

COMPETITION VENUE

The competition venue would consist of a competition swimming pool (50 meters by 25 yards, 2-meter depth) and a dive pool (25 meters by 25 yards, 17-foot depth) with a signature 10-meter diving tower (33 feet in height), a 3-meter springboard, and a 1-meter springboard. Additional facility components would include:

- Bleacher seating for approximately 1,100 people under a shade canopy
- Therapy spa seating for 12 to 20 athletes
- Team prep area
- Restrooms/showers
- Team equipment storage space
- Spectator restrooms
- Concessions and additional restrooms
- Scoreboard and flag display

The competition venue is anticipated to be home to multiple collegiate, high school, and regional club teams for practices and meets as well as recreational use. The Project also includes the potential for expansion into the team prep area.

WATER AND ADVENTURE PARK

The proposed water park component of the Project would include, but would not be limited to, a lazy/adventure river, wave pool, slide attractions, a possible future children's aquatic play system, a family activity pool, and various water feature elements.

The proposed adventure park component of the Project would be woven throughout the water park and would include, but would not be limited to, adult and child ropes courses, zip lines, a family adventure sky trail, and various challenge and team building elements and activities (**Figure 2-4**). In addition, the adventure park would include a two-story, approximately 40,000-square-foot family entertainment center to include an arcade, laser tag, bowling alley, main kitchen/commissary, food and beverage service, group entertainment stage, rental lockers, and party rooms. **Table 2-1** provides heights of key amenities.

TABLE 2-1
WATER AND ADVENTURE PARK STRUCTURE HEIGHTS

Structure	Height (in feet)
SK-1 Slide Complex	73
SK-2 Slide Complex	53
SK-4 Slide Complex	70
Zip Line Tower 1	79
Zip Line Tower 2	79
Zip Line Tower 3	79
Ropes Course Pod 1	58
Ropes Course Pod 2	58

The proposed water and adventure park would also include support buildings including restrooms and food and beverage service areas as well as shade amenities/cabanas/pavilions and event staging areas.

ANCILLARY COMPONENTS

In addition to the above, the Project is anticipated to include the following ancillary components:

- Administration office
- Staff break room
- Lifeguard station
- First aid station
- Storage rooms
- Mechanical rooms (described further below)
- Service road and loading/delivery area
- Drop-off/arrival plaza
- Pathways and trails
- Kiosks
- Wetland/nature area overlook
- Hardscape/landscape elements
- Screening and fencing
- Trash enclosures
- Parking

FACILITY CAPACITY AND HOURS OF OPERATION

Competition Venue

The competition venue would operate year-round Monday through Saturday with anticipated hours of 7:00 a.m. to 9:00 p.m., as well as on Sundays during the months of May through July from 7:00 a.m. to 7:00 p.m. The competition venue would have a capacity of up to 3,100 competitors and spectators over the course of an entire day for a large special event, such as a regional swim meet. Typical operation would be substantially less, with practices that would have fewer than 100 people and smaller competitions with 300 to 1,000 competitors and spectators, based on the Civic Center Aquatics Complex Schematic Design dated May 30, 2014.

Water and Adventure Parks

The water park would operate approximately 120 days per year (May through October), and the adventure park would be open on a year-round basis. Both parks would operate from 10:00 a.m. to 10:00 p.m. with occasional overnight functions (corporate events, high school lock-ins). The City anticipates that the facility would attract up to 250,000 guests annually. On a peak summer weekend day, maximum daily capacity, including both the water and adventure parks, is expected to be 4,000 over the 12-hour operating day. Non-warm weather weekend days and weekdays would be less.

(A) WATERPARK / ADVENTUE PARK SCHEMATIC CROSS SECTION
FROM EAST BOUNDARY LOOKING WEST

(B) WATERPARK / ADVENTUE PARK SCHEMATIC CROSS SECTION
FROM SOUTH BOUNDARY LOOKING NORTH

EMPLOYMENT

The proposed Project would employ a maximum of approximately 500 people during the peak summer season. The majority of these employees would be seasonal with a reduced number of year-round employees.

OPTIONAL DEVELOPMENT OF WETLAND PRESERVE

Development of the wetland preserve on the parcel south of Civic Center Drive between Big Horn Boulevard and Laguna Springs Drive (APN 132-1990-009) is currently restricted by a USACE permit, limiting the use of the property for wetlands only. The permit allows for the creation of a path for public viewing of the wetlands around the wetland's perimeter. Pursuant to the USACE permit, the Project could include a trail with a split-rail fence at the perimeter of the active open space area along the length of the trail and placement of interpretive signs educating the public about wetland functions. The City began preliminary design for approximately 900 feet of a 10-foot-wide asphalt concrete trail within an active open space area that is part of a pond/marsh preserve area. However, the public path is on hold pending discussions with USACE regarding the viability of the pond/marsh area since surrounding hydrology has been altered. If the USACE restrictions are removed and this area becomes available in the future for parkland usage, the wetlands area could be developed as a park as part of the Project. Because the status of the permit has not been determined, the details of the park have not been established at this time.

CIRCULATION AND PARKING

Circulation

The primary entrance to the facility would be from Big Horn Boulevard/ Denali Circle intersection, at the southern end of the Project site. This driveway would lead vehicles to a drop-off area near the arrival plaza and the main parking area and eventually to the facility exit also on Big Horn Boulevard north of the entrance.

A service/fire lane is also proposed from Civic Center Drive along the site's eastern perimeter, providing access for public safety vehicles and delivery and service trucks to the facility's loading area as well as a secondary access point for emergency vehicles. Immediately south of the proposed water and adventure park, this service road/fire lane would turn west. A pedestrian walkway would also be included south of the water/adventure park site to an overlook near the wetlands area.

The proposed Project would also include development of two bus stops: one on Big Horn Boulevard, between the proposed facility entrance and exit, and a second on Civic Center Drive near the site's mid-point.

Parking

Parking for the Project would be addressed in two ways: (1) on-site facilities (approximately 725 spaces) and (2) adjacent overflow lots (up to 1,500 spaces). The overflow lots would be developed at the City's Civic Center lot (Overflow A, 20.4 acres; 1,000 spaces) and an adjoining lot to the east (the Pappas site, or Overflow B, 6.9 acres; up to 500 spaces) (**Figure 2-2**). The intent of the parking plan would be to accommodate users first on-site, then at the Overflow A lot. When larger events are held at the competition venue simultaneously with the water/adventure park, the Overflow B site would be used to the extent necessary.

The overflow sites are intended to be temporary facilities until long-term parking design for the City's Civic Center project are identified, analyzed, and constructed. Therefore, these sites would likely be graded and covered with aggregate materials or may be paved with asphalt. Some landscaping, consistent with City zoning provisions, may be provided; however, due to the temporary nature of this surface parking, it may not be landscaped. Ultimately, off-site parking demand would be consolidated to the Overflow A lot (the Civic Center site) once that project is designed, through the use of parking structure(s).

Because the overflow sites would require users to cross public rights-of-way in order to access the Project, the Project includes the construction of enhanced pedestrian crossings, which may include the construction of raised crosswalks, enhanced striping, pedestrian warning lights, and other safety features as determined by the City at final design.

Deliveries and Refuse Pickup

Deliveries and refuse pickup for the project will vary, depending on time of year, day of week, and occupancy of the park. A project of this scale is anticipated to experience the following frequencies:

- Food and beverage deliveries: 3 to 4 times per week
- Retail deliveries: 2 to 3 times per week
- Refuse removal: 1 to 3 times per week (dependent on arrangement with refuse a disposal company, including size of dumpsters, inclusion of a compactor, recycling policies, etc.)

The location of deliveries and pick up of refuse are in the back of house. A service/fire lane loops around the eastern and southern edges of the Project site. The delivery trucks and garbage hauling trucks would access this service/fire lane from Civic Center Drive to the north. There would be a staging/delivery area designed for truck loading/unloading off of the service/fire lane, behind the service buildings housing equipment, storage, kitchen, and restrooms.

WATER CIRCULATION, FILTRATION, AND TREATMENT

The Project proposes three swimming pool mechanical rooms located at different points along the proposed service drive at the eastern boundary of the site. Pool Mechanical Building A would house the pool filtration system, recirculation pumps, heating system, and chemical systems for the competition pool, dive pool, and therapy spa. Pool Mechanical Building B would house the pool filtration system, recirculation pumps, and chemical systems for the activity pool slide SK-1 and related splash-down pools, adventure river pool, entrance water feature, and water walk equipment. Pool Mechanical Building C would house the pool filtration systems, recirculation pumps, and chemical systems for the wave pool, slides SK-2, SK-3, and SK-4 and related splash-down pools, and adventure river. In each mechanical building enclosure there would be a separate chemical room for disinfectant control and a separate chemical room for pH control, which would serve all bodies of water respective of the mechanical building location. Additional underground pumps may also be located near the proposed adventure river and waterslides.

Filtration and Recirculation Equipment

The proposed swimming pool filtration system would be a vertical-type tank and would be automated. The proposed pool filtration and recirculation pumps would be totally enclosed, drip-proof, fan cooled, close coupled, single stage, horizontal or vertical end suction, flooded suction, centrifugal, 60 hertz, and three-phase with low life-cycle costs and a high-efficiency motor. Proposed pumps and motors would be powered through a variable frequency drive coupled with the ability for soft-start and automatic high vacuum shut-off.

Disinfectant Control Equipment

The proposed disinfectant control equipment would include a skid-mounted, automated, powerbase commercial swimming pool chemical system for each body of water. These systems would utilize calcium hypochlorite tablets in lieu of a liquid system. In addition, the chemical system would incorporate an ultraviolet (UV) system to help reduce the use and cost of chemicals and add an extra method of disinfecting to the pool systems.

pH Control Equipment

The Project would control pH levels through the use of chemical pumps, utilizing a 10 percent solution of muriatic acid. It is anticipated that the Project would incorporate a 50-gallon dual containment tank active for each body of water and a 50-gallon dual containment tank staged in each mechanical room area, with deliveries made weekly depending on demand. The efficiency of chemical usage for each body of water would be closely monitored and managed by an automatic chemistry controller.

LANDSCAPING AND HARDSCAPING

A primary pedestrian walkway is proposed that would connect future uses north of the Project site to the proposed on-site facilities. A row of large deciduous shade trees and lighting with banners would line this walkway. The arrival plaza would feature colorful plantings and shade trees with benches for visitors. The primary driveway would feature flowering landscape plantings and wayfinding signage. The proposed parking area would feature tree plantings that would provide 50 percent shade within 10 years.

North of the competition venue, a tree grove would be provided to create a park-like shaded setting along Civic Center Drive. Pavement around the pools would feature different colors and finishes to accentuate specific areas for visitors, staff, and swimmers. South of the pools would be a shaded outdoor eating area with large canopy trees to provide shade.

A landscaped strip is proposed along the site's eastern perimeter adjacent to the proposed service drive/fire lane. Together, the landscaped strip and service drive/fire lane would provide an approximately 50-foot buffer providing screening for the adjacent approved homesites. Within this buffer area, large evergreen conifer trees that reach 80 feet in height and have a 40-foot spread would be planted in addition to tall screen shrubs. The proposed utility yard would also be visually screened on three sides.

The proposed plant palette would include many water-wise California native plants and drought-tolerant Mediterranean species that provide color and interest. Water conservation efforts include the installation of low-flow drip irrigation systems with smart controllers that adjust to the day's evapotranspiration.

LIGHTING

Project lighting would include lighting of the competition venue and water and adventure park entryways, lighted signage, lighting of the recreational features (slides, zip lines, etc.), including building obstruction lights, safety and wayfinding lighting throughout the Project site, and lighting of the parking lot. Details of the proposed lighting for each of the Project components are discussed below.

Water and Adventure Park Lighting

Within the water and adventure park, all overhead lighting would be designed with cut-off lenses to avoid light spill and glare on adjacent properties. Lighting of the recreational features would consist of light-emitting diode (LED) step and railing lights.

Competition Venue Lighting

The competition venue would utilize wall-mounted and pole lighting for evening events. The primary lighting would be pole lighting consisting of high-intensity discharge lamps (HID lamps) on 20-foot poles. Multiple luminaires per pole would be used to achieve 10 foot-candles of light at the water surface and deck. Wall-mounted lighting would be used to supplement the pole lighting and would include LED wall pack luminaires or TV-type fixture sports lights mounted on the structures.

Parking Lot Lighting

Parking lot lighting would consist of 20- to 25-foot light poles with LED luminaires. The light poles would utilize cut-off fixtures to avoid light spill and glare on adjacent properties and would be arranged in planter areas to avoid encroachment of the shade trees and parking spaces. The off-site parking areas would include temporary fixtures with cut-off lenses.

INFRASTRUCTURE

Water

Water service would be provided to the proposed Project by the Sacramento County Water Agency (SCWA). Proposed onsite water distribution infrastructure would consist of a loop system within the proposed service/fire lane and primary pedestrian walkway which would connect to existing public water lines at the site's northern boundary (within Civic Center Drive) and the site's southwestern corner (within Big Horn Boulevard). Water meters would be located within the loading/delivery area on the site's eastern boundary and would be accessed via the proposed service/fire lane. Fire hydrants would be included as required.

Wastewater

Wastewater collection and conveyance services would be provided to the proposed Project by the Sacramento Area Sewer District while wastewater treatment services would be provided by the Sacramento Regional County Sanitation District. Proposed onsite wastewater conveyance infrastructure would be located within the proposed service/fire lane and would connect to existing public sewer lines at the site's northern boundary (within Civic Center Drive).

Solid Waste and Recycling

Solid waste collection service would be provided to the proposed Project by the City of Elk Grove via a permitted hauler as selected by the operator of the proposed facilities. A trash enclosure would be provided in the proposed loading/delivery area and would be accessed for collection via the proposed service/fire lane.

Utilities and Telecommunications

Electric service would be provided to the proposed Project by the Sacramento Municipal Utility District (SMUD) while natural gas service would be provided by Pacific Gas and Electric Company (PG&E). Telephone service would be provided by one of the service providers that serves that City, including Frontier, SureWest, Comcast, or AT&T.

CONSTRUCTION/PHASING

It is anticipated that Project construction would begin in spring of 2015 and last approximately 14 months. The site would be graded and on-site utilities installed, followed by concurrent construction of the competition venue and water and adventure park facilities.

2.5 REGULATORY REQUIREMENTS, PERMITS, AND APPROVALS

CITY OF ELK GROVE

- Certification of an Environmental Impact Report and adoption of a Mitigation Monitoring and Reporting Program
- Approval of a CIP (Capital Improvement Project) Design Review
- Approval of an Amendment to the Laguna Ridge Specific Plan
- Approval of a Uniform Sign Program
- Approval of a Boundary Line Adjustment
- Approval of Building and Grading Permits, and Improvement Plans

RESPONSIBLE AGENCIES

- Central Valley Regional Water Quality Control Board
- Sacramento Metropolitan Air Quality Management District

References

City of Elk Grove. 2003. *Laguna Ridge Specific Plan*.

———. 2003. *Laguna Ridge Specific Plan Draft Environmental Impact Report*.

Google. 2014. Google Maps. Accessed May 2014. https://www.google.com/maps.

3.0 Land Use and Planning

This section describes the existing and proposed land uses on the Project site and surrounding parcels, as well as land use designations according to the City of Elk Grove General Plan and zoning according to the Laguna Ridge Specific Plan (LRSP). Section 15125(d) of the California Environmental Quality Act (CEQA) Guidelines states, "The EIR shall discuss any inconsistencies between the proposed project and applicable general plans and regional plans." As such, this section discusses the Project's compatibility with existing and planned land uses in the Project vicinity and consistency with applicable plans and policies.

CEQA does not treat project consequences relating solely to land use as a direct physical impact to the environment. An EIR may provide information regarding land use and planning, but CEQA does not recognize these types of project consequences as impacts on the physical environment. The following assessment focuses on land use compatibility and plan consistency, to the extent that potential conflicts may lead to physical impacts on the environment. Physical effects on the environment that could result from implementation of the Project are addressed in the appropriate technical sections of this Draft SEIR (see Sections 4.1 through 4.9).

3.1 EXISTING SETTING

EXISTING LAND USES ON THE PROJECT SITE

The Project site is approximately 57.3 acres. The 30-acre portion located south of Civic Center Drive is primarily undeveloped, with three vacant houses, ornamental landscaping, and outbuildings present on the northern half of the parcel. The southern half of the parcel is undeveloped. Proposed overflow parking would be provided on the three parcels located north of Civic Center Drive that total 27.3 acres. Therefore, without the overflow parking counted, the Aquatics Complex would be 30 acres. These parcels contain a single outbuilding, with no other developed uses. Although the Project site is not currently developed, infrastructure to support development has been constructed adjacent to the site, including Civic Center Drive, Elk Grove Boulevard to the north, Big Horn Boulevard to the west, and Lotz Parkway to the south. These roadways include curb, gutter, sidewalks, street lighting, and ornamental landscaping along the perimeter of the Project site.

SURROUNDING LAND USES

The Project site is located in an urbanizing area; the majority of the area has been developed or is in the process of being developed consistent with the Laguna Ridge Specific Plan or other approved development plans.

Elizabeth Pinkerton Middle School/Cosumnes Oaks High School is adjacent to the Project site to the south. An existing one- and two-story single-family residential development (The Grove subdivision) and a residential development consisting of three-story town houses are located to the west. An existing water treatment facility is located to the east of the proposed competition venue. The approved Allen Ranch residential development is also located immediately east of the Project site. An events center (The Falls of Elk Grove) has almost completed construction at 8280 Elk Grove Boulevard, east of the overflow parking area.

Existing and approved land uses in the vicinity of the Project site include single-family residential developments north of Elk Grove Boulevard and west of Bruceville Road; a medical campus, including a six-story hospital and five-story parking deck, under construction to the northeast; and the Elk Grove Automall to the east. The area to the south of Elizabeth Pinkerton Middle School/Cosumnes Oaks High School is currently undeveloped. However, the City is processing an application for master planning for the area, known as the Southeast Policy Area. Anticipated land uses include residential, office, commercial, light industrial, mixed use, schools, open space/recreation, and a sports complex. **Figure 2-1** (see Section 2.0, Project Description) shows the Project site in the context of the surrounding land uses.

CURRENT LAND USE DESIGNATIONS AND ZONING

City of Elk Grove General Plan

The Project site is located within the Laguna Ridge Specific Plan area, which is designated as a Policy Area by the City's General Plan. The General Plan designates the LRSP area with specific land use categories and requires that the Specific Plan be used to implement General Plan policies for the area. The General Plan designates the majority of the Project site as Public Parks (PP), a designation that includes public parks owned by the Cosumnes Community Services District or other public agencies. The portion of the Project site that contains wetlands is designated Public Open Space/Recreation (PubOS/Rec), which includes lands owned by public entities that have been reserved for open space uses such as habitat mitigation, lakes, trails, golf courses, and similar uses. **Table 3.0-1** identifies the General Plan land use designations for the Project site and adjacent areas.

Laguna Ridge Specific Plan

The LRSP involves the development of residential, commercial, park, public school, and mixed-use land uses within an approximately 1,900-acre site. When the City of Elk Grove approved the LRSP on June 16, 2004, the land use plan and land use categories identified within the LRSP established zoning for all of the properties within the LRSP area, including the proposed Project site. **Table 3.0-1** identifies the zoning for the Project site and adjacent areas.

TABLE 3.0-1
LAND USE DESIGNATIONS AND ZONING

	General Plan Land Use Designation	LRSP Zoning
Project Site	Public Parks (PP) Public Open Space/Recreation (PubOS/Rec) Public/Quasi-Public (P/QP) Medium Density Residential (MDR) Commercial/Office/Multi-Family (C/O/MF)	Community Park (CP) Open Space (OS) Shopping Commercial (SC) Multi-Family Residential (RD-20) Office Park (BP)
Northwest	Medium Density Residential (MDR) Commercial (C)	Shopping Commercial (SC) Single-Family (RD-10) [auto-court, cluster]
West	Low Density Residential (LDR)	Single-Family (RD-7) [conventional/non-conventional] Single-Family (RD-5) [conventional]
South	Public Schools (PS)	Schools (HS/MS) [high/middle]
East	Low Density Residential (LDR) Commercial/Office/Multi-Family (C/O/MF)	Single-Family (RD-5) [conventional] Office Park (BP)
Northeast	Institutional (IN) Commercial (C)	Water Treatment Facility (WTF) Shopping Commercial (SC)
North	Medium Density Residential	Multi-Family Residential (RD-20)

The LRSP zones the majority of the Project site as Community Park (CP), with the small portion of the Project site that contains wetlands zoned OS (Open Space). The CP zoning allows active recreation uses including some or all of the following (LRSP p. 5.4.4):

- Group picnic areas to accommodate large and small groups, all shaded, some with shelters
- Large outdoor shelter for picnic use, group use, and programming
- A mix of youth and adult ball fields (softball, skinned ball fields, and soccer fields);
- Lighted tennis courts, full court basketball, and other sports facilities
- High quality play areas, separated for preschool and older children, with a variety of play experiences and adjacent sitting areas
- Water play, as appropriate
- Drinking fountains
- Clearly defined park entry with identified theme
- Storage and/or maintenance building
- Restrooms/concession buildings
- On-site parking, per City of Elk Grove requirements
- Security and sports facility lighting
- Public recreation/civic uses (indoor and outdoor)

The LRSP identifies that the purpose of the larger parks is to encourage multiple uses and allow for active recreation, including water play and indoor and outdoor public recreation.

The northern portion of the site proposed as overflow parking is zoned Shopping Commercial (SC), Multi-Family Residential (RD-20), and Office Park (BP).

3.2 REGULATORY FRAMEWORK

LOCAL

City of Elk Grove General Plan

The General Plan serves as the overall guiding policy document for the City and identifies specific policies regarding land use in order to provide guidance to the development and management of land in Elk Grove. The General Plan contains goals, policies, and objectives to which all projects must adhere; these goals are established in the following General Plan elements: Land Use, Public Facilities & Finance, Circulation, Conservation & Air Quality, Housing, and Parks, Trails & Open Space.

The General Plan Land Use Exhibit illustrates the boundary of the LRSP to identify that a separate document provides further guidance for the LRSP area. In addition, the goals and policies of the General Plan govern the LRSP area and the LRSP was prepared to implement General Plan policies. The land use map for the LRSP is consistent with the layout identified in the General Plan for the LRSP area.

It should be noted that while this section provides information on the applicable policies and the Project's consistency with those policies, the final authority for interpretation of these policy statements and determination of the Project's General Plan consistency rests with the Elk Grove City Council.

Laguna Ridge Specific Plan

The LRSP is a policy and regulatory document. As a policy document, the LRSP implements the broader goals and policies contained in the General Plan through the establishment of policies for the LRSP area. As a regulatory document, the Laguna Ridge Specific Plan identifies the land use designations or zoning for all land in the LRSP area and lists development standards applicable solely to the area, while incorporating certain existing standards of the Elk Grove Zoning Code by reference.

The City of Elk Grove approved the LRSP and certified the Final EIR concurrently on June 16, 2004. The Laguna Ridge Specific Plan Environmental Impact Report (LRSP EIR) (SCH No. 2000082139) assessed the environmental impacts resulting from the construction and operation of the LRSP. A Mitigation Monitoring and Reporting Program (MMRP) was prepared and adopted with the LRSP. The MMRP is a binding document that runs with the land and is applicable to all projects in the LRSP area, including the proposed Project.

3.3 LAND USE EVALUATION

METHODOLOGY

Land use impacts are considered significant if the proposed Project would conflict with any applicable land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect. In the following analysis, the proposed Project is evaluated for compatibility with the existing and planned land uses in the Project vicinity and for consistency with adopted City plans and policies. This section differs from other discussions in that only plan consistencies and land use compatibility are addressed, as opposed to environmental impacts and mitigation measures. This discussion complies with Section 15125(d) of the CEQA Guidelines, which requires an EIR to discuss inconsistencies with general plans and regional plans as part of the environmental setting. Environmental impacts resulting from the Project are discussed in the respective environmental sections (Sections 4.1 through 4.9) of this EIR.

As mentioned above, the City Council is ultimately responsible for interpreting the General Plan and would determine whether the Project is inconsistent with any adopted land use goals or policies.

CONSISTENCY

General Plan

As mentioned above, the Project site is within the Laguna Ridge Specific Plan, which is designated as a Policy Area by the City's General Plan. As such, the General Plan designates the LRSP area with specific land use categories and requires that the Specific Plan be used to implement General Plan policies for the area. General Plan Policy LU-28 requires land uses in the Laguna Ridge Policy Area to conform to the general layout of land uses shown in Figure LU-5 of the General Plan. General Plan Policy LU-31 requires the LRSP and any related implementation plans to be consistent with the General Plan and to be used to implement the land use and other policies of the General Plan.

The LRSP EIR addressed land use impacts resulting from development of the entire LRSP area, of which the proposed Project is a part. The LRSP EIR determined that the land uses identified by the LRSP are consistent with the surrounding level of urban development and are compatible with low- and medium-density residential, commercial and office, and limited commercial uses surrounding the LRSP area. It also determined that the Specific Plan is consistent with the City General Plan policies and City standards and that the Specific Plan constituted a less than significant impact regarding land use conflicts. In addition, the land use map for the LRSP is consistent with the layout identified in the General Plan (Figure LU-5).

As such, development consistent with the LRSP would also be considered consistent with General Plan policies pertaining to the LRSP area.

Laguna Ridge Specific Plan

The LRSP zones the majority of the Project site as Community Park (CP), meaning that the LRSP and the LRSP EIR contemplated development of the Project site with active recreation uses as discussions in the Current Land Use Designations and Zoning subsection above. Approval of the Project would allow development of the Project site with recreation uses, including a competition venue, recreational facility (water/adventure park), parking, passive park area, and ancillary services. The wetland preserve on the Project site is currently restricted by a US Army Corps of Engineer (USACE) permit, limiting the use of the property for wetlands only. This area would remain a preserved area, unless the USACE restrictions are removed, at which time this area could be developed for parkland usage. Consistent with the current USACE permit, this area could include an informal pedestrian walkway leading to an overlook near the wetlands, providing a view into the natural preserved area.

The proposed Project is consistent with the intent of the LRSP for community park sites to provide recreational uses intended to serve the needs of the LRSP area and the Southeast Plan Area, as well as the residents of Elk Grove. According to the LRSP, the purpose of the larger parks is to encourage multiple uses and allow active recreation. Although the recreational uses included in the Project are on a larger scale than analyzed in the LRSP EIR, the type of use proposed on the Project site would be similar to those originally envisioned (lighted sports fields, play areas, indoor and outdoor public recreation, water play, concession/storage buildings, etc.). As such, the proposed Project is a permitted use in the CP zone. The Project would not conflict with the General Plan or the Laguna Ridge Specific Plan, nor would implementation of the proposed Project change the land use designations or zoning for the Project site.

It should be noted that the LRSP does not include development standards such as setbacks, height, landscaping, etc., for the CP zone. However, the Project includes approval of a Capital Improvement Project (CIP) Design Review in order to provide additional site and design consideration and to evaluate and ensure compliance with the City of Elk Grove Design Guidelines for nonresidential development. The proposed Project would be required to comply with applicable requirements in the Design Guidelines.

The Project includes development of overflow parking on three parcels located north of Civic Center Drive, which are zoned SC, RD-20, and BP in the Laguna Ridge Specific Plan. There are no restrictions on parking in the RD-20 and BP districts, but the Laguna Ridge Specific Plan does not allow parking as a primary use in the SC zone. However, the Project includes an amendment to the Laguna Ridge Specific Plan to remove the restriction for parking in the SC district. For topics where the LRSP is silent on a land use within a district, the topic would revert to Title 23 of the Municipal Code (Zoning Code). Parking facilities are a permitted use in the SC district (Municipal Code Section 23.32.030, Table 23.32-1). This would ensure consistency with zoning.

The physical effects of development of the site for parking are addressed in the technical sections of this Draft SEIR.

COMPATIBILITY

Existing and Planned Adjacent Land Uses

As discussed above, the Project site is located in an urbanizing area, with the majority of the area already developed or in the process of being developed consistent with the LRSP or other approved development plans. The Project would be generally compatible with the surrounding area to the extent that it would be located in an urbanized area and would provide recreational uses intended to serve the needs of the surrounding residential uses as well as of the City. The competition venue would provide competitive facilities to serve multiple colleges and high schools for practices and meets, including Cosumnes Oaks High School adjacent to the Project site to the south. In addition, a key element of the LRSP is the system of parkways, paseos, and landscape corridors that allow convenient pedestrian and bicycle connections between land uses. Similarly, a major component of the landscape architectural design concept for the Project is the connectivity of spaces. The main pedestrian walkway connects the future civic buildings to the north to the Project entry plaza, which in turn connects the main street, the competition venue, and the water and adventure parks with the parking areas.

However, the Project's compatibility with surrounding land uses is largely based on the interaction of the proposed use and the extent to which adjacent land uses would be affected by this interaction. The primary areas of concern associated with the proposed Project would be the recreation/residential interface that would be created along the Project site's eastern and western boundaries. The potential conflicts and impacts associated with increased traffic, noise, air pollution, light and glare, and viewshed are discussed in the respective environmental sections of this EIR. A general discussion of the compatibility of this interface and how the Project has been designed to minimize other potential land use conflicts between the Project site and the neighboring residences is included below.

Eastern Boundary

Several water/adventure park features, including slide complexes and zip line towers ranging from 53 feet to 79 feet in height, would be located along or near the eastern boundary of the water/adventure park, adjacent to future residential uses.

A minimum 6-foot-tall solid masonry wall would be included between the Project site boundary and adjacent residential uses, along with a 50-foot buffer area. The buffer would include a 20-foot fire lane/maintenance road, a 6-foot trail, and landscaping. The landscaping includes large evergreen conifer trees that would ultimately reach 80 feet in height and have a 40-foot spread. Tall screen shrubs are proposed to provide further screening. However, in the short term, the landscaping would not provide screening of the Project from the future residential uses to the east.

Given the height of the proposed water/adventure park features and the proximity of the adjacent residential uses, the potential exists for intrusion on the privacy of the residences. As discussed in Section 4.7, Noise, there is potential for noise from the elevated features to affect future residential uses to the east. Mitigation measure MM 4.7.4 requires installation of solid barriers on the east-facing sides of the elevated structures (slides and ziplines), with no gaps between construction materials, to reduce potential noise impacts from patrons on the stairs. In addition to reducing noise associated with the use of the structures, this measure would screen views of the residences from the water/adventure park features.

Western Boundary

The large surface parking lot would be near residences west of the Project site along Big Horn Boulevard. A 6-foot-tall solid masonry wall exists between the Project site boundary and adjacent residential uses to the west along Big Horn Boulevard. Furthermore, the Project would include landscape planters throughout the parking lot, as well as landscaped corridors with walkways connecting parking areas to the entry plaza. In addition, the utility yard near the parking lot is visually screened on three sides. Proposed tree plantings would provide 50 percent shade to the parking areas within 10 years.

As stated above, the Project includes approval of a CIP Design Review in order to provide additional site and design consideration and to evaluate and ensure compliance with the City of Elk Grove Design Guidelines for nonresidential development. The City's Design Guidelines regulate the building mass and scale of all proposed commercial buildings and include lighting and other site layout requirements that would apply to development of the Project site. The LRSP does not include development standards such as setbacks, height, landscaping, etc., for the CP zone; however, development standards for the Project would be reviewed/approved as part of the design review process. Compliance with the Design Guidelines and development standards identified in the design review process would lessen the project's potential land use compatibility conflicts with adjacent residential uses.

REFERENCES

City of Elk Grove. 2003. *Elk Grove Design Guidelines*.

———. 2004a. *Laguna Ridge Specific Plan*.

———. 2004b. *Laguna Ridge Specific Plan Environmental Impact Report* (SCH No. 2000082139).

4.0 Introduction to the Environmental Analysis

ANALYSIS ASSUMPTIONS GENERALLY USED TO EVALUATE THE IMPACTS OF THE PROJECT

BASELINE ENVIRONMENTAL CONDITIONS ASSUMED IN THE DRAFT EIR

Section 15125(a) of the California Environmental Quality Act (CEQA) Guidelines requires that an EIR include a description of the physical environmental conditions in the vicinity of the project, as they exist at the time the Notice of Preparation (NOP) is published. The CEQA Guidelines also specify that this description of the physical environmental conditions is to serve as the baseline physical conditions by which a lead agency determines whether impacts of a project are considered significant.

The environmental setting conditions of the Project site and the surrounding area are described in the technical sections of the Draft SEIR (Sections 4.1 through 4.9). In general, these setting discussions describe the setting conditions of the Project site and the surrounding area as they existed when the NOP for the Project (SCH No. 2000082139) was released on September 6, 2013. This also includes consideration of approved land uses under the Laguna Ridge Specific Plan (LRSP) around the Project site.

APPROACH TO THE PROJECT-SPECIFIC ANALYSIS

Project Buildout Assumptions

The specific design, engineering, and event/facility use details of the proposed Civic Center Aquatics Complex were in process of being developed at the time of the preparation of this EIR and will be refined during final design. In order to evaluate the construction and operational physical effects on the environment, City staff and the Project design team developed the following construction and operation assumptions:

Construction

The total construction period for the proposed Project was assumed to be 14 months. A list of construction equipment was provided by the Project design team, which includes the number and types of equipment that would be used for different phases of construction (McCarthy 2014). The EIR analysis assumed that grading and underground work (i.e., utilities) would require two months. Equipment identified for grading and underground work was assumed to operate 8 hours per day, five days per week for the two-month period. The tasks for the remainder of the schedule were assumed to occur concurrently over the remaining 12 months of the construction schedule, which is conservative, as certain tasks would be completed in less than the 12 months and that equipment would not be used for the full 12-month duration of the above-ground improvements. The proposed Project includes proposed overflow parking that could be covered with aggregate materials or may be paved with asphalt. The Air Quality analysis conservatively assumes that the entire overflow parking area is asphalt.

Competition Venue and Water and Adventure Park Operations

Based on the proposed Civic Center Aquatics Complex Schematic Design (dated May 30, 2014), the competition venue, water park and adventure park facilities would have varying days and seasons of operation. The EIR impact analysis assumes that the competition venue and water and adventure park are all in operation at the same time for up to 120 days a year. The water park would be closed during the months of November through April.

Attendance Assumptions

A wide range of recreation and special event opportunities and hours would be provided for both the competition venue and water and adventure park components of the Project. For purposes of the EIR impact analysis, the following peak attendance assumptions were used based on the operational usage information in the Civic Center Aquatics Complex Schematic Design (dated May 30, 2014) and consultation with the Project design team.

Typical Operations (outside of the peak weekends in the summer months) is based on attendance of up 3,230 on a weekday could occur with the combined operation of the competition venue and the water and adventure park. It should be noted that the water park would not be in operation during the months November through April, so overall attendance would be less.

Peak Summer Operations (peak operations during the summer months) assumes attendance of up to 5,500 at the entire Aquatics Complex at any one time. While the Aquatics Complex would have an estimated total capacity of 7,100 attendees, the hours of operation for the competition venue (e.g., 7:00 a.m. to 7:00 p.m. on weekends for swim meets June through August) and water and adventure park (10:00 a.m. to 10:00 p.m.) components would differ and would result in patrons arriving and leaving at different times during the day. This peak was used in the traffic analysis and is based on attendance ranges that could occur with swimming competitions happening at the same time as operation of the water and adventure park on a hot summer day. This peak was assumed to occur up to 20 days during the year (typically weekends) and was used to address impacts associated with peak operations, such as traffic and noise.

Previous Traffic Assumptions

During preparation of the Laguna Ridge Specific Plan EIR (LRSP EIR), land use on the portion of the Project site located south of Civic Center Drive was changed from residential use to park use that was ultimately approved. Prior to the change in land use, a traffic study had been prepared that assumed the site would be developed with up to 244 multi-family dwellings and 160 single-family dwellings. Based on these uses, the LRSP EIR assumed the portion of the site south of Civic Center Drive would generate 3,100 daily trips. The City determined that although the traffic analysis overstated the traffic levels that would be generated on the site from park use, the analysis was conservative and it was retained in the LRSP EIR.

Existing Setting

This subsection includes a description of the physical setting conditions associated with the technical area of discussion, consistent with CEQA Guidelines Section 15125. As previously identified, the existing setting is generally based on conditions as they existed when the NOP for the Project was released.

Regulatory Framework

This subsection identifies applicable federal, state, regional, and local plans, policies, laws, and regulations that apply to the technical area of discussion.

Impacts and Mitigation Measures

Sections 4.1 through 4.9 of this Draft SEIR contain a description of current setting conditions (including applicable regulatory setting), an evaluation of whether new or a substantial increase in severity of direct and indirect environmental effects identified in LRSP EIR would result from implementation of the proposed Project, identification of adopted Laguna Ridge Specific Plan mitigation measures would mitigate the identified significant environmental effects, additional feasible mitigation measures, and, if applicable, identification of whether significant environmental effects of the proposed Project would remain after application of proposed mitigation measures. The individual technical sections of the Draft SEIR follow the following format.

The Impacts and Mitigation Measures subsection identifies direct and indirect environmental effects associated with implementation of the proposed Project and identifies measures, where feasible, to mitigate potentially significant environmental effects. Concluding statements are included in the impact discussion to verify the level of significance of the impact before and after mitigation. Standards of significance are identified and utilized to determine whether identified environmental effects are considered "significant" and require the application of mitigation measures. Each environmental impact analysis is identified numerically and is supported by substantial evidence included in the discussion.

CEQA requires that mitigation to lessen the environmental impact must be feasible. CEQA Guidelines Section 15126.4(a) (1) states, "An EIR shall describe feasible measures which could minimize significant adverse impacts…" Feasible is defined as "capable of being accomplished in a successful manner within a reasonable period of time, taking into account economic, environmental, social, and technological factors" (CEQA Section 21061.1).

Mitigation measures for the proposed Project were developed through a review of the environmental effects of the Project by environmental professionals and consultants with specific technical expertise. Any feasible mitigation measures that could minimize significant adverse impacts are discussed, after which the impact discussion notes whether the impact would be mitigated to a less than significant level or if it would remain significant and unavoidable.

APPROACH TO THE CUMULATIVE IMPACT ANALYSIS

Definition of Cumulative Setting

CEQA Guidelines Section 15130(a) requires that an EIR "discuss cumulative impacts of a project when the project's incremental effect is cumulatively considerable." CEQA Guidelines Section 15130(b) states, "The discussion of cumulative impacts shall reflect the severity of the impacts and their likelihood of occurrence, but the discussion need not provide as great detail as is provided for the effects attributable to the project alone. The discussion should be guided by standards of practicality and reasonableness, and should focus on the cumulative impact to which the identified other projects contribute rather than the attributes of other projects which do not contribute to the cumulative impact."

For this Project, the cumulative setting conditions considered in this Draft SEIR generally encompass the City of Elk Grove and, specifically, the Laguna Ridge Specific Plan area. Therefore, the cumulative setting conditions consider the City of Elk Grove General Plan (adopted November 2003; amended January 2005) as well as development projects that have been proposed and/or approved in the City and the region as appropriate. However, the cumulative setting varies for each environmental issue area, depending on the resources affected and any relevant boundaries, such as the Sacramento Valley Air Basin for air quality resources. Each technical section of the Draft SEIR includes a description of the geographic extent of the cumulative setting for that resource based on the characteristics of the environmental issue under consideration as set forth in Section 15130(b) of the CEQA Guidelines.

Consideration of Cumulative Impacts

Each technical section in the Draft SEIR considers whether the Project's effect on anticipated cumulative setting conditions is cumulatively considerable (i.e., a significant effect). The determination of whether the Project's impact on cumulative conditions is considerable is based on applicable public agency standards, consultation with public agencies, and/or expert opinion. In addition, as described above, the environmental effects of potential development of the Project are considered in the cumulative impact analysis.

EFFECTS NOT FOUND TO BE SIGNIFICANT

As discussed in the Notice of Preparation for the Project, the following environmental issues would result in less than significant impacts and will not be discussed further in the Draft SEIR for the reasons discussed below.

Seiche, Tsunami, and Mudflow

Based on the Project's location (inland, away from any water bodies) and topography (relatively flat), there would be no impacts related to seiche, tsunami, or mudflow.

Mineral Resources

The Project site is not used for mineral extraction, nor is it designated as an important mineral recovery site. Therefore, there would not be a significant impact on mineral resources.

Airports, Airstrips, and Air Traffic Patterns

The airport nearest the Project site is Sacramento Executive Airport, approximately 10 miles to the north. Because the Project site is not located in the vicinity of any airports, there would be no impacts associated with conflicts with airports or changes in air traffic patterns.

Septic Systems

The Project does not propose the use of any septic tanks or alternative wastewater disposal systems. Therefore, there would be no impacts related to septic systems and necessary soil conditions.

EFFECTS ANALYZED IN PREVIOUS ENVIRONMENTAL DOCUMENTS

As discussed in Section 1.0, Introduction, the Project site is located within the Laguna Ridge Specific Plan area. Therefore, this EIR has been prepared as a Subsequent EIR to the Laguna Ridge Specific Plan EIR (SCH No. 2000082139). Several environmental issues were adequately addressed in this certified EIR: agriculture, geology and soils, hydrology and water quality, population and housing, public services, and recreation. As discussed in Section 1.0, Introduction, the proposed Project would be required to comply with mitigation measures adopted for the Laguna Ridge Specific Plan. The MMRP for the Laguna Ridge Specific Plan is included in **Appendix A** of this Draft SEIR.

Based on a review of the proposed Civic Center Aquatic Complex Project, the City has determined that there was no substantial evidence that the proposed Project would cause or otherwise result in any new significant environmental effects or an increase in severity of any previously identified Laguna Ridge Specific Plan EIR significant effects in the following resource areas: conversion of Important Farmland, conflicts with agricultural use or Williamson Act contract, conflict with forest zoning or loss of forestland, seismic hazards, soil erosion, unstable or expansive soils, water quality, groundwater recharge, stormwater drainage, flooding, population growth, displacement of housing or people, public services, or recreation.

Agriculture and Forestry Resources

Convert Important Farmland

The northwesterly portion of the Project site, totaling 3.6 acres, is designated by the Farmland Mapping and Monitoring Program (FMMP) as Farmland of Statewide Importance (DOC 2010). Although the proposed Project would result in the conversion of this Important Farmland, the conversion was previously evaluated as part of the LRSP EIR. The LRSP EIR concluded that conversion of Important Farmland would be a significant impact and that no feasible mitigation measures are available. Therefore, this impact would be significant and unavoidable. The Elk Grove City Council adopted a statement of overriding consideration for this impact as part of the LRSP EIR. The Project and the surrounding area are currently being developed into urban uses and there are no current agricultural operations.

Conflict with Zoning for Agricultural Use or a Williamson Act Contract

The Project site is currently designated/zoned by the LRSP as Community Park (CP). No portion of the Project site is subject to a Williamson Act contract. Therefore, the proposed Project would have no potential to conflict with agricultural zoning or an active Williamson Act contract. There would be no impact, and this issue will not be addressed further.

Conflict with Forest Zoning or Result in the Loss of Forestland

The Project site is primarily grassland containing no trees except several ornamental trees associated with the existing residences on the site. The Project site does not contain forestland. Furthermore, the Project site is not zoned for forestland or timberland. Therefore, the proposed Project would have no potential to conflict with forestry zoning or result in the conversion of forestland to non-forest use. There would be no impact, and this issue will not be addressed further.

Geology and Soils

Seismic Hazard

The Project site is not located in an Alquist-Priolo Earthquake Hazard Zone or Fault Study Zone, but it is located in an area that can be expected to experience ground motion of low to moderate severity. However, the proposed structures would be subject to the California Building Code, which includes seismic standards, which would ensure the structures are adequately designed and constructed based on site-specific conditions. Therefore, implementation of the proposed Project would not expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving earthquake, ground shaking, or seismic-related ground failure. The impact would be less than significant, and this issue will not be addressed further.

Soil Erosion

Construction activities associated with the proposed Project could expose Project site soils to the erosive effects of wind and water. The State Water Resources Control Board (SWRCB) permits all regulated construction activities under a National Pollutant Discharge Elimination System (NPDES) General Permit for Storm Water Discharges Associated with Construction Activity. Coverage under a General Construction Permit requires the preparation of a stormwater pollution prevention plan (SWPPP) and a Notice of Intent (NOI) to request coverage under the General Permit. The SWPPP includes pollution prevention measures (best management practices [BMPs] for erosion and sediment control measures and measures to control non-stormwater discharges and hazardous spills), demonstration of compliance with all applicable local and regional erosion and sediment control standards, identification of responsible parties, a detailed construction timeline, and monitoring and maintenance schedule to determine quantities of pollutants leaving the site. SWPPP best management practices are recognized as effective methods to prevent or minimize the potential releases of pollutants into surface waters or groundwater. Strict SWPPP compliance coupled with using the appropriate BMPs would reduce potential erosion and water quality impacts during construction activities. The Project is also subject to Chapter 15.12 of the City Municipal Code that regulates stormwater and sediment control.

In addition, the proposed Project would be subject to LRSP EIR mitigation measure MM 4.9.1, which requires submittal to the City of an erosion control plan including measures to limit the erosion effects of the Project, such as hydroseeding, placement of straw wattles along slope contours, and use of siltation fences. Compliance with existing regulations and LRSP EIR mitigation would reduce this impact to a less than significant level. This issue is not addressed further.

Unstable or Expansive Soils

According to the LRSP EIR, soils beneath the LSRP area, including the Project site, exhibit significant strength and are considered capable of supporting loads anticipated from development. However, according to the Elk Grove General Plan EIR, the primary soil types in the City contain a high percentage of claypan, indicating a high shrink-swell potential. The California Building Code (adopted by the City) and commonly accepted engineering practices already require special design and construction methods for dealing with expansive soil behavior. Furthermore, the proposed Project would be required to submit a geotechnical report that would identify site-specific soil conditions. All proposed structures would be required to comply with applicable building code standards and the recommendations of the geotechnical report. Therefore, this impact would be less than significant, and the issue is not addressed further.

Hydrology and Water Quality

Water Quality Standards

According to the LRSP EIR (Impact 4.7.3), the area served by the City of Elk Grove's storm drainage system is subject to the requirements of NPDES Stormwater Permit No. CA0082597 issued and enforced by the Central Valley Regional Water Quality Control Board (CVRWQCB). This permit requires that discharges of pollutants from areas of new development be reduced to the maximum extent practicable. Compliance with this standard requires that control measures be incorporated into the design of new development to reduce pollution discharges in site runoff over the life of the Project. The LRSP EIR concluded that this impact would be potentially significant and provided mitigation measures MM 4.7.3a, 4.7.3b, and 4.7.3c to reduce the impact to a less than significant level. These measures, which would apply to the proposed Project, require the biofiltration of pollutants in Project runoff consistent with the City's NPDES permit; storage areas to be located away from drainage features and to include water quality control measures in associated storm drainage facilities; and permanent storm drain messages discouraging dumping to be provided at all storm drain inlets. Compliance with existing regulations and LRSP EIR mitigation would reduce this impact to a less than significant level. This issue is not addressed further.

Groundwater Recharge

According to the LRSP EIR, the majority of the LRSP area has poor groundwater recharge capabilities. The closest groundwater recharge area to the Project site is approximately 1 mile to the east, across State Route (SR) 99, along the banks of the Cosumnes River. Therefore, implementation of the proposed Project would not interfere with groundwater recharge and this impact would be less than significant. The issue is not addressed further. Groundwater resource impacts associated with water supply are addressed in Section 4.8, Public Utilities.

Stormwater Drainage

The LRSP EIR included a detailed evaluation of that Project's drainage impacts including modeling and quantification of pre- and post-project conditions for the 10-year and 100-year peak stormwater flows (see LRSP EIR Table 4.7-3), which assumed construction of permanent drainage facilities as part of the Laguna Ridge Specific Plan. The proposed Project is located in Local Drainage Area B as defined in the LRSP EIR. According to the LRSP EIR (Impact 4.7.2), with the inclusion of the proposed drainage improvements and upgrades and off-site channel improvements, peak stormwater flows would be contained within the proposed channel, resulting in beneficial impacts to the downstream storm drainage system. Consequently, the LRSP EIR concluded that the impact would be less than significant provided that the proposed drainage improvements were constructed to City/County standards prior to site development.

LRSP EIR mitigation measure MM 4.7.2 requires that prior to approval of the proposed Project, it be demonstrated that permanent drainage facilities, generally consistent with the Storm Drainage Master Plan for Laguna Ridge Specific Plan, would adequately serve the Project consistent with City standards and off-site flooding impacts would not result, and that such facilities are either available or will be available upon site development. Compliance with LRSP EIR mitigation measure MM 4.7.2 would reduce this impact to a less than significant level, and the issue will not be addressed further.

Flooding

The Project site is located outside of any designated special flood hazard area and is outside of the inundation area for Folsom Dam (FEMA 2012). Furthermore, the Project site is relatively flat and is not located near an ocean or other large water body or any rivers or streams controlled by levees. Therefore, the Project would not place structures within the 100-year floodplain or otherwise impede flood flows and would not expose people or structures to flooding risk resulting from the failure of a dam or levee. There would be no impact and the issue will not be addressed further.

Population and Housing

Induce Substantial Population Growth

The proposed Project does not include any residential uses or major infrastructure projects. The Project would add approximately 500 jobs in the City. However, a portion of those jobs would be temporary summer jobs, as the water park component of the Project would only operate May through October. Consequently, the Project would not substantially increase employment opportunities such that the City's population would be significantly increased beyond that anticipated by the General Plan or LRSP EIR or result in the need for housing beyond that assumed in the LRSP EIR. This impact would be less than significant, and the issue will not be addressed further.

Displace Existing Housing or People

At the time of NOP publication, the Project site contained three vacant residences, which were planned for demolition due to health and safety concerns. Because the houses were not habitable, this is not considered substantial and there is adequate alternative housing available in the City. Therefore, this impact would be less than significant, and the issue will not be addressed further.

Public Services

The proposed Project does not include any residential uses, but would add up to 500 jobs in the City. As noted above, a portion of those jobs would be temporary summer jobs related to the water park, which would only operate May through October. The LRSP EIR projected the LRSP would generate up to 6,600 total new jobs and projected 38,203 jobs in the City of Elk Grove in 2022. The LRSP EIR also assumed over 7,800 new residential units in the plan area. The proposed Project would not represent a substantial increase in employment opportunities such that the City's population or the associated demand for public services would be significantly increased beyond that anticipated by the LRSP EIR or General Plan. Therefore, the Project would not trigger the need for new or expanded public facilities, the construction of which could result in environmental impacts. This impact would be less than significant, and the issue will not be addressed further.

Recreation

The proposed Project does not include any residential uses. Although the Project would increase the number of employees in the City, as noted above, it would not represent a substantial increase in employment opportunities such that the City's population or the associated demand at existing recreational facilities would be substantially increased. Therefore, the proposed Project would not significantly increase the use of existing recreational facilities such that they would be substantially deteriorated. The Project proposes the construction of new recreational facilities including active parkland and a competition venue. The environmental impacts associated with the construction of these facilities are evaluated throughout this Draft SEIR (see Sections 4.1 through 4.9). This impact would be less than significant, and recreation will not be addressed further.

REFERENCES

City of Elk Grove. 2003. *Elk Grove General Plan Draft Environmental Impact Report* (SCH No. 2002062082).

———. 2004a. *Laguna Ridge Specific Plan.*

———. 2004b. *Laguna Ridge Specific Plan Environmental Impact Report* (SCH No. 2000082139).

DOC (California Department of Conservation). 2010. Farmland Mapping and Monitoring Program. *Sacramento County Important Farmland 2010.*

FEMA (Federal Emergency Management Agency). 2012. Flood Insurance Rate Map Panel 06067C0319H Effective 8/16/2012.

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4.1 Aesthetics, Light, and Glare

4.1.1 EXISTING SETTING

PROJECT SITE

The Project site is primarily undeveloped. At the time of NOP publication there were three vacant residences on the parcel located south of Civic Center Drive as well as landscaping and outbuildings. The southern portion of this parcel includes a US Army Corps of Engineers wetlands area. The parcel located north of Civic Center Drive contain a single outbuilding, with no other developed uses. Although the Project site is largely undeveloped, there is existing infrastructure adjacent to the site to support development, including Civic Center Drive, Elk Grove Boulevard to the north, Big Horn Boulevard to the west, and Lotz Parkway to the south. These roadways include curb, gutter, sidewalks, street lighting, and ornamental landscaping along the perimeter of the Project site, as well as utilities in the roadways.

SURROUNDING LAND USES

The Project is located in an urban area; the majority of the area has been developed or is in the process of being developed consistent with the Laguna Ridge Specific Plan (LRSP) or other approved development plans. Specifically, Elizabeth Pinkerton Middle School/Cosumnes Oaks High School is located to the south. An existing one- and two-story single-family residential development (The Grove subdivision) and a residential development consisting of three-story town houses to the northwest. An existing water treatment facility as well as an events center (The Falls of Elk Grove), which has almost completed construction, are located to the east. The approved Allen Ranch residential development is also currently under construction to the east. Although not adjacent to the Project site, other development within the LRSP and in the vicinity of the Project site consists of a medical campus under construction to the west; existing single-family residential development north of Elk Grove Boulevard and west of Bruceville Road, and the Elk Grove Automall to the east. **Figure 2-1** (see Section 2.0, Project Description) shows the Project site in the context of the surrounding development. Where development has not yet occurred, most of the infrastructure needed to accommodate development, such as lighting, roadways, and traffic signals, has already been constructed.

4.1.2 REGULATORY FRAMEWORK

CITY OF ELK GROVE

Elk Grove Design Guidelines

The Project would be reviewed for compliance with the City of Elk Grove Design Guidelines for nonresidential development. The guidelines identify desirable characteristics of nonresidential site development and establish provisions and options to ensure implementation of those characteristics. The Design Guidelines also include architectural guidelines to ensure a base level of quality architecture that is responsive to context and builds on the aesthetic identity of the community. These include guidelines for architectural style; mass, scale, and form; materials and finishes; screening; signage; and building lighting.

The Design Guidelines require the quality design of nonresidential development based on the following design concepts: new development contributing to the character of the community with particular attention to design compatibility between nonresidential and adjacent residential uses; unified design theme; pedestrian-friendly design; establishment of a streetscape; parking lots designed with smaller, dispersed parking fields; and design flexibility for mixed-use developments. The following summarizes the guidelines that address aesthetic, light, and glare impacts and that would be applicable to the Project:

- Site Planning – Requires the building placement and configuration for a nonresidential project to take into consideration visual impact and experience for both users and passersby. Where nonresidential development abuts residential uses, such configuration requires site planning to carefully address potential undesirable impacts by utilizing appropriate buffering and siting techniques, including installation of a solid wall between uses, landscaping, and proper screening/placement of utilities, equipment, and trash enclosures.
- Parking Lots – Identifies design attributes that minimize the appearance of parking lots, including large surface parking areas designed with a series of smaller parking fields delineated with an on-site circulation system that utilizes uninterrupted drive aisles, mostly contiguous landscape planters, and/or pedestrian walkways.
- Streetscape and Landscaping – Requires landscaping to be designed as an integral part of the overall site plan with the purpose of enhancing building design, public views, and spaces, and providing buffers, transitions, and screening. Requires landscaping adjacent to and within parking areas to screen vehicles from view and to minimize the expansive appearance of parking lot fields (includes minimum percentages of parking lot landscaping and minimum percentage of shade coverage).
- Storage/Loading/Service Areas, Trash/Recycling Enclosures, and Utility Placement – Requires appropriate sizing and screening.
- Lighting of Parking Areas, Drives, and Pedestrian Walkways – Requires exterior site lighting be designed so that light is not directed off the site and the light source is shielded downward from direct off-site viewing. Light features are to be located and designed with cut-off lenses to avoid light spill and glare on adjacent properties. In order to minimize light trespass on residential structures directly abutting a nonresidential site, illumination measured at the nearest residential structure or rear yard/side yard setback line cannot exceed the moon's potential ambient illumination of one-tenth (0.1) foot-candle. Requires lighting for nonresidential development to be constructed with full shielding and, where the light source from an outdoor light fixture is visible beyond the property line, shielding is required to reduce glare so that the light source is not visible from within any existing or future residential dwelling unit.

4.1.3 IMPACTS AND MITIGATION MEASURES

STANDARDS OF SIGNIFICANCE

The impact analysis provided below is based on the application of the CEQA Guidelines Appendix G environmental checklist. A project is considered to have a significant effect on the environment if it will:

1) Have a substantial adverse effect on a scenic vista.
2) Substantially damage scenic resources, including but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway.
3) Substantially degrade the existing visual character or quality of the site and its surroundings.

4) Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area.

METHODOLOGY

The Laguna Ridge Specific Plan Environmental Impact Report (LRSP EIR) (SCH No. 2000082139) addressed aesthetic, light, and glare impacts resulting from development of the entire LRSP area, of which the proposed Project is a part. The Project would be subject to the Laguna Ridge Specific Plan Mitigation Monitoring and Reporting Program (MMRP), including implementation of mitigation measures required to reduce aesthetic, light, and glare impacts. Therefore, this analysis focuses on the potential for the Project to result in new significant environmental effects or a substantial increase in the severity of previously identified significant effects. The analysis addresses aesthetic, light, and glare impacts resulting from the Project as they differ from the analysis in the certified LRSP EIR.

Evaluation of potential aesthetic, light, and glare impacts of the proposed Project was based on review of relevant planning documents, including the City of Elk Grove General Plan, the LRSP, Title 23 of the City of Elk Grove Municipal Code (Zoning Code), and field review of the Project site and surrounding area.

PROJECT IMPACTS AND MITIGATION MEASURES

Scenic Vistas and Highways (Standards of Significance 1 and 2)

Impact 4.1.1 The Project area is not located in the vicinity of a scenic vista or designated state scenic highway. There is **no impact. The proposed Project would not result in a substantial increase in the severity of this impact. There are no new or substantially more severe significant impacts.**

The previous analysis in the LRSP EIR determined that there are no significant/scenic visual resources within or in the vicinity of the LRSP area, including scenic vistas. The Sacramento County General Plan Scenic Highways Element designates a scenic corridor extending 660 feet on either side of the right-of-way line of State Route (SR) 99 in the unincorporated areas of the county (Elk Grove 2004b, p. 4.11-1). The Project site is not within 660 feet of SR 99 and is located in the urbanized area of Elk Grove rather than in the unincorporated county. Therefore, the Project would not have a substantial adverse effect on a scenic vista or substantially damage scenic resources within a state scenic highway. **No impact** would occur.

Mitigation Measures

None required.

Local Visual Resource Impacts (Standard of Significance 3)

Impact 4.1.2 Implementation of the proposed Project would result in substantial changes to the existing visual character and quality of the site not consistent with the changes assumed in the LRSP EIR. **The proposed Project would alter the type of use compared to that assumed in the LRSP EIR and would result in an increase in the impact disclosed in the LRSP EIR. This is a new significant impact.**

As discussed in the Existing Setting subsection above, the Project site is primarily undeveloped but located in an urbanizing area planned for development. Implementation of the proposed Project would result in development of an aquatic competition venue, recreational facility (water and adventure park), parking, park area, and ancillary services that would collectively give the visual impression of a large-scale commercial operation on the Project site. Views of the Project, particularly the slide complexes, zip line towers, and ropes courses located within the competition venue and water and adventure park, would be visible from every direction. Sight line schematics illustrating potential views of the Project site from the east and from the south are shown in **Figure 2-4**.

Previous analysis in the LRSP EIR determined that there are no significant/scenic visual resources within or in the vicinity of the LRSP area. However, local visual resource impacts associated with development of the LRSP were identified as significant and unavoidable given that development would initially be out of character with the existing rural nature of the area. The LRSP EIR identified that the area is undergoing rapid urbanization and noted that impacts would diminish over time as other development occurs to the east, west, and south. Furthermore, the LRSP EIR stated that, over time, development of the LRSP area would become increasingly consistent with the evolving visual character of the area from rural to urban with a mix of land uses including low-, medium-, and high-density residential, neighborhood and community parks, commercial, open space, schools, and infrastructure.

Since approval of the LRSP, the area surrounding the Project site has been developed or is in the process of being developed as discussed in the Existing Setting subsection above. Therefore, the proposed Project would contribute to the evolving visual character of an urbanized area consistent with the assumption in the LRSP EIR that views of open areas would be replaced by views of urban uses. However, the Project site is zoned Community Park (CP), meaning that the LRSP and the LRSP EIR originally contemplated development of the Project site with active recreation uses such as group picnic areas, lighted tennis courts, full court basketball, a mix of youth and adult ball fields, children's play areas, water play areas, indoor and outdoor public recreation/civic uses, storage/maintenance buildings, restrooms/concession buildings, and on-site parking (see LRSP Section 5.4.4). Approval of the Project would allow development of the Project site with recreation uses on a scale that was not previously anticipated or evaluated in the LRSP EIR.

The primary aesthetic differences between previous assumptions for the Project site in the LRSP and the proposed Project are the scope and scale of the operations and the height of the proposed structures. **Table 4.1-1** lists the height of the taller structures included in the Project. As previously discussed, views of the Project would be visible from every direction. The Project would be particularly visually intrusive to adjacent residential uses to the east (currently under construction), as two slide complexes and two zip line towers would be located along or relatively near the eastern boundary of the water and adventure park.

TABLE 4.1-1
PROPOSED PROJECT STRUCTURE HEIGHTS

Structure	Height (in feet)
SK-1 Slide Complex	73
SK-2 Slide Complex	53
SK-4 Slide Complex	70
Zip Line Tower 1	79
Zip Line Tower 2	79

Structure	Height (in feet)
Zip Line Tower 3	79
Ropes Course Pod 1	58
Ropes Course Pod 2	58
Dive Tower	33

In addition, proposed parking lots, including the primary parking lot and overflow lots, would alter the character of the area from its existing undeveloped condition although they would not involve construction of any structures that could alter existing views.

The LRSP does not include development standards, such as setbacks, height, and landscaping, for the CP zone. However, the Project includes approval of a Capital Improvement Project (CIP) Design Review in order to provide additional site and design consideration and to evaluate and ensure compliance with the City of Elk Grove Design Guidelines for nonresidential development. The proposed Project would be reviewed for compliance with applicable requirements in the Design Guidelines.

The Project also includes design attributes to mitigate aesthetic impacts, including screening and buffering of the Project from adjacent uses and pedestrian-scale design of the parking and entryway portion of the site.

The Project includes a 50-foot buffer on the east side of the Project site boundary that would include a 20-foot fire lane/service road, a 6-foot trail, and landscaping. The landscaping proposed for that area includes evergreen conifer trees that would ultimately reach 80 feet in height and have a 40-foot spread. Tall shrubs are proposed to provide further screening. The southern portion of the water and adventure park would also include a 20-foot-wide fire lane/maintenance road and landscaping with evergreen trees to screen views from the south.

The primary parking lot (approximately 725 spaces) would be located on the west side of the Project site. In order to prevent the large surface parking lot from dominating the visual character of the western portion of the site, the Project includes contiguous landscape planters throughout the parking lot, as well as landscaped corridors with walkways connecting parking areas to the entry plaza. Proposed tree plantings would provide 50 percent shade to the parking areas within 10 years. Pedestrian walkways would connect the future civic buildings to the north to the entry plaza. An informal pedestrian walkway is proposed to lead visitors south to an overlook near the wetlands, providing a view into the natural preserved area. The main street and entry plaza portions of the Project also include a row of large deciduous shade trees and lighting to provide screening, shade, and visual enhancement. The two overflow parking lots would be developed in the northern portion of the Project site at the City's Civic Center lot (Overflow A; 1,000 spaces) and an adjoining lot to the east (Overflow B; up to 500 spaces). These overflow sites would be temporary until long-term parking for the Civic Center project are identified, analyzed, and constructed. As such, these lots would be graded and covered with asphalt. These lots could include landscaping, although due to the temporary nature of the lots, landscaping may not be included.

While these design attributes, along with compliance with the City's Design Guidelines and Zoning Code, would reduce impacts associated with changes to the visual character and quality of the Project site, the height of the features included in the Project would still result in an alteration of the visual character of the Project site that would be out of character with the surrounding area, particularly adjacent residential uses. The LRSP EIR recognized that the change in character of the Project would result in a significant and unavoidable impact. The

Project includes setbacks and screening that would reduce some of the visual effects of the Project, but the character of the Project is different from the park use that was assumed in the LRSP EIR for the site. Mitigation measure MM 4.7.4 in Section 4.7, Noise, would require that 8 to 12-foot walls be along the southern and eastern boundary of the Aquatic Complex that would assist in reducing the visual impact of the taller water and adventure park structures. However, this mitigation measure would not fully mitigate this impact. There is no feasible mitigation that would fully screen views of the Project site or reduce the scale of the proposed Project components. Therefore, **this impact would exceed the impact disclosed in the LRSP EIR and be significant and unavoidable.**

Mitigation Measures

None available.

Light and Glare (Standard of Significance 4)

Impact 4.1.3 Implementation of the proposed Project would introduce new sources of light and glare in and around the area. **The proposed Project would result in an increase in the severity of this impact, which was previously identified in the LRSP EIR as significant and unavoidable. This is a significant impact.**

The Project would introduce new sources of light that would be visible to surrounding land uses and would increase sky glow in the region. The Project could result in new sources of glare from cars and from any features utilizing reflective materials, such as glass. Light sources would include, but not be limited to, lighting of the competition venue and water and adventure park entryways, lighted signage, lighting of the recreational features (slides, zip lines, etc.), safety and wayfinding lighting throughout the Project site, lighting of the parking lot, and light from cars. This lighting would occur during evening operational hours, which would include weekdays and weekends until 10 p.m. and occasional overnight functions (corporate events, high school lock-ins, etc.).

Details of the proposed lighting for each of the Project components are discussed below.

Water and Adventure Park Lighting

Within the water and adventure park, all overhead lighting would be designed with cut-off lenses to avoid light spill and glare on adjacent properties. Lighting of the recreational features would consist of light emitting diode (LED) step and railing lights.

Competition Venue Area Lighting

The competitive swim area in the competition venue would utilize wall-mounted and pole lighting for evening events. The primary lighting would be pole lighting consisting of high-intensity discharge lamps (HID lamps) on 20-foot poles. Multiple luminaires per pole would be used to achieve 10 foot-candles of light at the water surface and deck. Wall-mounted lighting would be used to supplement the pole lighting and would include LED wall pack luminaires or TV-type fixture sports lightings mounted on the structures.

Parking Lot Lighting

Parking lot lighting would consist of 20- to 25-foot light poles with LED luminaires. The light poles would utilize cut-off fixtures to avoid light spill and glare on adjacent properties and would be arranged in planter areas to avoid encroachment of the shade trees and parking spaces. The off-site parking areas would include temporary fixtures with cut-off lenses.

The previous analysis in the LRSP EIR determined that development of the LRSP area would introduce new sources of glare from large areas of glass in commercial structures and new sources of light from streetlights, parking lot lighting, car lights, and lights associated with residential, park, school, and commercial structures. The LRSP EIR identified mitigation measures to reduce the effect of light and glare, but found that the impact would remain significant and unavoidable.

As discussed for Impact 4.1.2 above, the LRSP and the LRSP EIR contemplated development of the Project site with active recreation uses that including lighted tennis and basketball courts, lighted ball fields, and other uses that would require lighting, such as storage/maintenance buildings, restrooms/concession buildings, and on-site parking. Therefore, additional sources of light and glare were anticipated and analyzed for the Project site. Although the Project would include lighting and glare that were not included in the previously analyzed recreational uses, the lighting for the Project would not be as tall and would be of lower intensity than that required for lighted ball fields. The proposed Project would also be subject to the LRSP EIR Mitigation and Monitoring Reporting Program (MMRP), which includes implementation of LRSP EIR mitigation measures MM 4.11.2a and MM 4.11.2b. Mitigation measure MM 4.11.2a requires all nonresidential projects within the LRSP to prepare a lighting plan to ensure that parking lot pole lights and streetlights are fully hooded and back shielded to reduce light "spillage" and glare, prohibit the illumination from breaking the horizontal plane, and ensure that lighting not exceed the standard illumination of 2 foot-candles along the property lines of adjoining land uses. LRSP EIR mitigation measure MM 4.11.2b requires all nonresidential buildings to use non-glare glass. The Project would also be required to comply with lighting standards in the Elk Grove Design Guidelines, including requirements that exterior building and site lighting be designed so that light is not directed off-site and the light source is shielded downward from direct off-site viewing.

While some Project lighting would be visible from nearby residences and other land uses, it would be less intense than assumed in the LRSP EIR because the proposed lighting would not be as tall and would be of lower intensity than that required for lighted ball fields. In addition, all overhead lighting has been designed with cut-off lenses to avoid light spill and glare on adjacent properties. However, the proposed Project would regularly operate until 10 p.m. in the summer and would occasionally operate overnight. These extended hours of nighttime lighting were not considered in the LRSP EIR. Therefore, the proposed Project would result in an increase in the severity of this impact, which was previously identified in the LRSP EIR as significant and unavoidable. **This is considered a new significant impact.**

Mitigation Measures

None available.

4.1.4 CUMULATIVE SETTING, IMPACTS, AND MITIGATION MEASURES

CUMULATIVE SETTING

The cumulative setting for aesthetic resources, light, and glare includes all existing, proposed, approved, and reasonably foreseeable development in the viewshed of the LRSP. In addition to development within the LRSP area, this includes extensive residential development to the west and north, the Elk Grove Automall to the east, and vacant land within the Southeast Policy Area to the south. A master planning process (strategic plan) is currently under way for the Southeast

Policy Area, with anticipated land uses including residential, commercial, mixed use, light industrial, office, schools, and parks.

CUMULATIVE IMPACTS AND MITIGATION MEASURES

Cumulative Aesthetics, Light, and Glare Impacts

Impact 4.1.4 Development of the proposed Project, when considered with other existing, proposed, approved, and reasonably foreseeable development in the viewshed of the LRSP, would contribute further development to an urbanizing area. **The proposed Project would not result in a substantial increase in the severity of this impact. There is no new or substantially more severe contribution to the cumulative impact that would result from the proposed Project.**

The LRSP EIR states that cumulative impacts from development of the Laguna Ridge Specific Plan would result from the conversion of vacant and agricultural land to urban uses, as well as an increase in nighttime illumination and daytime glare. The LRSP EIR states that although individual development projects would be responsible for incorporating mitigation to minimize their visual impacts, the net result would still be a general conversion of an area with an open, rural character to a more urban and developed character. The LRSP EIR goes on to state that because the project-specific and cumulative impacts are inherently related to the general conversion of an agricultural area to urban development from the introduction of structures and lighting sources, both project-specific and cumulative impacts would be significant and unavoidable.

As previously discussed, the area surrounding the Project site has been developed or is in the process of being developed consistent with the LRSP and other area plans; the Project would contribute to this ongoing urbanization. Although the proposed Project would increase the scope and scale of operations and the height of the proposed structures on the Project site beyond what was previously assumed in the LRSP, the Project would not have a significantly greater aesthetic contribution to urbanization in the cumulative setting as the aesthetic character of the cumulative setting has already been converted to urban and developed. The Project would not substantially change the cumulative setting from that previously considered as its new visual impacts are site-specific. The proposed Project would not result in a substantial increase in the severity of this impact. **There is no new or substantially more severe contribution to the cumulative impact that would result from the proposed Project.**

Mitigation Measures

None required.

REFERENCES

City of Elk Grove. 2003a. *City of Elk Grove General Plan.*

———. 2003b. *Elk Grove Design Guidelines.*

———. 2004a. *Laguna Ridge Specific Plan.*

———. 2004b. *Laguna Ridge Specific Plan Environmental Impact Report* (SCH No. 2000082139).

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4.2 Air Quality

4.2.1 EXISTING SETTING

Air quality in a region is determined by its topography, meteorology, and existing air pollutant sources. These factors are discussed below, together with the current regulatory structure that applies to the Sacramento Valley Air Basin, which encompasses the City of Elk Grove, pursuant to the regulatory authority of the Sacramento Metropolitan Air Quality Management District (SMAQMD).

Ambient air quality is commonly characterized by climate conditions, the meteorological influences on air quality, and the quantity and type of pollutants released. The air basin is subject to a combination of topographical and climatic factors that reduce the potential for high levels of regional and local air pollutants. The following section describes pertinent characteristics of the air basin and provides an overview of the physical conditions affecting pollutant dispersion in the Project area.

AIR BASIN CHARACTERISTICS

Sacramento Valley Air Basin

The proposed Project is located in the Sacramento Valley Air Basin (SVAB), which is under the jurisdiction of the SMAQMD. The SVAB is relatively flat, bordered by mountains to the east, west, and north and by the San Joaquin Valley to the south. Air flows into the SVAB through the Carquinez Strait, moving across the Sacramento Delta, and bringing with it pollutants from the heavily populated San Francisco Bay Area. The climate is characterized by hot, dry summers and cool, rainy winters. Characteristic of SVAB winter weather are periods of dense and persistent low-level fog, which are most prevalent between storm systems. From May to October, the region's intense heat and sunlight lead to high ozone pollutant concentrations. Summer inversions are strong and frequent, but are less troublesome than those that occur in the fall. Autumn inversions, formed by warm air subsiding in a region of high pressure, have accompanying light winds that do not provide adequate dispersion of air pollutants.

Most precipitation in the SVAB results from air masses moving in from the Pacific Ocean during the winter months. These storms usually move through the area from the west or northwest. Over half the total annual precipitation falls during the winter rainy season (November through February); the average winter temperature is a moderate 49 degrees Fahrenheit (°F). During the summer, daytime temperatures can exceed 100°F. Dense fog occurs mostly in mid-winter and never in the summer. Daytime temperatures from April through October average between 70 and 90°F with extremely low humidity. The inland location and surrounding mountains shelter the valley from much of the ocean breezes that keep the coastal regions moderate in temperature. The only breach in the mountain barrier is the Carquinez Strait, which exposes the midsection of the valley to the coastal air mass.

Winds across Elk Grove, which encompasses the Project area, are an important meteorological parameter because they control the dilution of locally generated air pollutant emissions and their regional trajectory. Based on data obtained from the Sacramento Executive Airport, the closest station to the City that measures wind speed and direction, southwest winds are the most predominant (CARB 1992).

Meteorological Influences on Air Quality

Regional flow patterns affect air quality patterns by directing pollutants downwind of sources. Localized meteorological conditions, such as moderate winds, disperse pollutants and reduce pollutant concentrations. However, the mountains surrounding the Sacramento Valley can create a barrier to airflow, which can trap air pollutants in the valley when meteorological conditions are right and a temperature inversion exists. The highest frequency of air stagnation occurs in the autumn and early winter when large high-pressure cells lie over the valley. The lack of surface wind during these periods and the reduced vertical flow caused by less surface heating reduces the influx of outside air and allows air pollutants to become concentrated in a stable volume of air. The surface concentrations of pollutants are highest when these conditions are combined with smoke from agricultural burning or when temperature inversions trap cool air, fog, and pollutants near the ground (SMAQMD 2011a).

The ozone season (May through October) in the valley is characterized by stagnant morning air or light winds, with the delta sea breeze arriving in the afternoon out of the southwest. Usually the evening breeze transports the airborne pollutants to the north out of the valley. During about half of the days from July to September, however, a phenomenon called the Schultz Eddy prevents this from occurring. Instead of allowing for the prevailing wind patterns to move north and carry the pollutants out of the valley, the Schultz Eddy causes the wind pattern to circle back south. Essentially, this phenomenon causes the air pollutants to be blown south toward the Sacramento area, which exacerbates the pollution levels in the area and increases the likelihood of violating federal or state standards (SMAQMD 2011a).

REGIONAL AMBIENT AIR QUALITY

Motor vehicle transportation, including automobiles, trucks, transit buses, and other modes of transportation, is the major contributor to regional air pollution. Stationary sources were once important contributors to both regional and local pollution, and remain significant contributors in other parts of the State and the country. However, their role has been substantially reduced in recent years by pollution control programs, discussed below. Any further progress in air quality improvement now focuses heavily on transportation sources.

Criteria Air Pollutants

Criteria air pollutants are defined as those pollutants for which the federal and State governments have established air quality standards for outdoor or ambient concentrations to protect public health. The national and California ambient air quality standards have been set at levels to protect human health with a determined margin of safety. For some pollutants, there are also secondary standards to protect the environment. Ozone (O_3) and particulate matter (PM) are generally considered to be regional pollutants because they or their precursors affect air quality on a regional scale. Pollutants such as carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), and lead are considered to be local pollutants because they tend to accumulate in the air locally. In addition to being considered a regional pollutant, PM is considered a local pollutant. In the Elk Grove region, ozone and PM are of particular concern. Health effects commonly associated with criteria pollutants are summarized in **Table 4.2-1.**

TABLE 4.2-1
CRITERIA AIR POLLUTANTS SUMMARY OF COMMON SOURCES AND EFFECTS

Pollutant	Major Man-Made Sources	Human Health & Welfare Effects
Carbon Monoxide (CO)	An odorless, colorless gas formed when carbon in fuel is not burned completely; a component of motor vehicle exhaust.	Reduces the ability of blood to deliver oxygen to vital tissues, effecting the cardiovascular and nervous system. Impairs vision, causes dizziness, and can lead to unconsciousness or death.
Nitrogen Dioxide (NO_2)	A reddish-brown gas formed during fuel combustion for motor vehicles and industrial sources. Motor vehicles, electric utilities, and other sources that burn fuel.	Respiratory irritant; aggravates lung and heart problems. Precursor to ozone and acid rain. Contributes to global warming, and nutrient overloading which deteriorates water quality. Causes brown discoloration of the atmosphere.
Ozone (O_3)	Formed by a chemical reaction between volatile organic compounds (VOC) and nitrous oxides (NOx) in the presence of sunlight. VOCs are also commonly referred to as reactive organic gases (ROGs). Common sources of these precursor pollutants include motor vehicle exhaust, industrial emissions, gasoline storage and transport, solvents, paints and landfills.	Irritates and causes inflammation of the mucous membranes and lung airways; causes wheezing, coughing and pain when inhaling deeply; decreases lung capacity; aggravates lung and heart problems. Damages plants; reduces crop yield. Damages rubber, some textiles and dyes.
Particulate Matter (PM_{10} & $PM_{2.5}$)	Power plants, steel mills, chemical plants, unpaved roads and parking lots, wood-burning stoves and fireplaces, automobiles and others.	Increased respiratory symptoms, such as irritation of the airways, coughing, or difficulty breathing; aggravated asthma; development of chronic bronchitis; irregular heartbeat; nonfatal heart attacks; and premature death in people with heart or lung disease. Impairs visibility (haze).
Sulfur Dioxide (SO_2)	A colorless, nonflammable gas formed when fuel containing sulfur is burned; when gasoline is extracted from oil; or when metal is extracted from ore. Examples are petroleum refineries, cement manufacturing, metal processing facilities, locomotives, and ships.	Respiratory irritant. Aggravates lung and heart problems. In the presence of moisture and oxygen, sulfur dioxide converts to sulfuric acid which can damage marble, iron and steel; damage crops and natural vegetation. Impairs visibility. Precursor to acid rain.
Lead	Metallic element emitted from metal refineries, smelters, battery manufacturers, iron and steel producers, use of leaded fuels by racing and aircraft industries.	Anemia, high blood pressure, brain and kidney damage, neurological disorders, cancer, lowered IQ. Affects animals, plants, and aquatic ecosystems.

Source: CAPCOA 2011

Toxic Air Contaminants

In addition to the criteria pollutants discussed above, toxic air contaminants (TACs) are another group of pollutants of concern. TACs are considered either carcinogenic or noncarcinogenic based on the nature of the health effects associated with exposure to the pollutant. For regulatory purposes, carcinogenic TACs are assumed to have no safe threshold below which health impacts would not occur, and cancer risk is expressed as excess cancer cases per one million exposed individuals. Noncarcinogenic TACs differ in that there is generally assumed to be a safe level of exposure below which no negative health impact is believed to occur. These levels are determined on a pollutant-by-pollutant basis.

There are many different types of TACs, with varying degrees of toxicity. Sources of TACs include industrial processes such as petroleum refining and chrome plating operations, commercial operations such as gasoline stations and dry cleaners, and motor vehicle exhaust. Public exposure to TACs can result from emissions from normal operations, as well as from accidental releases of hazardous materials during upset conditions. The health effects of TACs include cancer, birth defects, neurological damage, and death.

To date, the California Air Resources Board (CARB) has designated nearly 200 compounds as TACs and has implemented control measures for a number of compounds that pose high risks and show potential for effective control. The majority of the estimated health risks from TACs can be attributed to a relatively few compounds, one of the most important in California being particulate matter from diesel-fueled engines. In 1998, CARB identified particulate emissions from diesel-fueled engines (diesel PM) as a TAC. Previously, the individual chemical compounds in diesel exhaust were considered as TACs. Almost all diesel exhaust particle mass is 10 microns or less in diameter and, because of their extremely small size, these particles can be inhaled and eventually trapped in the bronchial and alveolar regions of the lung.

Diesel Particulate Matter

According to the California Almanac of Emissions and Air Quality (CARB 2013), the majority of the estimated health risk from TACs can be attributed to relatively few compounds, the most important being PM from diesel-fueled engines. Diesel PM differs from other TACs in that it is not a single substance. Rather, the exhaust from diesel engines contains hundreds of different gaseous and particulate components, many of which are toxic. Many of these compounds adhere to the particles, and because diesel particles are so small, they penetrate deep into the lungs. Diesel engine particulate has been identified as a human carcinogen. Mobile sources, such as trucks, buses, automobiles, trains, ships, and farm equipment, are by far the largest source of diesel emissions. Studies show that diesel PM concentrations are much higher near heavily traveled highways and intersections.

Although diesel PM is emitted by diesel-fueled internal combustion engines, the composition of the emissions varies depending on engine type, operating conditions, fuel composition, lubricating oil, and whether an emission control system is present. No ambient monitoring data is available for diesel PM because no routine measurement method currently exists. However, CARB has made preliminary concentration estimates based on a PM exposure method. This method uses CARB's emissions inventory PM_{10} database, ambient PM_{10} monitoring data, and the results from several studies to estimate concentrations of diesel PM. In addition to diesel PM, benzene, 1,3-butadiene, acetaldehyde, carbon tetrachloride, hexavalent chromium, para-dichlorobenzene, formaldehyde, methylene chloride, and perchloroethylene pose the greatest existing ambient risk, for which data is available, in the State. However, diesel PM poses the greatest health risk among the ten TACs mentioned. Based on receptor modeling techniques, CARB estimated its health risk to be 360 excess cancer cases per million people in the SVAB. Since 1990, the health risk from diesel PM has been reduced by 52 percent. Overall, levels of most TACs have decreased since 1990, except for para-dichlorobenzene and formaldehyde (CARB 2013).

Unlike criteria pollutants such as nitrogen oxide, TACs do not have ambient air quality standards. Since no safe levels of TACs can be determined, there are no air quality standards for TACs. Instead, TAC impacts are evaluated by calculating the health risks associated with a given exposure. Two types of risk are usually assessed: chronic non-cancer risk and acute non-cancer risk. Diesel PM has been identified as a carcinogenic material but is not considered to have acute non-cancer risks. The State has begun a program of identifying and reducing risks associated with particulate matter emissions from diesel-fueled vehicles. The plan consists of new regulatory standards for all new on-road, off-road, and stationary diesel-fueled engines and vehicles, new retrofit requirements for existing on-road, off-road, and stationary diesel-fueled engines and vehicles, and new diesel fuel regulations to reduce the sulfur content of diesel fuel as required by advanced diesel emission control systems. Areas where individuals could be exposed to high levels of diesel exhaust in the City include railroad operations, warehouses, schools with a high volume of bus traffic, high-volume highways, and high-volume arterials and local roadways with a high level of diesel traffic.

Trucks are considered major sources of diesel-related emissions, and a portion of the Project area is adjacent to State Route 99, a high-volume highway facility.

Elk Grove Ambient Air Quality

Ambient air quality in the City, and thus in the Project area, can be deduced from ambient air quality measurements conducted at air quality monitoring stations. There is one air quality monitoring station in the City located on Bruceville Road, which monitors ambient concentrations of ozone. Concentrations of ozone and airborne particulate matter were obtained from a nearby monitoring station located in the City of Sacramento (Sacramento-T Street air monitoring station) (see **Table 4.2-2**). Ambient emission concentrations will vary due to localized variations in emission sources and climate and should be considered representative of ambient concentrations affecting the Project area.

Table 4.2-2 summarizes the last three years of published data from the Elk Grove-Bruceville Road monitoring station and the Sacramento-T Street air monitoring station. As depicted in **Table 4.2-2**, federal and State ozone standards have been exceeded on several occasions during the last three years of available data.

TABLE 4.2-2
AMBIENT AIR QUALITY MONITORING DATA FOR THE CITY OF ELK GROVE

Pollutant Standards	2010	2011	2012
Elk Grove-Bruceville Road Air Quality Monitoring Station			
Ozone			
Max 1-hour concentration (ppm)	0.106	0.097	0.093
Max 8-hour concentration (ppm) (state/federal)	0.089/0.089	0.081/0.080	0.087/0.086
Number of days above state 1-hr standard	1	1	0
Number of days above state/federal 8-hour standard	6/2	6/1	11/5
Sacramento-T Street Air Quality Monitoring Station			
Ozone			
Max 1-hour concentration (ppm)	0.092	0.100	0.104
Max 8-hour concentration (ppm) (state/federal)	1/0	5/1	0.093/0.092
Number of days above state 1-hr standard	0	1	1
Number of days above state/federal 8-hour standard	1/0	5/1	9/4
Respirable Particulate Matter (PM_{10})			
Max 24-hour concentration (μg/m3) (state/federal)	53.9/53.5	42.2/38.8	36.7/36.2
Number of days above state/federal standard	6.1/0	0/0	0/0
Fine Particulate Matter ($PM_{2.5}$)			
Max 24-hour concentration (μg/m3) (state/federal)	37/30.6	50.5/50.5	40.8/27.1
Number of days above federal standard	0	18.4	0

Source: CARB 2013a
μg/m3 = micrograms per cubic meter; ppm = parts per million
– Insufficient or no data currently available to determine the value

4.2.2 REGULATORY FRAMEWORK

The federal Clean Air Act of 1971 and Clean Air Act Amendments (1977) established the national ambient air quality standards (NAAQS), which are promulgated by the US Environmental Protection Agency (EPA). The State of California has also adopted its own California ambient air quality standards (CAAQS), which are promulgated by CARB. The proposed Project would occur in the Sacramento Valley Air Basin, which is under the air quality regulatory jurisdiction of the SMAQMD and is subject to the rules and regulations adopted by the SMAQMD to achieve attainment with the NAAQS and CAAQS. Federal, State, regional, and local laws, regulations, plans, and guidelines are summarized below.

AMBIENT AIR QUALITY STANDARDS

Both the EPA and CARB have established ambient air quality standards for common pollutants. These ambient air quality standards are levels of contaminants representing safe levels that avoid specific adverse health effects associated with each pollutant. The ambient air quality standards cover what are called "criteria" pollutants because the health and other effects of each pollutant are described in criteria documents. The national and California ambient air quality standards are summarized in **Table 4.2-3**. Areas that meet ambient air quality standards are classified as attainment areas, while areas that do not meet these standards are classified as nonattainment areas.

Regulations implementing the federal Clean Air Act and its subsequent amendments established national ambient air quality standards for the six criteria pollutants. California has adopted more stringent state ambient air quality standards for most of the criteria air pollutants. In addition, California has established ambient air quality standards for sulfates, hydrogen sulfide, vinyl chloride, and visibility-reducing particles. Because of the meteorological conditions in the State, there is a considerable difference between State and federal standards in California.

The ambient air quality standards are intended to protect the public health and welfare, and they incorporate an adequate margin of safety. They are designed to protect those segments of the public most susceptible to respiratory distress, known as sensitive receptors, including asthmatics, the very young, elderly, persons weak from other illness or disease, and persons engaged in strenuous work or exercise. Healthy adults can tolerate occasional exposure to air pollution levels somewhat above the ambient air quality standards before adverse health effects are observed.

TABLE 4.2-3
AIR QUALITY STANDARDS

Pollutant	Averaging Time	California Standards	National Standards
Ozone	8 Hour	0.070 ppm (137 $\mu g/m^3$)	0.075 ppm
	1 Hour	0.09 ppm (180 $\mu g/m^3$)	—
Carbon Monoxide	8 Hour	9.0 ppm (10 mg/m^3)	9 ppm (10 mg/m^3)
	1 Hour	20 ppm (23 mg/m^3)	35 ppm (40 mg/m^3)
Nitrogen Dioxide	1 Hour	0.18 ppm (339 $\mu g/m^3$)	100 ppb
	Annual Arithmetic Mean	0.030 ppm (57 $\mu g/m^3$)	53 ppb (100 $\mu g/m^3$)
Sulfur Dioxide	24 Hour	0.04 ppm (105 $\mu g/m^3$)	N/A
	3 Hour	—	N/A
	1 Hour	0.25 ppm (665 $\mu g/m^3$)	75 ppb
Particulate Matter (PM_{10})	Annual Arithmetic Mean	20 $\mu g/m^3$	N/A
	24 Hour	50 $\mu g/m^3$	150 $\mu g/m^3$
Particulate Matter – Fine ($PM_{2.5}$)	Annual Arithmetic Mean	12 $\mu g/m^3$	15 $\mu g/m^3$
	24 Hour	N/A	35 $\mu g/m^3$
Sulfates	24 Hour	25 $\mu g/m^3$	N/A
Lead	Calendar Quarter	N/A	1.5 $\mu g/m^3$
	30 Day Average	1.5 $\mu g/m^3$)	N/A
Hydrogen Sulfide	1 Hour	0.03 ppm (42 $\mu g/m^3$)	N/A
Vinyl Chloride (chloroethene)	24 Hour	0.01 ppm (26 $\mu g/m^3$)	N/A
Visibility-Reducing Particles	8 Hour (10:00 to 18:00 PST)	—	N/A

Source: CARB 2013b
Notes: mg/m^3 = milligrams per cubic meter; ppm = parts per million; ppb = parts per billion; $\mu g/m^3$ = micrograms per cubic meter

AMBIENT AIR QUALITY ATTAINMENT STATUS

Table 4.2-4 shows the national and California attainment status for Sacramento County. The region is nonattainment for both federal and state ozone, PM_{10}, and $PM_{2.5}$ standards (CARB 2011, 2013c).

Areas with air quality that exceed adopted air quality standards are designated as nonattainment areas for the relevant air pollutants, while areas that comply with the standards are designated as attainment areas for the relevant air pollutants. Unclassified areas are those with insufficient air quality monitoring data to support a designation of attainment or nonattainment, but are generally presumed to comply with the ambient air quality standard. State Implementation Plans must be prepared by states for areas designated as federal nonattainment areas to demonstrate how the area will come into attainment of the exceeded national ambient air quality standard.

As detailed below, both CARB and the EPA have established air pollution standards in an effort to protect human health and welfare. Geographic areas are designated attainment if these standards are met and nonattainment if they are not met.

TABLE 4.2-4
NATIONAL AND CALIFORNIA AMBIENT AIR QUALITY ATTAINMENT STATUS FOR SACRAMENTO COUNTY

Pollutant	National	California
1-hour Ozone (O_3)	—	Nonattainment
8-hour Ozone (O_3)	Nonattainment	Nonattainment
Coarse Particulate Matter (PM_{10})	Nonattainment	Nonattainment
Fine Particulate Matter ($PM_{2.5}$)	Nonattainment	Nonattainment
Carbon Monoxide (CO)	Unclassifiable/Attainment	Attainment
Nitrogen Dioxide (NO_2)	Unclassified/Attainment	Attainment
Sulfur Dioxide (SO_2)	Unclassified	Attainment
Hydrogen Sulfide (H_2S)	Unclassified	Unclassified

Source: CARB 2011, 2013c

Air quality with respect to criteria air pollutants and toxic air contaminants in the Sacramento Valley Air Basin is regulated by such agencies as the SMAQMD, CARB, and the EPA. Each of these agencies develops rules, regulations, policies, and/or goals to attain the goals or directives imposed through legislation.

Sacramento Metropolitan Air Quality Management District

The SMAQMD coordinates the work of government agencies, businesses, and private citizens to achieve and maintain healthy air quality for the Sacramento area. The SMAQMD develops market-based programs to reduce emissions associated with mobile sources, processes permits, ensures compliance with permit conditions and with SMAQMD rules and regulations, and conducts long-term planning related to air quality.

As a nonattainment area, the region is also required to submit rate-of-progress milestone evaluations in accordance with the Clean Air Act Amendments. These milestone reports include compliance demonstrations that the requirements have been met for the Sacramento nonattainment area. The air quality attainment plans and reports present comprehensive strategies to reduce reactive organic gases (ROG), nitrous oxides (NO_x), and PM_{10} emissions from stationary, area, mobile, and indirect sources. Such strategies include the adoption of rules and regulations, enhancement of California Environmental Quality Act (CEQA) participation, implementation of a new and modified indirect source review program, adoption of local air quality plans, and stationary-, mobile-, and indirect-source control measures.

Sacramento Area Regional Ozone Attainment Plan

As previously stated, the region is nonattainment for both federal and State ozone standards. The federal 8-hour ozone regulations require that areas classified as serious or above submit a reasonable further progress demonstration plan that shows a minimum of 18 percent volatile organic compound (and/or NO_x) emission reductions over the first six years following the 2002 baseline year and then an average of 3 percent reductions per year for each subsequent three-year period out to the attainment year. The Sacramento Regional 8-Hour Ozone 2011 Reasonable Further Progress Plan (SMAQMD 2008) includes the information and analyses to fulfill Clean Air Act requirements for demonstrating reasonable further progress toward attaining the 8-hour ozone NAAQS for the Sacramento region. In addition, this plan establishes an updated emissions inventory and maintains existing motor vehicle emission budgets for transportation conformity purposes.

Section 181(b)(3) of the Clean Air Act permits a state to request that the EPA reclassify or "bump up" a nonattainment area to a higher classification and extend the time allowed for attainment. This bump-up process is appropriate for areas that must rely on longer-term strategies to achieve the emission reductions needed for attainment. The air districts in the Sacramento region submitted a letter to CARB in February 2008 to request a voluntary reclassification (bump-up) of the Sacramento federal nonattainment area from a serious to a severe 8-hour ozone nonattainment area with an extended attainment deadline of June 15, 2019. On May 5, 2010, the EPA approved the request effective June 4, 2010.

Sacramento Area Regional PM_{10} Attainment Plan

As previously stated, the region is nonattainment for both national and California PM_{10} and $PM_{2.5}$ standards. The SMAQMD (2010a) prepared the PM_{10} Implementation/Maintenance Plan and Re-Designation Request for Sacramento County in compliance with the federal Clean Air Act requirements pertaining to PM_{10} nonattainment areas. The purpose of this plan is to fulfill the requirements for the EPA to redesignate Sacramento County from nonattainment to attainment of the PM_{10} national ambient air quality standards by preparing the following plan elements and tasks:

- Document the extent of the PM_{10} problem in Sacramento County.
- Determine the emission inventory sources contributing to the PM_{10} problem.
- Identify the appropriate control measures that achieved attainment of the PM_{10} NAAQS.
- Demonstrate maintenance of the PM_{10} NAAQS.
- Request formal redesignation to attainment of the PM_{10} NAAQS.

The SMAQMD has also adopted various rules and regulations pertaining to the control of emissions from area and stationary sources. Some of the more pertinent regulatory requirements applicable to the proposed Project are identified as follows (SMAQMD 2011a):

- *Rule 402: Nuisance*. The purpose of this rule is to limit emissions which cause injury, detriment, nuisance, or annoyance to any considerable number of persons or the public, or which endanger the comfort, repose, health, or safety of any such persons or the public, or which cause or have natural tendency to cause injury or damage to business or property.
- Rule 403: Fugitive Dust. The purpose of this rule is to require that reasonable precautions be taken so as not to cause or allow the emissions of fugitive dust from non-combustion sources from being airborne beyond the property line from which the emission originates.
- Rule 442: The purpose of this rule is to limit the quantity of volatile organic compounds in architectural coatings supplied, sold, offered for sale, applied, solicited for application, or manufactured for use within the district.

City of Elk Grove General Plan

The City of Elk Grove General Plan contains the following policies and actions related to air quality that apply to the proposed Project. These policies and goals are contained in the Conservation and Air Quality Element (City of Elk Grove 2003a). The Project does not include any actions or components that conflict with these General Plan policies. However, it should be noted that the final authority for interpretation of a policy statement and determination of the Project's consistency with the General Plan ultimately rests with the Elk Grove City Council.

"CAQ-26: It is the policy of the City of Elk Grove to minimize air pollutant emissions from all City facilities and operations to the extent feasible and consistent with the City's need to provide a high level of public service."

"CAQ-27: The City shall promote energy conservation measures in new development to reduce on-site emissions and power plant emissions. The City shall seek to reduce the energy impacts from new residential and commercial projects through investigation and implementation of energy efficiency measures during all phases of design and development."

"CAQ-28: The City shall emphasize "demand management" strategies which seek to reduce single-occupant vehicle use in order to achieve state and federal air quality plan objectives."

"CAQ-29: The City shall seek to ensure that public transit is a viable and attractive alternative to the use of private motor vehicles."

"CAQ-30: All new development projects which have the potential to result in substantial air quality impacts shall incorporate design, construction, and/or operational features to result in a reduction in emissions equal to 15 percent compared to an 'unmitigated baseline' project. An 'unmitigated baseline project' is a development project which is built and/or operated without the implementation of trip-reduction, energy conservation, or similar features, including any such features which may be required by the Zoning Code or other applicable codes."

"**CAQ-32**: As part of the environmental review of projects, the City shall identify the air quality impacts of development proposals to avoid significant adverse impacts and require appropriate mitigation measures, potentially including—in the case of projects which may conflict with applicable air quality plans—emission reductions in addition to those required by Policy CAQ-30."

TOXIC AIR CONTAMINANT REGULATIONS

In 1983, the California legislature enacted a program to identify the health effects of TACs and to reduce exposure to these contaminants to protect the public health. The Health and Safety Code defines a TAC as "an air pollutant which may cause or contribute to an increase in mortality or in serious illness, or which may pose a present or potential hazard to human health." A substance that is listed as a hazardous air pollutant pursuant to subsection (b) of Section 112 of the federal Clean Air Act (42 United States Code Section 7412[b]) is a TAC. Under state law, the California Environmental Protection Agency, acting through CARB, is authorized to identify a substance as a TAC if it determines the substance is an air pollutant that may cause or contribute to an increase in mortality or to an increase in serious illness, or may pose a present or potential hazard to human health.

California regulates TACs primarily through Assembly Bill (AB) 1807 (Tanner Air Toxics Act) and AB 2588 (Air Toxics "Hot Spot" Information and Assessment Act of 1987). The Tanner Air Toxics Act sets forth a formal procedure for CARB to designate substances as TACs. Once a TAC is identified, CARB adopts an "airborne toxics control measure" for sources that emit designated TACs. If there is a safe threshold for a substance (a point below which there is no toxic effect), the control measure must reduce exposure to below that threshold. If there is no safe threshold, the measure must incorporate best available control technology to minimize emissions. CARB has, to date, established formal control measures for eleven TACs, all of which are identified as having no safe threshold.

Air toxics from stationary sources are also regulated in California under the Air Toxics "Hot Spot" Information and Assessment Act of 1987. Under AB 2588, toxic air contaminant emissions from individual facilities are quantified and prioritized by the air quality management district or air pollution control district. High-priority facilities are required to perform a health risk assessment and, if specific thresholds are exceeded, are required to communicate the results to the public in the form of notices and public meetings.

In the last update to the TAC list in December 1999, CARB designated 244 compounds as TACs (CARB 1999). Additionally, CARB has implemented control measures for a number of compounds that pose high risks and show potential for effective control. The majority of the estimated health risks from TACs can be attributed to relatively few compounds, the most important being particulate matter from diesel-fueled engines.

California Diesel Risk Reduction Plan

In September 2000, CARB adopted the Diesel Risk Reduction Plan (DRRP), which recommends many control measures to reduce the risks associated with diesel PM and achieve a goal of 85 percent by 2020. The DRRP incorporates measures to reduce emissions from diesel-fueled vehicles and stationary diesel-fueled engines. Ongoing efforts by CARB to reduce diesel-exhaust emissions from these sources include the development of specific statewide regulations, which are designed to further reduce diesel PM emissions. The goal of each regulation is to make diesel engines as clean as possible by establishing state-of-the-art technology requirements or emission standards to reduce diesel PM emissions.

Since the initial adoption of the DRRP in September 2000, CARB has adopted numerous rules related to the reduction of diesel PM from mobile sources, as well as the use of cleaner-burning fuels. Transportation sources addressed by these rules include public transit buses, school buses, on-road heavy-duty trucks, and off-road heavy-duty equipment.

4.2.3 IMPACTS AND MITIGATION MEASURES

STANDARDS OF SIGNIFICANCE

The impact analysis provided below is based on the application of the CEQA Guidelines Appendix G environmental checklist. An air quality impact is considered significant if implementation of the Project will:

1) Violate any air quality standard or contribute substantially to an existing or projected air quality violation.

2) Expose sensitive receptors to substantial pollutant concentrations.

3) Create objectionable odors affecting a substantial number of people.

4) Conflict with or obstruct implementation of any applicable air quality plan.

5) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is nonattainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors).

METHODOLOGY

The Laguna Ridge Specific Plan Environmental Impact Report (LRSP EIR) (SCH No. 2000082139) addressed air quality issues related to the development of the entire Laguna Ridge Specific Plan area, of which this Project is a part. The proposed Project will be subject to the Mitigation Monitoring and Reporting Program (MMRP) adopted for the Laguna Ridge Specific Plan, including implementation of mitigation measures required to reduce air quality impacts. The Laguna Ridge Specific Plan MMRP is included in **Appendix A** of this Draft SEIR.

The impact evaluation below utilizes the analyses completed for the LRSP EIR to determine whether implementation of the proposed Project would result in a new impact on air quality not previously addressed in the LRSP EIR, or increase the severity of previously identified LRSP EIR impacts.

Criteria Air Pollutants

Short-term construction-related and long-term operational air quality impacts are disclosed and assessed in accordance with methodologies recommended by CARB and the SMAQMD and in comparison to the recommended SMAQMD construction significance threshold of 85 pounds per day (lbs/day) of NO_X and operational significance threshold of 65 lbs/day of NO_X and ROG. Both short-term construction emissions and long-term operational emissions associated with the proposed Project were calculated using the California Emissions Estimator Model (CalEEMod), version 2013.2.2, computer program. This model was developed in coordination with the South Coast Air Quality Management District and is the most current emissions model approved for use in the State of California by various air districts. Output from the model runs for both construction and operational activity is provided in **Appendix D**.

Localized CO Concentrations

The SMAQMD provides a project-level screening procedure to determine whether detailed CO hotspot modeling is required for a proposed development project. Analysis of localized CO impacts relies on the screening methodologies recommended by the SMAQMD. Potential short-term exposure to CO associated with the proposed Project was qualitatively assessed based on a review of Project-generated traffic volumes and predicted intersection levels of service.

Exposure to Toxic Air Pollutants

Exposure to localized concentrations of toxic air contaminants was assessed based on a review of stationary sources within 2,640 feet of the Project site per the SMAQMD. Potential increases in risk associated with the future development of new sources associated with the Project were also qualitatively assessed. Potential exposure to localized mobile-source pollutants were qualitatively assessed based on a review of major roadways in the vicinity of the proposed Project site and associated predicted risks provided by the SMAQMD.

Exposure to Odorous Emissions

The SMAQMD considers appropriate land use planning the primary method to mitigate odor impacts. Providing a sufficient buffer zone between sensitive receptors and odor sources should be considered prior to analyzing implementation of odor mitigation technology. In accordance with SMAQMD methodologies, potential exposure to odorous emissions was qualitatively assessed, based on a review of nearby potential odor-generating sources obtained from the SMAQMD.

PROJECT IMPACTS AND MITIGATION MEASURES

Short-Term or Construction-Related Air Quality Impacts (Standard of Significance 1)

Impact 4.2.1 Construction activities associated with the development of the proposed Project would result in a short-term increase in criteria air pollutants within the Laguna Ridge Specific Plan area. **The proposed Project would result in an increase in the severity of this impact, which was previously identified in the LRSP EIR as significant and unavoidable.**

Three basic sources of short-term emissions will be generated through construction of the proposed Project: operation of the construction vehicles (i.e., excavators, trenchers, dump trucks), the creation of fugitive dust during clearing and grading, and the use of asphalt or other oil-based substances during paving activities. Construction activities such as excavation and grading operations, construction vehicle traffic, and wind blowing over exposed soils would generate exhaust emissions and fugitive particulate matter emissions that affect local air quality at various times during construction. Effects would be variable depending on the weather, soil conditions, the amount of activity taking place, and the nature of dust control efforts. The dry climate of the area during the summer months creates a high potential for dust generation.

Construction activities would be subject to SMAQMD Rule 403 that requires taking reasonable precautions to prevent the emissions of fugitive dust, such as using water or chemicals, where possible, for control of dust in the demolition of existing buildings or structures, construction operations, the construction of roadways, or the clearing of land, and applying asphalt, oil, water, or suitable chemicals on dirt roads, materials, stockpiles, and other surfaces that can give rise to airborne dust.

The previous analysis under the LRSP EIR found that construction activities associated with the development of the Specific Plan area would contribute to regional pollutants, such as ROG, NO_X, and PM_{10}, to a level that is significant and unavoidable, despite the implementation of several mitigation measures that reduced the LRSP's construction impact. **Table 4.2-5** shows the estimated maximum daily air pollutant emissions from development of the entire Laguna Ridge Specific Plan as identified in the LRSP EIR.

TABLE 4.2-5
LAGUNA RIDGE SPECIFIC PLAN CONSTRUCTION-RELATED EMISSIONS
(POUNDS PER DAY)

Construction Phases	Reactive Organic Gases (ROG)	Nitrogen Oxide (NO_X)	Coarse Particulate Matter (PM_{10})
Grading and Earthmoving	9.9	159.7	513.5
Structure Construction	163.6	235.9	16.3

Source: City of Elk Grove 2004b

The LRSP EIR mitigation measures address air quality impacts resulting from construction, including the requirements to water all exposed surfaces, graded areas, storage piles, and haul roads at least twice daily during construction, to minimize the amount of material actively worked, the amount of disturbed area, and the amount of material stockpiled, to limit vehicle speed for on-site construction vehicles to 15 miles per hour (mph) over unpaved surfaces, to wash or sweep paved streets adjacent to construction sites daily in order to remove accumulated dust, and to maintain 2 feet of freeboard when transporting soil or other materials by truck during construction and to cover the material. The LRSP EIR also contains construction-related mitigation intended to reduce NO_X emissions and control visible emissions from off-road diesel-powered equipment and a requirement that contractors implement ridesharing programs for construction employees traveling to and from the site. (The LRSP MMRP is included in **Appendix A** of this Draft EIR. See LRSP EIR mitigation measures MM 4.3.1a through MM 4.3.1g.)

Projected daily emissions from construction of the proposed Project have been estimated and are summarized in **Table 4.2-6**.

TABLE 4.2-6
CIVIC CENTER AQUATICS COMPLEX CONSTRUCTION-RELATED CRITERIA POLLUTANT AND PRECURSOR EMISSIONS (POUNDS PER DAY)

Construction Phases	Reactive Organic Gases (ROG)	Nitrogen Oxide (NO_x)	Carbon Monoxide (CO)	Sulfur Dioxide (SO_2)	Coarse Particulate Matter (PM_{10})	Fine Particulate Matter ($PM_{2.5}$)
Summer Emissions – Pounds per Day						
Earthwork & Underground Work[1]	8.34	98.50	61.66	0.08	4.76	4.08
Building Construction, Facility Features Construction, and Asphalt Paving						
Building Construction (75,000 square feet)	11.64	39.96	30.25	0.04	4.13	2.69
Facility Features Construction (Competition Venue & Adventure Water Park	22.62	125.87	113.94	0.18	10.04	6.39
Asphalt Paving[2]	2.20	20.44	12.97	0.01	1.38	1.20
Total	**36.46**	**186.27**	**157.16**	**0.23**	**15.55**	**10.28**
Winter Emissions – Pounds per Day						
Earthwork and Underground Work[1]	10.87	39.90	30.14	0.04	4.13	2.69
Building Construction, Facility Features Construction, and Asphalt Paving						
Building Construction (75,000 square feet)	11.79	40.08	30.81	0.04	4.13	2.69
Facility Features Construction (Competition Venue & Adventure Water Park	24.60	127.54	125.46	0.17	10.04	6.39
Asphalt Paving[2]	2.23	20.46	12.90	0.01	1.38	1.20
Total	**38.62**	**188.08**	**169.17**	**0.22**	**15.55**	**10.28**

Source: CalEEMod version 2013.2.
Notes: Construction equipment derived from information provided by the Project applicant. Particulate matter emissions account for adherence to SMAQMD Rule 403.
1. The Earthwork and Underground Work phase accounts for emissions of grading and site preparation for the 30-acre Project site and the 27.3-acre overflow parking lot.
2. The Asphalt Paving phase accounts for emissions from paving the entire 30-acre Project site and 27.3-acre overflow parking lot. Refer to Appendix D for model data outputs.

As shown in **Table 4.2-6**, Project emissions resulting from construction would not exceed the maximum projected construction emissions for the entire Laguna Ridge Specific Plan as identified in the LRSP EIR (9.9 lbs/day of ROG, 159.7 lbs/day of NO_x, and 513.5 lbs/day of PM_{10} during earthmoving activities; 163.6 lbs/day of ROG, 235.9 lbs/day of NO_x, and 16.3 lbs/day of PM_{10} during building construction; see **Table 4.2-5**). However, the construction-generated emissions from the Project would surpass the SMAQMD significance threshold of 85 pounds per day of NO_x emissions during the earthwork and underground work phase of construction, as well as during the construction of Project facilities. In addition, the emissions projections for the entire Laguna Ridge Specific Plan account for development spanning 1,900 acres and consist of the development of residential, commercial, park, public school, and mixed-use land uses. Therefore, while the estimated construction-generated emissions from the proposed Project are less than that estimated for the Specific Plan, the Project is only a portion of the Specific Plan area (57.3 acres associated with the construction of the Aquatics Complex and overflow parking as compared to 1,900 acres for the entire Specific Plan area). The Project includes construction of Project-related facilities within the Project site that would include substantial paving in the competition venue and water and adventure park, which would generate emissions of criteria pollutants. The athletic fields assumed in the LRSP EIR would not require this amount of paving and would, therefore, generate fewer emissions during construction. The Project would also require construction of additional overflow parking facilities north of Civic Center Drive that would not be required to accommodate the use on the site contemplated in the LRSP EIR. Therefore, it would exceed construction-related emissions assumed in the LRSP EIR.

As previously discussed, the Project would be subject to the MMRP adopted for the Laguna Ridge Specific Plan. For instance, in order to address NO_x emissions, the contractor shall be required to submit to the City and the SMAQMD a comprehensive inventory of all off-road construction equipment (50 horsepower or more) that will be used an aggregate of 40 or more hours during any portion of Project construction. The contractor would also be required to submit a plan demonstrating that the heavy-duty off-road vehicles (50 horsepower or more) to be used in construction, including owned, leased, and subcontractor vehicles, will achieve a Project-wide fleet average 20 percent NO_x reduction and 45 percent particulate reduction compared to the most recent CARB fleet average. Adherence to LRSP EIR mitigation measures would reduce construction-generated air pollutants.

Nevertheless, the proposed Project would result in an increase in the severity of this impact, which was previously identified in the LRSP EIR as significant and unavoidable, because, while the estimated construction-generated emissions from the proposed Project are less than that estimated for the entire Specific Plan, the Project is only a portion of the Specific Plan area. Furthermore, the construction-generated emissions resulting from the proposed Project would surpass the SMAQMD significance threshold of 85 pounds per day of NO_x emissions during the earthwork and underground work phase of construction, as well as during the construction of Project facilities. LRSP EIR mitigation measures MM 4.3.1a through MM 4.3.1g incorporate SMAQMD-recommended construction mitigation measures. No additional measures are available. Therefore, **the proposed Project would result in an increase in the severity of this impact, which was previously identified in the LRSP EIR as significant and unavoidable.**

Mitigation Measures

None available.

Long-Term Increases of Criteria Air Pollutants (Standard of Significance 1)

Impact 4.2.2 Implementation of the proposed Project would result in long-term increases in criteria air pollutants. **The proposed Project would not result in a substantial increase in the severity of this impact, which was previously identified in the LRSP EIR as significant and unavoidable. This impact would remain significant and unavoidable under the proposed Project, but there are no new or substantially more severe significant impacts.**

The analysis under the LRSP EIR found that the long-term increase of criteria air pollutants resulting from implementation of the LRSP would be a significant and unavoidable impact. This was concluded despite implementation of an air quality plan (AQ-15 Management Plan) that helps to reduce operational air quality impacts in the Specific Plan area by requiring mixed-use development and enhanced bicycle and pedestrian access to popular uses (LRSP EIR mitigation measure MM 4.3.2). As stated previously, the proposed Project would be subject to the MMRP adopted for the LRSP EIR, including mitigation measure MM 4.3.2 required to reduce long-term air quality impacts.

The LRSP EIR estimates operational air pollutant emissions associated with buildout of the entire 1,900-acre Specific Plan area. According to the LRSP EIR, buildout of the Specific Plan would result in 1,047 pounds per day of ROG, 611.9 pounds per day of NO_X, and 617.8 pounds per day of PM_{10}, as shown in **Table 4.2-7**.

TABLE 4.2-7
LAGUNA RIDGE SPECIFIC PLAN OPERATIONAL-RELATED EMISSIONS AT BUILDOUT (POUNDS PER DAY)

Operations	Reactive Organic Gases (ROG)	Nitrogen Oxide (NO_X)	Coarse Particulate Matter (PM_{10})
Laguna Ridge Specific Plan Buildout	1,047.1	611.9	617.8

Source: City of Elk Grove 2004b

Projected daily emissions from operations of the proposed Project are summarized in **Table 4.2-8**.

TABLE 4.2-8
CIVIC CENTER AQUATICS COMPLEX OPERATIONAL CRITERIA POLLUTANT AND PRECURSOR EMISSIONS (POUNDS PER DAY)

Project Operations	Reactive Organic Gases (ROG)	Nitrogen Oxide (NO_X)	Carbon Monoxide (CO)	Sulfur Dioxide (SO_2)	Coarse Particulate Matter (PM_{10})	Fine Particulate Matter ($PM_{2.5}$)
Summer Emissions – Pounds per Day						
Area Source (landscaping & consumer products)	21.83	0.00	0.00	0.00	0.00	0.00
Automobile Trips	39.91	29.09	158.88	0.28	19.48	5.46
Total	**61.74**	**29.09**	**158.88**	**0.28**	**19.48**	**5.46**
Winter Emissions – Pounds per Day						
Area Source (landscaping & consumer products)	21.83	0.00	0.00	0.00	0.00	0.00
Automobile Trips	42.83	33.10	171.86	0.26	19.49	5.47
Total	**64.66**	**33.10**	**171.86**	**0.26**	**19.49**	**5.47**

Source: CalEEMod version 2013.2. Automobile trip source emissions are derived from trip generation estimates identified in the traffic impact analysis prepared for the Project, which projects 2,810 average daily trips and 4,780 trips under the maximum attendance scenario(Fehr & Peers 2014). In order to provide a conservative analysis, the emissions projections assume the maximum attendance occurring every Saturday and Sunday. Refer to Appendix D for model data outputs.

As shown in **Table 4.2-8**, Project emissions resulting from operations would not exceed the maximum projected operation-source emissions for the entire Laguna Ridge Specific Plan as identified in the LRSP EIR (1,047 lbs/day of ROG, 611.9 lbs/day of NO_X, and 617.8 lbs/day of PM_{10}; see **Table 4.2-7**). However, the emissions projections for the entire Laguna Ridge Specific Plan account for development spanning 1,900 acres and consist of the development of residential, commercial, park, public school, and mixed-use land uses. Therefore, while the estimated operational emissions from the proposed Project are less than that estimated for the Specific Plan, the Aquatics Complex is only a portion of the Specific Plan area.

During preparation of the Laguna Ridge Specific Plan EIR, land use on the portion of the Project site located south of Civic Center Drive was changed from residential use to the park use that was ultimately approved. Prior to the change in land use, a traffic study had been prepared that assumed the site would be developed with up to 244 multi-family dwellings and 160 single-family dwellings. The City determined that although the traffic analysis overstated the traffic levels that would be generated on the site from park use, the analysis was conservative and it was retained in the EIR. Based on the residential uses, the LRSP EIR assumed an average daily automobile trip generation of 3,100 daily trips (Fehr & Peers 2012). The proposed Project is estimated to result in 2,810 average daily trips which is less than that assumed for the site with planned residential development. However, it is noted that the proposed Project is projected to generate 4,780 trips during days of maximum attendance. Nonetheless, because the operational emissions resulting from the proposed Project would not surpass the SMAQMD significance threshold of 65 pounds per day of ROG or NO_X emissions even considering days of maximum attendance, impacts would be **less than significant** for the Project, and Project-related emissions would not represent a substantial increase relative to the entire Specific Plan area. Therefore, **the proposed Project would not result in an increase in the severity of this impact, and there is not a new or substantially more severe significant impact.**

Mitigation Measures

None required.

Contribution to Near-Term Local Mobile-Source CO Concentrations (Standard of Significance 2)

Impact 4.2.3 Implementation of the proposed Project would contribute to localized concentrations of mobile-source CO that would exceed applicable standards. **The proposed Project would not result in an increase in the severity of this impact, and there is not a new or substantially more severe significant impact.**

The primary mobile-source criteria pollutant of local concern is carbon monoxide (CO). As noted previously, Sacramento County, and thus Elk Grove, is currently designated attainment for both California and national CO ambient air quality standards, and the county typically experiences low background CO concentrations.

Concentrations of CO are a direct function of the number of vehicles, length of delay, and traffic flow conditions. Transport of this criteria pollutant is extremely limited; CO disperses rapidly with distance from the source under normal meteorological conditions. Under certain meteorological conditions, however, CO concentrations close to congested intersections that experience high levels of traffic and elevated background concentrations may reach unhealthy levels, affecting nearby sensitive receptors. Given the high traffic volume potential, areas of high CO concentrations, or "hotspots," are typically associated with intersections that are projected to operate at unacceptable levels of service during the peak commute hours. Modeling is therefore typically conducted for intersections that are projected to operate at unacceptable levels of service during peak commute hours.

The SMAQMD provides a two-tiered, project-level screening procedure to determine whether detailed CO hotspot modeling is required for a proposed development project (SMAQMD 2011a). This preliminary screening methodology provides lead agencies with a conservative indication of whether project-generated vehicle trips would result in the generation of CO emissions that contribute to an exceedance of the thresholds of significance. Per the SMAQMD's CO hotspot Tier 1 screening threshold, projects would result in a less than significant impact on air quality for local CO if:

- Traffic generated by the proposed Project would not result in deterioration of intersection level of service (LOS) to LOS E or F;[1] or
- The Project would not contribute additional traffic to an intersection that already operates at LOS of E or F.

Based on the traffic analysis prepared for this Project (Fehr & Peer 2014, pgs. 37 and 38), the proposed Project would increase the number of vehicles on the following facilities over existing conditions, causing these facilities to degrade to an unacceptable level of service. All other traffic facilities in the vicinity of the Project are projected to continue to operate acceptably with Project implementation.

- Elk Grove Boulevard / I-5 Southbound Ramps
- Elk Grove Boulevard / Bruceville Road
- Elk Grove Boulevard / Big Horn Boulevard
- Elk Grove Boulevard / Laguna Springs Drive
- Elk Grove Boulevard / State Route 99 Southbound Ramps
- Elk Grove Boulevard / East Stockton Boulevard
- Civic Center Drive / Big Horn Boulevard

According to the SMAQMD, if the first tier of screening criteria is not met, the second tier of screening criteria is to be examined. Pursuant to the SMAQMD's CO hotspot Tier 2 screening threshold, a project would result in a less than significant impact on air quality for local CO if:

- The Project will not result in an affected intersection experiencing more than 31,600 vehicles per hour;
- The Project will not contribute traffic to a tunnel, parking garage, bridge underpass, urban street canyon, or below-grade roadway, or other locations where horizontal or vertical mixing of air will be substantially limited; and
- The mix of vehicle types at the intersection is not anticipated to be substantially different from the County average (as identified by the EMFAC or CalEEMod models).

According to the transportation impact analysis prepared for the Project, none of the intersections identified above would accommodate more than 31,600 vehicles per hour or even come close to such a threshold (Fehr & Peers 2014, Appendix C). For instance, the Elk Grove Boulevard/Interstate 5 southbound ramp intersection will experience 1,615 vehicle trips during

[1] Level of service (LOS) is a measure used by traffic engineers to determine the effectiveness of transportation infrastructure. LOS is most commonly used to analyze intersections by categorizing traffic flow with corresponding safe driving conditions. LOS A is considered the most efficient level of service and LOS F the least efficient.

the peak hour, the Elk Grove Boulevard/Bruceville Road intersection will experience 7,268 vehicle trips during the peak hour, and the Elk Grove Boulevard/Big Horn Boulevard intersection will experience 7,867 vehicle trips during the peak hour. The Elk Grove Boulevard/Laguna Springs Drive intersection will experience 6,769 vehicle trips during the peak hour, the Elk Grove Boulevard/State Route 99 southbound ramp intersection will experience 6,678 vehicle trips during the peak hour, and the Elk Grove Boulevard/East Stockton Boulevard intersection will experience 6,531 vehicle trips during the peak hour. Lastly, the Civic Center Drive/Big Horn Boulevard intersection will experience 4,971 trips during the peak hour (Fehr & Peers 2014, Appendix C). In addition, the Project would not contribute traffic to a tunnel, parking garage, bridge underpass, urban street canyon, or below-grade roadway, and the mix of vehicle types is not anticipated to be any different from the county average. As such, the proposed Project would not exceed the SMAQMD's significance thresholds for carbon monoxide, and impacts would be **less than significant**. Therefore, **the proposed Project would not result in an increase in the severity of this impact, and there is not a new or substantially more severe significant impact**.

Mitigation Measures

None required.

Long-Term Exposure of Sensitive Receptors to Toxic Air Contaminants (Standard of Significance 2)

Impact 4.2.4 Implementation of the proposed Project would not result in increased exposure of sensitive receptors to toxic air contaminants. **The proposed Project would not result in a substantial increase in the severity of this impact, which was previously identified in the LRSP EIR as less than significant. There are no new or substantially more severe significant impacts.**

The LRSP EIR determined that only a few uses that could be developed in the Specific Plan area would emit toxic pollutants as a byproduct. It was further determined that any uses of toxic substances that could involve an air release would be subject to regulatory control under the permitting authority of the SMAQMD. Based on this requirement to obtain permits, impacts were considered to be less than significant.

Some land uses are considered more sensitive to air pollution than others due to the types of population groups or activities involved. Sensitive population groups include children, the elderly, the acutely ill, and the chronically ill, especially those with cardiorespiratory diseases. The proposed Project could be considered sensitive due to the high number of children at an aquatics complex. According to the SMAQMD, when a project would include the development of new sensitive receptors, all sources of TACs that could potentially affect the proposed development within a half mile (2,640 feet) of the proposed project site should be analyzed. According to CARB's (2004) Community Health Air Pollution Information System, there are no sources of TACs with a half mile of the proposed Project site. This search was augmented by the EPA's (2013) National Air Toxic Program Release Chemical Report, which similarly does not identify any sources of air toxics within a half mile of the proposed Project site.

Freeways and major roadways are another source of TACs, because they are sources of diesel PM, which, as stated previously, has been listed as a TAC by CARB. Therefore, the proposal to locate a sensitive land use on the Project site could be negatively affected by TACs generated at Elk Grove Boulevard, a major roadway in Elk Grove located approximately 900 feet to the north of the Project site, and/or Big Horn Boulevard located adjacent to the western boundary of the Project site. The SMAQMD has prepared the Recommended Protocol for Evaluating the Location of Sensitive Land Uses Adjacent to Major Roadways, which was updated in March

2011. This protocol sets a screening threshold (276 per million) under which potential health risk impacts are not anticipated. The screening threshold was selected by the SMAQMD as that level of increased individual risk corresponding to a 70 percent reduction from the highest risk calculated at distances from the edge of the nearest travel lane to the nearest sensitive receptor for peak-hour traffic volumes.

Based on the location of the Project site (900 feet south of Elk Grove Boulevard) and the peak-hour volumes (3,968) along Elk Grove Boulevard, the location of the Project site would not exceed the thresholds identified in the refined protocol (see **Table 4.2-9**).

TABLE 4.2-9
SCREENING EVALUATION OF POTENTIAL CANCER RISK TO PROPOSED RECEPTORS ATTRIBUTABLE TO ELK GROVE BOULEVARD

Elk Grove Boulevard Road Peak-Hour Traffic (vehicles/hr)	Receptor Distance from Edge of Nearest Travel Lane (feet)	Incremental Cancer Risk per Million: South	Distance Screening Threshold (276 per million) Exceeded	Aquatic Complex Distance from Elk Grove Boulevard	Screening Threshold Surpassed?
3,968	10	102	At No Distance Is Screening Threshold Exceeded	900 feet	**No**
	25	86			
	50	67			
	100	48			
	200	32			
	300	22			
	400	19			
	500 (or greater)	16			

Source: SMAQMD 2011b; Peak-Hour Traffic Source: Fehr & Peers 2014.

Based on the location of the Project site (adjacent to Big Horn Boulevard) and the peak-hour volumes (3,767) along Big Horn Boulevard, the location of the Project site would not exceed the thresholds identified in the refined protocol (see **Table 4.2-10**).

TABLE 4.2-10
SCREENING EVALUATION OF POTENTIAL CANCER RISK TO PROPOSED RECEPTORS ATTRIBUTABLE TO BIG HORN BOULEVARD

Elk Grove Boulevard Road Peak-Hour Traffic (vehicles/hr)	Receptor Distance from Edge of Nearest Travel Lane (feet)	Incremental Cancer Risk per Million: South	Distance Screening Threshold (276 per million) Exceeded	Aquatic Complex Distance from Big Horn Boulevard	Screening Threshold Surpassed?
3,767	10	219	At No Distance Is Screening Threshold Exceeded	10 feet	**No**
	25	188			
	50	149			
	100	105			

Elk Grove Boulevard Road Peak-Hour Traffic (vehicles/hr)	Receptor Distance from Edge of Nearest Travel Lane (feet)	Incremental Cancer Risk per Million: South	Distance Screening Threshold (276 per million) Exceeded	Aquatic Complex Distance from Big Horn Boulevard	Screening Threshold Surpassed?
	200	67			
	300	51			
	400	38			
	500 (or greater)	32			

Source: SMAQMD 2011b; Peak-Hour Traffic Source: Fehr & Peers 2014.

For the reasons described above, the proposed Project would not result in exposure of proposed sensitive receptors to existing stationary and mobile sources of TACs, and impacts would be **less than significant**. Therefore, **the proposed Project would not result in an increase in the severity of this impact or a new or substantially more severe significant impact.**

Mitigation Measures

None required.

Exposure of Sensitive Receptors to Odorous Emissions (Standard of Significance 3)

Impact 4.2.5 Implementation of the proposed Project would not result in increased exposure of sensitive receptors to substantial objectionable odors. As a result, **the proposed Project would not result in an increase in the severity of this impact, and there is not a new or substantially more severe significant impact.**

The LRSP EIR determined that development of the Laguna Ridge Specific Plan would not result in additional significant impacts related to objectionable odors. The occurrence and severity of odor impacts depends on numerous factors, including the nature, frequency, and intensity of the source, wind speed and direction, and the sensitivity of the receptors. While offensive odors rarely cause any physical harm, they still can be very unpleasant, leading to considerable distress among the public and often generating citizen complaints to local governments and regulatory agencies. Projects with the potential to frequently expose members of the public to objectionable odors would be deemed to have a significant impact. According to the SMAQMD, land uses commonly considered to be potential sources of odorous emissions include wastewater treatment plants, sanitary landfills, composting/green waste facilities, recycling facilities, petroleum refineries, chemical manufacturing plants, painting/coating operations, rendering plants, and food packaging plants.

Operation of the Project would involve the use and storage of chlorine. Swimming facilities that use a chlorine-based disinfectant may experience a "chlorine odor" problem. This issue can be present in any pool, but are particularly a problem with indoor pools because of the confined air space in the room (Aquatics 2012). Chlorine odors actually result from chemical compounds called, chloramines, not actual chlorine (Aquatics 2012). Chloramines are chemical compounds that are formed when chlorine comes in contact with ammonia-nitrogen in various forms. This ammonia is introduced into the swimming pool through various sources, but the three most common sources in a pool are oils, sweat, and urine (Aquatics 2012). Chlorine odors encountered at a swimming facility are actually indicative of too little chlorine. A facility in this condition needs to be super-chlorinated by the addition of much more chlorine in order for the pool water to return to proper chemical balance (Aquatics 2012).

The proposed Project would utilize a tablet-based disinfectant control system in the pool facilities to accurately deliver the necessary chlorine to maintain water clarity, safety, and water balance by eliminating harmful bacteria, controlling algae, and destroying organic contaminants. The efficiency of chlorine usage for each body of water would be closely monitored and managed by an automatic chemistry controller. Use of chlorine at the Project site would be in accordance with guidelines set forth by the EPA. Proper maintenance of the water chemistry would eliminate the potential for substantial chlorine odors that could affect nearby uses.

No major sources of odors were identified in the vicinity of the Project site that could potentially affect proposed recreational land uses. In addition, the proposed Project would not result in any land uses defined by the SMAQMD as commonly considered to be potential sources of odorous emissions, and the proper use of chlorine would eliminate potential odor impacts associated with chlorine odor. Impacts would be **less than significant**. As a result, **the proposed Project would not result in an increase in the severity of this impact and there is not a new or substantially more severe significant impact**.

Mitigation Measures

None required.

4.2.4 CUMULATIVE SETTING, IMPACTS, AND MITIGATION MEASURES

CUMULATIVE SETTING

The cumulative setting for air quality is the Sacramento Valley Air Basin. The SVAB includes the counties of Sacramento, Placer, Yuba, and Sutter, and parts of Solano and Yolo counties. The climate and geography of the lower SVAB severely limits the dilution and transportation of any air pollutants that are released to the atmosphere. At current levels of development (residential, commercial, industrial, etc.) and activity, the air basin exceeds the state and federal ambient standards for particulates and ozone. As a result, the region is required to submit air quality attainment plans (i.e., the Sacramento Area Regional Ozone Attainment Plan and/or the Sacramento Area Regional PM_{10} Attainment Plan) that present comprehensive strategies to reduce air pollutant emissions from stationary, area, mobile, and indirect sources. Such strategies include the adoption of rules and regulations, enhancement of CEQA participation, implementation of a new and modified indirect source review program, adoption of local air quality plans, and stationary-, mobile-, and indirect-source control measures. Cumulative growth in population, vehicle use, and industrial activity in the SVAB could inhibit efforts to improve regional air quality and attain the ambient air quality standards. For example, the Capitol Southeast Connector project has proposed to construct a 35-mile-long multimodal transportation facility that will link communities in Sacramento and El Dorado counties, including Elk Grove, Rancho Cordova, Folsom, and El Dorado Hills.

CUMULATIVE IMPACTS AND MITIGATION MEASURES

Result in a Cumulatively Considerable Net Increase in Nonattainment Criteria Pollutant (Standards of Significance 4 and 5)

Impact 4.2.6 Implementation of the proposed Project, in combination with growth throughout the air basin, will not exacerbate existing regional problems with ozone and particulate matter. **The proposed Project would not result in a substantial increase in the severity of this impact, which was previously identified in the LRSP EIR as significant and unavoidable. There is no new or substantially more severe contribution to the cumulative impact that would result from the proposed Project.**

Due to the region's nonattainment status for ozone and PM, if Project-generated emissions of either of the ozone precursor pollutants (i.e., ROG and NO_x) or PM exceed the long-term SMAQMD thresholds, then the Project's cumulative impacts will be considered significant as determined by the SMAQMD. In addition, if the Project results in a change in land use and corresponding increases in vehicle miles traveled (VMT), the regional emissions inventories contained in regional air quality control plans, such as the Sacramento Area Regional Ozone Attainment Plan and/or the Sacramento Area Regional PM_{10} Attainment Plan, may not account for the resultant increase in VMT. Substantial increases in VMT that are not accounted for in the emissions inventory may result in a considerable cumulative contribution to the region's existing air quality nonattainment status.

As discussed in Impact 4.2.2, the Laguna Ridge Specific Plan originally assumed that the portion of the site south of Civic Center Drive would generate an average of 3,100 daily automobile trips. The proposed Project is estimated to result in 2,810 average daily trips, which is less than that assumed for the site with planned residential development. However, it is noted that the proposed Project is projected to generate 4,780 trips during days of maximum attendance. Nonetheless, the operational emissions resulting from the proposed Project would not surpass the SMAQMD significance threshold of 65 pounds per day of ROG or NO_x emissions, as shown in Impact 4.2.2. For these reasons, the proposed Project would result in a less than cumulatively considerable contribution to regional problems with ozone and PM. **The proposed Project would not result in an increase in the severity of this impact, and there is not a new or substantially more severe significant impact.**

Mitigation Measures

None required.

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4.3 BIOLOGICAL RESOURCES

4.3.1 EXISTING SETTING

Several steps were taken to characterize the environmental setting in the Project area. Project-related documentation was reviewed to collect site-specific data regarding habitat suitability for special-status species as well as the identification of potentially jurisdictional waters. Additional information was obtained from a variety of outside data sources and can be found in the reference list. Preliminary database searches were performed on the following websites to identify special-status species with the potential to occur in the area:

- US Fish and Wildlife Service's (USFWS) Sacramento Office Species Lists (2014a)
- USFWS Critical Habitat Portal (2014b)
- California Department of Fish and Wildlife (CDFW) California Natural Diversity Database (CNDDB) (2014a)
- California Native Plant Society (CNPS) Inventory of Rare, Threatened, and Endangered Plants of California (2014)

A search of the USFWS Sacramento Office's database was performed for the Florin, Sacramento West, Sacramento East, Carmichael, Clarksburg, Elk Grove, Galt, Bruceville, and Courtland, California, US Geological Survey (USGS) 7.5-minute quadrangles to identify special-species within their jurisdiction that may be affected by the Project. The query of the USFWS Critical Habitat Portal did not identify any critical habitat within the Project area. A query of the CNDDB provided a list of known occurrences for special-status species within the USGS quadrangles listed above. Lastly, the CNPS database was queried to identify special-status plant species with the potential to occur in the aforementioned quadrangles. Raw data from the database queries is provided in **Appendix E**. Refer to the Special-Status Species subsection below for a summary of the database search results, as well as conclusions regarding the potential for each species to be impacted by Project-related activities.

BIOLOGICAL SETTING

The Project area comprises a mix of urban, annual grassland, seasonal marsh, seasonal wetland, and drainage ditch cover types (**Figure 4.3-1**). Aquatic features were mapped using the jurisdictional delineation data from the Laguna Ridge Specific Plan (LRSP) EIR (**Appendix E**), combined with aerial photo-interpretation and reconnaissance-level surveys for the remainder of the Project area. Each cover type is described below based on reconnaissance-level surveys and the data presented in the LRSP EIR. The discussion includes species that were observed in the Project area during the surveys.

Urban

The urban/ruderal cover types consist of rural residential lots, maintained roads, and other altered habitats within the Project area. These properties typically contain residential structures along with various outbuildings and other structures utilized for farming operations. Vegetation within these lots is characterized by ornamental trees, shrubs, and manicured lawns. Weedy annual species including shepherd's purse (*Capsella bursa-pastoris*), chickweed (*Stellaria media*), fiddle-neck (*Amsinckia menziesii*), and groundsel (*Senecio vulgaris*) grow in disturbed areas and along the edges of hardscape.

The rural nature of the urban cover types within the Project area combined with the proximity of large expanses of cropland habitats provide suitable habitat for a variety of species including coyote (*Canis latrans*), raven (*Corvus corax*), gopher snake (*Pituophis catenifer*), and western fence lizard (*Sceloporus occidentalis*), as well as other common migratory birds and raptors.

Annual Grassland

Annual grassland habitats are open grasslands dominated by annual plant species found from the flat plains of the Central Valley to the coastal mountain ranges of Mendocino County and in scattered locations across the southern portion of the State. Species typically associated with this community include wild oats (Avena sp.), soft chess (Bromus hordeaceus), ripgut brome (Bromus diandrus), wild barley (Hordeum spp.), rat-tail fescue (Festuca myuros), broadleaf filaree (Erodium botrys), redstem filaree (Erodium cicutarium), turkey mullein (Croton setigerus), true clovers (*Trifolium* spp.), bur clover (*Medicago* spp.), popcorn flower (*Cryptantha* spp.), and several other grasses and forbs.

In the Project area, this community is composed primarily of introduced grass species, including Italian ryegrass (*Festuca perennis*), wild oats, soft chess, ripgut brome, rat-tail fescue, medusahead (*Elymus caput-medusae*), and dallis grass (*Paspalum dilatatum*). Several forb species can be found throughout the Project area, including field bindweed (*Convolvulus arvensis*), rose clover (*Trifolium hirtum*), vetch (*Vicia* spp.), broadleaf filaree, spiny-fruit buttercup (*Ranunculus muricatus*), shepherd's purse (*Capsella bursa-pastoris*), curly dock (*Rumex crispus*), cut-leaf geranium (*Geranium dissectum*), chicory (*Cichorium intybus*), dandelion (*Taraxacum officianale*), cheeseweed (*Malva parviflora*), wild radish (*Raphanus sativus*), spreading hedgeparsley (*Torilis arvensis*), yellow star-thistle (*Centaurea solstitialis*), spikeweed (*Centromadia fitchii*), smooth catsear (*Hypochaeris glabra*), prickly lettuce (*Lactuca serriola*), turkey mullein, Spanish lotus (*Acmispon americanus* var. *americanus*), centaury (*Zeltnera muehlenbergii*), and fireweed (*Epilobium brachycarpum*).

Annual grasslands provide foraging habitat for a wide variety of wildlife species including raptors, seed-eating birds, small mammals, amphibians, and reptiles. However, some require special habitat features such as cliffs, caves, ponds, or habitats with woody vegetation for breeding, resting, and escape cover. Reptiles commonly associated with this habitat type include western fence lizard, common garter snake (*Thamnophis sirtalis*), and western rattlesnake (*Crotalis viridis*). Black-tailed jackrabbit (*Lepus californicus*), California ground squirrel (*Otospermophilus beecheyi*), western harvest mouse (*Reithrodontomys megalotis*), deer mouse (*Peromyscus maniculatus*), Botta's pocket gopher (*Thomomys bottae*), California vole (*Microtus californicus*), badger (*Taxidea taxus*), and coyote are mammals commonly found in this habitat type. Avian species observed or expected to forage and/or nest in this habitat include American crow (*Corvus brachyrhynchos*), yellow-billed magpie (*Pica nuttalli*), western meadowlark (*Sturnella neglecta*), mourning dove (*Zenaida macroura*), turkey vulture (*Cathartes aura*), house finch (*Carpodacus mexicanus*), European starling (*Sturnus vulgaris*), northern harrier (*Circus cyaneus*), black-shouldered kite (*Elanus leucurus*), Swainson's hawk (*Buteo swainsoni*), red-tailed hawk (*Buteo jamaicensis*), and barn owl (*Tyto alba*).

Document Path: T:_GIS\Elk_Grove\MXDs\Civic_Center\Figure 4.3-1 Vegetation.mxd (5/30/2014)

City of Elk Grove
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Figure 4.3-1

Vegetative Communities

Wetland Preserve

The Project area contains 4.34 acres of wetland preserve. The wetland preserve was created as a component of mitigation required through U.S Army Corps of Engineers Permit SPK-2001-00633 issued to Reynan and Bardis Communities in 2005. The wetland preserve contains a seasonal marsh complex. Construction of the Grove, which occurred under authorization of the permit, removed a significant amount of the watershed draining into the feature, resulting in the unforeseen consequence of drying out the marsh (a jurisdictional wetland) and altering its condition that was originally described in the LRSP EIR as a perennial marsh. The marsh once was dominated by species adapted to perennially wet soil conditions such as broad-leaved cattail (*Typha latifolia*), tule (*Scirpus acutus*), and willow (*Salix* spp.) (City of Elk Grove 2004b). Presently, the dominant species include curly dock, Johnson grass (*Sorghum halepense*), willow herb (*Epilobium* sp.), smartweed (*Persicaria* spp.), Italian ryegrass, Himalayan blackberry (*Rubus discolor*), and willow.

Perennial marsh wetlands provide substantial foraging, breeding, and cover habitat for a wide variety or resident and migratory wildlife species. Many of the wildlife species associated with the agricultural land, great blue heron (*Ardea herodias*), great egret (*Casmerodius albus*), red-winged blackbird (*Agelaius phoeniceus*), black phoebe (*Sayornis nigricans*), and marsh wren (*Cistothorus palustris*), are expected to utilize this habitat. The seasonal marsh wetland has much less value to these species. Its greatest value to wildlife occurs during the winter when water is present and overwintering birds can use this area for foraging and shelter and rest. Common mammal species expected to occur in this habitat type include raccoon (*Procyon lotor*), striped skunk (*Mephitis mephitis*), and opossum (*Didelphis marsupialis*).

Seasonal Wetlands

The Project area contains 2 seasonal wetlands. A wide variety of herbaceous species are associated with this community type. Seasonal wetlands (vernal pools) within the Project area are characterized by seasonally saturated soils and/or standing water. Species associated with seasonal wetlands in the Project area include coyote thistle (*Eryngium* sp.), seaside barley (*Hordeum marinum*), Sacramento mesamint (*Pogogyne zizyphoroides*), Italian ryegrass, rayless goldfields (*Lasthenia glaberrima*), slender popcorn flower (*Plagiobothrys stipitatus*), dwarf lupine (*Lupinus bicolor*), buttercup (*Ranunculus* sp.), and woolly marbles (*Psilocarphus brevissimus*).

Seasonal wetlands in the Project area are likely used by similar species of reptile, mammal, and bird to those that use the grassy agricultural areas. In addition, the seasonally ponded nature of these wetlands may provide suitable habitat for vernal pool branchiopods.

Drainage Ditch

Two drainage ditches are found within the Project area. The drainages are highly modified channels that vary in species composition and persistence of water. One ditch appears to be isolated and is a remnant stretch of the ditch that historically flowed into the on-site marsh. The second ditch is the recently constructed channel that was created to replace the aforementioned ditch. This second ditch is lined with riprap and has a limited amount of vegetation growing in the channel. Associated plant species include Himalayan blackberry, rabbits-foot grass (*Polypogon monspelienses*), rough cocklebur (*Xanthium strumarium*), curly dock, Bermuda grass (*Cynodon dactylon*), smartweed (*Persicaria* spp.), willow herb, and various weedy annual grasses.

The banks and open water of these drainages provide habitat for a variety of wildlife. Many species of insectivorous birds (e.g., swallows, swifts, and flycatchers) catch their prey over open water.

SENSITIVE HABITATS

Sensitive habitats included are those that are of special concern to resource agencies or those that are protected under the California Environmental Quality Act (CEQA), Section 1600 of the California Fish and Game Code (FGC), and/or Sections 401 and 404 of the Clean Water Act.

Waters of the United States and/or State

Jurisdictional waters of the United States and the State along with isolated wetlands provide a variety of functions for plants and wildlife. Wetlands and other water features provide habitat, foraging, cover, and migration and movement corridors for both special-status and common species. In addition to habitat functions, these features provide physical conveyance of surface water flows capable of handling large stormwater events. Large storms can produce extreme flows that cause bank cutting and sedimentation of open waters and streams. Jurisdictional waters can slow these flows and lessen the effects of these large storm events, protecting habitat and other resources.

Jurisdictional delineations have been performed within the Project area (provided in **Appendix E**).The mapped extent of jurisdictional features presented in the LRSP EIR was utilized in combination with a reconnaissance-level survey and aerial photo-interpretation of the extant wetlands and drainages in the remainder of the Project area. Based on this data, approximately 0.2 acres of drainage ditches, 0.6 acres of seasonal wetlands, and 3.8 acres of seasonal marsh habitats potentially occur within the Project area.

WILDLIFE MOVEMENT CORRIDORS

Wildlife corridors refer to established migration routes commonly used by resident and migratory species for passage from one geographic location to another. Corridors are present in a variety of habitats and link otherwise fragmented acres of undisturbed area. Maintaining the continuity of established wildlife corridors is important to (a) sustain species with specific foraging requirements, (b) preserve a species' distribution potential, and (c) retain diversity among many wildlife populations. Therefore, resource agencies consider wildlife corridors to be a sensitive resource.

A review of the Missing Linkages in California's Landscape [ds420] and Essential Connectivity Areas – CEHC [ds623] data layers available on the CDFW's BIOS 5 viewer revealed that the Project area is not located within identified corridors (CDFW 2014b).

SPECIAL-STATUS SPECIES

Candidate, sensitive, or special-status species are commonly characterized as species that are at potential risk or actual risk to their persistence in a given area or across their native habitat. These species have been identified and assigned a status ranking by governmental agencies such as the CDFW and the USFWS and by private organizations such as the CNPS. The degree to which a species is at risk of extinction is the determining factor in the assignment of a status ranking. Some common threats to a species' or population's persistence include habitat loss, degradation, and fragmentation, as well as human conflict and intrusion. For the purposes of this biological review, special-status species are defined by the following codes:

- Listed, proposed, or candidates for listing under the federal Endangered Species Act (50 Code of Federal Regulations [CFR] 17.11 – listed; 61 Federal Register [FR] 7591, February 28, 1996, candidates)
- Listed or proposed for listing under the California Endangered Species Act (FGC 1992 Section 2050 et seq.; 14 California Code of Regulations [CCR] Section 670.1 et seq.)
- Designated as Species of Special Concern by the CDFW
- Designated as Fully Protected by the CDFW (FGC Sections 3511, 4700, 5050, 5515)
- Species that meet the definition of rare or endangered under CEQA (14 CCR Section 15380) including CNPS List Rank 1b and 2

The USFWS, CDFW, and CNPS database queries identified several special-status species with the potential to be impacted by Project-related activities. Table 1 in **Appendix E** provides a summary of all special-status species identified in the database results, a description of the habitat requirements for each species, and conclusions regarding the potential for each species to occur in the Project area. The CNDDB results within 1 mile of the Project are depicted on **Figure 4.3-2.** Species with the potential to occur in the habitats within the Project area are summarized in **Table 4.3-1** below. This table summarizes species that were identified in the LRSP EIR and the effects identified in the LRSP EIR for these species, as well as additional species identified during the updated literature search associated with the writing of this document.

TABLE 4.3-1
SUMMARY OF SPECIAL-STATUS SPECIES WITH THE POTENTIAL TO OCCUR IN HABITATS WITHIN THE PROJECT AREA

Species	Habitat Within Project area	Addressed in LRSP EIR/ Effect?	Potential Impacts of Proposed Project
Plants			
Ferris' milk-vetch Astragalus tener var. ferrisiae	Seasonal wetlands	No/NA	None. Species not observed during surveys (see **Appendix E**).
bristly sedge *Carex comosa*	Seasonal wetlands and seasonal marsh	No/NA	
dwarf downingia Downingia pusilla	Seasonal wetlands	Yes/No Effect	
Boggs Lake hedge-hyssop *Gratiola heterosepala*	Seasonal wetlands	Yes/No Effect	
legenere Legenere limosa	Seasonal wetlands	Yes/No Effect	
Sanford's arrowhead Sagittaria sanfordii	Marsh	Yes, Less than Significant with Mitigation	None. Marsh has shifted from perennial to seasonal; thus, no longer habitat for this species. See Impact 4.3.1.
saline clover Trifolium hydrophilum	Seasonal wetlands	No/NA	None. Species not observed during surveys (see **Appendix E**).

Species	Habitat Within Project area	Addressed in LRSP EIR/ Effect?	Potential Impacts of Proposed Project
Invertebrates			
conservancy fairy shrimp Branchinecta conservatio	Seasonal wetlands	No/NA	Potential impact. See Impact 4.3.3.
vernal pool fairy shrimp *Branchinecta lynchi*	Seasonal wetlands	Yes, Less than Significant with Mitigation	Potential impact. See Impact 4.3.3.
vernal pool tadpole shrimp *Lepidurus packardi*	Seasonal wetlands	Yes, Less than Significant with Mitigation	Potential impact. See Impact 4.3.3.
Reptiles			
giant garter snake *Thamnophis gigas*	Marsh and drainage ditches	Yes, Less than Significant with Mitigation	None. Marsh has shifted from perennial to seasonal, thus, no longer habitat for this species. Hydroperiod of ditches is too short to support this species. See Impact 4.3.2
Birds			
tricolored blackbird *Agelaius tricolor*	Marsh	Yes, Less than Significant with Mitigation	Potential impact. See Impact 4.3.6.
grasshopper sparrow Ammodramus savannarum	Throughout	No/NA	Potential impact. See Impact 4.3.6.
burrowing owl Athene cunicularia	Open areas throughout	Yes, Less than Significant with Mitigation	Potential impact. See Impact 4.3.4.
Swainson's hawk Buteo swainsoni	Throughout	Yes, Less than Significant with Mitigation	Potential impact. See Impact 4.3.5.
white-tailed kite *Elanus leucurus*	Throughout	Yes, Less than Significant with Mitigation	Potential impact. See Impact 4.3.5.
loggerhead shrike Lanius ludovicianus	Throughout	Yes, Less than Significant with Mitigation	Potential impact. See Impact 4.3.6.
least Bell's vireo Vireo bellii pusillus	Marsh	No/NA	Potential impact. See Impact 4.3.6.
Mammals			
Western red bat Lasiurus blossevillii	Structures	Yes, Less than Significant with Mitigation	Potential impact. See Impact 4.3.7.
American badger *Taxidea taxus*	Grassland	Yes/No Effect	No effect. Disturbed nature of the plan area likely precludes the occurrence of this species.

Map ID	Scientific Name	Common Name	Federal Listing	State Listing	Rare Plant Rank
1	*Agelaius tricolor*	tricolored blackbird	None	None	
2	*Athene cunicularia*	burrowing owl	None	None	
3	*Buteo swainsoni*	Swainson's hawk	None	Threatened	
4	*Sagittaria sanfordii*	Sanford's arrowhead	None	None	1B.2
5	*Thamnophis gigas*	giant garter snake	Threatened	Threatened	

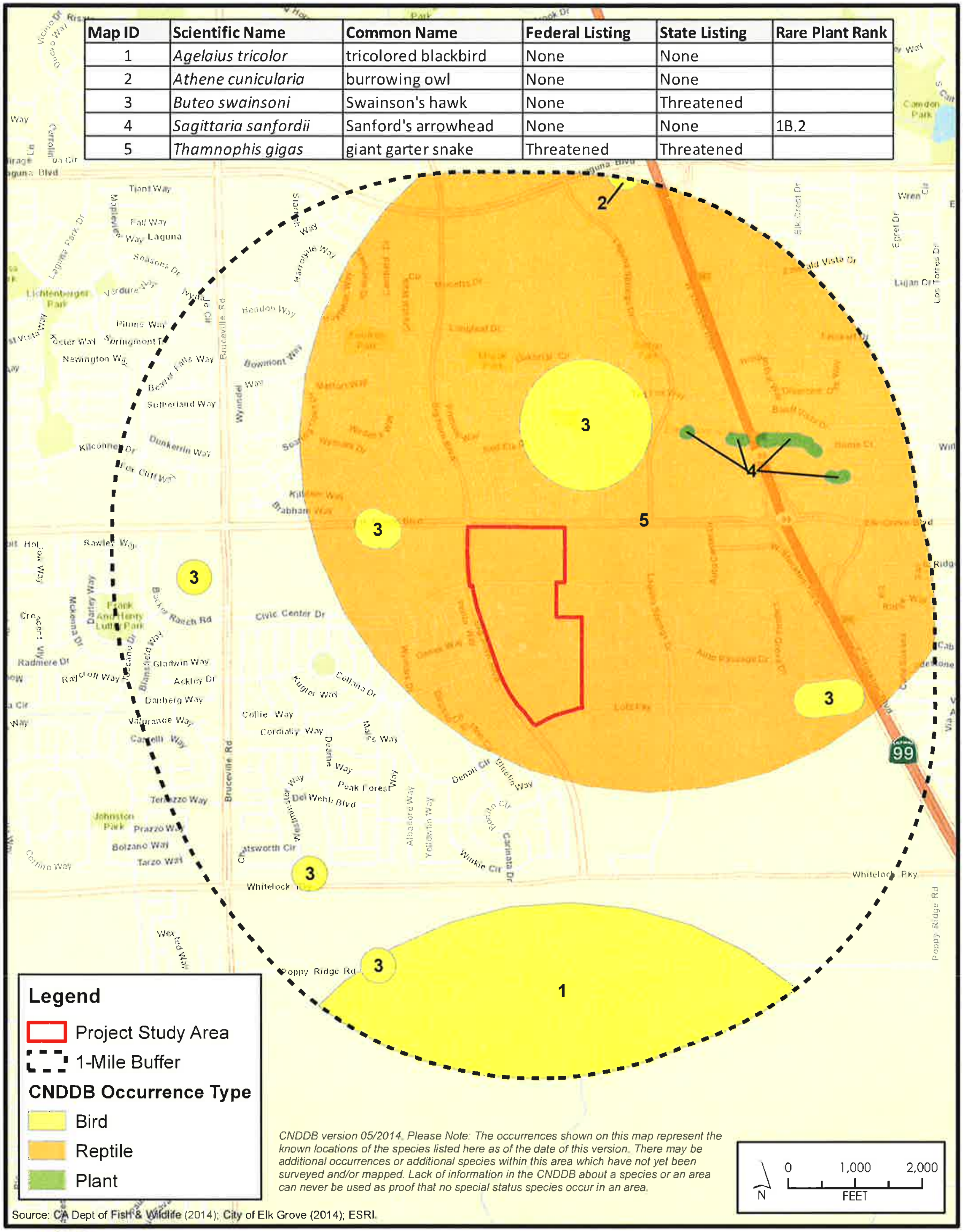

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Figure 4.3-2
Previously Recorded Occurrences of Special-Status Species Within 1 Mile of Project Study Area

4.3.2 REGULATORY FRAMEWORK

This section identifies environmental review and consultation requirements, as well as permits and approvals that must be obtained from local, State, and federal agencies before implementation of the Project.

FEDERAL

Endangered Species Act

The Endangered Species Act of 1973 (ESA), as amended, provides protective measures for federally listed threatened and endangered species, including their habitats, from unlawful take (16 United States Code (USC) Sections 1531–1544). The ESA defines "take" to mean "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct." Title 50, Part 222, of the Code of Federal Regulations (50 CFR Section 222) further defines "harm" to include "an act which actually kills or injures fish or wildlife. Such an act may include significant habitat modification or degradation where it actually kills or injures fish or wildlife by significantly impairing essential behavioral patterns including feeding, spawning, rearing, migrating, feeding, or sheltering."

ESA Section 7(a)(1) requires federal agencies to utilize their authority to further the conservation of listed species. ESA Section 7(a)(2) requires consultation with the USFWS or the National Marine Fisheries Service (NMFS) if a federal agency undertakes, funds, permits, or authorizes (termed the federal nexus) any action that may affect endangered or threatened species, or designated critical habitat. For projects that may result in the incidental take of threatened or endangered species, or critical habitat and that lack a federal nexus, a Section 10(a)(1)(b) incidental take permit can be obtained from the USFWS and/or the NMFS.

Clean Water Act

The basis of the Clean Water Act (CWA) was established in 1948; however, it was referred to as the Federal Water Pollution Control Act. The act was reorganized and expanded in 1972 (33 USC Section 1251), and at this time the Clean Water Act became the act's commonly used name. The basis of the CWA is the regulation of pollutant discharges into waters of the United States, as well as the establishment of surface water quality standards.

Section 404

CWA Section 404 (33 USC Section 1344) established the program to regulate the discharge of dredged or fill material into waters of the United States, including wetlands. Under this regulation, certain activities proposed within waters of the United States require the obtainment of a permit prior to initiation. These activities include, but are not limited to, placement of fill for the purposes of development, water resource projects (e.g., dams and levees), infrastructure development (e.g., highways and bridges), and mining operations.

The primary objective of this program is to ensure that the discharge of dredged or fill material is not permitted if a practicable alternative to the proposed activities exists that results in less impact to waters of the United States or the proposed activity would result in significant adverse impacts to these waters. To comply with these objectives, a permittee must document the measures taken to avoid and minimize impacts to waters of the United States and provide compensatory mitigation for any unavoidable impacts.

The US Environmental Protection Agency (EPA) and the USFWS are assigned roles and responsibilities in the administration of this program; however, the US Army Corps of Engineers (USACE) is the lead agency in the administration of day-to-day activities, including issuance of permits. The agencies will typically assert jurisdiction over the following waters: (1) traditional navigable waters (TNW); (2) wetlands adjacent to TNWs; (3) relatively permanent waters (RPW) that are non-navigable tributaries to TNWs and have relatively permanent flow or seasonally continuous flow (typically three months); and (4) wetlands that directly abut RPWs. Case-by-case investigations are usually conducted by the agencies to ascertain their jurisdiction over waters that are non-navigable tributaries and do not contain relatively permanent or seasonal flow, wetlands adjacent to the aforementioned features, and wetlands adjacent to but not directly abutting RPWs (USACE 2007). Jurisdiction is not generally asserted over swales or erosional features (e.g., gullies or small washes characterized by low-volume/short-duration flow events) or ditches constructed wholly within and draining only uplands that do not have relatively permanent flows.

The extent of jurisdiction within waters of the United States that lack adjacent wetlands is determined by the ordinary high water mark (OHWM). The OHWM is defined in 33 CFR Section 328.3(e) as the "line on the shore established by the fluctuations of water and indicated by physical characteristics such as clear, natural line impressed on the bank, shelving, changes in the character of soil, destruction of terrestrial vegetation, the presence of litter and debris, or other appropriate means that consider the characteristics of the surrounding areas." Wetlands are further defined under 33 CFR Section 328.3 and 40 CFR Section 230.3 as "those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions" and typically include "swamps, marshes, bogs, and similar areas." The 1987 *Corps of Engineers Wetland Delineation Manual* (1987 Manual) sets forth a standardized methodology for delineating the extent of wetlands under federal jurisdiction (USACE 1987).

The 1987 Manual outlines three parameters that all wetlands, under normal circumstances, must contain positive indicators for to be considered jurisdictional. These parameters include (1) wetland hydrology, (2) hydrophytic vegetation, and (3) hydric soils (USACE 1987). In 2006, the USACE issued a series of Regional Supplements to address regional differences that are important to the functioning and identification of wetlands. The supplements present "wetland indicators, delineation guidance, and other information" that is specific to the region. The USACE requires that wetland delineations submitted after June 5, 2007, be conducted in accordance with both the 1987 Manual and the applicable supplement.

Section 401

Under CWA Section 401 (33 USC Section 1341), federal agencies are not authorized to issue a permit and/or license for any activity that may result in discharges to waters of the United States, unless a state or tribe where the discharge originates either grants or waives CWA Section 401 certification. CWA Section 401 provides states or tribes with the ability to grant, grant with conditions, deny, or waive certification. Granting certification, with or without conditions, allows the federal permit/license to be issued and remain consistent with any conditions set forth in the CWA Section 401 certification. Denial of the certification prohibits the issuance of the federal license or permit, and waiver allows the permit/license to be issued without comments from states or tribes. Decisions made by states or tribes are based on the proposed Project's compliance with EPA water quality standards as well as applicable effluent limitations guidelines, new source performance standards, toxic pollutant restrictions, and any other appropriate requirements of state or tribal law. In California, the State Water Resources Control Board is the primary regulatory authority for CWA Section 401 requirements (additional details below).

Migratory Bird Treaty Act

Migratory birds are protected under the Migratory Bird Treaty Act (MBTA) of 1918 (16 USC Sections 703–711). The MBTA makes it unlawful to take, possess, buy, sell, purchase, or barter any migratory bird listed in 50 CFR Section 10, including feathers or other parts, nests, eggs, or products, except as allowed by implementing regulations (50 CFR Section 21). The majority of birds found in the Project vicinity would be protected under the MBTA.

Bald and Golden Eagle Protection Act

The bald eagle and golden eagle are federally protected under the Bald and Golden Eagle Protection Act (16 USC Sections 668–668c). Under the act, it is illegal to take, possess, sell, purchase, barter, offer to sell or purchase or barter, transport, export, or import at any time or in any manner a bald or golden eagle, alive or dead; or any part, nest or egg of these eagles unless authorized by the Secretary of the Interior. Violations are subject to fines and/or imprisonment for up to one year. Active nest sites are also protected from disturbance during the breeding season.

Executive Order 13112 – Invasive Species

This executive order directs all federal agencies to refrain from authorizing, funding, or carrying out actions or projects that may spread invasive species. The order further directs federal agencies to prevent the introduction of invasive species, control and monitor existing invasive species populations, restore native species to invaded ecosystems, research and develop prevention and control methods for invasive species, and promote public education on invasive species. As part of the proposed action, the USFWS and the USACE would issue permits and therefore would be responsible for ensuring that the proposed action complies with Executive Order 13112 and does not contribute to the spread of invasive species.

Fish and Wildlife Coordination Act of 1958 (16 USC 661 et seq.)

The Fish and Wildlife Coordination Act requires that whenever any body of water is proposed or authorized to be impounded, diverted, or otherwise controlled or modified, the lead federal agency must consult with the USFWS, the state agency responsible for fish and wildlife management, and the National Marine Fisheries Service. Section 662(b) of the act requires the lead federal agency to consider the recommendations of the USFWS and other agencies. The recommendations may include proposed measures to mitigate or compensate for potential damages to wildlife and fisheries associated with a modification of a waterway.

Executive Order 11990 – Protection of Wetlands (42 FR 26961)

Executive Order 11990 requires federal agencies to provide leadership and take action to minimize destruction, loss, or degradation of wetlands and to preserve and enhance the natural qualities of these lands. Federal agencies are required to avoid undertaking or providing support for new construction located in wetlands unless (1) no practicable alternative exists and (2) all practical measures have been taken to minimize harm to wetlands.

STATE

California Endangered Species Act

Under the California Endangered Species Act (CESA), the CDFW has the responsibility for maintaining a list of endangered and threatened species (FGC Section 2070). The CDFW also maintains a list of "candidate species," which are species formally noticed as being under review for potential addition to the list of endangered or threatened species, and a list of "species of special concern," which serve as a species "watch lists."

Pursuant to the requirements of the CESA, an agency reviewing a proposed project within its jurisdiction must determine whether any State-listed endangered or threatened species may be present and determine whether the proposed project will have a potentially significant impact on such species. In addition, the CDFW encourages informal consultation on any proposed project that may impact a candidate species.

Project-related impacts to species on the CESA endangered or threatened list would be considered significant. State-listed species are fully protected under the mandates of the CESA. Take of protected species incidental to otherwise lawful management activities may be authorized under FGC Section 206.591. Authorization from the CDFW would be in the form of an incidental take permit.

California Fish and Game Code

Streambed Alteration Agreement (FGC Sections 1600–1607)

State and local public agencies are subject to FGC Section 1602, which governs construction activities that will substantially divert or obstruct the natural flow or substantially change the bed, channel, or bank of any river, stream, or lake designated as waters of the State by the CDFW. Under FGC Section 1602, a discretionary Streambed Alteration Agreement must be issued by the CDFW to a project proponent prior to the initiation of construction activities within lands under CDFW jurisdiction. As a general rule, this requirement applies to any work undertaken within the 100-year floodplain of a stream or river containing fish or wildlife resources.

Native Plant Protection Act

The Native Plant Protection Act (FGC Sections 1900–1913) prohibits the taking, possessing, or sale within the State of any plants with a State designation of rare, threatened, or endangered (as defined by the CDFW). An exception in the act allows landowners, under specified circumstances, to take listed plant species, provided that the owners first notify the CDFW and give that State agency at least 10 days to retrieve the plants before they are plowed under or otherwise destroyed (FGC Section 1913). Project impacts to these species are not considered significant unless the species are known to have a high potential to occur within the area of disturbance associated with construction of the proposed Project.

Birds of Prey

Under FGC Section 3503.5, it is unlawful to take, possess, or destroy any birds in the orders Falconiformes or Strigiformes (birds of prey) or to take, possess, or destroy the nest or eggs of any such bird except as otherwise provided by this code or any regulation adopted pursuant thereto.

Fully Protected Species

California statutes also afford fully protected status to a number of specifically identified birds, mammals, reptiles, and amphibians. These species cannot be taken, even with an incidental take permit. FGC Section 3505 makes it unlawful to take "any aigrette or egret, osprey, bird of paradise, goura, numidi, or any part of such a bird." FGC Section 3511 protects from take the following fully protected birds: (a) American peregrine falcon (*Falco peregrinus anatum*); (b) brown pelican (*Pelecanus occidentalis*); (c) California black rail (*Laterallus jamaicensis coturniculus*); (d) California clapper rail (*Rallus longirostris obsoletus*); (e) California condor (*Gymnogyps californianus*); (f) California least tern (*Sterna albifrons browni*); (g) golden eagle; (h) greater sandhill crane (*Grus canadensis tabida*); (i) light-footed clapper rail (*Rallus longirostris levipes*); (j) southern bald eagle (*Haliaeetus leucocephalus leucocephalus*); (k) trumpeter swan (*Cygnus buccinator*); (l) white-tailed kite (*Elanus leucurus*); and (m) Yuma clapper rail (*Rallus longirostris yumanensis*).

FGC Section 4700 identifies the following fully protected mammals that cannot be taken: (a) Morro Bay kangaroo rat (*Dipodomys heermanni morroensis*); (b) bighorn sheep (*Ovis canadensis*), except Nelson bighorn sheep (subspecies *Ovis canadensis nelsoni*); (c) northern elephant seal (*Mirounga angustirostris*); (d) Guadalupe fur seal (*Arctocephalus townsendi*); (e) ring-tailed cat (genus *Bassariscus*); (f) Pacific right whale (*Eubalaena sieboldi*); (g) salt-marsh harvest mouse (*Reithrodontomys raviventris*); (h) southern sea otter (*Enhydra lutris nereis*); and (i) wolverine (*Gulo gulo*).

FGC Section 5050 protects from take the following fully protected reptiles and amphibians: (a) blunt-nosed leopard lizard (*Crotaphytus wislizenii silus*); (b) San Francisco garter snake (*Thamnophis sirtalis tetrataenia*); (c) Santa Cruz long-toed salamander (*Ambystoma macrodactylum croceum*); (d) limestone salamander (*Hydromantes brunus*); and (e) black toad (*Bufo boreas exsul*).

FGC Section 5515 identifies certain fully protected fish that cannot lawfully be taken, even with an incidental take permit. The following species are protected in this fashion: (a) Colorado River squawfish (*Ptychocheilus lucius*); (b) thicktail chub (*Gila crassicauda*); (c) Mohave chub (*Gila mohavensis*); (d) Lost River sucker (*Catostomus luxatus*); (e) Modoc sucker (*Catostomus microps*); (f) shortnose sucker (*Chasmistes brevirostris*); (g) humpback sucker (*Xyrauchen texanus*); (h) Owens River pupfish (*Cyprinoden radiosus*); (i) unarmored threespine stickleback (*Gasterosteus aculeatus williamsoni*); and (j) rough sculpin (*Cottus asperrimus*).

California Wetlands and Other Waters Policies

The California Resources Agency and its various departments do not authorize or approve projects that fill or otherwise harm or destroy coastal, estuarine, or inland wetlands. Exceptions may be granted if all of the following conditions are met:

- The project is water-dependent.
- No other feasible alternative is available.
- The public trust is not adversely affected.
- Adequate compensation is proposed as part of the project.

Porter-Cologne Water Quality Control Act

The Porter-Cologne Water Quality Control Act of 1966 (California Water Code Section 13000 et seq.; CCR Title 23, Chapter 3, Subchapter 15) is the primary State regulation addressing water quality. The requirements of the act are implemented by the State Water Resources Control Board at the State level and at the local level by the Regional Water Quality Control Board (RWQCB). The RWQCB carries out planning, permitting, and enforcement activities related to water quality in California. The act provides for waste discharge requirements and a permitting system for discharges to land or water. Certification is required by the RWQCB for activities that can affect water quality.

Clean Water Act, Section 401 Water Quality Certification

CWA Section 401 (33 USC Section 1341) requires that any applicant for a federal license or permit that may result in a pollutant discharge to waters of the United States obtain a certification that the discharge will comply with EPA water quality standards. The State or tribal agency responsible for issuance of the Section 401 certification may also require compliance with additional effluent limitations and water quality standards set forth in State/tribal laws. In California, the RWQCB is the primary regulatory authority for CWA Section 401 requirements.

The Central Valley RWQCB is responsible for enforcing water quality criteria and protecting water resources in the Project area. In addition, the RWQCB is responsible for controlling discharges to surface waters of the State by issuing waste discharge requirements (WDR) or commonly by issuing conditional waivers to WDRs. The RWQCB requires that a project proponent obtain a CWA Section 401 water quality certification for CWA Section 404 permits issued by the USACE. A request for water quality certification (including WDRs) by the RWQCB and an application for a General Permit for Storm Water Discharges Associated with Construction Activities are prepared and submitted following completion of the CEQA environmental document and submittal of the wetland delineation to the USACE.

Delegated Permit Authority

California has been delegated permit authority for the National Pollutant Discharge Elimination System (NPDES) permit program, including stormwater permits for all areas except tribal lands. Issuance of CWA Section 404 dredge and fill permits remains the responsibility of the USACE; however, the State actively uses its CWA Section 401 certification authority to ensure CWA Section 404 permits are in compliance with State water quality standards.

State Definition of Covered Waters

Under California State law, the term *waters of the State* means "any surface water or groundwater, including saline waters, within the boundaries of the state." Therefore, water quality laws apply to both surface water and groundwater. After the US Supreme Court decision in *Solid Waste Agency of Northern Cook County v. US Army Corps of Engineers*, the Office of Chief Counsel of the State Water Resources Control Board released a legal memorandum confirming the State's jurisdiction over isolated wetlands. The memorandum stated that under the California Porter-Cologne Water Quality Control Act (Porter-Cologne), discharges to wetlands and other waters of the State are subject to State regulation, and this includes isolated wetlands. In general, the Board regulates discharges to isolated waters in much the same way as it does for waters of the United States, using Porter-Cologne rather than Clean Water Act authority.

NONGOVERNMENTAL AGENCY

California Native Plant Society

The California Native Plant Society (CNPS) is a nongovernmental agency that classifies native plant species according to current population distribution and threat level in regard to extinction. These data are utilized by the CNPS to create/maintain a list of native California plants that have low numbers, limited distribution, or are otherwise threatened with extinction. This information is published in the *Inventory of Rare and Endangered Plants* (CNPS 2014). Potential impacts to populations of CNPS-listed plants receive consideration under CEQA review.

The following identifies the definitions of the CNPS listings:

List 1A: Plants believed to be extinct

List 1B: Plants that are rare, threatened, or endangered in California and elsewhere

List 2: Plants that are rare, threatened, or endangered in California, but are more numerous elsewhere

All of the plant species on List 1 and 2 meet the requirements of the Native Plant Protection Act Section 1901, Chapter 10, or FGC Section 2062 and Section 2067 and are eligible for State listing. Plants appearing on List 1 or 2 are considered to meet the criteria of CEQA Section 15380, and effects on these species are considered "significant." Classifications for plants on List 3 (plants about which we need more information and/or List 4 (plants of limited distribution), as defined by the CNPS, are not currently protected under State or federal law. Therefore, no detailed descriptions were provided or impact analysis performed on species with these classifications.

LOCAL

City of Elk Grove Municipal Code – Tree Preservation and Protection

Chapter 19.12 of the City Municipal Code, Tree Preservation and Protection, strives to protect and preserve trees of local importance, including coast live oak, valley oak, blue oak, interior live oak, oracle oak, California sycamore, and California black walnut with a single trunk 6 inches diameter at breast height (dbh) or greater or a multi-trunk with a combined dbh of 6 inches or greater. Chapter 19.12 requires mitigation for the removal of trees of local importance with dimensions described above, trees that have been selected for preservation, all portions of adjacent off-site native trees that have driplines that extend onto the Project site, and all off-site native trees that may be impacted by utility installation and/or improvements associated with the Project. Current policies require that every inch lost will be mitigated by an inch planted or equivalent credit obtained from a tree mitigation bank.

City of Elk Grove Municipal Code – Swainson's Hawk Impact Mitigation Fees

Chapter 16.130 of the City Municipal Code, Swainson's Hawk Impact Mitigation Fees, requires mitigation for the loss of Swainson's hawk habitat at a 1:1 ratio. Mitigation can be achieved through the payment of a fee, which is used to fund the City's Swainson's hawk habitat restoration program. Other options for achieving mitigation through the code include the direct transfer to the City of a Swainson's hawk habitat conservation easement along with an easement monitoring endowment or the purchase of credits at a CDFW-approved conservation bank. The site must be surveyed to determine whether it is suitable Swainson's hawk foraging habitat.

City of Elk Grove General Plan

The City's General Plan identifies specific goals, objectives, and policies regarding natural resources (City of Elk Grove 2003a). The General Plan serves as the overall guiding policy document for land use, development, and environmental quality for the City. The Conservation and Air Quality Element of the General Plan include goals and policies to preserve, protect, enhance, and promote the City's valuable natural resources. The General Plan identifies specific goals and policies regarding biological and natural resources. The following policies are applicable to the proposed Project:

"CAQ-8: Large trees of all species are an important aesthetic (and, in some cases, biological) resource. Trees which function as an important part of the City's or a neighborhood's aesthetic character or as natural habitat should be retained during the development of new structures, roadways (public and private, including roadway widening), parks, or other uses."

"CAQ-9: Wetlands, vernal pools, marshland and riparian (streamside) areas are considered to be important resources. Impacts to these resources shall be avoided whenever technically feasible."

"PRO-5: The City views open space lands of all types as important resource which should be preserved in the region, and supports the establishment of multi-purpose open space areas to address a variety of needs, including, but not limited to:

- Maintenance of agricultural uses
- Wildlife habitat
- Recreational open space
- Aesthetic benefits
- Flood control

To the extent possible, lands protected in accordance with this policy should be in proximity to Elk Grove, to facilitate use of these areas by Elk Grove residents, assist in mitigation of habitat loss within the city, and provide an open space resource close to the urbanized areas of Elk Grove."

Proposed South Sacramento County Habitat Conservation Plan

The South Sacramento County Habitat Conservation Plan (SSHCP) is in the process of being prepared and will address the conservation and development of lands within this southern area of Sacramento County. Some of the species analyses of the plan are complete and include northern harrier (*Circus cyaneus*), tri-colored blackbird, giant garter snake, vernal pool fairy shrimp (*Branchinecta lynchi*), and Sanford's arrowhead. The complete list can be found on the Sacramento County Planning and Community Development Department website (Sacramento County 2006). The City supports the South Sacramento County Habitat Conservation Planning efforts but currently is not a participant in the plan. The area bound by the City's limits is not in the SSHCP Plan area currently, but the City may seek participation in the Plan at a later date.

4.3.3 IMPACTS AND MITIGATION MEASURES

STANDARDS OF SIGNIFICANCE

The impact analysis provided below is based on the application of the CEQA Guidelines Appendix G environmental checklist. A project is considered to have a significant effect on the environment if it will:

1) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by the CDFW or the USFWS.

2) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, or regulations or by the CDFW or the USFWS.

3) Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the CWA (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means.

4) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites.

5) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance.

6) Conflict with the provisions of an adopted habitat conservation plan, natural community conservation plan, or other approved local, regional, or State habitat conservation plan.

7) Reduce the number or restrict the range of an endangered, rare, or threatened plant or animal species or biotic community, thereby causing the species or community to drop below self-sustaining levels.

METHODOLOGY

The LRSP EIR (SCH No. 2000082139) addressed biological resources issues related to the development of the entire Laguna Ridge Specific Plan area, of which this Project is a part. The proposed Project will be subject to the Mitigation Monitoring and Reporting Program (MMRP) adopted for the Laguna Ridge Specific Plan, including implementation of mitigation measures required to reduce impacts to biological resources. The Laguna Ridge Specific Plan MMRP is included in **Appendix A** of this Draft SEIR.

The impact evaluation below utilizes the analyses completed for the LRSP EIR as well as the outcomes of studies and surveys undertaken in 2014 to determine whether implementation of the proposed Project would result in a new impact to biological resources not previously addressed in the LRSP EIR or increase the severity of previously identified impacts.

IMPACTS AND MITIGATION MEASURES

Impacts to Candidate, Sensitive, or Special-Status Species (Standards of Significance 1 and 7)

Special-Status Plant Species

Impact 4.3.1 Implementation of Project-related activities would not result in substantial adverse effects, either directly or through habitat modification, to special-status plant species. **The LRSP EIR identified this impact as less than significant with mitigation. The proposed Project would result in no impact to special-status plant species and therefore would not result in a substantial increase in the severity of this impact.**

The analysis in the LRSP EIR found that the perennial marsh complex within the wetland preserve in the Project area provided potentially suitable habitat for Sanford's arrowhead. The LRSP EIR included mitigation specific to Sanford's arrowhead for any work done near the marsh. Currently the wetland preserve functions as a seasonal marsh complex and no longer supports potential habitat for Sanford's arrowhead (see wetland preserve discussion in Section 4.3.4 Existing Setting)

The LRSP EIR determined that the seasonal wetlands including the two seasonal wetlands in the Project area were not suitable habitat for special-status plants based on the wetlands' disturbed nature. Results of a May 2014 plant survey confirmed the absence of the species addressed in the LRSP EIR as well as Ferris' milk-vetch, bristly sedge, and saline clover (see **Appendix E**).

Thus, there is no impact to special-status plant species and there is no requirement to implement LRSP EIR mitigation measures MM 4.8.2a through 4.8.2b. **The proposed Project would not result in an increase in the severity of this impact, and there is not a new or substantially more severe significant impact.**

Mitigation Measures

None required.

Giant Garter Snake

Impact 4.3.2 Implementation of Project-related activities would not result in substantial adverse effects, either directly or through habitat modifications, to giant garter snake. **The LRSP EIR identified this impact as less than significant with mitigation. The proposed Project would result in no impact to giant garter snake and therefore would not result in a substantial increase in the severity of this impact.**

The analysis in the LRSP EIR found that the perennial marsh complex within the wetland preserve and drainage ditches in the Project area provided potentially suitable habitat for giant garter snake. Currently, the wetland preserve functions as a seasonal marsh complex and no longer supports potential habitat giant garter snake (see wetland preserve discussion in Section 4.3.4 Existing Setting).

The remnant ditch lacks perennial water and therefore no longer is habitat for giant garter snake habitat. The new ditch also lacks perennial water . Rock armoring and open vegetative cover make this feature unsuitable habitat for this species. All potential giant garter snake habitat has been removed from the Project area. Thus, there would be **no impact** to giant garter snake and there is no requirement to implement LRSP EIR mitigation measures (MM 4.8.4a through 4.8.4e). **The proposed Project would not result in an increase in the severity of this impact, and there is not a new or substantially more severe significant impact.**

Mitigation Measures

None required.

Vernal Pool Branchiopods

Impact 4.3.3 Implementation of Project-related activities could result in substantial adverse effects, either directly or through habitat modification, to conservancy fairy shrimp, vernal pool fairy shrimp, and/or vernal pool tadpole shrimp. **The LRSP EIR identified this impact as less than significant with mitigation. The proposed Project would not result in a new impact or substantially increase the severity of a previously identified significant impact.**

More than 10 occurrences of vernal pool fairy shrimp and vernal pool tadpole shrimp have been reported within 5 miles of the Project area (CDFW 2014a). Approximately 0.6 acres of seasonal wetland (e.g., vernal pool) habitat occurs within the Project area, which could be considered suitable habitat for conservancy fairy shrimp, vernal pool fairy shrimp, and/or vernal pool tadpole shrimp. Due to the proximity of known occurrences and the presence of suitable habitat within the Project area, the potential exists for adverse impacts to listed vernal pool branchiopods due to Project-related activities. LRSP EIR mitigation measure MM 4.8.6 requires mitigation of vernal pools through on-site creation/preservation of the pools or purchase of credits at an approved mitigation bank that mitigates this impact to **less than significant. The proposed Project would not result in an increase in the severity of this impact, and there is not a new or substantially more severe significant impact.**

Mitigation Measures

None required.

Nesting Raptors and Other Migratory Birds

Impact 4.3.4 Implementation of Project-related activities could result directly disturbance to nesting raptors and other migratory birds including burrowing owl. **The LRSP EIR identified this impact as less than significant with mitigation. The proposed Project would not result in a new impact or substantially increase the severity of a previously identified significant impact.**

The Project area supports habitat for raptors and other migratory birds including burrowing owl. Focused surveys for these species have not been conducted. The presence of potentially suitable habitat and the California Natural Diversity Database record of burrowing owl within 1 mile of the Project identify a potential for this species to be present in the Project area. LRSP EIR mitigation measure MM 4.8.8 requires preconstruction surveys for nesting migratory birds, including burrowing owl, 30 days prior to construction activity, with avoidance measures if active nests are present. The LRSP EIR determined that mitigation measure MM 4.8.8 would reduce the impact to **less than significant**. Pre-construction surveys 30 days prior to construction of the Project would identify any nesting raptors or migratory birds, if present, and allow for avoidance if required. Implementation of this measure in the Project area would have the same mitigating effect for the proposed Project. **The proposed Project would not result in an increase in the severity of this impact, and there is not a new or substantially more severe significant impact.**

Mitigation Measures

None required.

Swainson's Hawk, White-Tailed Kite, and Other Raptors

Impact 4.3.5 Implementation of Project-related activities could result in substantial adverse effects, either directly or through habitat modifications, to Swainson's hawk, white-tailed kites, and other protected raptor species. **The LRSP EIR identified this impact as less than significant with mitigation. The proposed Project would not result in a new impact or substantially increase the severity of a previously identified significant impact.**

Five occurrences of Swainson's hawks have been reported within 1 mile of the Project area, and one occurrence of a white-tailed kite has been reported within 5 miles of the Project area. The entire Project area provides suitable nesting and/or foraging habitat for Swainson's hawks, white-tailed kites, and other raptor species not identified in **Appendix E**. As a result, vegetation clearing during the nesting season could result in direct impacts to nesting birds should they be present. Furthermore, noise and other human activity may result in nest abandonment if nesting birds are present within 500 feet of a work site. Due to the presence of suitable habitat for these species, implementation of Project-related activities may result in adverse impacts should the species be present in areas proposed for disturbance. LRSP EIR mitigation measure MM 4.8.7 requires preconstruction surveys for raptors 30 days prior to construction activity and also requires compliance with Chapter 16.130, Swainson's Hawk Impact Mitigation Fees, of the City Municipal Code. LRSP EIR mitigation measure MM 4.8.8 requires preconstruction surveys for raptor nests 30 days prior to construction activity, with avoidance measures if nests are present. The LRSP EIR assumed raptors could be present and that mitigation measures MM 4.8.7 and MM 4.8.8 would reduce the impact to **less than significant**. Implementation of these measures in the Project area would have the same mitigating effect for the proposed Project. **The proposed Project would not result in an increase in the severity of this impact, and there is not a new or substantially more severe significant impact.**

Mitigation Measures

None required.

Tricolored Blackbird, Grasshopper Sparrow, Loggerhead Shrike, Least Bell's Vireo, and Other Migratory Birds

Impact 4.3.6 Implementation of Project-related activities could result in loss of populations or essential habitat for special-status avian species. **The LRSP EIR identified this impact as less than significant with mitigation. The proposed Project would not result in a new impact or substantially increase the severity of a previously identified significant impact.**

The Project area could provide nesting and/or foraging habitat for tricolored blackbirds, grasshopper sparrows, loggerhead shrikes, least Bell's vireo, and other special-status migratory birds not identified in **Appendix E**. Vegetation clearing during the nesting season could result in direct impacts to special-status nesting birds should they be present. Furthermore, noise and other human activity may result in nest abandonment if special-status nesting birds are present within 200 feet of a work site. Due to the presence of suitable habitat for these species, implementation of Project-related activities may result in adverse impacts should they be present in areas proposed for disturbance. LRSP EIR mitigation measure MM 4.8.8 requires preconstruction surveys for migratory bird nests 30 days prior to construction activity, with avoidance measures if nests are present. The LRSP EIR identified that mitigation measures MM 4.8.7 and MM 4.8.8 would reduce the impact to **less than significant ensuring nesting birds are avoided during construction activities.** Implementation of these measures in the Project area would have the same mitigating effect for the proposed Project.. **The proposed Project would not result in an increase in the severity of this impact, and there is not a new or substantially more severe significant impact.**

Mitigation Measures

None required.

Special-Status Bats

Impact 4.3.7 Implementation of Project-related activities could result loss of populations or essential habitat for special-status bats. **The LRSP EIR identified this impact as less than significant with mitigation. The proposed Project would not result in a new impact or substantially increase the severity of a previously identified significant impact.**

The Project area could provide roosting habitat for special-status bats, such as the western red bat. Demolition of on-site structures could result in direct impacts to roosting bats should they be present. Due to the presence of suitable habitat for these species, implementation of Project-related activities may result in adverse impacts should they be present in areas proposed for disturbance. LRSP EIR mitigation measure MM 4.8.8a requires preconstruction surveys for bat roosts 30 days prior to construction activity, with avoidance measures if bats are present. This measure ensures that roosting and bats would not be harmed and bats are allowed to disperse prior to active roosting site destruction. The LRSP EIR identified that mitigation measures MM 4.8.7 and MM 4.8.8 would reduce the impact to **less than significant.** Implementation of this measure in the Project area would have the same mitigating effect for the proposed Project. **The proposed Project would not result in an increase in the severity of this impact, and there is not a new or substantially more severe significant impact.**

Mitigation Measures

None required.

Impacts to Riparian Habitat, Sensitive Natural Communities, or Federally Protected Wetlands (Standards of Significance 2 and 3)

Impact 4.3.8 Implementation of Project activities could result in the loss of riparian vegetation, sensitive natural communities, and/or federally protected wetlands, which would be considered a potentially significant impact. **The LRSP EIR identified this impact as less than significant with mitigation. The proposed Project would not result in a new impact or substantially increase the severity of a previously identified significant impact.**

Sensitive habitats include those that are of special concern to resource agencies and those that are protected under CEQA, Section 1600 of the Fish and Game Code, and Section 401 and Section 404 of the Clean Water Act. Project-related activities are likely to substantially adversely affect federally protected wetlands and/or other sensitive natural communities identified in State, local, or regional plans.

The Project is designed to avoid the wetland preserve. However, the Project is anticipated to result in permanent impacts to approximately 0.3 acres of seasonal wetlands within the Project area, which were identified in the LRSP EIR. The LRSP EIR disclosed the potential for impacts to wetland habitat and included mitigation measure MM 4.8.3, which requires applicants to conduct a jurisdiction determination, obtain a U.S Army Corps of Engineers Permit and mitigate to at least no-net-loss standard through implementation of an onsite mitigation plan or through purchase of mitigation credits at an approved mitigation bank prior to final map recordation Implementation of LRSP EIR mitigation measure MM 4.8.3 for the Project would ensure that impacts to wetlands or sensitive natural communities are **less than significant** for the Project. **The proposed Project would not result in an increase in the severity of this impact, and there is not a new or substantially more severe significant impact**.

Mitigation Measures

None required.

Impacts to Wildlife Movement (Standard of Significance 4)

Impact 4.3.9 Implementation of the proposed Project would not interfere with the movement of native resident or migratory wildlife species. **The LRSP EIR did not evaluate this impact. The Project would result in no impact to the movement of native resident or migratory wildlife species.**

Available data on movement corridors and linkages was accessed via the CDFW BIOS Viewer. Data reviewed included the Essential Connectivity Areas [ds623] layer and the Missing Linkages in California [ds420] layer. The Project area is not located within an identified corridor. Therefore, the Project would result in **no impact** to the movement of native resident or migratory wildlife species.

Mitigation Measures

None required.

Conflict with Local Policies and Ordinances (Standard of Significance 5)

Impact 4.3.10 Development of the Project area could result in the loss of protected tree species and removal of Swainson's hawk habitat, which could conflict with the City's Municipal Code. **The LRSP EIR identified this impact as less than significant with mitigation. The proposed Project would not result in a new impact or substantially increase the severity of a previously identified significant impact.**

The City's Municipal Code includes Chapter 19.12, Tree Preservation and Protection, and Chapter 16.130, Swainson's Hawk Impact Mitigation Fee. Municipal Code Chapter 19.12 requires mitigation for impacts to trees of local importance, which include coast live oak, valley oak, blue oak, interior live oak, oracle oak, California sycamore, and California black walnut with a single trunk 6 inches dbh or greater or a multi-trunk with a combined dbh of 6 inches or greater. Municipal Code Chapter 16.130 requires mitigation for the loss of Swainson's hawk habitat at a 1:1 ratio. The proposed Project would be required to comply with Municipal Code Chapter 19.12, Tree Preservation and Protection, and Municipal Code Chapter 16.130, Swainson's Hawk Impact Mitigation Fees. **The proposed Project would not result in an increase in the severity of this impact, and there is not a new or substantially more severe significant impact.**

Mitigation Measures

None required.

Conflict with Adopted Conservation Plans (Standard of Significance 6)

Impact 4.3.11 Implementation of the proposed Project would not conflict with the provisions of an adopted habitat conservation plan, natural community conservation plan, or other approved local, regional, or State habitat conservation plan. **The LRSP EIR did not evaluate this impact. The Project would not result in conflicts with adopted conservation plans.**

The Project area is not within the current plan area for the South Sacramento County Habitat Conservation Plan draft. The plan is currently be drafted and is not adopted. **Therefore, the Project would not result in conflicts with adopted conservation plans.**

Mitigation Measures

None required.

4.3.4 CUMULATIVE SETTING, IMPACTS, AND MITIGATION MEASURES

CUMULATIVE SETTING

The region is predominantly characterized by urban and agricultural uses including vineyards, irrigated row/field crops, irrigated hayfields, orchards, and associated irrigation/drainage ditches. Fremont cottonwood, arroyo willow, valley oak, poison oak, and Himalayan blackberry area commonly found adjacent to ditches. Freshwater emergent wetlands and farmed seasonal wetlands are also prevalent in the region, which support cattails, tule, Himalayan blackberry, and willow, as well as various grasses and forbs. Several species of oak, California black walnut, sycamore, and other native and ornamental tree species grow in the area. The agricultural lands, wetlands, ditches, and trees provide nesting and foraging habitat for several special-status species including Sanford's arrowhead, valley elderberry longhorn beetle, vernal pool branchiopods, giant garter snake, western pond turtle, Swainson's hawk, burrowing owl, and tricolored blackbird.

CUMULATIVE IMPACTS AND MITIGATION MEASURES

Impact 4.3.12 Implementation of the proposed Project would contribute to the loss of biological resources in the region, as well as ongoing urbanization in southern Sacramento County. **The LRSP EIR identified this impact as significant and unavoidable. The proposed Project would not result in a new impact or substantially increase the severity of a previously identified significant and unavoidable impact.**

The character and landscape of the region has been gradually changing from agricultural to residential and commercial uses since the 1970s. The continuing urbanization of the region will result in additional loss of habitat and impacts on sensitive species. This is considered a significant cumulative impact.

In addition to the proposed Project, several other developments in southern Sacramento County are currently approved, proposed, under construction, or in the preliminary planning stages. These projects include the Southeast Policy Area, Kammerer Road Extension, Sterling Meadows, Lent Ranch Marketplace, Franklin Crossing, and potential future development of lands south of the Project area, which have the potential to adversely affect regional biological resources. Future developments would require on- and off-site improvements to provide water, wastewater, stormwater drainage/storage, solid waste disposal, and other services at the City's required level of service. Such improvements could contribute to the loss of potential habitat in the region.

On a cumulative level, the change in land uses would contribute to a loss of habitat for special-status species that currently inhabit, or that could potentially inhabit, the Project area in the future. Although the Project area is generally degraded and disturbed as a result of recurring agricultural activities, it provides habitat for a variety of common wildlife species as well as for special-status species. While potential direct impacts to biological resources are reduced, the increased human presence would be anticipated to cause indirect impacts. Indirect impacts could disturb breeding and foraging behavior of wildlife and would result in a significant and unavoidable contribution to the cumulative impact. This cumulative impact was previously addressed in the LRSP EIR. **The proposed Project would not result in a new impact or substantially increase the severity of a previously identified significant and unavoidable impact.**

Mitigation Measures

None required.

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4.4 Cultural Resources

CONCEPTS AND TERMINOLOGY FOR EVALUATION OF CULTURAL RESOURCES

The following definitions are common terms used to discuss the regulatory requirements and treatment of cultural resources:

Cultural resource is a term used to describe several different types of properties: prehistoric and historical archaeological sites; architectural properties such as buildings, bridges, and infrastructure; and resources of importance to Native Americans.

Historic properties is a term defined by the National Historic Preservation Act (NHPA) as any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in, the National Register of Historic Places (NRHP), including artifacts, records, and material remains related to such a property.

Historical resource is a California Environmental Quality Act (CEQA) term that includes buildings, sites, structures, objects, or districts, each of which may have historical, prehistoric, architectural, archaeological, cultural, or scientific importance, and is eligible for listing or is listed in the California Register of Historical Resources (CRHR).

Paleontological resource is defined as fossilized remains of vertebrate and invertebrate organisms, fossil tracks and trackways, and plant fossils. A unique paleontological site would include a known area of fossil-bearing rock strata.

4.4.1 EXISTING SETTING

ARCHEOLOGICAL BACKGROUND

The Sacramento Delta was one of the first regions in California to attract intensive archeological fieldwork. Between 1893 and 1901, avocational archeologist J. A. Barr excavated many prehistoric mounds in the Stockton area. He collected nearly 2,000 artifacts during the course of his investigations. H. C. Meredith was another avocational archeologist of the period who pursued collecting in the same Stockton locality. Meredith published a compilation of his own and Barr's findings, and these appear to constitute the earliest accounts of Delta archeology. Holmes, from the Smithsonian Institution, further elaborated on the Delta, or "Stockton District," archeology, presenting illustrations of artifacts collected by Meredith and Barr.

Elmer J. Dawson first recognized culture changes through time in Delta archeology. Dawson collaborated with W. E. Schenck to produce an overview of northern San Joaquin Valley archeology, which contained information on more than 90 prehistoric sites, as well as data on previous collectors.

By 1931, the focus of archeological work was directed toward the Cosumnes River locality, where survey and exploration were conducted by Sacramento Junior College. Excavations, especially at the stratified Windmiller mound (CA-SAC-107), suggested three temporally distinct cultural traditions: Early, Transitional, and Late. Information grew as a result of excavations at other mounds in the Delta and lower Sacramento Valley by Sacramento Junior College and the University of California, Berkeley.

Previous investigations in the Project region have focused on very detailed archival research of Spanish sources and the archeological investigations at a number of small sites. A reexamination of earlier work has also been undertaken. Several of the previously investigated sites probably represent satellite encampments or small villages associated with major villages.

The majority of the sites appear to be relatively late in time and probably represent Plains Miwok. As mentioned above, the sites appear to be satellite encampments or small villages. The activities practiced are varied, but detailed studies on the faunal collection suggest seasonality of occupation and a focus on fish species other than the main channel varieties.

Writing the definitive summary of California archeology, Moratto devoted an entire chapter to linguistic prehistory. For the Central Valley region, Moratto points out that some Early Horizon and Middle Horizon central California archeological sites appear at least in part contemporaneous, based on existing radiocarbon dates. Cultural materials recovered from CA-SJO-68, an Early Horizon site, are thought to date to 4350±250 BP or 2350 BC. On the other hand, a Middle Horizon component at CA-CCO-308 dates to 4450±400 BP or 2450 BC. The antiquity of other Early and Middle Horizon sites demonstrate an overlap of the two horizons by a millennium or more.

One explanation proposes that the Middle Horizon represents an intrusion of ancestral Miwok-speaking people into the lower Cosumnes, Mokelumne, and Sacramento river areas from the Bay Area. The Early Horizon may represent older Yokuts settlements or perhaps the speakers of an Utian language who were somehow replaced by a shift of population(s) from the bay (Peak & Associates 2014, pp. 6–7).

Ethnological Background

The Eastern Miwok represent one of the two main divisions of the Miwokan subgroup of the Utian language family. The Plains Miwok, one of five separate cultural and linguistic groups of the Eastern Miwok, occupied the lower reaches of the Mokelumne, Cosumnes, and Sacramento rivers, including the area of south Sacramento County surrounding the Project area. Linguistic studies and the application of a lexicostatistic model for language divergence suggest that Plains Miwok was a distinct linguistic entity for the last 2000 years. This result led researchers such as Richard Levy to conclude that the Plains Miwok inhabited the Sacramento Delta for a considerable period of time.

The political organization of the Plains Miwok centered on the tribelet. Tribelets comprised 300 to 500 individuals. Each tribelet was thought to control a specific area of resources and usually consisted of several villages or hamlets. Each tribelet also was divided along lineages. These lineages were apparently localized to a specific geographic setting and most likely represented a village site and their associated satellite sites where the seasonal collection of resources occurred. Descent was reckoned through males. Each settlement apparently contained roughly 21 individuals according to data collected by Gifford.

The diet of the Plains Miwok emphasized the collection of floral resources such as acorns, buckeye, digger pine nuts, seeds from the native grasses, and various fresh greens. Faunal resources such as tule elk, pronghorn antelope, deer, jackrabbits, cottontails, beaver, gray squirrels, woodrats, quail, and waterfowl were hunted. Fishing, particularly of salmon and sturgeon, contributed significantly to the Plains Miwok diet. The primary method of collecting fish was by nets, but the use of bone hooks, harpoons, and obsidian-tipped spears is also known ethnographically.

Both twined and coiled basketry were manufactured by the Eastern Miwok. The uses of baskets included the collection and storage of seeds, basketry cradles, and gaming. Tule mats were also known to have been used by the Plains Miwok, primarily as a floor covering. Other uses of tule included the manufacture of the tule balsa, a watercraft in which native people navigated and exploited adjacent Delta and major river systems.

Four main types of structures were known among the Eastern Miwok, depending on the environmental setting. In the mountains, the primary structure was a conical structure of bark slabs. At lower elevations, the structures consisted of thatched structures, semi-subterranean earth-covered dwellings, and two types of assembly houses used for ceremonial purposes.

The Plains Miwok have been characterized as intensive hunter-gatherers, with an emphasis on gathering. The seasonal availability of floral resources defined the limits of the group's economic pursuits. Hunting and fishing subsistence pursuits apparently accommodated the given distribution of resources. The Plains Miwok territory covered six seasonally productive biotic communities and as such, native people could apparently afford to pick and choose the resources they ranked highest from each of these zones. The subsequent storage of floral resources (such as acorns in granaries) allowed for a more stable use of the resource base. The acorn was apparently the subsistence base needed to provide an unusually productive environment as earlier non-acorn-using peoples who resided in the same geographic setting apparently suffered some seasonal deprivation. Such an emphasis on the gathering of acorns is consistent with the population increase evident during the Upper Emergent Period in California.

The study of piscine (fish) remains from both CA-SAC-65 and CA-SAC-145 indicates that small villages away from the major rivers appear to concentrate on the collection of piscine species (particularly the Sacramento perch) that inhabited slow-moving waters (Peak & Associates 2014, pp. 8–9).

HISTORICAL BACKGROUND

The name of Elk Grove was originally applied to the location of the home of the John Hall family, along the current alignment of State Route 99. James Hall built a hotel there in 1850 and named it after his home town in Missouri. This hotel burned down in 1857. The eventual site of Elk Grove was on the ranch of Major James Buckner, who also built a hotel on the site in 1850. The hotel was owned successively by Buckner, Phineas Woodward, Mrs. Jared Erwin, and Nicholas Christophel.

The site did not really become a town until after the railroad was constructed. A farmer named Everson saw potential commercial opportunities for a town at this location, but none of the residents, including Everson, had the money available to construct the necessary buildings. Everson persuaded the citizens to pool their money to form the Elk Grove Building Company in 1876. The profits from the first building, the Chittenden and Everson general merchandise store, fueled further construction which in turn brought in merchants from outside the area.

Only four years later, the town boasted the original general store and one other, two hotels, a flouring mill, the railroad depot, a hardware store, a meat market, a furniture factory, two drugstores, a harness shop, a grain and hay warehouse, a dressmaking shop, two millinery shops, a boot shop, a wagon factory, and a blacksmith.

The town continued to grow, first as a commercial center for the farmers in the area and recently as a suburban residential zone for greater Sacramento. The City of Elk Grove incorporated in 2000, and the City has grown to become an important economic power in the region.

The region of the Project area was first occupied in the late 1850s or early 1860s. Early large landholdings were common, with hay, wheat, and grapes as common crops. In the early 1900s, the large holdings were divided into smaller subsistence size plots that would allow more efficient use of arable land, and an increase in population would speed the pace of development.

Dairying became more common in the region. The increase in dairying may have also been related to the completion of the Western Pacific Railroad in 1909, with the route lying just over 2 miles west of the Project site, providing a means of getting dairy production to market in an urban area, the City of Sacramento.

The 1909 Florin map shows two buildings within the Project area. The 1942 Franklin 15-minute US Geological Survey (USGS) topographic map indicates that the two older buildings were no longer present, and there were three buildings present. By 1953, a number of other buildings were added within the Project area along Johnston Road, and the three buildings from the 1942 map were still standing, two apparently residences and one an outbuilding. In 1968, several of the buildings along Johnston Road had been removed and another building added on the south side of Elk Grove Boulevard. A shallow pond had been added to the southern portion of the Project area. In the next 12 years, two more buildings were added to the west side of Johnston Road (Peak & Associates 2014, pp. 9–10).

KNOWN CULTURAL RESOURCES ON THE PROJECT SITE

Records Search and Previous Field Surveys

Records of previously recorded cultural resources and cultural resource investigations were examined by the North Central Information Center of the California Historical Resources Information System on May 2, 2014 (NCIC File No.: SAC-14-67, Appendix 2). The Project site had been primarily field surveyed in 1999 and 2000 by Peak & Associates with no sites recorded (NCIC Reports #2392 and #2393). The additional portion of the Project site not previously surveyed was covered by Peak & Associates in 2003 and 2004 (NCIC Reports #5976 and #5971). At the time of these surveys, none of the buildings on the Project site were over 50 years old and were therefore not formally recorded. No prehistoric sites have been recorded on the Project site.

An additional records search was conducted through the North Central Information Center on May 19, 2014, for the proposed off-site parking location (NCIC File No.: SAC-14-76, Appendix 2). The off-site parking site was covered by the previous survey efforts, with no sites recorded. A modern produce stand was present (Peak & Associates 2014, p. 10 see **Appendix F**).

Current Field Survey

Due to the age of the field surveys (over ten years), new field surveys were conducted on the proposed Project site and off-site parking area, using complete coverage techniques.

Project Site

On May 5, 2014, Michael Lawson completed a field survey of the southern portion of the Project site, using complete coverage (transects no wider than 10 meters).

The northern two-thirds of the Project site are mostly flat with tall, thick grass and brush, resulting in fair visibility. A few native oaks and non-native trees are along Johnston Road where it meets Civic Center Drive on the north boundary.

Three heavily damaged dwellings are also at this intersection. The three houses have had windows, doors, and most other metal removed. Handwritten notes on an interior garage wall indicate construction on the houses began in 1960. Extensive vandalism and remodeling makes this difficult to confirm visually, but some remaining fixtures and architectural remains tend to confirm the claim.

Behind the third house (southernmost) is a concrete slab with a closed well pipe and a power supply box on a pole a few feet away. The topographic map of the area shows a "well" to the west of this well and the associated house, on the west side of Johnston Road, but careful searching of this area found no evidence of a well, except for a power pole and access box.

In the southern half of the Project site is a former wetland area with raised islands and native oak stands and other trees. Grasses here are also tall and heavy, making visibility only fair.

Along the southern boundary next to Lotz Parkway is an untended pistachio nut orchard, and near the northwest corner of the parcel are the remains of a concrete cylindrical tank or silo, enclosed in a chain-link fence. The feature appears about 12 feet wide and 22 feet tall, with steel bands around its entirety. The feature appears to be in sound condition, but graffiti has been painted on it. Objects found near the feature include some rusted sheet metal scraps, nails, and modern glass.

East of the concrete tank or silo is an approximately 50-foot by 50-foot slightly concave area where a building may have stood. This is next to a dirt road, and a mature palm tree and other non-native trees border the open area. Objects found in this area include window glass, lumber scraps, small concrete chunks, modern nails, plastic, and porcelain fragments. None of the objects appeared older than 30–40 years (Peak & Associates 2014, pp. 10–12).

Off-Site Parking Area

On May 19, 2014, Robert Gerry completed a field survey of the proposed off-site parking area. This property contains evidence of the historic period occupancy: two concrete slabs of unknown date, a chicken wire enclosure, a line of wood fence posts, a well with a concrete collar, a pile of stream cobbles that includes a couple of red bricks, and a concrete walkway. Consistent with the period of occupancy for the parcels, there are no old artifacts and several very modern ones (PVC pipe, plastic tarps, and plastic beverage containers).

Conclusions

Prehistoric Period Resources

According to Peak & Associates (2014, p. 13), no evidence of prehistoric period resources has been found on or near the Project site. The Project site lies on a flat open plain not close to any natural water source. Campsites and villages would more likely be located near the larger, more reliable water sources such as the Cosumnes River. As a result, it is possible that the Native American inhabitants of the region used the Project site for collecting plant foods and for hunting, but such activities leave little physical evidence.

Historic Period Resources

Although earliest occupancy of the overall Project area predates 1910, the earlier houses were removed many years ago. Different residential buildings and outbuildings have been added and removed over the years, as the needs of the occupants changed, with several slabs and farm features remaining on the site, with correlation with specific owners not possible.

The residential complex in the northern portion of the Project site appears to date to about 1960. The complex was photographed in 2000 while still occupied. It now has been abandoned for a number of years and has been stripped of fixtures and building elements. A great deal of vandalism has occurred. At this point, there is little to be learned from the buildings. They are modern in age, plain and of no particular design or association with important architects, and not associated with important people or events in Elk Grove's past. All buildings have been altered to some degree over the years, and the complex is not an important resource.

The tank on the southern portion of the Project site appears to relate to the water system for the pistachio orchard and post-dates 1980 (Peak & Associates 2014, p. 13).

PALEONTOLOGICAL RESOURCES

According to the LRSP EIR, quaternary alluvium terraces underlie the LRSP area, which have a low potential for yielding unique paleontological resources due to the geologic age of the deposits.

4.4.2 REGULATORY FRAMEWORK

STATE

California Environmental Quality Act

Under CEQA, public agencies must consider the effects of their actions on both "historical resources" and "unique archaeological resources." Pursuant to Public Resources Code (PRC) Section 21084.1, a "project that may cause a substantial adverse change in the significance of an historical resource is a project that may have a significant effect on the environment." Section 21083.2 requires agencies to determine whether proposed projects would have effects on "unique archaeological resources."

Historical resource is a term with a defined statutory meaning (PRC Section 21084.1 and State CEQA Guidelines Section 15064.5[a], [b]). The term embraces any resource listed in or determined to be eligible for listing in the California Register of Historical Resources. The CRHR includes resources listed in or formally determined eligible for listing in the NRHP, as well as some California State Landmarks and Points of Historical Interest.

Properties of local significance that have been designated under a local preservation ordinance (local landmarks or landmark districts) or that have been identified in a local historical resources inventory may be eligible for listing in the CRHR and are presumed to be historical resources for purposes of CEQA unless a preponderance of evidence indicates otherwise (PRC Section 5024.1 and California Code of Regulations, Title 14, Section 4850). Unless a resource listed in a survey has been demolished, lost substantial integrity, or there is a preponderance of evidence indicating that it is otherwise not eligible for listing, a lead agency should consider the resource to be potentially eligible for the CRHR.

In addition to assessing whether historical resources potentially impacted by a proposed project are listed or have been identified in a survey process (PRC Section 5024.1[g]), lead agencies have a responsibility to evaluate them against the CRHR criteria prior to making a finding as to a proposed project's impacts to historical resources (PRC Section 21084.1 and State CEQA Guidelines Section 15064.5[a][3]). Following CEQA Guidelines Section 21084.5(a) and (b), a historical resource is defined as any object, building, structure, site, area, place, record, or manuscript that:

1) Is historically or archeologically significant, or is significant in the architectural, engineering, scientific, economic, agricultural, educational, social, political, or cultural annals of California; and

2) Meets any of the following criteria:

   a. Is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage;

   b. Is associated with the lives of persons important in our past;

   c. Embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important creative individual, or possesses high artistic values; or

   d. Has yielded, or may be likely to yield, information important in prehistory or history.

Archaeological resources may also qualify as historical resources, and PRC Section 5024 requires consultation with the Office of Historic Preservation (OHP) when a project may impact historical resources located on State-owned land.

For historic structures, State CEQA Guidelines Section 15064.5(b)(3) indicates that a project that follows the Secretary of the Interior's Standards for the Treatment of Historic Properties with Guidelines for Preserving, Rehabilitating, Restoring, and Reconstructing Historic Buildings, or the Secretary of the Interior's Standards for Rehabilitation and Guidelines for Rehabilitating Historic Buildings (1995) must mitigate impacts to a level of less than significant. Potential eligibility also rests on the integrity of the resource. Integrity is defined as the retention of the resource's physical identity that existed during its period of significance. Integrity is determined through considering the setting, design, workmanship, materials, location, feeling, and association of the resource.

As noted above, CEQA also requires lead agencies to consider whether projects will impact unique archaeological resources. PRC Section 21083.2(g) states:

> *"Unique archaeological resource" means an archaeological artifact, object, or site about which it can be clearly demonstrated that, without merely adding to the current body of knowledge, there is a high probability that it meets any of the following criteria:*
>
> *1) Contains information needed to answer important scientific research questions and that there is a demonstrable public interest in that information.*
>
> *2) Has a special and particular quality such as being the oldest of its type or the best available example of its type.*
>
> *3) Is directly associated with a scientifically recognized important prehistoric or historic event or person.*

Treatment options under Section 21083.2 include activities that preserve such resources in place in an undisturbed state. Other acceptable methods of mitigation under Section 21083.2 include excavation and curation or study in place without excavation and curation (if the study finds that the artifacts would not meet one or more of the criteria for defining a unique archaeological resource).

Advice on procedures to identify cultural resources, evaluate their importance, and estimate potential effects is given in several agency publications such as the series produced by the Governor's Office of Planning and Research (OPR). The technical advice series produced by the OPR strongly recommends that Native American concerns and the concerns of other interested persons and corporate entities, including but not limited to museums, historical commissions, associations, and societies, be solicited as part of the process of cultural resources inventory. In addition, California law protects Native American burials, skeletal remains, and associated grave goods regardless of their antiquity and provides for the sensitive treatment and disposition of those remains.

Section 7050.5(b) of the California Health and Safety code specifies protocol when human remains are discovered. The code states:

> *In the event of discovery or recognition of any human remains in any location other than a dedicated cemetery, there shall be no further excavation or disturbance of the site or any nearby area reasonably suspected to overlie adjacent remains until the coroner of the county in which the human remains are discovered has determined, in accordance with Chapter 10 (commencing with Section 27460) of Part 3 of Division 2 of Title 3 of the Government Code, that the remains are not subject to the provisions of Section 27492 of the Government Code or any other related provisions of law concerning investigation of the circumstances, manner and cause of death, and the recommendations concerning treatment and disposition of the human remains have been made to the person responsible for the excavation, or to his or her authorized representative, in the manner provided in Section 5097.98 of the Public Resources Code.*

State CEQA Guidelines Section 15064.5(e) requires that excavation activities be stopped whenever human remains are uncovered and that the county coroner be called in to assess the remains. If the county coroner determines that the remains are those of Native Americans, the Native American Heritage Commission (NAHC) must be contacted within 24 hours. At that time, the lead agency must consult, in a timely manner, with the appropriate Native Americans, if any, as identified by the NAHC. Section 15064.5 directs the lead agency (or applicant), under certain circumstances, to develop an agreement with the Native Americans for the treatment and disposition of the remains.

In addition to the mitigation provisions pertaining to accidental discoveries of human remains, the State CEQA Guidelines also require that a lead agency make provisions for the accidental discovery of historical or archaeological resources, generally. Pursuant to Section 15064.5(f), these provisions should include "an immediate evaluation of the find by a qualified archaeologist. If the find is determined to be an historical or unique archaeological resource, contingency funding and a time allotment sufficient to allow for implementation of avoidance measures or appropriate mitigation should be available. Work could continue on other parts of the building site while historical or unique archaeological resource mitigation takes place."

Paleontological resources are classified as nonrenewable scientific resources and are protected by State statute (PRC Chapter 1.7, Section 5097.5, Archeological, Paleontological, and Historical Sites, and Appendix G). No state or local agencies have specific jurisdiction over paleontological resources. No state or local agency requires a paleontological collecting permit to allow the recovery of fossil remains discovered as a result of construction-related earth moving on state or private land in a project area.

LOCAL

City of Elk Grove General Plan

The following Elk Grove General Plan policies regarding cultural resources are applicable to the proposed Project:

"Policy HR-1: Encourage the preservation and enhancement of existing historical and archaeological resources in the City."

"Policy HR-6: Protect and preserve prehistoric and historic archaeological resources throughout the City."

The Project does not include any actions or components that conflict with these General Plan policies. However, it should be noted that the final authority for interpretation of a policy statement, determination of the Project's consistency with the General Plan, ultimately rests with the Elk Grove City Council.

City of Elk Grove Municipal Code

The City of Elk Grove Municipal Code Title 7.00, Historic Preservation, contains regulatory requirements for the identification and protection of cultural resources. Archaeological and historical resources investigations that comply with regulatory requirements presented in Municipal Code Title 7.00 were conducted for the Project. The Project is in compliance with this title of the Municipal Code.

4.4.3 IMPACTS AND MITIGATION MEASURES

STANDARDS OF SIGNIFICANCE

The impact analysis provided below is based on the application of the CEQA Guidelines Appendix G environmental checklist. The Project is considered to have a significant effect on the environment if it would:

1) Cause a substantial adverse change in the significance of a historical resource as defined in Section 15064.5.

2) Cause a substantial adverse change in the significance of an archaeological resource pursuant to Section 15064.5.

3) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature.

4) Disturb any human remains, including those interred outside of formal cemeteries.

State CEQA Guidelines Section 15064.5 defines "substantial adverse change" as physical demolition, destruction, relocation, or alteration of the resource or its immediate surroundings such that the significance of an historical resource is materially impaired.

The LRSP EIR (page 4.10-8) determined that due to the geologic age of the deposits underlying the LRSP area, there is low potential for the presence of unique paleontological resources.

Therefore, Standard of Significance 3 would not apply, and this issue is not addressed in this Draft SEIR.

METHODOLOGY

The following impact analysis is based on the Cultural Resources Assessment prepared for the proposed Project by Peak & Associates in 2014 and review of the City's General Plan Background Report (City of Elk Grove 2003d), the General Plan Draft EIR (City of Elk Grove 2003a), and the Laguna Ridge Specific Plan EIR (City of Elk Grove 2003b) for information about the presence of known and the potential for the occurrence of unknown cultural and paleontological resources.

The Laguna Ridge Specific Plan Environmental Impact Report (LRSP EIR) addressed the impacts associated with construction and operation of residential and nonresidential uses in the LRSP area. Potentially significant impacts disclosed in the LRSP EIR include impacts on undiscovered cultural resources from on- and off-site development and impacts to known historic resources. The LRSP EIR determined that these potential impacts would be reduced to a less than significant level with implementation of mitigation measure identified in the LRSP EIR (mitigation measures MM 4.10.1a, MM 4.10.1b, and MM 4.10.2 – see **Appendix A**). The LRSP EIR also determined that due to the geologic age of the deposits which underlie the LRSP area, there is low potential for the presence of unique paleontological resources. Therefore, this issue is not addressed further in this Draft SEIR. The following analysis focuses on the results of a site-specific and updated cultural resources assessment for the Project site and the potential for the proposed Project to impact cultural resources.

PROJECT IMPACTS AND MITIGATION MEASURES

Prehistoric Resources, Historic Resources, and Human Remains (Standards of Significance 1, 2, and 4)

Impact 4.4.1 Construction of the proposed Project could adversely affect or result in the damage of potential or unknown cultural resources (i.e., prehistoric sites, historic sites, historic buildings/structures, and isolated artifacts) and human remains. **The proposed Project would not result in a new impact or substantially increase the severity of a previously identified significant impact.**

The LRSP EIR (Impact 4.10.1) evaluated potential impacts on cultural resources from development of the LRSP area, including development of the Project site. The LRSP EIR concluded that although there was no evidence for the presence of cultural resources in the LRSP area, there is potential for unknown, buried resources; the impact was determined to be potentially significant. Mitigation measures were provided to reduce the impact to a less than significant level. LRSP EIR mitigation measure 4.10.1b requires that if any surface or subsurface archaeological features or deposits are uncovered during construction, all work within 100 feet of the find must cease and the City must be notified. The measure further requires that an archaeologist be contacted to determine the significance of the resource and appropriate mitigation. If the uncovered resource includes human remains, the county coroner and the Native American Commission must be contacted. The proposed Project would be subject to this mitigation measure.

The 2014 Cultural Resources Assessment prepared for the proposed Project (Peak & Associates 2014, p. 13) also determined that no evidence of prehistoric period resources has been found on or near the Project site and that the site features (i.e., flat topography and lack of a natural water source) do not indicate likely prehistoric habitation of the area. The assessment further determined that none of the structures present on the Project site would qualify as important historic resources. However, the Assessment concluded that there is a possibility that buried or otherwise obscured and previously undiscovered cultural resources could be present on the Project site. Therefore, the Assessment recommended that, should such resources be uncovered during construction activities, an archeologist should be consulted for evaluation. If the find includes human remains, the county coroner and, if appropriate, the Native American Heritage Commission should be notified. These recommendations are consistent with LRSP EIR mitigation measure MM 4.10.1b, with which the proposed Project must comply. **Therefore, the proposed Project would not result in an increase in the severity of this impact, and there is not a new or substantially more severe significant impact.**

Mitigation Measures

None required.

4.4.4 CUMULATIVE SETTING, IMPACTS, AND MITIGATION MEASURES

CUMULATIVE SETTING

The cumulative context associated with the proposed Project includes proposed, planned, reasonably foreseeable, and approved projects in the City's Sphere of Influence and in Sacramento County.

CUMULATIVE IMPACTS AND MITIGATION MEASURES

Prehistoric Resources, Historic Resources, and Human Remains (Standards of Significance 1, 2, and 4)

Impact 4.4.2 Development of the proposed Project could contribute to the cumulative disturbance of cultural resources (i.e., prehistoric sites, historic sites, historic buildings/structures, and isolated artifacts and features) and human remains. **The proposed Project would not result in a substantial increase in the severity of this impact. There is no new or substantially more severe contribution to the cumulative impact that would result from the proposed Project.**

Urban development that has occurred over the past several decades in the incorporated and unincorporated county has resulted in adverse impacts on innumerable significant historical and archaeological resources. It is reasonable to assume that present and future development activities will continue to result in impacts on significant cultural resources, including historical resources, archaeological resources, and human remains. Federal, State, and local laws protect cultural resources in most instances but are not always feasible, particularly when in-place preservation would frustrate implementation of projects. Future developments and planned land uses would contribute to potential impacts on cultural resources, including archaeological resources associated with Native American activities and historic resources associated with Euroamerican settlement, gold mining, agriculture, and economic development. Future developments could conflict with these resources through inadvertent destruction or removal resulting from grading, excavation, and/or construction activities. For this reason, the cumulative effects of development in the region on cultural resources are considered significant.

As discussed in Impact 4.4.1, the proposed Project site is unlikely to contain any significant cultural resources and, should any previously undiscovered cultural resources be encountered during Project construction, compliance with LRSP EIR mitigation measure MM 4.10.1 would ensure such resources are protected from destruction and properly mitigated. The Project would not substantially change the cumulative setting from that previously considered and would not result in a substantial increase in the severity of this impact. **There is no new or substantially more severe contribution to the cumulative impact that would result from the proposed Project.**

Mitigation Measures

None required.

REFERENCES

City of Elk Grove. 2003a. *Elk Grove General Plan Draft Environmental Impact Report.*

———. 2003b. *Laguna Ridge Specific Plan Revised Draft Environmental Impact Report.*

———. 2003c. *City of Elk Grove General Plan.*

———. 2003d. *City of Elk Grove General Plan Background Report.*

Peak & Associates. 2014. *Cultural Resource Assessment for the Civic Center Aquatic Complex Project, City of Elk Grove, Sacramento County, California.*

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4.5 Greenhouse Gases and Climate Change

This section provides a discussion of the Project's effect on greenhouse gas (GHG) emissions and the associated effects of climate change. The reader is referred to Section 4.2, Air Quality, for a discussion of Project impacts associated with air quality.

4.5.1 EXISTING SETTING

Since the early 1990s, scientific consensus holds that the world's population is releasing GHGs faster than the earth's natural systems can absorb them. These gases are released as byproducts of fossil fuel combustion, waste disposal, energy use, land use changes, and other human activities. This release of gases, such as carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O), creates a blanket around the earth that allows light to pass through but traps heat at the surface, preventing its escape into space. While this is a naturally occurring process known as the greenhouse effect, human activities have accelerated the generation of GHG emissions beyond natural levels. The overabundance of GHGs in the atmosphere has led to a warming of the earth and has the potential to severely affect the earth's climate system.

While often used interchangeably, there is a difference between the terms *climate change* and *global warming*. According to the National Academy of Sciences, climate change refers to any significant, measurable change of climate lasting for an extended period of time that can be caused by both natural factors and human activities. Global warming, on the other hand, is an average increase in the temperature of the atmosphere caused by increased GHG emissions. The use of the term *climate change* is becoming more prevalent because it encompasses all changes to the climate, not just temperature.

To fully understand global climate change, it is important to recognize the naturally occurring greenhouse effect and to define the GHGs that contribute to this phenomenon. Various gases in the earth's atmosphere, classified as atmospheric GHGs, play a critical role in determining the earth's surface temperature. Solar radiation enters the earth's atmosphere from space and a portion of the radiation is absorbed by the earth's surface. The earth emits this radiation back toward space, but the properties of the radiation change from high-frequency solar radiation to lower-frequency infrared radiation. GHGs, which are transparent to solar radiation, are effective in absorbing infrared radiation. As a result, this radiation that otherwise would have escaped back into space is now retained, resulting in a warming of the atmosphere. This phenomenon is known as the greenhouse effect. Among the prominent GHGs contributing to the greenhouse effect are CO_2, CH_4, N_2O, hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF_6).

Table 4.5-1 provides descriptions of the primary GHG emissions attributed to global climate change, including a description of their physical properties, primary sources, and contribution to the greenhouse effect.

TABLE 4.5-1
GREENHOUSE GASES

Greenhouse Gas	Description
Carbon Dioxide (CO_2)	Carbon dioxide is a colorless, odorless gas. CO_2 is emitted in a number of ways, both naturally and through human activities. The largest source of CO_2 emissions globally is the combustion of fossil fuels such as coal, oil, and gas in power plants, automobiles, industrial facilities, and other sources. A number of specialized industrial production processes and product uses such as mineral production, metal production, and the use of petroleum-based products can also lead to CO_2 emissions. The atmospheric lifetime of CO_2 is variable because it is so readily exchanged in the atmosphere.[1]
Methane (CH_4)	Methane is a colorless, odorless gas that is not flammable under most circumstances. CH_4 is the major component of natural gas, about 87 percent by volume. It is also formed and released to the atmosphere by biological processes occurring in anaerobic environments. Methane is emitted from a variety of both human-related and natural sources. Human-related sources include fossil fuel production, animal husbandry (intestinal fermentation in livestock and manure management), rice cultivation, biomass burning, and waste management. These activities release significant quantities of methane to the atmosphere. Natural sources of methane include wetlands, gas hydrates, permafrost, termites, oceans, freshwater bodies, non-wetland soils, and other sources such as wildfires. Methane's atmospheric lifetime is about 12 years.[2]
Nitrous Oxide (N_2O)	Nitrous oxide is a clear, colorless gas with a slightly sweet odor. N_2O is produced by both natural and human-related sources. Primary human-related sources of N_2O are agricultural soil management, animal manure management, sewage treatment, mobile and stationary combustion of fossil fuels, adipic acid production, and nitric acid production. N_2O is also produced naturally from a wide variety of biological sources in soil and water, particularly microbial action in wet tropical forests. The atmospheric lifetime of N_2O is approximately 120 years.[3]
Hydrofluorocarbons (HFCs)	Hydrofluorocarbons are man-made chemicals, many of which have been developed as alternatives to ozone-depleting substances for industrial, commercial, and consumer products. The only significant emissions of HFCs before 1990 were of the chemical HFC-23, which is generated as a byproduct of the production of HCFC-22 (or Freon 22, used in air conditioning applications). The atmospheric lifetime for HFCs varies from just over a year for HFC-152a to 260 years for HFC-23. Most of the commercially used HFCs have atmospheric lifetimes less than 15 years (e.g., HFC-134a, which is used in automobile air conditioning and refrigeration, has an atmospheric life of 14 years).[4]
Perfluorocarbons (PFCs)	Perfluorocarbons are colorless, highly dense, chemically inert, and nontoxic. There are seven PFC gases: perfluoromethane (CF_4), perfluoroethane (C_2F_6), perfluoropropane (C_3F_8), perfluorobutane (C_4F_{10}), perfluorocyclobutane (C_4F_8), perfluoropentane (C_5F_{12}), and perfluorohexane (C_6F_{14}). Natural geological emissions have been responsible for the PFCs that have accumulated in the atmosphere in the past; however, the largest current source is aluminum production, which releases CF_4 and C_2F_6 as byproducts. The estimated atmospheric lifetimes for CF_4 and C_2F_6 are 50,000 and 10,000 years, respectively.[4,5]
Sulfur Hexafluoride (SF_6)	Sulfur hexafluoride is an inorganic compound that is colorless, odorless, nontoxic, and generally nonflammable. SF_6 is primarily used as an electrical insulator in high voltage equipment. The electric power industry uses roughly 80 percent of all SF_6 produced worldwide. Significant leaks occur from aging equipment and during equipment maintenance and servicing. SF_6 has an atmospheric life of 3,200 years.[4]

Sources: [1]EPA 2011a, [2]EPA 2011b, [3]EPA 2010a, [4]EPA 2010b, [5]EFCTC 2003

Each GHG differs in its ability to absorb heat in the atmosphere based on the lifetime, or persistence, of the gas molecule in the atmosphere. Gases with high global warming potential, such as HFCs, PFCs, and SF_6, are the most heat-absorbent. Methane traps over 21 times more heat per molecule than CO_2, and N_2O absorbs 310 times more heat per molecule than CO_2.

Often, estimates of GHG emissions are presented in carbon dioxide equivalents (CO_2e), which weighs each gas by its global warming potential (GWP). Expressing GHG emissions in carbon dioxide equivalents takes the contribution of all GHG emissions to the greenhouse effect and converts them to a single unit equivalent to the effect that would occur if only CO_2 were being emitted. **Table 4.5-2** shows the GWPs for different greenhouse gases for a 100-year time horizon.

TABLE 4.5-2
GLOBAL WARMING POTENTIAL FOR GREENHOUSE GASES

Greenhouse Gas	Global Warming Potential
Carbon Dioxide (CO_2)	1
Methane (CH_4)	21
Nitrous Oxide (N_2O)	310
Hydrofluorocarbons (HFCs), Perfluorocarbons (PFCs)	6,500
Sulfur Hexafluoride (SF_6)	23,900

Source: California Climate Action Registry 2009

As the name implies, global climate change is a global problem. GHGs are global pollutants, unlike criteria air pollutants and toxic air contaminants, which are pollutants of regional and local concern, respectively. California is a significant emitter of CO_2 in the world and produced 448 million gross metric tons of CO_2e in 2011 (CARB 2013). Consumption of fossil fuels in the transportation sector was the single largest source of California's GHG emissions in 2011, accounting for 37.5 percent of total GHG emissions in the state (CARB 2013). This category was followed by the industrial sector (20.7 percent) and electric power sector (including both in-state and out-of-state sources) (19.3 percent) (CARB 2013).

EFFECTS OF GLOBAL CLIMATE CHANGE

With more than a decade of concerted research, scientists have established that the early signs of climate change are already evident in the State—as shown, for example, in increased average temperatures, changes in temperature extremes, reduced snowpack in the Sierra Nevada, sea level rise, and ecological shifts.

Many of these changes are accelerating—locally, across the country, and around the globe. As a result of emissions already released into the atmosphere, California will face intensifying climate changes in coming decades (CNRA 2009a). Generally, research indicates that California should expect overall hotter and drier conditions with a continued reduction in winter snow (with concurrent increases in winter rains), as well as increased average temperatures and accelerating sea-level rise. In addition to changes in average temperatures, sea level, and precipitation patterns, the intensity of extreme weather events is also changing (CNRA 2009a).

Climate change temperature projections identified in the 2009 California Climate Adaptation Strategy suggest the following:

- Average temperature increase is expected to be more pronounced in the summer than in the winter season.
- Inland areas are likely to experience more pronounced warming than coastal regions.

- Heat waves are expected to increase in frequency, with individual heat waves also showing a tendency toward becoming longer and extending over a larger area, thus more likely to encompass multiple population centers in California at the same time.
- As GHGs remain in the atmosphere for decades, temperature changes over the next 30 to 40 years are already largely determined by past emissions. By 2050, temperatures are projected to increase by an additional 1.8 to 5.4°F (an increase one to three times as large as that which occurred over the entire twentieth century).
- By 2100, the models project temperature increases between 3.6 and 9°F. (CNRA 2009a)

According to the 2009 California Climate Adaptation Strategy, the impacts of climate change in California have the potential to include, but are not limited to, the areas discussed in **Table 4.5-3**.

TABLE 4.5-3
POTENTIAL STATEWIDE IMPACTS FROM CLIMATE CHANGE

Potential Statewide Impact	Description
Public Health	Climate change is expected to lead to an increase in ambient (i.e., outdoor) average air temperature, with greater increases expected in summer than in winter months. Larger temperature increases are anticipated in inland communities as compared to the California coast. The potential health impacts from sustained and significantly higher than average temperatures include heat stroke, heat exhaustion, and the exacerbation of existing medical conditions such as cardiovascular and respiratory diseases, diabetes, nervous system disorders, emphysema, and epilepsy. Numerous studies have indicated that there are generally more deaths during periods of sustained higher temperatures, and these are due to cardiovascular causes and other chronic diseases. The elderly, infants, and socially isolated people with pre-existing illnesses who lack access to air conditioning or cooling spaces are among the most at risk during heat waves.
Floods and Droughts	The impacts of flooding can be significant. Results may include population displacement, severe psychosocial stress with resulting mental health impacts, exacerbation of pre-existing chronic conditions, and infectious disease. Additionally, impacts can range from a loss of personal belongings, and the emotional ramifications from such loss, to direct injury and/or mortality. Drinking water contamination outbreaks in the United States are associated with extreme precipitation events. Runoff from rainfall is also associated with coastal contamination that can lead to contamination of shellfish and contribute to food-borne illness. Floodwaters may contain household, industrial, and agricultural chemicals as well as sewage and animal waste. Flooding and heavy rainfall events can wash pathogens and chemicals from contaminated soils, farms, and streets into drinking water supplies. Flooding may also overload storm and wastewater systems, or flood septic systems, also leading to possible contamination of drinking water systems. Drought impacts develop more slowly over time. Risks to public health that Californians may face from drought include impacts on water supply and quality, food production (both agricultural and commercial fisheries), and risks of waterborne illness. As surface water supplies are reduced as a result of drought conditions, the amount of groundwater pumping is expected to increase to make up for the water shortfall. The increase in groundwater pumping has the potential to lower the water tables and cause land subsidence. Communities that utilize well water will be adversely affected by drops in water tables or through changes in water quality. Groundwater supplies have higher levels of total dissolved solids compared to surface waters. This introduces a set of effects for consumers, such as repair and maintenance costs associated with mineral deposits in water heaters and other plumbing fixtures, and on public water system infrastructure designed for lower salinity surface water supplies. Drought may also lead to increased concentration of contaminants in drinking water supplies.

Potential Statewide Impact	Description
Water Resources	The state's water supply system already faces challenges to provide water for California's growing population. Climate change is expected to exacerbate these challenges through increased temperatures and possible changes in precipitation patterns. The trends of the last century—especially increases in hydrologic variability—will likely intensify in this century. The state can expect to experience more frequent and larger floods and deeper droughts. Rising sea level will threaten the Delta water conveyance system and increase salinity in near-coastal groundwater supplies. Planning for and adapting to these simultaneous changes, particularly their impacts on public safety and long-term water supply reliability, will be among the most significant challenges facing water and flood managers this century.
Forests and Landscapes	Global climate change has the potential to intensify the current threat to forests and landscapes by increasing the risk of wildfire and altering the distribution and character of natural vegetation. If temperatures rise into the medium warming range, wildfire occurrence statewide could increase from 57 percent to 169 percent by 2085. However, since wildfire risk is determined by a combination of factors, including precipitation, winds, temperature, and landscape and vegetation conditions, future risks will not be uniform throughout the state.

Source: CNRA 2009a

Current Greenhouse Gas Emissions

Statewide Inventory

The California GHG inventory compiles statewide anthropogenic GHG emissions and sinks. It includes estimates for CO_2, CH_4, N_2O, SF_6, nitrogen trifluoride (NF_3), HFCs, and PFCs. The current inventory covers the years 2000 to 2008.

Annual statewide emission inventories provide the basis for establishing historical emission trends. Trends are useful in tracking progress toward a specific goal or target. There are many factors affecting GHG emissions, including the state of the economy, changes in demography, improved efficiency, and changes in environmental conditions such as drought. 2008 saw a small decrease in statewide GHG emissions, driven by a noticeable drop in on-road transportation emissions. 2008 also reflects the beginning of the economic recession and fuel price spikes. California generated approximately 449,590,000 metric tons of GHG emissions in 2009 and 448,110,000 metric tons in 2011 (CARB 2013).

Citywide Inventory

In June 2009, Sacramento County finalized a GHG inventory for each jurisdiction in the county. The inventory calculates municipal and community-wide emissions caused by activities in 2005, including transportation, waste, water, and energy-related activities. The inventory established a baseline against which future changes in emissions can be measured and provides an understanding of major sources of GHG emissions in the City and the region.

The City of Elk Grove has since revised this citywide inventory to incorporate new data and GHG accounting methods and protocols, identifying a revised total of 737,838 metric tons of CO_2e in 2005. Revisions to the inventory include, but are not limited to, revised vehicle miles traveled (VMT) calculations, omission of off-road equipment and vehicle emissions, omission of residential wood-burning emissions, omission of wastewater treatment and discharge emissions, and omission of high global warming potential emissions (such as fugitive refrigerant emissions) (City of Elk Grove 2013a).

4.5.2 REGULATORY FRAMEWORK

The adoption of recent legislation has provided a clear mandate that climate change must be included in an environmental review for a project subject to the California Environmental Quality Act (CEQA). Several GHG emission–related laws and regulations are provided below.

FEDERAL REGULATION AND THE CLEAN AIR ACT

In the past, the US Environmental Protection Agency (EPA) has not regulated GHGs under the Clean Air Act (CAA) because it asserted that the act did not authorize the EPA to issue mandatory regulations to address global climate change and that such regulation would be unwise without an unequivocally established causal link between GHGs and the increase in global surface air temperatures. However, the US Supreme Court held that the EPA must consider regulation of motor vehicle GHG emissions. In *Massachusetts v. Environmental Protection Agency et al.*, twelve states and cities, including California, together with several environmental organizations, sued to require the EPA to regulate GHGs as pollutants under the Clean Air Act (127 S. Ct. 1438 [2007]). The US Supreme Court held that the EPA was authorized by the Clean Air Act to regulate CO_2 emissions from new motor vehicles. The court did not mandate that the EPA enact regulations to reduce GHG emissions, but found that the only instances in which the EPA could avoid taking action were if it found that GHG emissions do not contribute to climate change or if it offered a "reasonable explanation" for not determining that GHG emissions contribute to climate change.

On December 7, 2009, the EPA issued an "endangerment finding" under the Clean Air Act, concluding that GHG emissions threaten the public health and welfare of current and future generations and that motor vehicles contribute to GHG pollution (EPA 2009). These findings provide the basis for adopting new national regulations to mandate GHG emissions reductions under the federal Clean Air Act. The EPA's endangerment finding paves the way for federal regulation of GHG emissions.

It was expected that Congress would enact GHG legislation, primarily for a cap-and-trade system. However, proposals circulated in both the House of Representatives and the Senate were controversial, and it may be some time before Congress adopts major climate change legislation. Under the Consolidated Appropriations Act of 2008 (HR 2764), Congress established mandatory GHG reporting requirements for some emitters of GHGs. In addition, on September 22, 2009, the EPA issued the Final Mandatory Reporting of Greenhouse Gases Rule. The rule requires annual reporting to the EPA of greenhouse gas emissions from large sources and suppliers of GHGs, including facilities that emit 25,000 metric tons or more a year of GHGs.

The following discussion summarizes the EPA's recent regulatory activities with respect to various types of GHG sources.

EPA and National Highway Traffic Safety Administration Joint Rulemaking for Vehicle Standards

In response to the *Massachusetts v. EPA* ruling discussed above, the Bush Administration issued an Executive Order on May 14, 2007, directing the EPA, the Department of Transportation, and the Department of Energy to establish regulations that reduce GHG emissions from motor vehicles, non-road vehicles, and non-road engines by 2008.

On October 10, 2008, the National Highway Traffic Safety Administration (NHTSA) released a final environmental impact statement analyzing proposed interim standards for passenger cars and light trucks in model years 2011 through 2015. The NHTSA (2009) issued a final rule for model year 2011 on March 30, 2009.

On May 7, 2010, the EPA and the NHTSA issued a final rule regulating fuel efficiency and GHG pollution from motor vehicles for cars and light-duty trucks for model years 2012–2016 (EPA 2010c). On May 21, 2010, President Obama issued a memorandum to the Secretaries of Transportation and Energy, and to the administrators of the EPA and the NHTSA, calling for the establishment of additional standards regarding fuel efficiency and GHG reduction, clean fuels, and advanced vehicle infrastructure. In response to this directive, the EPA and the NHTSA issued a Supplemental Notice of Intent announcing plans to propose stringent, coordinated federal GHG and fuel economy standards for model year 2017–2025 light-duty vehicles. The agencies proposed standards projected to achieve 163 grams per mile of CO_2 in model year 2025, on an average industry fleet-wide basis, which is equivalent to 54.5 miles per gallon if this level were achieved solely through fuel efficiency. California has announced its support of this national program. The final rule was adopted in October 2012, and the NHTSA intends to set standards for model years 2022–2025 in a future rulemaking.

STATE REGULATION

California has adopted various administrative initiatives and also enacted a variety of legislation relating to climate change, much of which sets aggressive goals for GHG emissions reductions within the State. However, none of this legislation provides definitive direction regarding the treatment of climate change in the environmental review documents prepared under CEQA. In particular, the amendments to the CEQA Guidelines do not require or suggest specific methodologies for performing an assessment or thresholds of significance and do not specify GHG reduction mitigation measures. Instead, the CEQA amendments continue to rely on lead agencies to choose methodologies and make significance determinations based on substantial evidence, as discussed in further detail below. In addition, no State agency has promulgated binding regulations for analyzing GHG emissions, determining their significance, or mitigating any significant effects in CEQA documents. Thus, lead agencies exercise their discretion determining how to analyze GHG emissions.

The discussion below provides a brief overview of California Air Resources Board (CARB) and Office of Planning and Research (OPR) documents and of the primary legislation relating to climate change that may affect the emissions associated with the proposed Project. It begins with an overview of the primary regulatory acts that have driven GHG regulation and analysis in California.

Executive Order S-3-05 (Statewide GHG Targets)

California Executive Order S-03-05 (June 1, 2005) mandates a reduction of GHG emissions to 2000 levels by 2010, to 1990 levels by 2020, and to 80 percent below 1990 levels by 2050. Although the 2020 target has been incorporated into legislation (AB 32), the 2050 target remains only a goal of the Executive Order.

Assembly Bill 32, the California Global Warming Solutions Act of 2006

The California Global Warming Solutions Act of 2006 (AB 32) (Health and Safety Code Sections 38500, 38501, 28510, 38530, 38550, 38560, 38561–38565, 38570, 38571, 38574, 38580, 38590, 38592–38599) was signed into law in September 2006 after considerable study and expert testimony before the legislature. The law instructs CARB to develop and enforce regulations for the reporting and verifying of statewide GHG emissions. The act directed CARB to set a GHG emissions limit based on 1990 levels, to be achieved by 2020. The bill set a timeline for adopting a scoping plan for achieving GHG reductions in a technologically and economically feasible manner.

The heart of the bill is the requirement that statewide GHG emissions be reduced to 1990 levels by 2020 (1990 levels have been estimated to equate to 15 percent below 2005 emission levels). Based on CARB's calculation of 1990 baseline emissions levels, California must reduce GHG emissions by approximately 29 percent below "business-as-usual" predictions of year 2020 GHG emissions to achieve this goal.

The bill required CARB to adopt rules and regulations in an open public process to achieve the maximum technologically feasible and cost-effective GHG reductions. CARB accomplished the key milestones set forth in AB 32, including the following:

- June 30, 2007. Identification of discrete early action GHG emissions reduction measures. On June 21, 2007, CARB satisfied this requirement by approving three early action measures. These were later supplemented by adding six other discrete early action measures.
- January 1, 2008. Identification of the 1990 baseline GHG emissions level, approval of a statewide limit equivalent to that level, and adoption of reporting and verification requirements concerning GHG emissions. On December 6, 2007, CARB approved a statewide limit on GHG emissions levels for the year 2020 consistent with the determined 1990 baseline.
- January 1, 2009. Adoption of a scoping plan for achieving GHG emission reductions. On December 11, 2008, CARB adopted the Climate Change Scoping Plan: A Framework for Change (Scoping Plan), discussed in more detail below.
- January 1, 2010. Adoption and enforcement of regulations to implement the "discrete" actions. Several early action measures have been adopted and became effective on January 1, 2010.
- January 1, 2011. Adoption of GHG emissions limits and reduction measures by regulation. On October 28, 2010, CARB released its proposed cap-and-trade regulations, which would cover sources of approximately 85 percent of California's GHG emissions (CARB 2010a). CARB's board ordered CARB's executive director to prepare a final regulatory package for cap and trade on December 16, 2010.
- January 1, 2012. GHG emissions limits and reduction measures adopted in 2011 become enforceable.

AB 32 Scoping Plan

As noted above, on December 11, 2008, CARB adopted the Scoping Plan to achieve the goals of AB 32. The Scoping Plan establishes an overall framework for the measures that will be adopted to reduce California's GHG emissions. CARB determined that achieving the 1990 emissions level would require a reduction of GHG emissions of approximately 29 percent below what would otherwise occur in 2020 in the absence of new laws and regulations (referred to as "business as usual"). The Scoping Plan evaluates opportunities for sector-specific reductions, integrates all CARB and Climate Action Team early actions and additional GHG reduction measures by both entities, identifies additional measures to be pursued as regulations, and outlines the role of a cap-and-trade program. The key elements of the Scoping Plan include:

- Expanding and strengthening existing energy efficiency programs as well as building and appliance standards.
- Achieving a statewide renewables energy mix of 33 percent.
- Developing a California cap-and-trade program that links with other Western Climate Initiative partner programs to create a regional market system and caps sources contributing 85 percent of California's GHG emissions.
- Establishing targets for transportation-related GHG emissions for regions throughout California, and pursuing policies and incentives to achieve those targets.
- Adopting and implementing measures pursuant to existing state laws and policies, including California's clean car standards, heavy-duty truck measures, and the Low Carbon Fuel Standard.
- Creating targeted fees, including a public goods charge on water use, fees on high global warming potential gases, and a fee to fund the administrative costs of the State of California's long-term commitment to AB 32 implementation. (CARB 2008)

In 2009, a coalition of special interest groups brought a challenge to the Scoping Plan alleging that it violated AB 32 and that the environmental review document (called a "Functional Equivalent Document") violated CEQA by failing to appropriately analyze alternatives to the proposed cap-and-trade program. On May 20, 2011, the San Francisco Superior Court entered a final judgment ordering that CARB take no further action with respect to cap-and-trade rulemaking until it complies with CEQA. While CARB disagrees with the trial court finding and appealed the decision on May 23, 2011, in order to remove any doubt about the matter and in keeping with CARB's interest in public participation and informed decision-making, CARB revisited the alternatives. The revised analysis includes the five alternatives included in the original environmental analysis: a "no project" alternative (that is, taking no action at all); a plan relying on a cap-and-trade program for the sectors included in a cap; a plan relying more on source-specific regulatory requirements with no cap-and-trade component; a plan relying on a carbon fee or tax; and a plan relying on a variety of proposed strategies and measures. The public hearing to consider approval of the AB 32 Scoping Plan Functional Equivalent Document and the AB 32 Scoping Plan was held on August 24, 2011. On this date, CARB re-approved the Scoping Plan. On May 22, 2014, after public and stakeholder comment, the First Update to the Climate Change Scoping Plan was approved by the CARB Board, along with the finalized environmental documents.

In August 2012, CARB released revised estimates of the expected 2020 emissions reductions. The revised analysis relies on emissions projections updated in light of current economic forecasts that account for the economic downturn since 2008 as well as reduction measures already approved and put in place. This reduced the projected 2020 emissions from 596 million metric tons (MMT) CO_2e to 545 $MMTCO_2e$. The reduction in projected 2020 emissions means that the revised business-as-usual (BAU) reduction necessary to achieve AB 32's goal of reaching 1990 levels by 2020 is now 21 percent.

Assembly Bill 1493

Assembly Bill 1493 ("the Pavley Standard," or AB 1493) (Health and Safety Code Sections 42823 and 43018.5) required CARB to adopt regulations by January 1, 2005, to reduce GHG emissions from noncommercial passenger vehicles and light-duty trucks of model years 2009–2016. The bill also required the California Climate Action Registry to develop and adopt protocols for the reporting and certification of GHG emissions reductions from mobile sources for use by CARB in granting emissions reduction credits. The bill authorizes CARB to grant emissions reduction credits for reductions in GHG emissions prior to the date of enforcement of regulations, using model year 2000 as the baseline for reduction.

In 2004, CARB applied to the EPA for a waiver under the federal Clean Air Act to authorize implementation of these regulations. The EPA formally denied the waiver request in December 2007 after California filed suit to prompt federal action. In January 2008, the California Attorney General filed a new lawsuit against the EPA for denying California's request for a waiver to regulate and limit GHG emissions from these vehicles. In January 2009, President Obama issued a directive to the EPA to reconsider California's request for a waiver. On June 30, 2009, the EPA granted the waiver to California for its GHG emission standards for motor vehicles. As part of this waiver, the EPA specified the provision that CARB may not hold a manufacturer liable or responsible for any noncompliance caused by emission debits generated by a manufacturer for the 2009 model year. CARB has adopted a new approach to passenger vehicles—cars and light trucks—by combining the control of smog-causing pollutants and GHG emissions into a single coordinated package of standards. The new approach also includes efforts to support and accelerate the numbers of plug-in hybrids and zero-emission vehicles in California. These standards will apply to all passenger and light-duty trucks used by the residents of Elk Grove.

Low Carbon Fuel Standard

Executive Order S-01-07 (January 18, 2007) requires a 10 percent or greater reduction in the average fuel carbon intensity for transportation fuels in California regulated by CARB. CARB identified the Low Carbon Fuel Standard (LCFS) as a discrete early action item under AB 32, and the final resolution (09-31) was issued on April 23, 2009. In 2009, CARB approved for adoption of the LCFS regulation, which became fully effective in April 2010 and is codified at Title 17, California Code of Regulations, Sections 95480–95490. The LCFS will reduce GHG emissions by reducing the carbon intensity of transportation fuels used in California by at least 10 percent by 2020. Carbon intensity is a measure of the GHG emissions associated with the various production, distribution, and use steps in the "life cycle" of a transportation fuel.

On December 29, 2011, the US District Court for the Eastern District of California issued several rulings in the federal lawsuits challenging the LCFS. One of the district court's rulings preliminarily enjoined CARB from enforcing the regulation. In January 2012, CARB appealed that decision to the Ninth Circuit Court of Appeals and then moved to stay the injunction pending resolution of the appeal. On April 23, 2012, the Ninth Circuit granted CARB's motion for a stay of the injunction while it continued to consider CARB's appeal of the lower court's decision. In September 2013, the Ninth Circuit Court of Appeals vacated the lower court injunction against the LCFS regulation. The Ninth Circuit concluded that such regulation does not constitute extraterritorial regulation prohibited by the dormant Commerce Clause.

Clean Cars

In January 2012, CARB approved the Advanced Clean Cars Program, a new emissions-control program for model years 2017–2025. The program combines the control of smog, soot, and GHG emissions with requirements for greater numbers of zero-emission vehicles. By 2025, when the rules will be fully implemented, the new automobiles will emit 34 percent fewer global warming gases and 75 percent fewer smog-forming emissions.

Renewables Portfolio Standard (Senate Bill 1078, Senate Bill 107, and Senate Bill X1-2)

Established in 2002 under Senate Bill (SB) 1078, and accelerated in 2006 under SB 107 and again in 2011 under SB X1-2, California's Renewables Portfolio Standard (RPS) requires retail sellers of electric services to increase procurement from eligible renewable energy resources to 33 percent of total retail sales by 2020. The 33 percent standard is consistent with the RPS goal established in the Scoping Plan. As interim measures, the RPS requires 20 percent of retail sales to be sourced from renewable energy by 2013, and 25 percent by 2016. Initially, the RPS provisions applied to investor-owned utilities, community choice aggregators, and electric service providers. SB X1-2 added, for the first time, publicly owned utilities to the entities subject to the RPS. The expected growth in the RPS to meet the standards in effect in 2008 is not reflected in the BAU calculation in the AB 32 Scoping Plan. In other words, the Scoping Plan's 2020 business as usual does not take credit for implementation of the RPS that occurred after its adoption.

Senate Bill 375

SB 375 (codified at Government Code and Public Resources Code[1]), signed in September 2008, provides for a new planning process to coordinate land use planning, regional transportation plans, and funding priorities in order to help California meet the GHG reduction goals established in AB 32. SB 375 will be implemented over the next several years and includes provisions for streamlined CEQA review for some infill projects such as transit-oriented development. SB 375 also requires metropolitan planning organizations (MPOs) to incorporate a "sustainable communities strategy" in their regional transportation plans that will achieve GHG emissions reduction targets by reducing vehicle miles traveled from light-duty vehicles through the development of more compact, complete, and efficient communities. The MPO with jurisdiction in the Project area is the Sacramento Area Council of Governments (SACOG).

SB 375 is similar to the Regional Blueprint Planning Program, established by the California Department of Transportation (Caltrans), which provides discretionary grants to fund regional transportation and land use plans voluntarily developed by MPOs working in cooperation with councils of governments. The Scoping Plan relies on the requirements of SB 375 to implement the carbon emissions reductions anticipated from land use decisions.

On September 23, 2010, CARB adopted regional targets for the reduction of GHG emissions applying to the years 2020 and 2035 (CARB 2011a). For the area under SACOG jurisdiction, including the Project area, CARB adopted regional targets for reduction of GHG emissions by 7 percent for 2020 and by 16 percent for 2035 (CARB 2010b). On February 15, 2011, CARB's executive officer approved the final targets (CARB 2011b).

California Building Energy Efficiency Standards

Energy conservation standards for new residential and commercial buildings were originally adopted by the California Energy Resources Conservation and Development Commission in June 1977 and most recently revised in 2008 (Title 24, Part 6 of the California Code of Regulations [CCR]). In general, Title 24 requires the design of building shells and building components to conserve energy. The standards are updated periodically to allow consideration and possible incorporation of new energy efficiency technologies and methods.

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[1] Senate Bill 375 is codified at Government Code Sections 65080, 65400, 65583, 65584.01, 65584.02, 65584.04, 65587, 65588, 14522.1, 14522.2, and 65080.01 as well as Public Resources Code Sections 21061.3 and 21159.28 and Chapter 4.2.

On July 17, 2008, the California Building Standards Commission adopted the nation's first green building standards. The California Green Building Standards Code (Part 11, Title 24) was adopted as part of the California Building Standards Code (Title 24, California Code of Regulations). Part 11 establishes voluntary standards on planning and design for sustainable site development, energy efficiency (in excess of the California Energy Code requirements), water conservation, material conservation, and internal air contaminants. Some of these standards have become mandatory in the 2010 edition of the Part 11 code. Current mandatory standards include:

- Twenty (20) percent mandatory reduction in indoor water use, with voluntary goal standards for 30, 35, and 40 percent reductions
- Separate water meters for nonresidential buildings' indoor and outdoor water use, with a requirement for moisture-sensing irrigation systems for larger landscape projects
- Diversion of 50 percent of construction waste from landfills, increasing voluntarily to 65 and 75 percent for new homes and 80 percent for commercial projects
- Mandatory inspections of energy systems (i.e., heat furnace, air conditioner, mechanical equipment) for nonresidential buildings over 10,000 square feet to ensure that all are working at their maximum capacity according to their design efficiencies
- Low-pollutant-emitting interior finish materials such as paints, carpet, vinyl flooring, and particleboard

The California Energy Commission has opened a public process and rulemaking proceeding for the adoption of changes to the 2013 Building Energy Efficiency Standards contained in the California Code of Regulations, Title 24, Part 6 (also known as the California Energy Code) and associated administrative regulations in Part 1 (collectively referred to here as the standards). The 2013 Building Energy Efficiency Standards are 25 percent more efficient than previous standards for residential construction and 30 percent better for nonresidential construction. The standards, which took effect on January 1, 2014, will offer builders better windows, insulation, lighting, ventilation systems, and other features that reduce energy consumption in homes and businesses.

LOCAL

Sacramento Metropolitan Air Quality Management District

The proposed Project is located in the Sacramento Valley Air Basin, which is under the jurisdiction of the Sacramento Metropolitan Air Quality Management District (SMAQMD). The SMAQMD (2011) offers the guidance contained in the Guide to Air Quality Assessment in Sacramento County for addressing the GHG emissions associated with land use development projects. However, the SMAQMD does not currently have an adopted threshold of significance for GHG emissions. The SMAQMD recommends addressing the potential impacts of project-generated GHG emissions, including a description of the existing environmental conditions or setting (see the Existing Setting subsection above), a discussion of the existing regulatory environment pertaining to GHGs (see the Regulatory Framework subsection above), a discussion of the GHG emission sources associated with the proposed Project's construction and operational activities, and a discussion of feasible construction and operational mitigation necessary to reduce impacts.

City of Elk Grove Climate Action Plan and Sustainability Element

Background

On March 27, 2013, the City of Elk Grove adopted a Climate Action Plan (CAP) and the Sustainability Element of the General Plan. The Sustainability Element and CAP are two separate but related components of the City's sustainability strategy. The City is taking proactive steps to become a more environmentally sustainable community and respond to State requirements related to GHG emissions. The CAP is a culmination of existing and proposed initiatives to reduce GHG emissions through goals and measures related to transportation, land use, energy use, waste, and water use. The CAP is a tool for the City to achieve the State-recommended GHG emissions reduction target in Elk Grove through new and existing land uses, transportation, and City codes and programs. Concurrently with the CAP, the City adopted a new General Plan Sustainability Element. The Sustainability Element is a long-term (20+ years) plan that organizes and highlights the City's goals related to sustainability and provides new direction and vision to maintain a healthy, balanced community. As an element of the City's General Plan, the Sustainability Element governs land use decisions. The Sustainability Element also creates an overarching framework for the City to achieve GHG emissions reductions.

The CAP functions as an implementation tool of the Sustainability Element, focusing specifically on strategies to reduce GHG emissions and providing direction to reduce emissions consistent with State recommendations. It also builds on the goals and vision of the Sustainability Element, but translates these goals into numeric estimates of GHG emissions reduction potential. While the CAP is not an adopted component of the General Plan, it is connected to the General Plan as an implementation item of the Sustainability Element in order to directly implement the goals and policies of the element.

CEQA Streamlining and the CAP

Responding to the CEQA Guidelines identified above, lead agencies may use adopted GHG emissions reduction plans to assess the cumulative impacts of discretionary projects on climate change. The CEQA Guidelines also provide a mechanism to streamline development review of future projects. The City of Elk Grove Climate Action Plan meets the criteria identified in the CEQA Guidelines for a GHG reduction plan.

For developments wishing to benefit from CEQA streamlining provisions provided by the CAP, a project must demonstrate consistency with the CAP forecasts, include measures applicable to the project, and demonstrate the project's incorporation of the measures. The City determined the GHG impacts of community-wide GHG emissions based on the AB 32 reduction target. The City identified the statewide AB 32 reduction target as the reduction of GHG emissions to 1990 levels by 2020, or as outlined in the AB 32 Scoping Plan, the functional equivalent of 15 percent below "existing" (2005–2008) levels by 2020. For the purpose of defining existing emissions levels, the City chose the emissions in the year 2005 as a benchmark for existing emissions conditions in the City (City of Elk Grove 2013a). The Sustainability Element adopts the target of a 15 percent reduction below 2005 emissions by 2020, whereas the CAP provides the mitigations to achieve the reduction target.

The City's target is consistent with statewide efforts established in CARB's Climate Change Scoping Plan to reduce statewide GHG emissions to 1990 levels by 2020. The CAP presents a 2020 target of 627,128 metric tons CO_2e. As shown in **Table 4.5-4**, the CAP achieves a community-wide 15 percent reduction below baseline 2005 levels by 2020.

TABLE 4.5-4
CLIMATE ACTION PLAN COMMUNITY-WIDE GHG REDUCTIONS – METRIC TONS PER YEAR*

Emissions Inventory	
2005 Baseline Emissions Inventory	737,838
2020 Unmitigated Emissions Inventory	1,017,499
Reductions from 2020 Unmitigated Emissions Inventory	
California State-Led Reductions	
SMUD Renewables Portfolio Standard	-102,452
CALGreen Building Standards (Buildings Energy Efficiency Standards)	-17,305
Clean Car Fuel Standard (AB 1493 Pavley Vehicle Standards)	-65,140
Low Carbon Fuel Standard	-29,642
Total State-Led Emissions Reductions	**-214,539**
Elk Grove Climate Action Plan Reductions	
An Innovative and Efficient Built Environment	-37,240
Resource Conservation	-28,221
Transportation Alternatives and Congestion Management	-108,221
Municipal Programs	-2,149
Total Climate Action Plan Emissions Reductions	**-175,831**
Combined CAP and State Reductions	390,371
AB 32 Emissions Target (15% below 2005 Baseline Inventory)	**627,162**
Elk Grove Climate Action Plan and State-Adjusted Inventory	627,128
AB 32 Target Achieved?	**Yes**

Source: City of Elk Grove 2013a
**Note: Due to rounding, the total may not be the sum of component parts.*

In March 2013, the City certified a Subsequent Environmental Impact Report (SEIR) for the Sustainability Element and CAP (City of Elk Grove 2013b). The City prepared the SEIR for use as a tiering and streamlining document for GHG emissions as allowed under Section 15183.5 of the CEQA Guidelines. The SEIR allows the City to use the Climate Action Plan to determine that a subsequent project's incremental contribution to GHG and climate change impacts is not cumulatively considerable if the Project complies with the CAP.

4.5.3 IMPACTS AND MITIGATION MEASURES

STANDARDS OF SIGNIFICANCE

The impact analysis provided below is based on the application of the CEQA Guidelines Appendix G environmental checklist. A GHG impact is considered significant if implementation of the Project will:

1) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment.

2) Conflict with any applicable plan, policy, or regulation of an agency adopted for the purpose of reducing the emissions of greenhouse gases.

GHG emissions associated with the Project would occur over the short term from construction activities, consisting primarily of emissions from equipment exhaust. There would also be long-term regional emissions associated with Project-related new vehicular trips, stationary source emissions such as natural gas used for heating, and indirect source emissions such as electricity usage for lighting. Preliminary guidance from the Office of Planning and Research (OPR) and letters from the Attorney General critical of CEQA documents that have taken different approaches indicate that lead agencies should calculate, or estimate, emissions from vehicular traffic, energy consumption, water conveyance and treatment, waste generation, and construction activities. The calculation presented below includes construction and long-term operational emissions in terms of annual CO_2e.

Addressing GHG generation impacts requires an agency to make a determination as to what constitutes a significant impact. The amendments to the CEQA Guidelines specifically allow lead agencies to determine thresholds of significance that illustrate the extent of an impact and are a basis from which to apply mitigation measures. This means that each agency is left to determine if a project's GHG emissions will have a "significant" impact on the environment. The guidelines direct that agencies are to use "careful judgment" and "make a good-faith effort, based to the extent possible on scientific and factual data, to describe, calculate or estimate" the project's GHG emissions (14 CCR Section 15064.4[a]).

In its Final Statement of Reasons for Regulatory Action accompanying the CEQA Amendments (FSOR), the California Natural Resources Agency (CNRA) (2009b) explains that quantification of GHG emissions "is reasonably necessary to ensure an adequate analysis of GHG emissions using available data and tools" and that "quantification will, in many cases, assist in the determination of significance." However, as explained in the FSOR, the revised Section 15064.4(b) assigns lead agencies the discretion to determine the methodology to quantify GHG emissions. The FSOR also notes that CEQA case law has long stated that "there is no iron-clad definition of 'significance.' Accordingly, lead agencies must use their best efforts to investigate and disclose all that they reasonably can concerning a project's potential adverse impacts."

Determining a threshold of significance for a project's climate change impacts poses a special difficulty for lead agencies. Much of the science in this area is new and is evolving constantly. At the same time, neither the State nor local agencies is specialized in this area, and there are currently no local, regional, or State thresholds for determining whether a project has a significant impact on climate change. The CEQA Amendments do not prescribe specific significance thresholds but instead leave considerable discretion to lead agencies to develop appropriate thresholds to apply to projects within their jurisdiction.

As noted earlier, AB 32 is a legal mandate requiring that statewide GHG emissions be reduced to 1990 levels by 2020. In adopting AB 32, the legislature determined the necessary GHG reductions for the State to make in order to sufficiently offset its contribution to the cumulative climate change problem to reach 1990 levels. AB 32 is the only legally mandated requirement for the reduction of GHGs. As such, compliance with AB 32 is the adopted basis on which the agency can base its significance threshold for evaluating a project's GHG impacts.

The City of Elk Grove has adopted a Climate Action Plan containing a GHG reduction strategy based on the AB 32 reduction target. Additionally, the GHG-reducing policy provisions contained in the CAP were prepared with the purpose of complying with the requirements of AB 32 and achieving the goals of the AB 32 Scoping Plan. As a result, the CAP is consistent with statewide efforts established in CARB's Climate Change Scoping Plan to reduce statewide GHG emissions to 1990 levels by 2020. The CAP meets the criteria identified in the CEQA Guidelines for a GHG reduction plan. Therefore, the Project is analyzed relative to the City's adopted CAP to determine the significance of GHG emissions and contribution to climate change.

METHODOLOGY

The effects of greenhouse gas emissions generated in the Laguna Ridge Specific Plan area on climate change were not considered in the LRSP EIR. The resultant GHG emissions of the proposed Project were calculated using the California Emissions Estimator Model (CalEEMod), version 2013.2, computer program (see **Appendix G**). CalEEMod is a statewide land use emissions computer model designed to provide a uniform platform for the use of government agencies, land use planners, and environmental professionals. This model was developed in coordination with the South Coast Air Quality Management District and is the most current emissions model approved for use in California by various other air districts.

The CNRA (2009c) has noted that impacts of GHG emissions should focus on the cumulative impact on climate change, stating:

> *While the Proposed Amendments do not foreclose the possibility that a single project may result in greenhouse gas emissions with a direct impact on the environment, the evidence before [CNRA] indicates that in most cases, the impact will be cumulative. Therefore, the Proposed Amendments emphasize that the analysis of greenhouse gas emissions should center on whether a project's incremental contribution of greenhouse gas emissions is cumulatively considerable.*

Thus, the CEQA Guidelines continue to make clear that the significance of GHG emissions is most appropriately considered on a cumulative level.

PROJECT IMPACTS AND MITIGATION MEASURES

GHG Emissions (Standards of Significance 1 and 2)

Impact 4.5.1 Implementation of the proposed Project would result in a net increase in GHG emissions, but would not conflict with the goals of AB 32 or result in a significant impact on the environment. **This impact was not addressed in the LRSP EIR, but would result in an impact that is not cumulatively considerable.**

Construction GHG Emissions

Subsequent development under the proposed Project would result in direct emissions of GHGs from construction. The approximate quantity of annual GHG emissions generated by construction equipment utilized to build the proposed Project is shown in **Table 4.5-5.**

TABLE 4.5-5
CONSTRUCTION-RELATED GREENHOUSE GAS EMISSIONS – METRIC TONS

Construction Phases	CO_2	CH_4	N_2O	CO_2e
Earthwork & Underground Work[1]	454	0.1	0.0	457
Building Construction (75,000 square feet)	393	0.1	0.0	395
Facility Features Construction (Competition Venue & Water/Adventure Park)	884	0.2	0.0	887
Asphalt Paving[2]	66	0.0	0.0	66
Total	**1,797**	**0.4**	**0.0**	**1,805**

Source: CalEEMod version 2013.2. Construction equipment derived from information provided by the Project applicant.

Notes: The projected 1,805 metric tons of CO_2e would be generated over the course of 14 months of construction.

1. The Earthwork and Underground Work phase accounts for emissions of grading and site preparation for the 30-acre Project site and 27.3-acre overflow parking lot.

2. The Asphalt Paving phase accounts for emissions from paving the entire 30-acre Project site and 27.3-acre overflow parking lot.

Refer to Appendix C for model data outputs.

Operational GHG Emissions

As shown in **Table 4.5-6**, the long-term operations of the proposed Project would produce 4,504 metric tons of CO_2e annually. Construction-generated GHG emissions were amortized over the estimated life of the Project (30 years) and added to long-term operational emissions in order to provide a conservative analysis.

TABLE 4.5-6
OPERATIONAL GREENHOUSE GAS EMISSIONS – METRIC TONS PER YEAR (UNMITIGATED)

Source	CO_2	CH_4	N_2O	CO_2e
Construction (amortized over 30 years of Project life)	60	0.0	0.0	60
Area	0	0.0	0.0	0
Energy	1,464	0.1	0.0	1,471
Mobile	2,693	0.1	0.0	2,695
Solid Waste	109	6.4	0.0	243
Water	32	0.1	0.0	35
Total	**4,358**	**6.7**	**0.0**	**4,504**

Source: CalEEMod version 2013.2. Mobile trip source emissions are derived from trip generation estimates identified in the traffic impact analysis prepared for the Project (Fehr & Peers 2014). See Appendix C for emission model outputs.

The Elk Grove CAP is a strategic planning document that identifies sources of GHG emissions from within the City's boundary and reduces emissions through energy use, transportation, land use, water use, and solid waste strategies (referred to as "measures" in the CAP). The policy provisions contained in the CAP were prepared with the purpose of complying with the requirements of AB 32 and achieving the goals of the AB 32 Scoping Plan. A specific project proposal is considered consistent with the Elk Grove CAP if it complies with the GHG reduction measures contained in the adopted CAP.

The Project will be required to comply with the provisions of the Elk Grove CAP. Ways in which the Project will comply include, but are not limited to, the following:

- Compliance with City-adopted building code requirements for energy efficiency materials
- Pre-wire and conduit installation for solar photovoltaics
- Implementation of recycling and waste reduction measures
- Use of variable speed pumps and drives for circulation and treatment of pool water
- Installation of drought-tolerant plants and drip irrigation in compliance with EGMC Chapters 14.10 and 23.54, which mandate low-water-use landscaping

Compliance with the CAP and the City's Municipal Code will reduce potential GHG emissions from the Project. As a result, the Project would comply with the AB 32 strategies to help California reach the emissions reduction targets. Therefore, **this impact was not addressed in the LRSP EIR, but would result in an impact that is not cumulatively considerable.**

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4.6 Hazards and Hazardous Materials

4.6.1 EXISTING SETTING

HAZARDOUS MATERIALS DEFINED

Under Title 22 of the California Code of Regulations (CCR), the term *hazardous substance* refers to both hazardous materials and hazardous wastes. Both of these are classified according to four properties: toxicity, ignitability, corrosiveness, and reactivity (CCR Title 22, Chapter 11, Article 3). A material is defined as hazardous if it appears on a list of hazardous materials prepared by a federal, State, or local regulatory agency or if it has characteristics defined as hazardous by such agency.

The California Environmental Protection Agency, Department of Toxic Substances Control (DTSC) defines hazardous materials, as found under CCR Title 22, Chapter 19, Section 66269.1(3), as follows:

> *. . . any material, whether a product, a substance, or a waste, that, because of its quantity, concentration, or physical or chemical characteristics, poses a significant present or potential hazard to human health and safety or to the environment if released into the workplace or the environment. A material has been shown to pose a significant hazard if the material is included on any list identified in subsection (b). A hazardous material includes, but is not limited to, a product or piece of equipment that contains a component or ingredient that is a hazardous material, or requires the use of a fuel that is a hazardous material.*

Public health is potentially at risk whenever hazardous materials are or will be used. It is necessary to differentiate between the "hazard" of these materials and the acceptability of the "risk" they pose to human health and the environment. A hazard is any situation that has the potential to cause damage to human health and the environment. The risk to health and public safety is determined by the probability of exposure combined with the inherent toxicity of a material. When the risk of an activity is judged acceptable by society, in relation to perceived benefits, then the activity is judged to be safe. For example, ammonia is a common household chemical whose use has been judged safe in our society. Although it can be hazardous to health, irritating the eyes, respiratory tract, and skin, and even causing bronchitis or pneumonia following severe exposures, the risk of such a severe exposure is believed to be low. Therefore, the use of household ammonia is thought to be a safe activity.

Factors that can influence the health effects of exposure to hazardous materials include the dose to which the person is exposed, the frequency of exposure, the duration of exposure, the exposure pathway (route by which a chemical enters a person's body), and the individual's unique biological susceptibility.

In addition to chemicals, which are most commonly associated with the term *hazardous materials*, other categories applicable to the definition are, for example, biohazardous materials including certain infectious agents (microorganisms, bacteria, molds, parasites, and viruses) that normally cause or significantly contribute to increased human mortality, and organisms capable of being communicated by invading and multiplying in body tissues.

PREVIOUS ANALYSIS

The Laguna Ridge Specific Plan EIR (LRSP EIR) addressed the impacts associated with construction and operation of residential and nonresidential uses in the LRSP area. Potentially significant impacts disclosed in the LRSP EIR include exposure to past herbicide or pesticide applications due to construction on agricultural land; exposure to asbestos and lead paint materials due to demolition of existing on-site structures; and exposure to contaminants due to historic chemical or burn dump areas. The EIR determined that these site-specific potential impacts would be reduced to less than significant levels with implementation of mitigation measures identified in the EIR (mitigation measures MM 4.5.1 through 4.5.4 – see **Appendix A**). The LRSP EIR also determined that the Project site is not on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5, such that it would create a significant hazard to the public or to the environment. Because the proposed Project would not result in conditions that would require any changes to the analysis or mitigation measures in the previous EIR, these site-specific issues are not addressed further in this Draft EIR. However, an aquatics complex use was not considered in the hazards and hazardous materials component of the previous EIR, so this analysis focuses on the hazardous materials handling aspects of the Project that are specific to an aquatics complex use.

PROJECT SETTING

The Project site is approximately 57.3 acres. The 30-acre portion located south of Civic Center Drive is primarily undeveloped, with three vacant houses, ornamental landscaping, and outbuildings present on the northern half of the parcel. The southern half of the parcel is undeveloped. Proposed overflow parking would be provided on the three parcels located north of Civic Center Drive that total 27.3 acres. These parcels contain a single outbuilding, with no other developed uses. The Project site is located east of a residential subdivision, north of Elizabeth Pinkerton Middle School/Consumnes Oaks High School, and west of a parcel containing aboveground water tanks as well as planned residential and community event uses.

4.6.2 REGULATORY FRAMEWORK

Numerous federal, State, and local laws have been enacted to regulate the management of hazardous materials. These laws are regulated through programs administered by various agencies at the federal, state, and local levels. The following discussion contains a summary review of regulatory controls pertaining to hazardous substances.

FEDERAL

Federal agencies that regulate hazardous substances include the US Environmental Protection Agency (EPA), the Occupational Safety and Health Administration (OSHA), the US Department of Transportation (DOT), and the National Institute of Health. The following federal laws and guidelines govern hazardous materials.

- Federal Water Pollution Control Act
- Clean Air Act
- Occupational Safety and Health Act
- Comprehensive Environmental Response, Compensation, and Liability Act
- Resource Conservation and Recovery Act (RCRA)
- Safe Drinking Water Act
- Toxic Substances Control Act

Worker Safety

The Hazard Communication Standard (Title 29, Part 1910 of the Code of Federal Regulations [CFR]) requires that workers be informed of the hazards associated with the materials they handle. Workers must be trained in safe handling of hazardous materials, use of emergency response equipment, and the building emergency response plan and procedures. Containers must be appropriately labeled, and Material Safety Data Sheets must also be available in the workplace.

OSHA's Bloodborne Pathogens Standard is intended to protect workers, including lifeguards at aquatics facilities and water bodies, from the exposure of blood and bodily fluids, which is the primary means of transmittal for the most harmful infectious agents known.

Hazardous Materials Transportation

The US Department of Transportation developed regulations pertaining to the transport of hazardous materials by all modes of transportation. DOT regulations specify packaging requirements for different types of materials. In addition to the DOT, the US Postal Service (USPS), the EPA, the California Highway Patrol (CHP), the California Department of Transportation (Caltrans), and the DTSC implement and enforce State and federal laws regarding hazardous materials transportation. The USPS has regulations for the transport of hazardous materials by mail.

Transporters of hazardous materials are subject to both DOT and EPA enforcement of the regulations. Consequently, the DOT and the EPA coordinate their efforts, especially at the regional level, to obtain compliance with both the RCRA and Hazardous Materials Transportation Act (HMTA) regulations. Under the authority of the Resource Conservation and Recovery Act, the EPA regulates the transportation of hazardous materials. The EPA coordinates its transportation ordinances with the requirements of the HMTA and any statutes promulgated by the US Department of Transportation pursuant to the HMTA. The EPA set forth these standards applicable to transporters of hazardous materials in 40 CFR 263. These EPA standards incorporate and require compliance with the DOT provisions on labeling, marking, placarding, using proper containers, and reporting discharges. The EPA's adoption of these DOT standards ensures consistency among the requirements and avoids establishing conflicting rules. The DOT's regulations are documented in 49 CFR 171-180 and implemented by the Research and Special Programs Administration within the DOT. In summary, the EPA is directed by the RCRA to establish certain standards for transporters of hazardous materials and to coordinate regulatory activities with the DOT.

EPA regulations require a transporter to:

- Comply with the manifest system (a system that ensures the integrity of the shipment from the point of origin to its destination).
- Maintain the appropriate records (signed manifests) for three years.
- Take immediate action to protect human health and the environment (e.g., notify local authorities or initiate interim measures) in the case of a discharge.
- Notify the National Response Center and submit a report to the DOT Office of Hazardous Materials Regulations in the event of a hazardous waste discharge.
- Clean up any discharges to the environment and take any actions required by the appropriate government officials for mitigating the discharge effects on human health and environment.

Transporters of hazardous materials must also adhere to all of the Federal Motor Carrier Safety Regulations that the DOT has adopted under the Motor Carrier Safety Act of 1984. This act specifies more requisites that apply to the transport vehicle and the driver. Among them are concise specifications for vehicle parts and accessories, such as lighting devices, brakes, glazing and windows, fuel systems, tires, and horns. Additional requirements concerning inspection, repair, and maintenance are enumerated. Special driving and parking rules that relate to hazardous materials transportation are also indicated. Standards for drivers identify minimum qualifications, including physical qualifications, background and character profiles, and pertinent examinations. Also included among these rules are testing requirements for alcohol and controlled substances such as marijuana, cocaine, opiates, amphetamines, and phencyclidine. Other regulations pertaining to drivers include standards for the driving of vehicles, stopping, fueling, the use of lamps, the reporting of accidents, and the monitoring of a driver's hours of service.

STATE

The California Environmental Protection Agency (CalEPA) and the State Water Resources Control Board establish rules governing the use of hazardous materials. Applicable State laws include the following:

- Public Safety/Fire Regulations/Building Codes
- Hazardous Substances Information and Training Act
- Air Toxics Hot Spots and Emissions Inventory Law
- Underground Storage of Hazardous Substances Act
- Porter-Cologne Water Quality Control Act

Within CalEPA, the DTSC has primary regulatory responsibility, with delegation of enforcement to local jurisdictions that enter into agreements with the State agency, for the management and transport of hazardous materials under the authority of the Hazardous Waste Control Law.

Hazardous Materials Management

CalEPA has established regulations governing the use of hazardous materials in the State. Within CalEPA, the DTSC has primary hazardous materials regulatory responsibility, but can delegate enforcement responsibilities to local jurisdictions that enter into agreements with the DTSC, for the generation, transport, and disposal of hazardous materials under the authority of the Hazardous Waste Control Law. State regulations applicable to hazardous materials are contained primarily in Title 22 of the California Code of Regulations. Title 26 of the CCR is a compilation of those chapters or titles of the CCR that are applicable to hazardous materials management. California Division of Occupational Safety and Health (Cal/OSHA) standards are presented in Title 8 of the CCR; these are more stringent than federal OSHA regulations and address workplace regulations involving the use, storage, and disposal of hazardous materials.

CalEPA adopted regulations implementing a Unified Hazardous Waste and Hazardous Materials Management Regulatory Program (Unified Program). The six elements of the Unified Program are hazardous waste generation and on-site treatment, underground storage tanks, aboveground storage tanks, hazardous material release response plans and inventories, risk management and prevention programs, and Uniform Fire Code hazardous materials management plans and inventories. The program is implemented at the local level by a local agency, referred to as the Certified Unified Program Agency (CUPA), which is responsible for consolidating the administration of the six program elements within its jurisdiction. The Sacramento County Environmental Management Department (EMD) is the CUPA for Sacramento County.

Article 3 of the California Health and Safety Code, Division 2.5, Chapter 3, Section 1797.182 outlines hazardous materials management for the maintenance and operation of public swimming pools. The law sets forth requirements regarding clarity of water, disinfection, pH control, cyanuric acid, bacteriological and chemical quality of pool water, and compressed chlorine gas, among provisions for worker safety. As required by Section 1797.182, pools must be disinfected continuously to maintain acceptable bacteria levels, but chemical quality must not cause objectionable physiological effects on bathers of the aquatics facility.

State and federal laws require detailed planning to ensure that hazardous materials are properly handled, used, stored, and disposed of, and, in the event that such materials are accidentally released, to prevent or to mitigate injury to health or the environment. California's Hazardous Materials Release Response Plans and Inventory Law, also called the Business Plan Act, is intended to minimize the potential for accidents involving hazardous materials and facilitate an appropriate response to possible hazardous materials emergencies. The law requires businesses that use hazardous materials to provide inventories of those materials to designated emergency response agencies, to illustrate on a diagram where the materials are stored on-site, to prepare an emergency response plan, and to train employees to use the materials safely.

Worker Safety

Occupational safety standards exist in federal and State laws to minimize worker safety risks from both physical and chemical hazards in the workplace. Cal/OSHA is responsible for developing and enforcing workplace safety standards and ensuring worker safety in the handling and use of hazardous materials. Among other requirements, Cal/OSHA obligates many businesses to prepare Injury and Illness Prevention Plans and Chemical Hygiene Plans. As at the federal level, the Hazard Communication Standard requires that workers be informed of the hazards associated with the materials they handle. This is achieved through actions such as requiring manufacturers to appropriately label containers, make Material Safety Data Sheets available in the workplace, and require employers to properly train workers.

Uniform Fire Code

The Uniform Fire Code contains regulations relating to construction and maintenance of buildings and the use of premises. The code includes specifications for fire department access, fire hydrants, automatic sprinkler systems, fire alarm systems, fire and explosion hazards safety, hazardous materials storage and use, provisions intended to protect and assist fire responders, industrial processes, and many other general and specialized fire-safety requirements for new and existing buildings and premises. Storage of corrosive materials and liquid and solid oxidizers, including pool chemicals, must be in compliance with Sections 5404 and 6304 of the Uniform Fire Code, which include provisions for indoor storage, detached storage, liquid-tight floors, smoke detection, and others.

California Accidental Release Prevention Program

The California Accidental Release Prevention Program (CCR Title 19, Division 2, Chapter 4.5) covers certain businesses that store or handle more than a certain volume of specific regulated substances at their facilities. The list of regulated substances is found in Article 8, Section 2770.5 of the program regulations and includes common chemicals used in swimming pools such as chlorine and hydrochloric acid (also known as muriatic acid).

LOCAL

Sacramento County

The County of Sacramento, Office of Emergency Services implements the State's Right-to-Know Ordinance that gives it the authority to inventory hazardous materials used by businesses. The County is also in the process of collecting information regarding existing and proposed locations of hazardous material storage, handling, disposal, and transportation facilities.

The Sacramento County Environmental Management Department (EMD) is responsible for enforcing the State regulations on the city and county level, governing hazardous waste generators, hazardous waste storage, underground storage tanks, and environmental health, including inspections and enforcement. The EMD also regulates the use, storage, and disposal of hazardous materials and the abandonment of wells in the county by issuing permits, monitoring regulatory compliance, investigating complaints, and other activities. The EMD reviews technical aspects of hazardous waste site cleanups and oversees remediation of certain contaminated sites resulting from leaking underground storage tanks. As noted above, the Environmental Management Department is the CUPA for Sacramento County and administers the local regulatory programs for all CUPA program elements through inspections, permit issuance, enforcement, complaint response, local ordinance maintenance and oversight, and establishment of administrative policy.

City of Elk Grove General Plan

The City of Elk Grove General Plan Safety Element addresses regulatory issues including safety and exposure standards, risk management, and interagency coordination. The following policies would have a mitigating effect with respect to hazards and hazardous materials:

"Policy SA-2: In considering the potential impact of hazardous facilities on the public and/or adjacent or nearby properties, the City shall consider the hazards posed by reasonably foreseeable events. Evaluation of such hazards shall address the potential for events at facilities to create hazardous physical effects at offsite locations that could result in death, significant injury, or significant property damage. The potential hazardous physical effects of an event need not be considered if the occurrence of an event is not reasonably foreseeable as defined in Policy SA-3. Absent substantial evidence to the contrary, a "hazardous physical effect" from an event shall be a level of exposure to a hazardous physical effect in excess of the levels identified in Policy SA-4."

"Policy SA-3: For the purposes of implementing Policy SA-2, the City considers an event to be 'reasonably foreseeable' when the probability of the event occurring is as indicated in the table below."

Land Use	Probability of Occurrence per Year
"Agriculture, Light Industrial and Industrial" Uses involving continuous access and the presence of limited number of people but easy evacuation, e.g. open space, warehouses, manufacturing plants, etc.	Between 100 in one million and 10 in one million (10-4 to 10-5)
"Commercial" Uses involving continuous access but of easy evacuation, e.g. commercial uses, offices, etc.	Between 10 in one million and 1 in one million (10-5 to 10-6)
"Residential" All other land uses without restriction including institutional uses, residential areas, etc.	1 in one million and less (10-6)

"Policy SA-4: The Maximum Acceptable Exposure standards shown in Table SA-A [of the City of Elk Grove General Plan Safety Element] shall be used in determining the appropriateness of either:

1) Placing a use near an existing hazardous facility which could expose the new use to hazardous physical effects, or

2) Siting a hazardous facility that could expose other nearby uses to hazardous physical effects.

Absent substantial evidence to the contrary, the placement of land uses that do not meet the Maximum Acceptable Exposure standards shall be considered to result in a significant, adverse impact for the purposes of CEQA analysis."

"Policy SA-8: Storage of hazardous materials and waste shall be strictly regulated, consistent with state and federal law."

"Policy SA-10: Industries which store and process hazardous or toxic materials shall provide a buffer zone between the installation and the property boundaries sufficient to protect public safety. The adequacy of the buffer zone shall be determined by the City of Elk Grove."

"Policy SA-11: Support continued coordination with the State Office of Emergency Services, the State Department of Toxic Substances Control, the State Highway Patrol, the Sacramento County Department of Environmental Health Services, the Elk Grove CSD Fire District, the Sheriff's Department, and other appropriate agencies in hazardous materials route planning and incident response."

City of Elk Grove Municipal Code Section 23.60.030, Hazardous Materials

The City's Municipal Code, Title 23, Chapter 23.60, Section 23.60.030 includes the following standards, which are intended to ensure that the use, handling, storage, and transportation of hazardous materials comply with all applicable State laws (Government Code Section 65850.2 and Health and Safety Code Section 25505 et seq.) and that appropriate information is reported to the Fire Department as the regulatory authority.

A. Reporting Requirements. All businesses required by state law (Section 6.95 of the Health and Safety Code) to prepare hazardous materials release response plans and hazardous materials inventory statements shall, upon request, submit copies of these plans, including any revisions, to the Fire Department.

B. Underground Storage. Underground storage of hazardous materials shall comply with all applicable requirements of state law (Section 6.7 of the Health and Safety Code and Articles 679 and 680 of the California Fire Code, or as subsequently amended). Businesses that use underground storage tanks shall comply with the following procedures:

   1) Notify the Fire Department of any unauthorized release of hazardous materials prescribed by City, county, state, and federal regulations;

2) Notify the Fire Department and the Sacramento County Health Department of any proposed abandoning, closing, or ceasing operation of an underground storage tank and actions to be taken to dispose of any hazardous materials; and

3) Submit copies of the closure plan to the Fire Department.

C. Aboveground Storage. Aboveground storage tanks for hazardous materials and flammable and combustible materials may be allowed subject to the approval of the Fire Department.

D. New Development. Structures adjacent to a commercial supply bulk transfer delivery system with at least 6-inch pipes shall be designed to accommodate a setback of at least 100 feet from that delivery system. The setback may be reduced if the Planning Director, with recommendation from the Fire Department, can make one or more of the following findings:

1) The structure would be protected from the radiant heat of an explosion by berming or other physical barriers;

2) A 100-foot setback would be impractical or unnecessary because of existing topography, streets, parcel lines or easements; or

3) A secondary containment system for petroleum pipelines and transition points shall be constructed. The design of the system shall be subject to the approval of the Fire Department.

E. Notification Required. A subdivider of a development within 500 feet of a pipeline shall notify a new/potential owner before the time of purchase and the close of escrow of the location, size, and type of pipeline.

4.6.3 IMPACTS AND MITIGATION MEASURES

STANDARDS OF SIGNIFICANCE

The impact analysis provided below is based on the application of the CEQA Guidelines Appendix G environmental checklist. An impact is considered significant if implementation of the Project will:

1) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials.

2) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment as defined by City of Elk Grove General Plan Policy SA-3.

3) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school.

4) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would create a significant hazard to the public or the environment.

5) For a project located within an airport land use plan or, where such a plan has not been adopted, within 2 miles of a public airport or public use airport, would result in a safety hazard for people residing or working in the project area.

6) For a project within the vicinity of a private airstrip, would result in a safety hazard for people residing or working in the project area.

7) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan.

8) Expose people or structures to a significant risk of loss, injury, or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands.

The Project area is not located on a site that is included on a list of hazardous materials sites, nor is it located in the vicinity of a public or private airport or within an airport land use plan; therefore, Standards of Significance 4, 5, and 6 would not apply, and these issues are not addressed in this Draft SEIR. Furthermore, the Project would not require road closures or other construction activities that would result in impairment or interference with an adopted emergency response plan or emergency evacuation plan; therefore, Standard of Significance 7 would not apply, and this issue is not addressed in this Draft SEIR.

METHODOLOGY

Exposure pathways are the means by which hazardous substances move through the environment from a source to exposure with people. A complete exposure pathway must have four parts: (1) a source of contamination; (2) a mechanism for transport of the substance from the source to the air, surface water, groundwater, or soil; (3) a point where people come in contact with contaminated air, surface water, groundwater, or soil; and (4) a route of entry into the body. As discussed in the Regulatory Framework subsection, the transport, use, storage, and disposal of hazardous materials are governed by a substantial body of existing regulations. These regulations are intended to reduce the potential for exposure by controlling the pathways by which persons could be exposed to hazardous substances to ensure that effects are less than significant. Compliance with these regulations is required, not optional.

The LRSP EIR addressed the impacts associated with construction and operation of residential and nonresidential uses in the LRSP area. Because the proposed Project would not result in conditions that would require any changes to the analysis or mitigation measures in the previous EIR, site-specific impacts, which were determined to be reduced to less than significant levels with implementation of LRSP EIR mitigation measures MM 4.5.1 through 4.5.4 – see **Appendix A**, are not addressed further in this Draft EIR. However, an aquatics complex was not considered in the hazards and hazardous materials component of the previous EIR, so this analysis focuses on the hazardous materials handling aspects of the Project that are specific to aquatics complex uses.

The qualitative analysis of the potential public safety and hazards impacts identified is based on review of intended uses to identify potential environmental effects, based on the standards of significance presented in this section. In determining the level of significance, the analysis assumes that the proposed Project would comply with all applicable laws, ordinances, and regulations (summarized in the Regulatory Framework subsection).

PROJECT IMPACTS AND MITIGATION MEASURES

Exposure Through Transport, Use, Storage, and Disposal of Hazardous Materials (Standard of Significance 1)

Impact 4.6.1 Construction and/or operation of the proposed Project would involve the routine transport, use, storage, and disposal of hazardous materials including construction solvents, paints, adhesives, other construction-related materials, and pool maintenance chemicals, which could create a potential health hazard to the public or environment. **Because the transport, use, storage, and disposal of these types of hazardous materials was not evaluated in the LRSP EIR, this represents a new less than significant impact.**

Project Construction

Construction of the Project would involve the use of various products that contain materials classified as hazardous (e.g., solvents, adhesives and cements, certain paints, cleaning agents, and degreasers). Project construction would be required to comply with applicable building, health, fire, and safety codes. Hazardous materials would be used in varying amounts during construction and occupancy of the Project. Construction and maintenance activities would use hazardous materials such as fuels (gasoline and diesel), oils and lubricants, paints and paint thinners, glues, cleaners (which could include solvents and corrosives in addition to soaps and detergents), and possibly pesticides and herbicides.

Title 8 of the CCR addresses workplace regulations involving the use, storage, and disposal of hazardous materials, and specific applications for construction workers. Titles 22 and 26 of the CCR set forth environmental health standards for hazardous materials management. Chapter 6.95 of the California Health and Safety Code sets forth enabling legislation for the application of Titles 8, 22, and 26 of the CCR. Safety precautions for the prevention of fire hazards associated with the use and storage of hazardous materials are addressed in the Uniform Fire Code. Compliance with applicable federal, State, and local regulations including, but not limited to, Titles 8 and 22 of the CCR, the Uniform Fire Code, and Chapter 6.95 of the California Health and Safety Code would ensure that the Project would not create a significant hazard to the public or to the environment through the routine transport, use, or disposal of hazardous materials.

Construction of the Project requires demolition of structures within the Project site built circa 1980. According to the Draft Phase I Environmental Site Assessment prepared by Blackburn Consulting (2013), construction materials used prior to 1980 may contain asbestos and/or lead-based paint. The presence of a shed on a parcel within the Project site may indicate potential contamination sources such as leach fields, septic tanks, and buried heating oil tanks (Blackburn 2013). Parcels on the Project site have been used historically for agricultural uses, prior to 1972, during which time persistent pesticides such as DDT and lead arsenate were commonly used (Blackburn 2013). Ground disturbance on the Project site and overflow parking lot areas, which have been used historically for agricultural activities, may expose construction workers to potential contamination sources and persistent pesticides. Potential risks associated with demolition of structures and contaminated soils are addressed in LRSP EIR Impacts 4.5.1 through 4.5.4 which provided mitigation measures MM 4.5.1 through MM 4.5.4b to reduce these impacts to less than significant levels. The proposed Project would subject to these measures, which generally require material sampling, soils sampling, and remediation, to address risks associated with the presence of hazardous materials and potential contamination sources at the Project site.

Hazardous materials regulations, which are codified in Titles 8, 22, and 26 of the CCR, and their enabling legislation set forth in Chapter 6.95 of the California Health and Safety Code, were established at the State level to ensure compliance with federal regulations to reduce the risk to human health and the environment from the routine use of and exposure to hazardous substances. These regulations must be implemented by employers/businesses, as appropriate, and are monitored by the State (e.g., Cal/OSHA in the workplace or the DTSC for hazardous waste) and/or local jurisdictions. Enforcement of regulations included in Titles 8, 22, and 26 of the CCR and the Uniform Fire Code during Project construction and monitoring of enforcement by Cal/OSHA and/or local jurisdictions will effectively address impacts associated with the transport, use, storage, and disposal of hazardous materials.

Project Operation

Operation of the Project would involve the use and storage of hazardous materials listed on OSHA's (2011) List of Highly Hazardous Chemicals, Toxics and Reactives, including chlorine, muriatic acid, and other hazardous materials associated with pool maintenance. Hazards such as fires, toxic vapor releases, and personnel injuries may result from the wetting or improper mixture of pool chemicals. The proposed Project would utilize a tablet-based disinfectant control system in the aquatic facilities to accurately deliver the necessary chlorine to maintain water clarity, safety, and water balance by eliminating harmful bacteria, controlling algae, and destroying organic contaminants. The tablet-based system uses calcium hypochlorite tablets, which are composed of a chemical compound including calcium, oxygen, and chlorine. Use of the proposed calcium hypochlorite tablet-based system is free of cyanuric acid and minimizes the risks and safety concerns associated with the use of liquid bleach, leaks, and spills. The Project would control pH levels through the use of chemical pumps, utilizing a 10 percent solution of muriatic acid (also known as hydrochloric acid). It is anticipated that the Project would incorporate a 50-gallon dual containment tank active for each body of water and a 50-gallon dual containment tank staged in each mechanical room area. The efficiency of chemical usage for each body of water would be closely monitored and managed by an automatic chemistry controller. Use of chemicals at the Project site would be in accordance with guidelines set forth by the EPA. Water treatment chemicals would be stored separately from one another in separate rooms for disinfectant control and pH control within the mechanical rooms.

When handling chemicals at the Project site, employees would use appropriate personal protective equipment (PPE) to prevent injury per OSHA's General Requirements for Personal Protective Equipment (Standard Number 1910.132). Handling of the calcium hypochlorite tablets proposed for disinfectant control of the water in the pool and water attractions requires rubber gloves and safety goggles as safety precautions. Under OSHA's Hazard Communication Standard, training in the use and handling of hazardous chemicals is to be provided to employees at the time they are assigned to work with hazardous materials (Standard Number 1910.1200[h]). Use of hazardous materials would be required to comply with the regulations set forth in the California Health and Safety Code, Division 2.5, Chapter 3, Article 3 for pool maintenance and operation, as well as all other applicable federal, State, and local regulations as discussed in the Regulatory Framework subsection.

The Project will include three designated mechanical buildings, with separate storage rooms for disinfectant control and pH control chemicals. Proper storage and handling of pool chemicals require efforts to prevent water contact and improper mixing. Buildings for chemical storage are required to provide spill control and secondary containment under Section 5005.2 of the Uniform Fire Code. Storage and handling of pool chemicals at the Project would be required to comply with federal, State, and local regulations. Pursuant to the California Fire Code, all chemicals on the Project site would be stored in separate designated containment areas, which would prevent mixing of chemicals and a release of chemicals outside of storage rooms.

The delivery route for pool chemicals and supplies to the mechanical buildings, as provided in the Preliminary Conceptual Site Plan, extends through the Civic Center Aquatic Complex from Civic Center Drive to Lotz Parkway via roadways along the eastern and southern perimeters of the site (H2O Design 2014). It is anticipated that deliveries would be made on a weekly basis, depending on demand. Various routes through Elk Grove and the surrounding region would be used for the transport of chemicals to the Project site. To minimize the potential for accidental spills of hazardous materials during transit to and from the Project site, transporters are required to follow US Department of Transportation, California Highway Patrol, and US Postal Service regulations for packaging and handling hazardous materials per Title 13, Division 2, Chapter 6 of the CCR. Compliance with Title 13, Division 2, Chapter 6 of the CCR will protect the public from exposure to hazardous materials by avoiding the release of chemicals during transit.

Workplace regulations addressing hazardous materials in Title 8 of the CCR would apply to the Project site. Compliance with these regulations would be monitored by the Consumnes Community Services District Fire Department when inspections are performed for flammable and hazardous materials storage. Other mechanisms in place to enforce the Title 8 regulations include compliance audits and reporting to local and State agencies. Implementation of the workplace regulations would work to protect the public from exposure to hazardous materials and further reduce the potential for hazardous materials releases.

The use, storage, and transportation of hazardous materials are subject to stringent local, State, and federal regulations, the intent of which is to minimize the public's risk of exposure. Based on the uses that would be part of the Project and the existing regulatory structure that controls the transport, use, storage, and disposal of hazardous materials, hazardous materials would not be transported, used, stored, or disposed of such that the proposed Project would cause a threat to public safety, either during construction or operation of the Project. Therefore, the risk that the Project would cause exposure of hazardous materials that could create a public or environmental health hazard is unlikely. However, **because the transport, use, storage and disposal of these types of hazardous materials was not evaluated in the LRSP EIR, this represents a new less than significant impact.** Mitigation Measures

None required.

Exposure Through Reasonably Foreseeable Accident Involving the Release of Hazardous Materials (Standard of Significance 2)

Impact 4.6.2 The proposed Project involves the use, storage, and transport of hazardous materials that could involve accident conditions, resulting in the release of hazardous materials into the environment. **Because the transport, use, storage, and disposal of these types of hazardous materials was not evaluated in the LRSP EIR, this represents a new less than significant impact.**

Accidents on the Project site could be caused by improper handling and storage of hazardous materials. Compliance with existing federal and State regulations associated with the handling and storage of hazardous materials would minimize the potential for accidents associated with pool chemicals, as addressed in Impact 4.6.1.

Accidents during transport of materials to and from the Project site could expose the community and the environment to risks along routes to the site. However, as discussed in the Regulatory

Framework subsection, a substantial body of regulations related to the transportation of hazardous materials protects people and the environment. Under EPA regulations, in the event of a hazardous material discharge, a transporter must take immediate action to protect human health and the environment, notify the National Response Center and submit a report to the DOT Office of Hazardous Materials Regulations, and clean up any discharges to the environment and take any actions required by the appropriate government officials for mitigating the discharge effects on human health and environment. Compliance with existing federal, State, and local regulations would ensure that the proposed Project would not cause a threat to public safety, either during construction or operation of the Project. Therefore, the Project has a low risk of causing an accidental release of hazardous materials that could create a public or environmental health hazard and this impact would be less than significant. However, **because the transport, use, storage and disposal of these types of hazardous materials was not evaluated in the LRSP EIR, this represents a new less than significant impact.**

Mitigation Measures

None required.

Exposure Through Hazardous Emissions or Handling Hazardous Materials Within One-Quarter Mile of an Existing or Proposed School (Standard of Significance 3)

Impact 4.6.3 The proposed Project is located within one-quarter mile of Elizabeth Pinkerton Middle School/Consumnes Oaks High School. Although hazardous materials would be stored and handled on the Project site, activities involving hazardous materials would be managed in accordance with existing federal and State regulations. **The proposed Project would not result in an increase in the severity of this impact, and there is not a new or substantially more severe significant impact.**

During construction of the proposed Project, hazardous materials such as fuels (gasoline and diesel), oils, lubricants, paints, and paint thinners, glues, cleaners (which could include solvents and corrosives in addition to soaps and detergents), and possibly pesticides and herbicides would be used. Project construction would be required to comply with applicable building, health, fire, and safety codes. Chemicals used for pool maintenance at the Project site have the potential to pose a threat to public safety, if handled and stored improperly. However, as discussed in Impact 4.6.1, compliance with applicable federal, State, and local regulations would ensure the handling of hazardous materials at the Project site would not expose nearby receptors, including those at Elizabeth Pinkerton Middle School/Consumnes Oak High School south of the Project, to substantial risks associated with hazardous materials. **The proposed Project would not result in an increase in the severity of this impact, and there is not a new or substantially more severe significant impact.**

Mitigation Measures

None required.

Exposure to Risks Involving Wildland Fires (Standard of Significance 8)

Impact 4.6.4 The proposed Project is not located in a Fire Hazard Zone as indicated on the Fire Hazard Severity Zones map (Cal Fire 2007). The Project involves the use of hazardous materials that, if stored or handled improperly, could result in a fire; however, compliance with existing federal and State regulations and local policies would minimize the risk of fire at the Project site. **The proposed Project would not result in an increase in the severity of this impact, and there is not a new or substantially more severe significant impact.**

The EPA (2001) sets forth guidelines for the safe storage and handling of pool chemicals, including proper facility management for fire prevention, such as avoiding wetting and mixing of chemicals and keeping combustible or flammable materials away from the chemicals. The Project would adhere to the safety guidelines outlined by the EPA and comply with federal, State, and local regulations regarding storage and handling of hazardous materials. The proposed Project is not located near any wildlands or fire hazard zones as designated by the California Department of Forestry and Fire Protection (Cal Fire). Proper handling and storage of hazardous materials at the Project site as required by federal, State, and local regulations would reduce the risk of fire on site. **The proposed Project would not result in an increase in the severity of this impact, and there is not a new or substantially more severe significant impact.**

Mitigation Measures

None required.

4.6.4 CUMULATIVE SETTING, IMPACTS, AND MITIGATION MEASURES

CUMULATIVE SETTING

The analysis of cumulative impacts focuses on those effects that, when combined together with other similar activities or projects, could result in a large enough effect or impact that would be considered cumulatively significant. In some instances, a project-specific impact may not combine with effects from other activities, in which case, the Project's contribution to a cumulative effect would be less than cumulatively considerable. The health and safety hazards posed by most hazardous materials are typically local in nature. They generally do not combine in any cumulative sense with the hazards of other projects. Possible exceptions, however, include potential transportation of hazardous materials. The context for the evaluation of cumulative impacts associated with operation of the proposed Project includes projects that would increase the amount of hazardous materials used, stored, disposed of, and transported in combination with other development in Elk Grove.

CUMULATIVE IMPACTS AND MITIGATION MEASURES

Cumulative Exposure Through Transport, Use, Storage, and Disposal of Hazardous Materials (Significance Standard 1)

Impact 4.6.5 Cumulative development in the City would increase handling, storage, disposal, and transport of hazardous materials in the Project area. However, cumulative development, including the proposed Project, would be subject to applicable federal, State, and local regulations that would govern the handling, storage, disposal, and transport of hazardous materials. Therefore, **the proposed Project would not result in a substantial increase in the severity of this impact. There is no new or substantially more severe contribution to the cumulative impact that would result from the proposed Project.**

Hazardous materials are transported on virtually all public roads, particularly since all motor vehicles contain hazardous materials (e.g., fuel) in addition to any hazardous cargo that may be on board. During construction of other projects in the City, use of hazardous materials, such as construction solvents, paints, adhesives, and other construction-related materials, must comply with federal, State, and local regulations regarding the handling and transportation of hazardous materials, thereby reducing the potential for accidental release of those materials to the environment. Long-term handling, storage, and transportation of hazardous materials of other uses in the City would also be subject to the same regulations described above for the Project. Hazardous materials handled, stored, transported, and disposed of during Project operation, such as chemicals for pool maintenance, must also comply with federal, State, and local regulations regarding hazardous materials.

The cumulative effects of transporting hazardous materials would continue to be addressed by existing regulatory requirements of the CHP. Packaging requirements for hazardous materials established by Caltrans, the USPS, and the EPA minimize the potential consequences of possible accidents during transport. For these reasons, the cumulative impact of potential transportation-related accidents would not be substantial.

As discussed, the transport, use, storage, and disposal of hazardous materials is governed by a substantial body of existing regulations. These regulations are intended to reduce the potential for exposure by controlling the pathways by which persons could be exposed to hazardous substances to ensure effects are less than significant. Compliance with these regulations is required by all projects and handlers of these materials. Consequently, compliance with these regulations would ensure that the cumulative impact associated with the handling, storage, disposal, and transport of hazardous materials would be less than significant and would not substantially contribute to any cumulatively considerable hazards in the City or the region. The proposed Project would not result in a substantial increase in the severity of this impact. **There is no new or substantially more severe contribution to the cumulative impact that would result from the proposed Project.**

Mitigation Measures

None required.

REFERENCES

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4.7 Noise

4.7.1 BACKGROUND INFORMATION ON NOISE

FUNDAMENTALS OF ACOUSTICS

Acoustics is the science of sound. Sound may be thought of as mechanical energy of a vibrating object transmitted by pressure waves through a medium to human (or animal) ears. If the pressure variations occur frequently enough (at least 20 times per second), then they can be heard and are called sound. The number of pressure variations per second is called the frequency of sound and is expressed as cycles per second or Hertz (Hz).

Noise is a subjective reaction to different types of sounds. Noise is typically defined as airborne sound that is loud, unpleasant, unexpected, or undesired and may therefore be classified as a more specific group of sounds. Perceptions of sound and noise are highly subjective from person to person.

Measuring sound directly in terms of pressure would require a very large and awkward range of numbers. To avoid this, the decibel scale was devised. The decibel scale uses the hearing threshold (20 micropascals), as a point of reference, defined as 0 dB. Other sound pressures are then compared to this reference pressure, and the logarithm is taken to keep the numbers in a practical range. The decibel scale allows a million-fold increase in pressure to be expressed as 120 dB, and changes in levels (dB) correspond closely to human perception of relative loudness.

The perceived loudness of sounds is dependent upon many factors, including sound pressure level and frequency content. However, within the usual range of environmental noise levels, perception of loudness is relatively predictable and can be approximated by A-weighted sound levels. There is a strong correlation between A-weighted sound levels (expressed as dBA) and the way the human ear perceives sound. For this reason, the A-weighted sound level has become the standard tool of environmental noise assessment. All noise levels reported in this section are in terms of A-weighted levels, but are expressed as dB, unless otherwise noted.

The decibel scale is logarithmic, not linear. In other words, two sound levels 10 dB apart differ in acoustic energy by a factor of 10. When the standard logarithmic decibel is A-weighted, an increase of 10 dBA is generally perceived as a doubling in loudness. For example, a 70 dBA sound is half as loud as an 80 dBA sound and twice as loud as a 60 dBA sound.

NOISE DESCRIPTORS

The decibel scale alone does not adequately characterize how humans perceive noise. Human hearing is limited in the range of audible frequencies. In general, people are most sensitive to the frequency range of 1,000 to 8,000 Hz. To approximate the response of the human ear, sound levels of individual frequency bands are weighted, depending on the human sensitivity to those frequencies, which is referred to as the A-weighted sound level. When people make judgments of the relative loudness or annoyance of a sound, their judgments correlate well with the A-weighted noise scale. Other weighting networks have been devised to address high noise levels or other special problems (e.g., B-, C-, and D-scales), but these scales are rarely used in conjunction with environmental noise.

The intensity of environmental noise fluctuates over time. As a result, several descriptors of time-averaged noise levels are typically used for environmental noise assessment. The most commonly used descriptors are L_{eq}, L_{dn}, and CNEL. The energy-equivalent noise level, L_{eq}, is a measure of the average energy content (intensity) of noise over any given period. Many communities use 24-hour descriptors of noise levels to regulate noise. The day-night average noise level, L_{dn}, is the 24-hour average of the noise intensity, with a 10 dBA "penalty" added for nighttime noise (10 p.m. to 7 a.m.) to account for the greater sensitivity to noise during this period. CNEL, the community equivalent noise level, is similar to L_{dn} but adds an additional 5 dBA penalty for evening noise (7 p.m. to 10 p.m.) Common noise descriptors are summarized in **Table 4.7-1**.

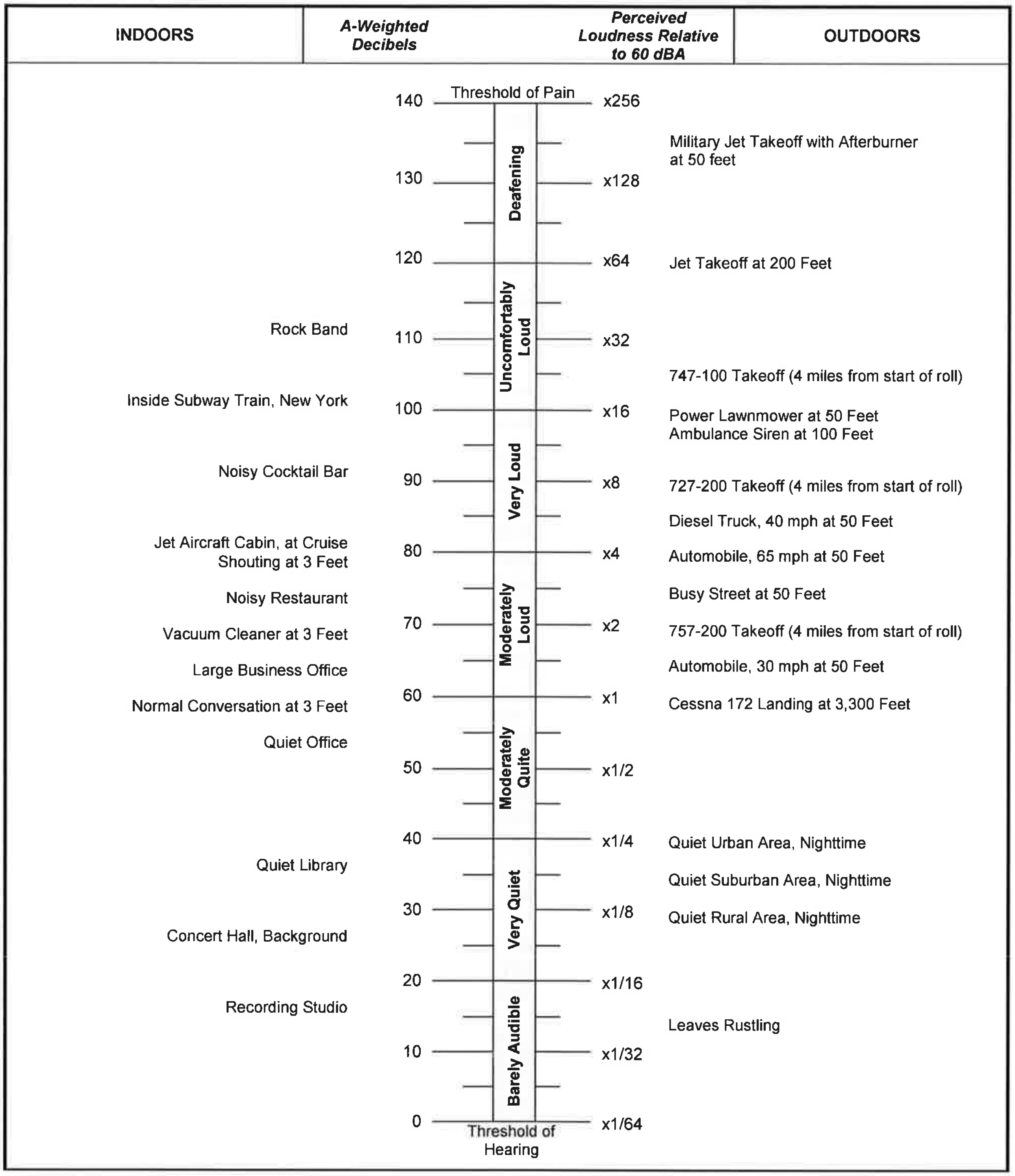
TABLE 4.7-1
COMMON ACOUSTICAL TERMS AND DESCRIPTORS

Descriptor	Definition
Decibel (dB)	A unit-less measure of sound on a logarithmic scale, which indicates the squared ratio of sound pressure amplitude to referenced sound pressure amplitude. The reference pressure is 20 micropascals.
A-Weighted Decibel (dBA)	An overall frequency-weighted sound level in decibels that approximates the frequency response of the human ear.
Energy Equivalent Noise Level (L_{eq})	The energy mean (average) noise level. The instantaneous noise levels during a specific period of time in dBA are converted to relative energy values. From the sum of the relative energy values, an average energy value (in dBA) is calculated.
Maximum Noise Level (L_{max})	The maximum instantaneous noise level during a specific period of time.
Day-Night Average Noise Level (DNL or L_{dn})	The 24-hour L_{eq} with a 10 dBA "penalty" for noise events that occur during the noise-sensitive hours between 10:00 p.m. and 7:00 a.m. In other words, 10 dBA is "added" to noise events that occur in the nighttime hours to account for increases sensitivity to noise during these hours.
Community Noise Equivalent Level (CNEL)	The CNEL is similar to the L_{dn} described above, but with an additional 5 dBA "penalty" added to noise events that occur between the hours of 7:00 p.m. to 10:00 p.m. The calculated CNEL is typically approximately 0.5 dBA higher than the calculated L_{dn}.

HUMAN RESPONSE TO NOISE

The human response to environmental noise is subjective and varies considerably from individual to individual. The effects of noise typically arise from interference with human activities, including sleep, speech, recreation, and tasks that demand concentration or coordination. Hearing loss can occur at the highest noise intensity levels. The acceptability of noise and the threat to public well-being are the basis for land use planning policies preventing exposure to excessive community noise levels.

FIGURE 4.7-1
TYPICAL NOISE LEVELS



Sources: Caltrans 2002a; HUD 1985

Unfortunately, there is no completely satisfactory way to measure the subjective effects of noise or the corresponding reactions of annoyance and dissatisfaction. This is primarily because of the wide variation in individual thresholds of annoyance and habituation to noise over differing individual experiences with noise. Thus, an important way of determining a person's subjective reaction to a new noise is the comparison of it to the existing environment to which one has adapted: the so-called "ambient" environment. In general, the more a new noise exceeds the previously existing ambient noise level, the less acceptable the new noise will be judged. Regarding increases in A-weighted noise levels, knowledge of the following relationships will be helpful in understanding this analysis:

- Except in carefully controlled laboratory experiments, a change of 1 dB cannot be perceived by humans.
- Outside of the laboratory, a 3 dB change is considered a just-perceivable difference.
- A change in level of at least 5 dB is required before any noticeable change in community response would be expected. An increase of 5 dB is typically considered substantial.
- A 10 dB change is subjectively heard as an approximate doubling in loudness and would almost certainly cause an adverse change in community response.

A limitation of using a single noise-level increase value to evaluate noise impacts, as discussed above, is that it fails to fully account for pre-project noise conditions. With this in mind, the Federal Interagency Committee on Noise (FICON) developed guidance to be used for the assessment of project-generated increases in noise levels that take into account the ambient noise level. The FICON recommendations are based on studies that relate aircraft noise levels to the percentage of persons highly annoyed by aircraft noise. Although the FICON recommendations were specifically developed to assess aircraft noise impacts, these recommendations are often used in transportation noise impact assessments. FICON-recommended noise evaluation criteria are summarized in **Table 4.7-2**.

As depicted in **Table 4.7-2**, a noise level increase of 5.0, or greater, would typically be considered to result in increased levels of annoyance where existing ambient noise levels are less than 60 dB. In areas where the ambient noise level ranges from 60 to 65 dB, increased levels of annoyance would be anticipated at increases of 3 dB, or greater. Increases of 1.5 dB, or greater, could result in increased levels of annoyance in areas where the ambient noise level exceeds 65 dB. The rationale for the FICON-recommended criteria is that as ambient noise levels increase, a smaller increase in noise resulting from a project is sufficient to cause significant increases in annoyance (FICON 1992; FAA 2000).

TABLE 4.7-2
FEDERAL INTERAGENCY COMMITTEE ON NOISE
RECOMMENDED CRITERIA FOR EVALUATION OF INCREASES IN AMBIENT NOISE LEVELS

Ambient Noise Level Without Project	Increase Required for Significant Impact
<60 dB	5.0 dB, or greater
60–65 dB	3.0 dB, or greater
>65 dB	1.5 dB, or greater

Source: FAA 2000; FICON 1992

4.7.2 EXISTING SETTING

EXISTING NOISE RECEPTORS

Noise-sensitive land uses are generally considered to include those uses where noise exposure could result in health-related risks to individuals, as well as places where quiet is an essential element of their intended purpose. Residential uses are of primary concern because of the potential for increased and prolonged exposure of individuals to both interior and exterior noise levels. Additional land uses such as parks, historic sites, cemeteries, and recreation areas are also considered sensitive to increases in exterior noise levels. Schools, churches, hotels, libraries, and other places where low interior noise levels are essential are also considered noise-sensitive land uses.

Noise-sensitive land uses in the Project area consist predominantly of residential land uses, the nearest of which are located west of the Project site, across Big Horn Boulevard. The area located adjacent to and east of the Project site is designated for residential use, and this area is currently being developed. Residences located west of Big Horn Boulevard are shielded by an approximate 8-foot-high noise barrier, which extends along the roadway. Nearby noise-sensitive land uses and existing noise barriers are depicted in **Figure 4.7-2**.

EXISTING AMBIENT NOISE LEVELS

The noise environment in the proposed Project area is defined primarily by vehicular traffic on area roadways, including Big Horn Boulevard, which is adjacent to the western boundary of the Project site, and to a lesser extent Civic Center Drive, which is located adjacent to the northern boundary of the Project site. Nearby non-transportation noise sources, including an existing water treatment facility and water pump station, also contribute to ambient noise levels at the Project site. Occasional aircraft overflights and landscape maintenance activities at nearby residential land uses also contribute on an intermittent basis to ambient noise levels in the Project area.

Roadway Traffic

The Federal Highway Administration (FHWA) Highway Traffic Noise Prediction Model (FHWA RD-77-108) was used to determine noise levels associated with existing vehicle traffic on area roadways. The FHWA model used California vehicle reference noise emission factors (CALVENO) for automobiles, medium trucks, and heavy trucks, with consideration given to vehicle volume, speed, roadway configuration, distance to the receiver, and the acoustical characteristics of the site. Traffic data used in the modeling effort was obtained from the traffic analysis prepared for this Project (Fehr & Peers 2014).

Table 4.7-3 and **Table 4.7-4** depict predicted existing average-daily traffic noise levels (in CNEL/L_{dn}) for weekday and Saturday conditions, respectively. Traffic noise levels were predicted at a distance of 50 feet from the near travel-lane centerline for major roadways within the Project area, as well as distances to the predicted 70, 65, and 60 dBA CNEL/L_{dn} traffic noise contours. The extent to which nearby land uses are affected by existing traffic noise depends on multiple factors, including their respective proximity to the roadways, shielding provided by intervening terrain and structures, and their individual sensitivity to noise.

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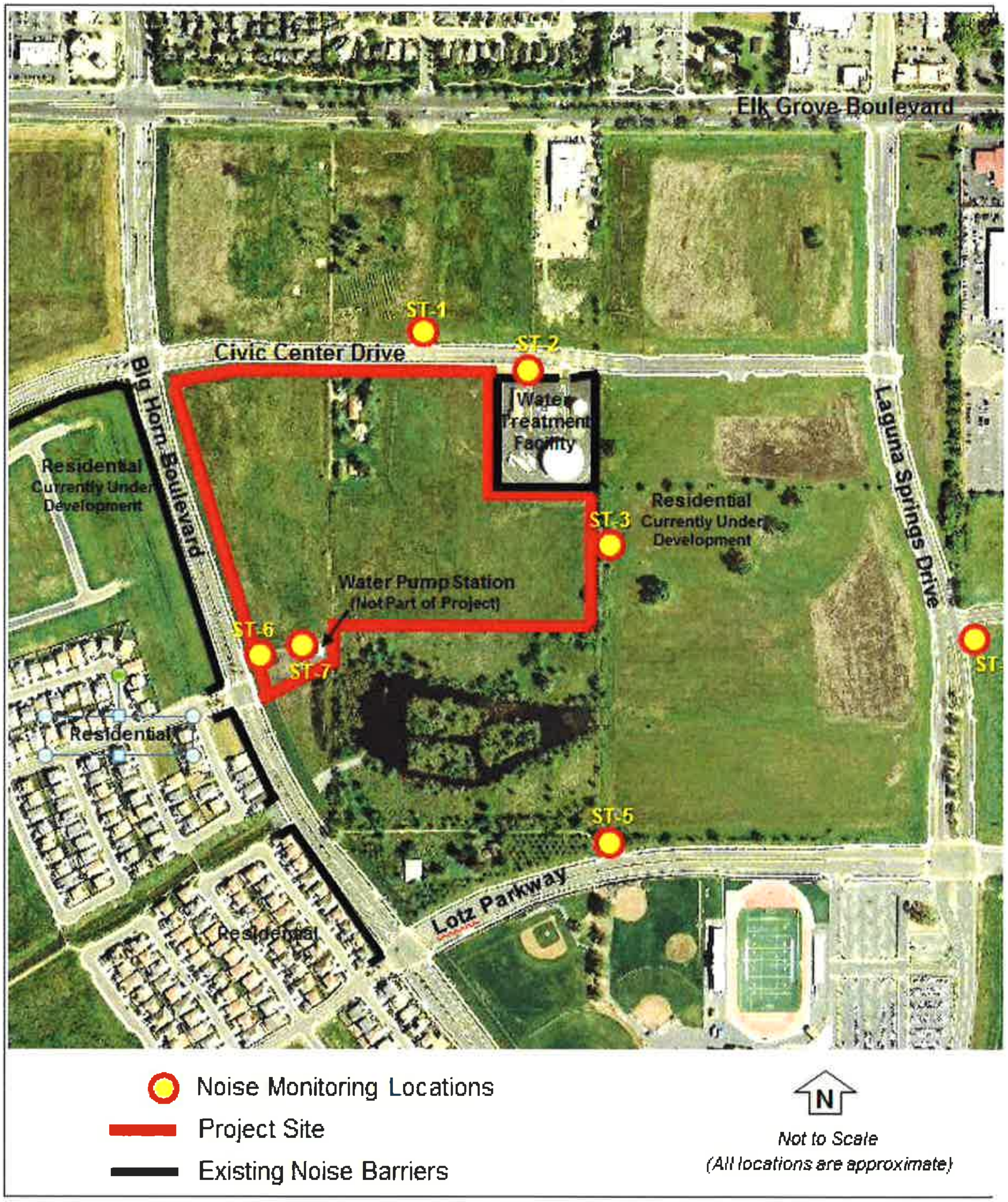
FIGURE 4.7-2
NOISE MONITORING LOCATIONS AND EXISTING CONDITIONS



Refer to Table 4.7-4 and Table 4.7-5 for noise measurement data.
Image Source: USGS 2014

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TABLE 4.7-3
EXISTING WEEKDAY TRAFFIC NOISE LEVELS

Segment	Existing ADT[1]	CNEL/L_{dn} at 50 Feet from Near-Travel-Lane Centerline[2]	Distance (feet) to Noise Level Contours (dBA CNEL/L_{dn}) from Roadway Centerline[2]		
			70	65	60
Elk Grove Blvd., West of Big Horn Blvd.	32,840	70.4	108	307	960
Elk Grove Blvd., Big Horn Blvd. to Laguna Springs Dr.	35,605	70.8	115	333	1041
Elk Grove Blvd., East of Laguna Springs Dr.	35,780	70.8	116	334	1046
Laguna Springs Dr., North of Elk Grove Blvd.	5,830	59.8	WR	WR	77
Laguna Springs Dr., Elk Grove Blvd. to Civic Center Dr.	4,495	58.7	WR	WR	63
Laguna Springs Dr., Civic Center Dr. to Lotz Pkwy	3,470	57.6	WR	WR	137
Laguna Springs Dr., South of Lotz Pkwy.	1,910	55.0	WR	WR	WR
Lotz Pkwy., Big Horn Blvd. to Laguna Springs Dr.	2,500	55.9	WR	WR	WR
Lotz Pkwy., East of Laguna Springs Dr.	550	49.3	WR	WR	WR
Big Horn Blvd., Elk Grove Blvd. to Civic Center Dr.	9,655	64.7	WR	WR	220
Big Horn Blvd., South of Civic Center Dr.	3,970	63.8	WR	WR	181
Big Horn Blvd., South of Lotz Pkwy.	6,050	60.5	WR	WR	76
Civic Center Dr., West of Big Horn Blvd.	3,050	57.6	WR	WR	WR
Civic Center Dr., Big Horn Blvd. to Laguna Springs Dr.	124	43.6	WR	WR	WR

Source: Ambient 2014

1. *ADT = Average Daily Traffic. Calculated based on peak-hour volumes assuming peak-hour volumes represent approximately 10 percent of the ADT volumes.*
2. *Traffic noise levels and contour distances were calculated using the FHWA roadway noise prediction model and do not include shielding from existing structures, sound barriers, or intervening terrain.*

WR = Within roadway right-of-way

Refer to ***Appendix I*** *for modeling assumptions and results.*

TABLE 4.7-4
EXISTING SATURDAY TRAFFIC NOISE LEVELS

Segment	Existing ADT[1]	CNEL/L_{dn} at 50 Feet from Near-Travel-Lane Centerline[2]	Distance (feet) to Noise Level Contours (dBA CNEL/L_{dn}) from Roadway Centerline[2]		
			70	65	60
Elk Grove Blvd., West of Big Horn Blvd.	25,770	69.4	90	243	754
Elk Grove Blvd., Big Horn Blvd. to Laguna Springs Dr.	28,575	69.8	97	269	836
Elk Grove Blvd., East of Laguna Springs Dr.	29,980	70.1	101	281	877
Laguna Springs Dr., North of Elk Grove Blvd.	3,310	57.4	WR	WR	WR
Laguna Springs Dr., Elk Grove Blvd. to Civic Center Dr.	1,830	54.8	WR	WR	WR
Laguna Springs Dr., Civic Center Dr. to Lotz Pkwy	1,455	53.8	WR	WR	WR

Segment	Existing ADT[1]	CNEL/L_{dn} at 50 Feet from Near-Travel-Lane Centerline[2]	Distance (feet) to Noise Level Contours (dBA CNEL/L_{dn}) from Roadway Centerline[2]		
			70	65	60
Laguna Springs Dr., South of Lotz Pkwy.	570	49.7	WR	WR	WR
Lotz Pkwy., Big Horn Blvd. to Laguna Springs Dr.	1,510	53.7	WR	WR	WR
Lotz Pkwy., East of Laguna Springs Dr.	290	46.6	WR	WR	WR
Big Horn Blvd., Elk Grove Blvd. to Civic Center Dr.	7,510	63.6	WR	61	172
Big Horn Blvd., South of Civic Center Dr.	2,905	59.5	WR	WR	72
Big Horn Blvd., South of Lotz Pkwy.	4,760	59.5	WR	WR	61
Civic Center Dr., West of Big Horn Blvd.	2,510	56.7	WR	WR	WR
Civic Center Dr., Big Horn Blvd. to Laguna Springs Dr.	91	42.3	WR	WR	WR

Source: Ambient 2014

1. *ADT=Average Daily Traffic. Calculated based on peak-hour volumes assuming peak-hour volumes represent approximately 10 percent of the ADT volumes.*
2. *Traffic noise levels and contour distances were calculated using the FHWA roadway noise prediction model and do not include shielding from existing structures, sound barriers, or intervening terrain.*

WR=Within roadway right-of-way

*Refer to **Appendix I** for modeling assumptions and results.*

Non-Transportation Noise Sources

Major non-transportation noise sources in the Project area include a water treatment facility located at 8280 Civic Center Drive and a water pump station located at 9751 Big Horn Boulevard. Major noise sources associated with these facilities are enclosed and shielded from direct public exposure. The existing water treatment facility is shielded by an approximate 8-foot-high noise barrier, which extends around the boundary of the facility. Nearby stationary noise sources are depicted in **Figure 4.7-2**.

Operational noise levels at the existing water treatment facility measured approximately 53 dBA L_{eq} at the northern entrance to the facility. Operational noise levels at the existing water pump station building were highest along the western side of the structure, measuring approximately 67 dBA L_{eq} at 5 feet from building air vents. Operational noise levels along the northern, southern, and eastern sides of the building measured approximately 53 dBA L_{eq}, or less, at 5 feet from the building. Operational noise levels associated with these existing stationary sources are not projected to exceed applicable noise standards at the nearest residential land uses and are largely masked by existing traffic noise levels.

MEASURED AMBIENT NOISE LEVELS

To document existing ambient noise levels in the Project area, ambient noise measurements were conducted on April 30 and May 1 and 2, 2014. Noise measurements were conducted using a Larson Davis Laboratories, Type I, Model 820 integrating sound-level meter positioned at a height of approximately 4.5 feet above ground level. The meter was calibrated before use and is certified to be in compliance with ANSI specifications.

Short-term (i.e., 10-minute) noise measurement surveys were conducted at seven locations in the vicinity of the Project site (see **Figure 4.7-2**.) Short-term noise measurement data corresponding to these measurement locations is summarized in **Table 4.7-5**. Based on the measurements conducted, ambient noise levels at the measurement locations generally range from approximately 51 to 67 dBA L_{eq}. Maximum intermittent noise levels were primarily associated with vehicle passbys near area roadways, which ranged from approximately 66 to 71 dBA L_{max}.

TABLE 4.7-5
SUMMARY OF SHORT-TERM AMBIENT NOISE MEASUREMENT DATA

Site[2]	Location	Date	Time Period	Measured Noise Levels (dBA)[1]	
				L_{eq}	L_{max}
ST-1	Civic Center Drive, approximately 8 feet from roadway	May 1, 2014	6:15–6:25 pm	51.2	70.3
		April 30, 2014	5:40–5:50 pm	50.7	71.3
ST-2	8280 Civic Center Drive. Existing water treatment facility. Northern boundary.	May 2, 2014	8:00–8:05 am	53.3	54.8
ST-3	Eastern Project site boundary[2]	May 2, 2014	8:40–8:50 am	55.7	59.3
ST-4	Laguna Springs Drive, approximately 15 feet from roadway	April 30, 2014	5:10–5:20 pm	61.4	68.9
ST-5	Lotz Parkway, approximately 13 feet from roadway	April 30, 2014	5:30–5:40 pm	60.2	69.1
		May 1, 2014	6:36–6:46 pm	59.7	69.5
ST-6	Big Horn Boulevard, approximately 67 feet from roadway	May 1, 2014	5:40–6:00 pm	60.5	65.8
		May 1, 2014	6:00–6:10 pm	60.8	69.4
		May 2, 2014	7:00–7:15 am	60.1	66.3
ST-7	9751 Big Horn Boulevard. Existing water pump station. Approximately 5 feet from west side of building air vents.	May 2, 2014	9:00–9:25 am	52.6–66.7	67.4

Source: Ambient 2014

1. *Noise measurements were conducted on April 30 and May 1and 2, 2014, using a Larson Davis Type 1, Model 820 sound-level meter positioned at a height of approximately 4.5 feet above ground level.*
2. *Refer to **Figure 4.7-2** for noise monitoring locations.*
3. *Noise levels partially affected by nearby construction activities.*

GROUNDBORNE VIBRATION

No major existing sources of groundborne vibration have been identified in the proposed Project area. Roadway vehicle traffic on area roadways are generally not considered to result in significant levels of groundborne vibration that would adversely impact nearby land uses (Caltrans 1976).

4.7.3 REGULATORY FRAMEWORK

STATE

California Building Code

Title 24 of the California Code of Regulations contains standards for allowable interior noise levels associated with exterior noise sources (California Building Code, 2013 edition, Volume 1, Chapter 12). The standards apply to new hotels, motels, dormitories, apartment houses, and dwellings other than detached single-family residences. The standards state that the interior noise level attributable to exterior sources may not exceed 45 dBA CNEL in any habitable room. Proposed residential structures to be located where the CNEL exceeds 60 dBA shall require an acoustical analysis showing that the proposed building design would achieve the prescribed allowable interior noise standard. Worst-case noise levels, either existing or future, are to be used as the basis for determining compliance with these standards.

LOCAL

City of Elk Grove General Plan Noise Element

The City of Elk Grove General Plan Noise Element establishes policies and noise level criteria, both for transportation noise sources and for non-transportation (stationary) noise sources. The Project does not include any actions or components that conflict with these General Plan policies. However, it should be noted that the final authority for interpretation of a policy statement, determination of the Project's consistency with the General Plan, ultimately rests with the Elk Grove City Council. The General Plan policies most applicable to the proposed Project are included below.

"**Policy NO-1:** New development of the uses listed in Tables NO-C shall conform with the noise levels contained in that Table. All indoor and outdoor areas shall be located, constructed, and/or shielded from noise sources in order to achieve compliance with the City's noise standards."

"**Policy NO-2:** Where noise-sensitive land uses are proposed in areas exposed to existing or projected exterior noise levels exceeding the levels specified in Table NO-C or the performance standards of Table NO-A, an acoustical analysis shall be required as part of the environmental review process so that noise mitigation may be included in the project design."

"**Policy NO-3:** Noise created by new proposed non-transportation noise sources shall be mitigated so as not to exceed the noise level standards of Table NO-A as measured immediately within the property line of lands designated for noise-sensitive uses."

- "**NO-3, Action 1:** Limit construction activity to the hours of 7 a.m. to 7 p.m. whenever such activity is adjacent to residential uses."
- "**NO-3, Action 2:** Consider limiting the hours of operation for loading docks, trash compactors, and other noise-producing uses in commercial areas which are adjacent to residential uses."
- "**NO-3, Action 3:** The City shall require that stationary construction equipment and construction staging areas be set back from existing noise-sensitive land uses."

"**Policy NO-4:** Where proposed non-residential land uses are likely to produce noise levels exceeding the performance standards of Table NO-A at existing or planned noise-sensitive uses, an acoustical analysis shall be required as part of the environmental review process so that noise mitigation may be included in the project design. The requirements for the content of an acoustical analysis are shown in Table NO-B."

"**Policy NO-8:** Where noise mitigation measures are required to achieve the standards of Tables NO-A and NO-C, the emphasis of such measures shall be placed upon site planning and project design. The use of noise barriers shall be considered a means of achieving the noise standards only after all other practical design-related noise mitigation measures—including the use of distance from noise sources—have been integrated into the project."

"**Policy NO-9:** Where soundwalls or noise barriers are constructed, the City shall strongly encourage and may require the use of a combination of berms and walls to reduce the apparent height of the wall and produce a more aesthetically appealing streetscape."

Transportation Noise Source Criteria

For transportation noise sources, the City's noise criteria for determination of land use compatibility ranges from an exterior noise level of 60 dBA CNEL/L_{dn} for residential uses to 70 dBA CNEL/L_{dn} for parks and playgrounds. The intent of this standard is to provide an acceptable noise environment for outdoor activities. The City has also established an interior noise standard of 45 dBA CNEL/L_{dn} for residential, school, and office uses exposed to transportation noise sources. Interior hourly noise limitation (in dBA L_{eq}) are also established for land uses that are sensitive to daytime noise levels, such as churches, offices, libraries, and schools. The intent of the interior noise standards is to provide a suitable environment for indoor activities and reduced levels of annoyance. The City's noise standards for transportation noise sources are summarized in **Table 4.7-6**.

Non-Transportation Noise Sources

Table 4.7-7 provides the noise level performance criteria for new projects that are affected by or include non-transportation noise sources, such as those attributed to commercial and industrial land uses. These criteria are applied at the property line of noise-sensitive land uses. The standards shown in **Table 4.7-7** are lowered by 5 dB for noise sources that are tonal in nature, impulsive or repetitive, or consist primarily of speech or music (e.g., humming sounds, outdoor speaker systems). Typical noise sources in this category include pile drivers, drive-through speaker boxes, punch presses, steam valves, and transformer stations. These standards do not apply to residential units established in conjunction with industrial or commercial uses.

TABLE 4.7-6
MAXIMUM ALLOWABLE NOISE EXPOSURE –TRANSPORTATION NOISE SOURCES
(ELK GROVE GENERAL PLAN TABLE NO-C)

Land Use	Outdoor Activity Areas [1] CNEL/L_{dn}, dB	Interior Spaces	
		CNEL/L_{dn}, dB	L_{eq}, dB [2]
Residential	60[3]	45	—
Residential subject to noise from railroad tracks, aircraft overflights	60[3]	40[5]	—
Transient Lodging	60[4]	45	—
Hospitals, Nursing Homes	60[3]	45	—
Theaters, Auditoriums, Music Halls	—	—	35
Churches, Meeting Halls	60[3]	—	40
Office Buildings	—	—	45
Schools, Libraries, Museums	—	—	45
Playgrounds, Neighborhood Parks	70	—	—

Source: City of Elk Grove 2003, Table NO-C

Notes:

1. *Where the location of outdoor activity areas is unknown, the exterior noise level standard shall be applied to the property line of the receiving land use.*

   Where it is not practical to mitigate exterior noise levels at patio or balconies of apartment complexes, a common area such as a pool or recreation area may be designated as the outdoor activity area.
2. *As determined for a typical worst-case hour during periods of use.*
3. *Where it is not possible to reduce noise in outdoor activity areas to 60 dB CNEL/Ldn or less using a practical application of the best -available noise reduction measures, an exterior noise level of up to 65 dB CNEL/Ldn may be allowed provided that available exterior noise level reduction measures have been implemented and interior noise levels are in compliance with this table.*
4. *In the case of hotel/motel facilities or other transient lodging, outdoor activity areas such as pool areas may not be included in the Project design. In these cases, only the interior noise level criterion will apply.*
5. *The intent of this noise standard is to provide increased protection against sleep disturbance for residences located near railroad tracks.*

TABLE 4.7-7
EXTERIOR NOISE LEVEL PERFORMANCE STANDARDS FOR NON-TRANSPORTATION NOISE SOURCES
(ELK GROVE GENERAL PLAN TABLE NO-A)

Noise Level Descriptor	Maximum Acceptable Noise Level, dBA	
	Daytime (7 a.m.–10 p.m.)	Nighttime (10 p.m.–7 a.m.)
Hourly L_{eq}, dB	55	45

Source: City of Elk Grove 2003, Table NO-A

Notes:

1. *Noise level standards are applied at the property line of the receiving noise-sensitive land uses.*
2. *Noise level standards apply to new projects affected by or including non-transportation noise sources. Examples include, but are not limited to: industrial facilities including pump stations, trucking operations, tire shops, auto maintenance shops, metal fabricating shops, shopping centers, drive-up windows, car washes, loading docks, public works projects, batch plants, bottling and canning plants, recycling centers, electric generating stations, race tracks, landfills, sand and gravel operations, and athletic fields.*
3. *The standards are reduced by 5 dB for noise sources that are tonal, impulsive or repetitive; or, consist primarily of speech or music (e.g., humming sounds, outdoor speaker systems). Typical noise sources in this category include: pile drivers, drive-through speaker boxes, punch presses, steam valves, and transformer stations.*
4. *Noise level standards do not apply to residential units established in conjunction with industrial or commercial uses.*

City of Elk Grove Municipal Code

The City's noise control requirements for existing non-transportation noise sources are included in Chapter 6.32 of the Elk Grove Municipal Code. The noise control chapter identifies hourly noise standards that are applicable to existing non-transportation noise sources that are consistent with those identified in the City's General Plan, as depicted in **Table 4.7-7**. The noise ordinance also identifies noise level restrictions based on a percentage of time exceeded during a one-hour period. Based on these limitations, maximum instantaneous noise levels associated with existing noise sources are limited to 75 dBA L_{max} during the daytime hours and 70 dBA L_{max} during the nighttime hours. These noise level standards are to be reduced by 5 dB for noise sources that are tonal, impulsive or repetitive, or consist primarily of speech or music (e.g., humming sounds, outdoor speaker systems). In accordance with the City's noise control ordinance, construction activities are generally prohibited between the hours of 7:00 p.m. and 7:00 a.m., excluding emergency work of public service utilities. In addition, the operation of pavement sweeping equipment and associated equipment (e.g., blowers), as well as material loading and unloading activities that would result in a noise disturbance, are typically prohibited between the hours of 10:00 p.m. and 7:00 a.m.

Vibration Criteria

Sources of earthborne vibrations include natural phenomena (earthquakes, volcanic eruptions, sea waves, landslides, etc.) or manmade causes (explosions, machinery, traffic, trains, construction equipment, etc.). Vibration sources may be continuous (e.g., factory machinery) or transient (e.g., explosions).

Vibration is like noise in that it involves a source, a transmission path, and a receiver. While vibration is related to noise, it differs in that noise is generally considered to be pressure waves transmitted through air, whereas vibration usually consists of the excitation of a structure or surface. As with noise, vibration consists of an amplitude and frequency. A person's perception to the vibration will depend on their individual sensitivity to vibration, as well as the amplitude and frequency of the source and the response of the system that is vibrating. Vibration can be measured in terms of acceleration, velocity, or displacement.

The City of Elk Grove does not have specific policies pertaining to vibration levels. However, various agencies, such as the California Department of Transportation (Caltrans), have developed recommended criteria for the evaluation of groundborne vibration levels with regard to potential human annoyance and building structural damage. Caltrans-recommended criteria for the evaluation of groundborne vibration events are summarized in **Table 4.7-8**. The vibration levels are presented in terms of peak particle velocity (ppv) in inches per second (in/sec) for continuous/frequent sources.

The effects of groundborne vibration levels, with regard to human annoyance and structural damage, are influenced by various factors, including ground type, distance between source and receptor, duration, and the type of vibration events (i.e., continuous or transient). As indicated in **Table 4.7-8,** the threshold at which there is a risk to normal structures is 0.2 in/sec ppv. This same threshold is typically considered the level at which increased levels of annoyance may begin to occur to occupants of nearby buildings. The recommended criterion for transient sources of single isolated events (i.e., blasting or demolition ball drops) is generally twice the level identified for continuous/frequent sources (Caltrans 2002b, 2004).

TABLE 4.7-8
EFFECTS OF VIBRATION ON PEOPLE AND BUILDINGS

Peak Particle Velocity (inches/second)	Human Reaction	Effect on Buildings
0.006–.019	Range of threshold of perception	Vibrations unlikely to cause damage of any type
0.08	Vibrations readily perceptible	Recommended upper level to which ruins and ancient monuments should be subjected
0.1	Level at which continuous vibrations may begin to annoy people, particularly those involved in vibration sensitive activities	Virtually no risk of architectural damage to normal buildings
0.2	Vibrations may begin to annoy people in buildings	Threshold at which there is a risk of architectural damage to normal dwellings
0.4–0.6	Vibrations considered unpleasant by people subjected to continuous vibrations and unacceptable to some people walking on bridges	Architectural damage and possibly minor structural damage

Source: Caltrans 2002b, 2004

Notes: Vibration levels based on peak particle velocity in the vertical direction for continuous/frequent intermittent sources. The criterion for transient sources of single isolated events (i.e., blasting or demolition ball drops) is generally twice the level identified for continuous/frequent sources. Where human reactions are concerned, the value is at the point at which the person is situated. For buildings, the value refers to the ground motion. No allowance is included for the amplifying effect, if any, of structural components.

4.7.4 IMPACTS AND MITIGATION MEASURES

STANDARDS OF SIGNIFICANCE

The impact analysis provided below is based on the application of the California Environmental Quality Act (CEQA) Guidelines Appendix G environmental checklist. A noise impact is considered significant if implementation of the Project will result in:

1) Exposure of persons to or generation of noise levels in excess of standards established in the City of Elk Grove General Plan Noise Element or the City of Elk Grove Municipal Code Chapter 6.32, Noise Control.

2) Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels.

3) A substantial permanent increase in ambient noise levels in the Project vicinity above levels existing without the Project.

4) A substantial temporary or periodic increase in ambient noise levels in the Project vicinity above levels existing without the Project.

5) For a project located within an airport land use plan or, where such a plan has not be adopted, within 2 miles of a public airport or public use airport, exposure of people residing or working in the area to excessive noise levels.

6) For a project within the vicinity of a private airstrip, exposure of people residing or working in the project area to excessive noise levels.

The nearest airports to the Project site are Franklin Field, approximately 5 miles south of the Project site, and Sacramento Executive, approximately 9.5 north of the Project site. The Project site is not located within the projected noise contour zones of either of these airports; therefore, Standards of Significance 5 and 6 would not apply.

METHODOLOGY

Short-Term Construction Activities

Predicted noise levels at nearby noise-sensitive land uses were calculated using typical noise levels and usage rates associated with construction equipment, derived from the FHWA's Roadway Construction Noise Model (version 1.1). Maximum intermittent and average-hourly noise levels associated with construction equipment are summarized in **Table 4.7-9**. Construction noise levels at nearby noise-sensitive land uses were predicted assuming an average noise attenuation rate of 6 dB per doubling of distance from the source.

TABLE 4.7-9
TYPICAL CONSTRUCTION EQUIPMENT NOISE LEVELS

Equipment	Typical Noise Level (dBA) at 50 Feet from Source	
	L_{max}	L_{eq}
Air Compressor	80	76
Backhoe/Front-End Loader	80	76
Compactor (Ground)	80	73
Concrete Mixer Truck	85	81
Concrete Mixer (Vibratory)	80	73
Concrete Pump Truck	82	75
Concrete Saw	90	83
Crane	85	77
Dozer/Grader/Excavator/Scraper	85	81
Generator	82	79
Gradall	85	81
Jackhammer	85	78
Impact Hammer/Hoe Ram (Mounted)	90	83
Paver	85	82
Pneumatic Tools	85	82
Pumps	77	74
Truck (Dump/Flat Bed)	84	80

Sources: FHWA 2006

Long-Term Operational Activities

Non-Transportation Noise

The water and adventure park would operate from 10:00 a.m. to 10:00 p.m. on weekdays and weekends; the competition venue would operate from 7:00 a.m. to 9:00 p.m. Non-transportation noise sources associated with the proposed Project are largely associated with on-site recreational uses (e.g., water slides, zip lines, swimming pools), amplified public address and sound systems, and equipment maintenance buildings, as well as noise generated in vehicle parking lots (vehicle alarms, doors closing, tire squeal, etc.). Occasional night events may be held at the adventure park. . However, these events would not generate vehicle trips in excess of normal venue operations because they would be reserved for private parties, oriented to smaller groups of users.

Predicted operational noise levels associated with on-site recreational and equipment maintenance areas were calculated using the SoundPlan, version 3.0, computer program. The model was calibrated based on representative noise levels obtained from similar land uses (refer to **Table 4.7-10**). Modeling assumptions and calculations are included in **Appendix I**.

Parking lot noise levels were calculated using the Federal Transit Administration's (FHWA) Transit Noise and Vibration Impact Assessment Guidelines (2006), based on a reference noise level of 92 dBA SEL and peak-hour parking lot volumes obtained from the traffic analysis prepared for this project. Parking lot noise levels were calculated for both weekday and Saturday operational conditions, based on peak-hour volumes of 337 and 622 vehicles per hour, respectively (see **Table 4.9-3** in Section 4.9, Transportation).

For determination of impact significance, combined operational noise levels from on-site non-transportation noise sources were calculated at the property line of the nearest existing and/or approved residential land uses. Operational noise levels were modeled for noise sources and operational conditions projected to result in the highest noise levels at nearby land uses, including weekday and Saturday operational conditions. Predicted non-transportation noise levels were compared to the City's noise standards for proposed non-transportation noise sources, as summarized in **Table 4.7-7**. Accordingly, the City's daytime noise standard of 55 dBA L_{eq} was reduced by 5 dB to account for noise sources that consist primarily of speech or music. It is important to note that the City's General Plan does not identify a noise limitation for instantaneous noise sources. Maximum instantaneous noise levels were therefore evaluated based on the City's daytime noise standard of 75 dBA L_{max}, in accordance with the limitation identified in the City's Municipal Code.

TABLE 4.7-10
REPRESENTATIVE NON-TRANSPORTATION NOISE LEVELS

Representative Measurement Location	Noise Source	Distance from Source (feet)	Measured Noise Levels (dBA)	
			L_{eq}	L_{max}
Ventura Ranch KOA 7400 Pine Grove Road Santa Paula, CA(1)	Overhead Zip Line	25	69.3	72.4
	Zip Line Tower Platform	15	73.2	75.1
Raging Waters 111 Lakeside Road San Dimas, CA(2)	Water Slides – amplified public address speaker at upper platform	25	72.1–73.3	78.9–82.4
	Water Slides – exit pool	3	68.8–71.2	76.9–87.3
	Wave Pool	3	80.1	82.3
	Wave Pool – mechanical bldg. vent	5	83.4	84.9
	Food Court Amplified Speaker	15	73.7	76.2
	Lazy River	3	65.1	71.3
	Beach/Cabana Area	3	66.3	72.4
	Water Lagoon Splash/Play Area	3	72.9	75.6
Clovis Olympic Swim Complex Clovis West High School 1070 E. Teague Fresno, CA(3)	Pool Mechanical Equipment Area	2	67.3	68.3
	Competition Swim Meet	40	57.8	71.3

Source: Ambient 2014

Notes:

1. *Noise measurements were conducted on May 17, 2014. Primary sources included individuals talking/yelling, cable/wheel noise. Does not include the use of amplified sound/public address systems.*
2. *Noise measurements were conducted on May 18, 2014. Primary sources included individuals talking/yelling, background amplified music, and public address systems.*
3. *Noise measurements were conducted on May 3, 2014. IMX-Extreme Long Course Meet. Primary sources included individuals talking/yelling, whistles, buzzers, and amplified public address system.*

Traffic Noise

Traffic noise levels were calculated using the FHWA roadway noise prediction model (FHWA-RD-77-108) based on California vehicle reference noise emission factors and traffic data obtained from the traffic analysis prepared for this Project. Additional input data included day/night percentages of autos, medium and heavy trucks, vehicle speeds, ground attenuation factors, and roadway widths. Predicted noise levels were calculated at a distance of 50 feet from the near-travel-lane centerline, as well as distances to the predicted noise contours. Traffic noise levels were calculated for both weekday and Saturday operational conditions. Increases in traffic noise levels attributable to the proposed Project were determined based on a comparison of predicted noise levels, with and without Project implementation. Modeling assumptions and calculations are included in **Appendix I**.

Groundborne Vibration

No existing outdoor areas of frequent human exposure or major sources of groundborne vibration have been identified in the proposed Project area. Groundborne vibration impacts associated with the proposed Project would be primarily associated with short-term construction activities. Construction of the proposed Project is not anticipated to require the use of equipment that would generate substantial groundborne vibration levels, such as pile drivers. **Table 4.7-11** depicts the typical vibration levels produced by construction equipment likely to be used during Project construction. Groundborne vibration impacts were evaluated based on the typically applied criteria of 0.2 in/sec ppv for structural damage and human annoyance (**Table 4.7-8**).

TABLE 4.7-11
VIBRATION LEVELS FOR VARYING CONSTRUCTION EQUIPMENT

Type of Equipment	Peak Particle Velocity at 25 Feet (inches/second)
Large Bulldozer	0.089
Loaded Trucks	0.076
Small Bulldozer	0.003
Jackhammer	0.035
Vibratory Hammer	0.070
Vibratory Compactor/roller	0.210

Source: FTA 2006

Substantial Increases in Noise Levels

For purpose of this analysis, a substantial increase in noise levels is defined as an increase of 5 dBA, or greater, where noise levels are less than the City's normally acceptable minimum noise level of 60 dBA CNEL/L_{dn}; 3 dBA, or greater, where noise levels range from 60 to 65 dBA CNEL; and 1.5 dBA, or greater, where the noise level exceeds 65 dBA CNEL without the proposed Project. These criteria are based on the FICON criteria (**Table 4.7-2**) and are consistent with the City's commonly applied noise criteria for roadway construction and improvement projects (Elk Grove General Plan Policy NO-6).

PROJECT IMPACTS AND MITIGATION MEASURES

Construction Noise (Standards of Significance 1 and 4)

Impact 4.7.1 The proposed Project could generate construction noise at sensitive receptors. **The proposed Project would result in an increase in the severity of this impact, which was previously identified in the LRSP EIR as less than significant. The Project's impact would be less than significant. There is not a new or substantially more severe significant impact.**

The Laguna Ridge Specific Plan (LRSP) EIR (City of Elk Grove 2004) found that construction noise would be reduced to less than significant with implementation of LRSP EIR mitigation measure MM 4.4.1 (see **Appendix A**), which requires appropriate mufflers on construction equipment, location of staging areas as far from noise-sensitive uses as feasible, the use of acoustic barriers, and posting of information of the construction site contact to report noise issues.

The nearest noise-sensitive land uses are located adjacent to the eastern property line of the Project site. Residential land uses are also located west of the Project site, across Big Horn Boulevard. Construction of the proposed Project would result in temporary increases in ambient noise levels at these nearest land uses. Activities involved in typical construction would generate maximum noise levels, as indicated in **Table 4.7-9**, ranging from 77 to 90 dB. For typical construction activities, construction-generated noise levels at the nearest existing residential uses could reach levels in excess of approximately 83 dBA L_{eq} when localized construction activities occur near the Project site boundaries.

Noise would also be generated during the construction phase by increased truck traffic on area roadways. A significant Project-generated noise source would be truck traffic associated with transport of heavy materials and equipment to and from construction sites. This noise increase would be of short duration and would likely occur during daytime hours.

The City of Elk Grove Municipal Code Chapter 6.32, Noise Control exempts construction activities from the specified noise ordinance standards during the hours of 6:00 a.m. to 8:00 p.m. Monday through Friday and from 7:00 a.m. to 8:00 p.m. on Saturday and Sunday. If a construction project adheres to the construction times identified in Municipal Code Chapter 6.32, construction noise is exempted. In addition, the General Plan Noise Element includes action items specific to construction activities under Policy NO-3, which limits construction activity to the hours of 7 a.m. to 7 p.m. whenever such activity is adjacent to residential uses and requires that stationary construction equipment and construction staging areas be set back from existing noise-sensitive land uses. Implementation of these policies, and compliance with the LRSP EIR mitigation measure, would ensure the effects of construction noise from the proposed Project would be reduced to a less than significant level. While **the proposed Project would result in an increase in the severity of this impact, there is not a new or substantially more severe significant impact.**

Mitigation Measures

None required.

Construction Vibration (Standard of Significance 2)

Impact 4.7.2 The proposed Project could generate construction vibration at sensitive receptors. **The proposed Project would result in an increase in the severity of**

this impact, which was previously identified in the LRSP EIR as less than significant. This is considered a new potentially significant impact.

The LRSP EIR evaluated groundborne vibration impacts associated with construction activities and concluded that construction activities, excluding pile driving, would have a less than significant impact. In the event that construction involves the use of pile drivers, LRSP EIR mitigation measure MM 4.4.2 would be required to reduce potential vibration impacts at nearby receptors to a less than significant level (see **Appendix A**).

Construction of the proposed Project would require the use of various construction equipment, including dozers, tractors, compactors, and trucks. The use of pile drivers would not be required for construction of the proposed Project. Groundborne vibration levels associated with typical construction equipment are summarized in **Table 4.7-11.** Based on the levels shown, most construction equipment and activities would generate ground vibration levels of approximately 0.09 in/sec ppv, or less, at 25 feet, which would not exceed the commonly applied threshold of 0.2 in/sec ppv.

However, site preparation activities, including construction of the perimeter maintenance/fire roads, would likely require the use of vibratory rollers/compactors, which could occur within approximately 25 feet of the residential land uses under construction along the eastern property line of the Project site. As depicted in **Table 4.7-11**, vibratory rollers can generate ground vibration levels of approximately 0.21 in/sec ppv at 25 feet. Ground vibration levels at these nearest residential land uses could therefore exceed the commonly applied threshold of 0.2 in/sec ppv.

LRSP EIR mitigation measure MM 4.4.2 addresses groundborne vibration levels associated with pile driving activities. The mitigation measure does not address the use of other construction equipment (e.g., vibratory rollers/compactors). **For this reason, the proposed Project would result in a potential increase in the severity of this impact and is a new potentially significant impact.**

Mitigation Measures

MM 4.7.2 Prior to the commencement of the use of vibratory rollers/compactors within 25 feet of adjacent land uses, an assessment of vibrations induced by vibratory rollers/compactors at the site shall be completed. During indicator vibratory rollers/compactor activities, vibrations shall be measured at regular intervals to determine the levels of vibration at various distances from vibratory rollers/compactor activities. The indicator vibratory rollers/compactor activities shall be conducted at locations at least 50 feet from any existing structures. After monitoring, methods of reducing the peak ground velocities to less than 0.2 inches per second shall be determined and implemented. Methods to reduce vibrations, if needed, could include the use of alternative equipment. The vibration reduction techniques to be used shall be described in the construction plans for the Project to be reviewed and approved by the City prior to issuance of building permits. This requirement shall be included in all Project construction plans.

Timing/Implementation: *Prior to construction activities*

Enforcement/Monitoring: *City of Elk Grove Development Services*

Implementation of mitigation measure **MM 4.7.2** would reduce vibration impacts to **less than significant** by ensure vibration levels at a level that would not cause disturbance of area residents.

Traffic Noise at Nearby Noise-Sensitive Receptors (Standards of Significance 1 and 3)

Impact 4.7.3 Increased traffic noise could affect sensitive receptors. **The proposed Project would not result in an increase in the severity of this impact, which was previously identified in the LRSP EIR as less than significant. There is not a new or substantially more severe significant impact.**

The LRSP EIR evaluated traffic noise impacts and concluded that LRSP EIR mitigation measure MM 4.4.5 would reduce impacts to a less than significant level. This mitigation measure requires identification of traffic noise mitigation measures for areas that would be significantly impacted by future development sufficient to reduce traffic noise levels to levels summarized in **Table 4.7-6**.

Traffic noise levels associated with the proposed Project were calculated for roadway segments in the project study area using the FHWA Highway Noise Prediction Model (FHWA-RD-77-108). Traffic noise levels were modeled for both weekday and Saturday operational conditions, with and without implementation of the proposed Project. Predicted traffic noise levels for weekday and Saturday operational conditions are summarized in **Table 4.7-12** and **Table 4.7-13**, respectively.

As indicated in **Table 4.7-12**, the proposed Project would result in increases in traffic noise levels of approximately 0.6 dBA, or less, during weekday operations. During Saturday operations, the proposed Project would result in increases in traffic noise levels of up to 5.1 dBA. As depicted in **Table 4.7-13**, a substantial increase in traffic noise levels would be projected to occur during Saturday operations along Big Horn Boulevard, between Civic Center Drive and Lotz Parkway. Residential land uses located along this roadway segment are currently shielded by an approximately 8-foot-high noise barrier. An 8-foot sound barrier typically reduces traffic noise levels by approximately 8 dB. Based on this reduction, predicted traffic noise levels at the nearest residences would be approximately 60 dBA CNEL, or less, at the ground level of the nearest structures, which would not exceed the City's conditionally acceptable noise level of 65 dBA CNEL. At second-story locations, which are unshielded by the sound barrier, predicted exterior noise levels at the nearest structures would be approximately 63 dBA CNEL. Assuming exterior noise levels of 60–65 dBA CNEL and an average exterior-to-interior noise reduction of 25 dB, predicted interior noise levels at the lower and upper levels of these nearest residences would not be projected to exceed the interior noise level standard of 45 dBA CNEL.

Using a reasonable 8 dB reduction in noise level achieved by an 8-foot sound wall that exists along Big Horn Boulevard, the noise levels at outdoor activity areas at those residences would be below 57 dBA CNEL. Therefore, predicted traffic noise levels at the nearest residential structures located along Big Horn Boulevard would not exceed the City's conditionally acceptable exterior noise standard of 65 dBA CNEL, nor would predicted interior noise levels at these structures exceed the interior noise standard of 45 dBA CNEL. The existing noise barriers are the best available technology for reducing traffic noise levels and are sufficient to reduce predicted traffic noise levels at the nearest residential structures to within acceptable levels. **For this reason, the proposed Project would not result in an increase in the severity of this impact, and there is not a new or substantially more severe significant impact.**

Mitigation Measures

None required.

TABLE 4.7-12
PREDICTED INCREASES IN EXISTING WEEKDAY TRAFFIC NOISE LEVELS

Segment	CNEL/Ldn at 50 Feet from Near-Travel-Lane Centerline[1]		Predicted Increase	Substantial Increase?[2]
	Without Project	With Project		
Elk Grove Blvd., West of Big Horn Blvd.	70.4	70.5	0.1	No
Elk Grove Blvd., Big Horn Blvd. to Laguna Springs Dr.	70.8	70.9	0.1	No
Elk Grove Blvd., East of Laguna Springs Dr.	70.8	71.0	0.2	No
Laguna Springs Dr., North of Elk Grove Blvd.	59.8	59.9	0.1	No
Laguna Springs Dr., Elk Grove Blvd. to Civic Center Dr.	58.7	59.2	0.5	No
Laguna Springs Dr., Civic Center Dr. to Lotz Pkwy	57.6	57.9	0.3	No
Laguna Springs Dr., South of Lotz Pkwy.	55.0	55.0	0	No
Lotz Pkwy., Big Horn Blvd. to Laguna Springs Dr.	55.9	56.3	0.4	No
Lotz Pkwy., East of Laguna Springs Dr.	49.3	49.3	0	No
Big Horn Blvd., Elk Grove Blvd. to Civic Center Dr.	64.7	65.2	0.5	No
Big Horn Blvd., South of Civic Center Dr.	63.8	64.8	0	No
Big Horn Blvd., South of Lotz Pkwy.	60.5	60.6	0.1	No
Civic Center Dr., West of Big Horn Blvd.	57.6	58.2	0.6	No
Civic Center Dr., Big Horn Blvd. to Laguna Springs Dr.	43.6	45.1	0.5	No

Source: Ambient 2014; Automobile trips are from the traffic impact analysis prepared for the Project, which projects 2,810 average daily trips (Fehr & Peers 2014).

Notes:

1. *Traffic noise levels were calculated using the FHWA roadway noise prediction model and do not include shielding from existing structures, sound barriers, or intervening terrain.*
2. *Substantial increases defined as an increase of 5.0, or greater, where existing noise levels are less than the City's normally acceptable minimum noise level of 60 dBA CNEL/Ldn; 3 dBA, or greater, where existing noise levels range from 60 to 65 dBA CNEL; and 1.5 dB, or greater, where the existing noise level exceeds 65 dBA CNEL without the proposed Project.*

Refer to **Appendix I** for modeling assumptions and results.

TABLE 4.7-13
PREDICTED INCREASES IN EXISTING SATURDAY TRAFFIC NOISE LEVELS

Segment	CNEL/Ldn at 50 Feet from Near-Travel-Lane Centerline[1]		Predicted Increase	Substantial Increase?[2]
	Without Project	With Project		
Elk Grove Blvd., West of Big Horn Blvd.	69.4	69.5	0.1	No
Elk Grove Blvd., Big Horn Blvd. to Laguna Springs Dr.	69.8	70.1	0.3	No
Elk Grove Blvd., East of Laguna Springs Dr.	70.1	70.5	0.4	No
Laguna Springs Dr., North of Elk Grove Blvd.	57.4	57.6	0.2	No
Laguna Springs Dr., Elk Grove Blvd. to Civic Center Dr.	54.8	57.0	2.2	No
Laguna Springs Dr., Civic Center Dr. to Lotz Pkwy	53.8	54.9	1.1	No
Laguna Springs Dr., South of Lotz Pkwy.	49.7	49.7	0	No
Lotz Pkwy., Big Horn Blvd. to Laguna Springs Dr.	53.7	54.8	1.1	No
Lotz Pkwy., East of Laguna Springs Dr.	46.6	46.6	0	No
Big Horn Blvd., Elk Grove Blvd. to Civic Center Dr.	63.6	65.3	1.7	No
Big Horn Blvd., South of Civic Center Dr.	**59.5**	**64.6**	**5.1**	**Yes**
Big Horn Blvd., South of Lotz Pkwy.	59.5	59.7	0.2	No
Civic Center Dr., West of Big Horn Blvd.	56.7	58.0	1.3	No
Civic Center Dr., Big Horn Blvd. to Laguna Springs Dr.	42.3	45.3	3.0	No

Source: Ambient 2014; Automobile trips are from the traffic impact analysis prepared for the Project, which projects 4,780 trips under the maximum weekend attendance scenario (Fehr & Peers 2014).

Notes:

1. *Traffic noise levels were calculated using the FHWA roadway noise prediction model and do not include shielding from existing structures, sound barriers, or intervening terrain.*
2. *Substantial increases defined as an increase of 5.0, or greater, where existing noise levels are less than the City's normally acceptable minimum noise level of 60 dBA CNEL/Ldn; 3 dBA, or greater, where existing noise levels range from 60 to 65 dBA CNEL; and 1.5 dB, or greater, where the existing noise level exceeds 65 dBA CNEL without the proposed Project.*

Refer to** Appendix I **for modeling assumptions and results.

Non-Transportation Noise Levels (Standards of Significance 1, 3, and 4)

Impact 4.7.4 Average-hourly non-transportation noise levels would exceed the City's noise standard at residential land uses located along the eastern Project site property line. **The proposed Project would result in an increase in the severity of this impact, which was previously identified in the LRSP EIR as less than significant. This is considered a new significant impact.**

The LRSP EIR evaluated average-hourly operational noise impacts associated with non-transportation noise sources and concluded that LRSP EIR mitigation measure MM 4.4.3b (see **Appendix A**) would reduce impacts to a less than significant level. This mitigation measure requires proposed nonresidential land uses located adjacent to residential uses to implement appropriate mitigation measures sufficient to comply with the applicable City's General Plan noise standards. The City's General Plan noise standards are summarized in **Table 4.7-7** of this Draft SEIR.

With the exception of swim practices at the competition venue which could start as early as 7:00 a.m., the proposed Project would generally operate from 10:00 a.m. to 10:00 p.m. on weekdays and weekends. Non-transportation noise sources associated with the proposed Project are largely associated with on-site recreational uses (e.g., water slides, zip lines, swimming pools), amplified public address and sound systems, and equipment/maintenance buildings, as well as noise generated in vehicle parking lots (vehicle horns, alarms, doors closing, tire squeal, etc.). Major Project components, associated noise sources, and representative noise levels are discussed below.

Water Park

Noise generated by the proposed water park would be predominantly associated with water rides. The loudest noise events generally consist of elevated laughter, screams, and yelling, which predominantly occur in the vicinity of unenclosed slides, ride splash-down/exit pools, and within water play areas. Other noise sources include amplified music, public address systems, water splashing, and the operation of water pumps and related equipment. The sporadic sounding of whistles by ride attendants would also contribute to overall operational noise levels.

Based on noise measurement data obtained from a similar land use (refer to **Table 4.7-10**), operational noise levels associated with water parks can range from approximately 65 to 83 dBA L_{eq}. Actual noise levels can vary depending on location and orientation to the various noise sources. The loudest measured noise source was associated with the operation of wave pool equipment, which measured roughly 83 dBA L_{eq} at approximately 5 feet from the equipment enclosure vent. Noise generated by amplified public address/sound systems and individuals yelling were also primary noise sources, which generated noise levels of 65 to 73 dBA L_{eq} at approximately 3 feet from major attractions. With the exception of the wave-generating equipment building, equipment maintenance buildings housing water pump and filtration equipment would be enclosed in buildings, removed from direct public exposure, and masked by noise levels generated by park venues.

Competition Venue/Swimming Pools

Noise levels associated with the competition venue/swimming pools are predominantly associated with noise generated by amplified public address/sound systems, and noise generated by spectators. To a lesser extent, the intermittent sounding of whistles and buzzers also contribute to overall operational noise levels. Water pump and filtration equipment would be enclosed in buildings, removed from direct public exposure, and largely masked by noise levels generated during competitive events. As noted in **Table 4.7-10**, measured overall operational noise levels average approximately 58 dBA L_{eq} at 40 feet from the event boundary. Actual noise levels can vary depending on location and orientation to the various noise sources.

Adventure Park

Noise levels associated with the adventure park would consist predominantly of elevated laughter, screams, and yelling from participants. Noise levels generated by children's play areas typically average less than 60 dBA L_{eq} at approximately 50 feet. The operation of zip lines would also contribute to overall operational noise levels, generating levels of approximately 70 to 73 dBA L_{eq} (refer to **Table 4.7-10**). Actual noise levels can vary depending on location and orientation to the various noise sources. To a lesser extent, noise generated by amplified sound systems would also contribute to overall operational noise levels.

Parking Lots

Noise levels commonly associated with parking lots are generated by the starting of vehicles, the opening and closing of vehicle doors, tire squeal, and the occasional sound of vehicle alarms and horns. Noise levels commonly generated by vehicle parking lots can reach intermittent noise levels of up to approximately 92 dBA SEL at 50 feet (FTA 2006). Average noise levels are dependent on the number of vehicles accessing the parking lot over a given time period.

Combined Operational Noise Levels at Nearby Noise-Sensitive Receptors

Combined average-hourly operational noise levels associated with on-site non-transportation noise sources were calculated using the SoundPlan, version 3.0, computer program. The model was calibrated based on representative noise levels obtained from similar land uses (refer to **Table 4.7-10**). It is important to note that the placement of amplified public address/sound system speakers has not yet been identified. To be conservative, amplified public address/sound system speakers were included on the upper platforms of slides and zip line towers located within the water park. The primary public address system speaker for the competition venue was located at the scoreboard. Noise levels were predicted at residential lots currently under construction along the eastern property line, as well as at residential lots located west of the Project site, across Big Horn Boulevard. Operational noise levels were predicted at the ground level, as well as at the upper floor to account for the potential construction of exterior balconies within the rear-yard areas of these nearest residential uses. Combined average-hourly operational noise levels at receptor locations are summarized in **Table 4.7-14**. Receptor locations and predicted average-hourly noise contours are depicted in **Figure 4.7-3**.

Predicted average-hourly noise levels at residences located west of the Project site, across Big Horn Boulevard, would be approximately 55 dBA L_{eq}, or less, and would be largely masked by existing traffic noise levels emanating from Big Horn Boulevard. However, as noted in **Table 4.7-14** and depicted in **Figure 4.7-3**, predicted average-hourly noise levels at the nearest residential land uses located along the eastern Project site property line would range from approximately 60 to 73 dBA L_{eq}. Noise levels would be greatest at planned residential land uses located nearest the wave pool and elevated ride platforms generally located in the southeastern portion of the Project site. Noise generated by these sources would consist predominantly of yelling from patrons, amplified music/public address systems, and noise generated by the wave pool mechanical equipment. Consistent with the City's daytime noise regulations, the City's noise standard of 55 dBA L_{eq} was reduced to 50 dBA L_{eq} for receptors located along the eastern property line to account for the increased potential for annoyance associated with these noise sources. As noted in **Table 4.7-14**, predicted operational noise levels at residences located along the eastern Project site property line would exceed the City's exterior daytime noise standard of 50 dBA L_{eq}.

Nighttime events, such as corporate or high school "lock-in" events, could occasionally occur in the water and adventure park. Noise generated by these events would consist predominantly of elevated laughter, screaming, and yelling by patrons. As shown in **Table 4.7-10**, noise levels associated with the use of zip lines can generate noise levels of approximately 73 dBA L_{eq} at distances of approximately 15 feet and noise at water slides can reach 73 dBA L_{eq}. In the event that amplified music or sound systems were to be used, noise levels could exceed 78 dBA L_{eq}. The nearest residential land use in relation to on-site zip line towers is located approximately 80 feet from the southeast zip line tower. Based on the noise levels noted above, predicted noise levels at this nearest residential land use would range from approximately 59 dBA L_{eq}, without the use of amplified PA/sound systems, to approximately 64 dBA L_{eq} with the use of amplified

PA/sound systems. Therefore, predicted nighttime noise levels would exceed the City's nighttime noise standard of 40 dBA L_{eq}.

Based on the above discussion, predicted daytime and nighttime noise levels would exceed the City's applicable noise standards. As a result, this impact would be considered **potentially significant**.

TABLE 4.7-14
PREDICTED NON-TRANSPORTATION AVERAGE-HOURLY NOISE LEVELS AT NEARBY RECEPTORS WITHOUT MITIGATION

Receptor(1)	Primary Noise Sources	Predicted Exterior Noise Levels (dBA Leq)		Exceeds City Noise Standards?(2)
		1st Floor	2nd Floor	
1 – 8313 & 8317 La Cruz Way	Water Park	59.9	60.3	**Yes**
2 – 8305 & 8309 La Cruz Way	Water Park	63.7	63.9	**Yes**
3 – 8301 La Cruz Way	Water Park	67.2	67.2	**Yes**
4 – 8316 & 8320 Columbo Circle	Water Park	70.5	70.5	**Yes**
5 – 8308 & 8312 Columbo Circle	Water Park	70.4	70.5	**Yes**
6 – 8300 & 8304 Columbo Circle	Water Park	69.2	69.3	**Yes**
7 – 9732 La Ropa Way	Water Park	70.4	70.6	**Yes**
8 – 9736 & 9740 La Ropa Way	Water Park	72.9	73.2	**Yes**
9 – 9744 & 9748 La Ropa Way	Water Park	72.6	73.1	**Yes**
10 – 9752 & 9756 La Ropa Way	Water Park	68.9	69.3	**Yes**
11 - 9760 La Ropa Way	Water Park	67.2	67.5	**Yes**
12 - West of Big Horn Boulevard	Parking Lot	52.0	54.6	No
13 - West of Big Horn Boulevard	Parking Lot	52.4	54.8	No

Source: Ambient 2014

Notes:

1. *Refer to **Figure 4.7-3** for receptor locations.*
2. *Predicted noise levels along the eastern property line of the Project site are anticipated to be predominantly associated with voices and music. Consistent with the City's noise regulations, the City's noise standard of 55 dBA was reduced to 50 dBA at Receptors 1–11 to account for the increased potential for annoyance associated with these noise sources. Predicted noise levels at Receptors 12 and 13 would be predominantly associated with vehicle activity within the parking lot, would not exceed the City's noise standard of 55 dBA Leq, and would be largely masked by vehicle traffic on Big Horn Boulevard.*

Refer to **Appendix I** for modeling assumptions and results.

Mitigation Measures

MM 4.7.4 The following mitigation measures shall be implemented to mitigate non-transportation noise levels associated with the proposed Project:

a. Solid barriers shall be installed, at a minimum, on the east-facing sides of the elevated slide and zip line towers and sufficient to block line-of-sight of patrons located on stairways and upper platform areas to adjacent residential land uses located along the eastern property line. Barriers on elevated structures shall be constructed of wood, or material of similar density, with no visible gaps between construction materials.

b. The use of amplified public address/sound systems on elevated slide and zip line towers shall be prohibited.

c. The installation of amplified public address/sound system speakers shall be prohibited within 50 feet of the eastern property line. Amplified public address/sound system speakers located within 200 feet of the eastern property line shall be installed to a maximum height not to exceed 12 feet and directed away from the eastern property line.

d. A sound barrier shall be constructed to a minimum height of 12 feet above ground level along the eastern Project site property line. The sound barrier shall also extend along the southern Project site property line, to a distance of 360 feet from the eastern property line. The barrier constructed along the southern property line shall be constructed to a minimum height of 12 feet at the eastern property line and to a minimum height of 8 feet at the western terminus. Reductions in barrier height along the southern property line shall occur gradually. The sound barrier shall be constructed of masonry block, or material of similar density, with no visible gaps between adjoining barriers, construction materials, or at the base of the barrier.

e. The use of stationary noise-generating equipment (e.g., public address/sound systems) shall be prohibited during the hours of 10 p.m. to 7 a.m.

Timing/Implementation: *Included as part of final design*

Enforcement/Monitoring: *City of Elk Grove Planning Department*

Predicted average-hourly non-transportation noise levels, with implementation of **MM 4.7.6**, are summarized in **Table 4.7-15**. As depicted, implementation of the above mitigation measure would reduce operational noise levels, but not to levels below the City's exterior noise standard of 50 dBA L_{eq} at residential land uses located adjacent to the Project site's eastern property line. As a result, **the proposed Project would result in an increase in the severity of this impact.** This impact is considered **significant and unavoidable**.

TABLE 4.7-15
PREDICTED NON-TRANSPORTATION AVERAGE-HOURLY NOISE LEVELS AT NEARBY RECEPTORS WITH MITIGATION

Receptor1	Primary Noise Sources	Predicted Exterior Noise Levels (dBA Leq)		Exceeds City Noise Standards?2
		1st Floor	2nd Floor	
1 – 8313 & 8317 La Cruz Way	Water Park	59.2	59.6	**Yes**
2 – 8305 & 8309 La Cruz Way	Water Park	63.1	63.4	**Yes**
3 – 8301 La Cruz Way	Water Park	65.4	65.8	**Yes**
4 – 8316 & 8320 Columbo Circle	Water Park	60.4	63.8	**Yes**
5 – 8308 & 8312 Columbo Circle	Water Park	61.1	65.3	**Yes**
6 – 8300 & 8304 Columbo Circle	Water Park	66.4	67.3	**Yes**
7 – 9732 La Ropa Way	Water Park	69.3	70.2	**Yes**
8 – 9736 & 9740 La Ropa Way	Water Park	62.0	67.2	**Yes**
9 – 9744 & 9748 La Ropa Way	Water Park	62.9	70.0	**Yes**
10 – 9752 & 9756 La Ropa Way	Water Park	67.5	68.6	**Yes**
11 - 9760 La Ropa Way	Water Park	66.1	66.7	**Yes**
12 - West of Big Horn Boulevard	Parking Lot	52.0	54.6	No
13 - West of Big Horn Boulevard	Parking Lot	52.4	54.8	No

Source: Ambient 2014

Notes:

1. *Refer to **Figure 4.7-3** for receptor locations.*
2. *Predicted noise levels along the eastern property line of the Project site are anticipated to be predominantly associated with voice and music. Consistent with the City's noise regulations, the City's noise standard of 55 dBA was reduced to 50 dBA at Receptors 1–11 to account for the increased potential for annoyance associated with these noise sources. Predicted noise levels at Receptors 12 and 13 would be predominantly associated with vehicle activity within the parking lot, would not exceed the City's noise standard of 55 dBA Leq, and would be largely masked by vehicle traffic on Big Horn Boulevard.*

*Refer to **Appendix I** for modeling assumptions and results.*

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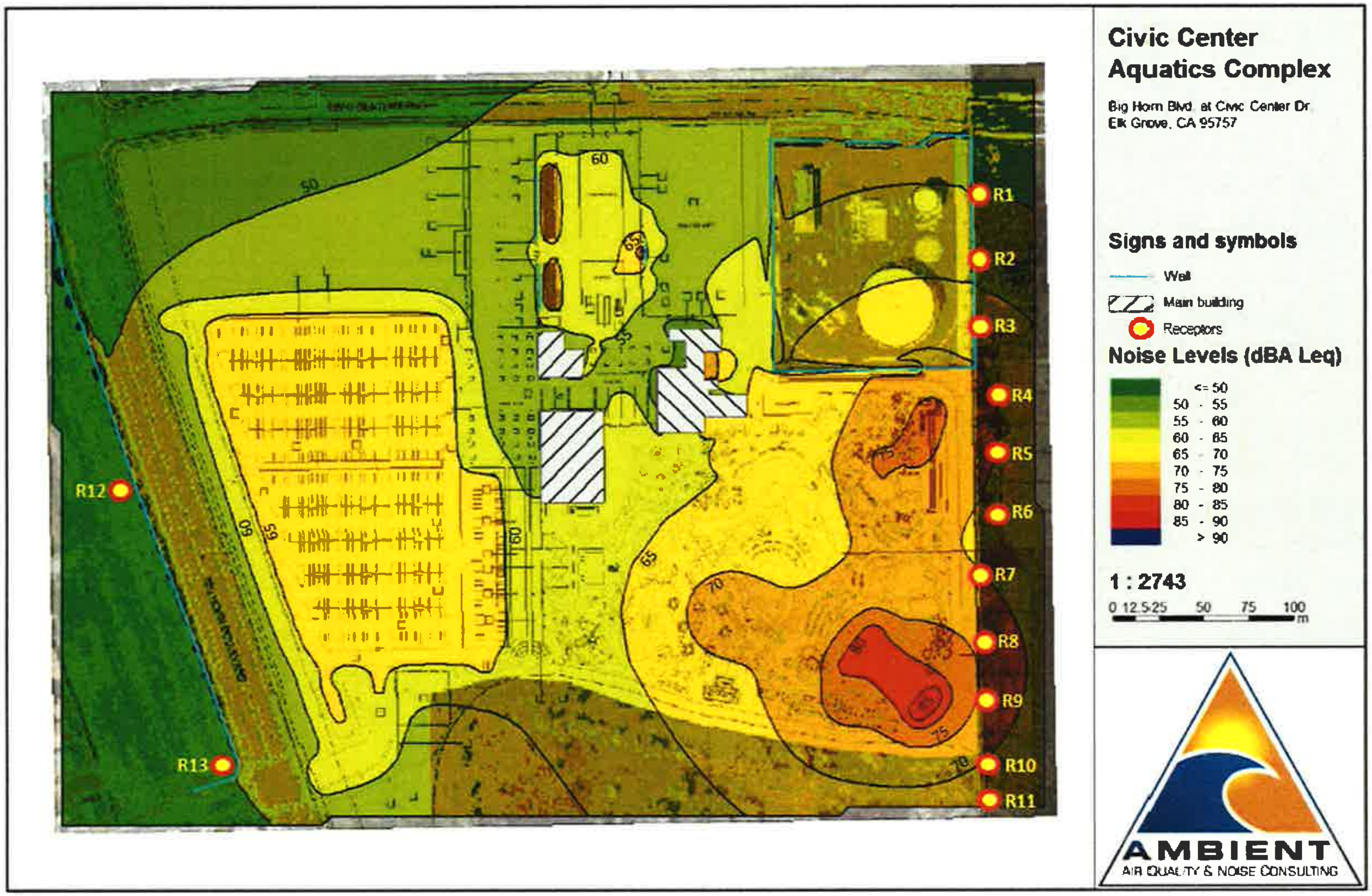
FIGURE 4.7-3 AVERAGE-HOURLY NON-TRANSPORTATION NOISE LEVELS WITHOUT MITIGATION



*Notes: Non-transportation noise sources were predicted using the SoundPlan computer program, version 3.0. Predicted noise contours are approximate based on data obtained from similar land uses (refer to **Table 4.7-10**). Parking lot noise levels represent peak-hour noise levels for Saturday operational conditions. Refer to **Table 4.7-14** for predicted noise levels at receptor locations.*

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FIGURE 4.7-4
AVERAGE-HOURLY NON-TRANSPORTATION NOISE LEVELS WITH MITIGATION

Notes: Non-transportation noise sources were predicted using the SoundPlan computer program, version 3.0. Predicted noise contours are approximate based on data obtained from similar land uses (refer to **Table 4.7-10**). Parking lot noise levels represent peak-hour noise levels for Saturday operational conditions. Refer to **Table 4.7-15** for predicted noise levels at receptor locations.

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Non-Transportation Noise Maximum Levels (Standard of Significance 1)

Impact 4.7.5 Maximum instantaneous non-transportation noise levels would exceed the City's noise standard at residential land uses located along the eastern Project site property line. **Because maximum instantaneous noise levels from non-transportation noise sources were not evaluated in the LRSP EIR, this represents a new significant impact.**

The LRSP EIR did not evaluate maximum instantaneous operational noise impacts associated with non-transportation noise sources. The City's General Plan noise standards do not include noise standards that address maximum instantaneous noise levels. Therefore, this analysis relies on the City's noise standard identified in Chapter 6.32 of the Elk Grove Municipal Code pertaining to maximum instantaneously noise events. As noted earlier in this section, maximum instantaneous noise levels are limited to 75 dBA L_{max} during the daytime hours (i.e., 7:00 a.m. to 10:00 p.m.). This noise level standard is to be reduced by 5 dB for noise sources that are tonal, impulsive, or repetitive, or consist primarily of speech or music (e.g., humming sounds, outdoor speaker systems).

As noted in Impact 4.7.4, non-transportation noise sources associated with the proposed Project are largely associated with on-site recreational uses (e.g., water slides, zip lines, swimming pools), amplified public address and sound systems, and equipment/maintenance buildings, as well as noise generated in vehicle parking lots (vehicle horns, alarms, doors closing, tire squeal, etc.) Refer to Impact 4.7.4 for additional discussion of primary noise sources associated with the proposed Project.

Maximum instantaneous operational noise levels associated with on-site non-transportation noise sources were calculated using the SoundPlan, version 3.0, computer program. The model was calibrated based on representative noise levels obtained from similar land uses (refer to **Table 4.7-10**). As noted in Impact 4.7.4, operational noise levels were predicted at the ground level, as well as at the upper floor to account for the potential construction of exterior balconies within the rear-yard areas of these nearest residential uses. Maximum instantaneous operational noise levels (in dBA L_{max}) at receptor locations are summarized in **Table 4.7-16**. Receptor locations and predicted L_{max} noise contours are depicted in **Figure 4.7-6**.

Predicted maximum instantaneous noise levels at residences located west of the Project site, across Big Horn Boulevard, would be approximately 69 dBA L_{max}, or less, and would be largely masked by existing traffic noise levels emanating from Big Horn Boulevard. However, as noted in **Table 4.7-16** and depicted in **Figure 4.7-6**, predicted maximum instantaneous noise levels at the nearest residential land uses located along the eastern Project site property line would range from approximately 68 to 81 dBA L_{max}. Noise levels would be greatest at planned residential land uses located nearest the wave pool and elevated ride platforms generally located in the southeastern portion of the Project site. Noise generated by these sources would consist predominantly of yelling from patrons, amplified music/public address systems, and noise generated by the wave pool mechanical equipment. Consistent with the City's noise regulations, the City's daytime noise standard of 75 dBA L_{max} was reduced to 70 dBA L_{max} for receptors located along the eastern property line to account for the increased potential for annoyance associated with these noise sources. Predicted operational noise levels at residences located along the eastern Project site property line would exceed the City's exterior noise standard of 70 dBA L_{max}.

As discussed in Impact 4.7.4, nighttime events could occur in the Adventure Park. Noise generated by these events would consist predominantly of elevated laughter, screaming and yelling by patrons. As noted in Table 4.7-10, noise levels associated with the use of ziplines can generate peak noise levels of approximately 72 dBA L_{max} at distances of approximately 25 feet. In the event that amplified music or soundsystems were to be used, noise levels could reach approximately 82 dBA L_{max} at 25 feet. The nearest residential land use in relation to onsite zipline towers is located approximately 80 feet from the southeast zipline tower. Based on the noise levels noted above, predicted noise levels at this nearest residential land use would range from approximately 62 dBA L_{max}, without the use of amplified PA/sound systems, to approximately 72 dBA L_{max} with the use of amplified PA/sound systems. Predicted nighttime noise levels would exceed the City's nighttime noise standard of 60 dBA L_{max}.

Based on the above discussion, predicted daytime and nighttime noise levels would exceed the City's noise standards. As a result, this impact would be considered **potentially significant**.

TABLE 4.7-16
PREDICTED NON-TRANSPORTATION MAXIMUM INSTANTANEOUS NOISE LEVELS AT NEARBY RECEPTORS WITHOUT MITIGATION

Receptor1	Primary Noise Sources	Predicted Exterior Noise Levels (dBA Lmax)		Exceeds City Noise Standards?2
		1st Floor	2nd Floor	
1 – 8313 & 8317 La Cruz Way	Water Park	68.4	68.9	No
2 – 8305 & 8309 La Cruz Way	Water Park	72.0	72.2	**Yes**
3 – 8301 La Cruz Way	Water Park	75.5	75.6	**Yes**
4 – 8316 & 8320 Columbo Circle	Water Park	78.7	78.8	**Yes**
5 – 8308 & 8312 Columbo Circle	Water Park	78.8	79.1	**Yes**
6 – 8300 & 8304 Columbo Circle	Water Park	77.9	78.2	**Yes**
7 – 9732 La Ropa Way	Water Park	78.9	79.3	**Yes**
8 – 9736 & 9740 La Ropa Way	Water Park	80.8	81.1	**Yes**
9 – 9744 & 9748 La Ropa Way	Water Park	79.6	79.6	**Yes**
10 – 9752 & 9756 La Ropa Way	Water Park	76.3	76.5	**Yes**
11 - 9760 La Ropa Way	Water Park	74.8	75.0	**Yes**
12 - West of Big Horn Boulevard	Parking Lot	64.6	68.5	No
13 - West of Big Horn Boulevard	Parking Lot	61.8	63.4	No

Source: Ambient 2014

Notes:

1. *Refer to **Figure 4.7-5** for receptor locations.*
2. *Predicted noise levels along the eastern property line of the Project site are anticipated to be predominantly associated with voice and music. Consistent with the City's noise standards, the City's noise standard of 75 dBA was reduced to 70 dBA to account for the increased potential for annoyance associated with these noise sources. Based on an exterior noise standard of 70 dBA L_{max}.*

Refer to **Appendix I** for modeling assumptions and results.

Mitigation Measures

Implement mitigation measure **MM 4.7.4**.

Predicted maximum instantaneous non-transportation noise levels, with implementation of mitigation measure **MM 4.7.4**, are summarized in **Table 4.7-17**. As depicted, implementation of mitigation measure **MM 4.7.4** would reduce operational noise levels, but not to levels below the City's exterior noise standard of 70 dBA L_{max} at all adjacent residential land uses. **Because maximum instantaneous noise levels from non-transportation noise sources were not evaluated in the LRSP EIR, this represents a new significant impact. This impact would be considered significant and unavoidable.**

TABLE 4.7-17
PREDICTED NON-TRANSPORTATION MAXIMUM INSTANTANEOUS NOISE LEVELS AT NEARBY RECEPTORS WITH MITIGATION

Receptor(1)	Primary Noise Sources	Predicted Exterior Noise Levels (dBA Lmax)		Exceeds City Noise Standards?(2)
		1st Floor	2nd Floor	
1 – 8313 & 8317 La Cruz Way	Water Park	63.7	64.4	No
2 – 8305 & 8309 La Cruz Way	Water Park	66.6	67.1	No
3 – 8301 La Cruz Way	Water Park	69.3	69.9	No
4 – 8316 & 8320 Columbo Circle	Water Park	66.1	69.2	No
5 – 8308 & 8312 Columbo Circle	Water Park	67.2	71.4	**Yes**
6 – 8300 & 8304 Columbo Circle	Water Park	70.4	73.4	**Yes**
7 – 9732 La Ropa Way	Water Park	72.5	75.0	**Yes**
8 – 9736 & 9740 La Ropa Way	Water Park	72.6	74.9	**Yes**
9 – 9744 & 9748 La Ropa Way	Water Park	71.3	73.9	**Yes**
10 – 9752 & 9756 La Ropa Way	Water Park	70.7	72.1	**Yes**
11 - 9760 La Ropa Way	Water Park	69.6	70.5	**Yes**
12 - West of Big Horn Boulevard	Parking Lot	64.0	68.2	No
13 - West of Big Horn Boulevard	Parking Lot	60.2	61.7	No

Source: Ambient 2014

Notes:

1. *Refer to **Figure 4.7-5** for receptor locations.*
2. *Predicted noise levels along the eastern property line of the Project site are anticipated to be predominantly associated with voice and music. Consistent with the City's noise standards, the City's noise standard of 75 dBA was reduced to 70 dBA to account for the increased potential for annoyance associated with these noise sources. Based on an exterior noise standard of 70 dBA L_{max}.*

Refer to **Appendix I** for modeling assumptions and results.

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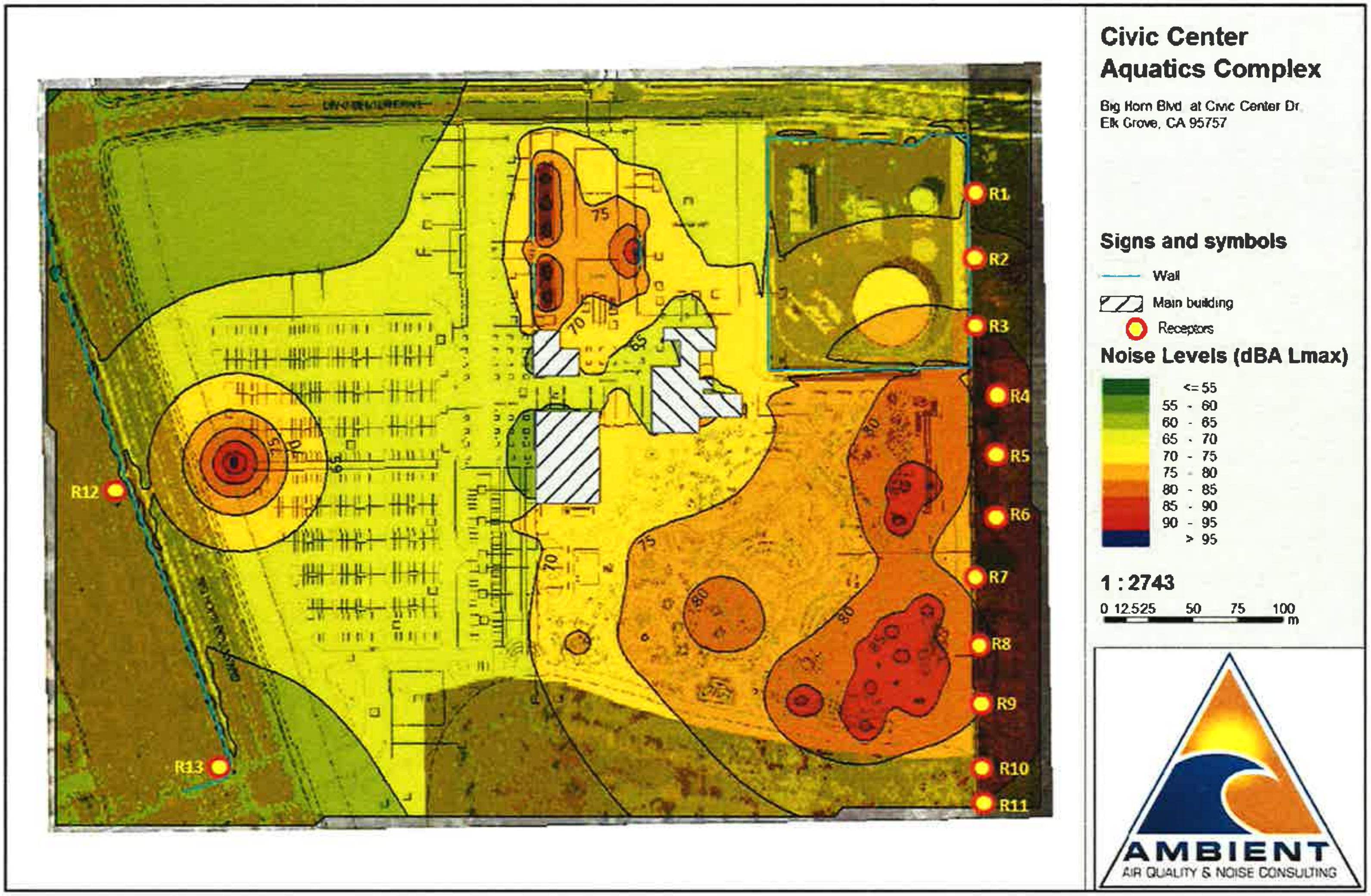
FIGURE 4.7-5 MAXIMUM INSTANTANEOUS NON-TRANSPORTATION NOISE LEVELS WITHOUT MITIGATION



*Notes: Non-transportation noise sources were predicted using the SoundPlan computer program, version 3.0. Predicted noise contours are approximate based on data obtained from similar land uses (refer to **Table 4.7-10**). Instantaneous noise sources were placed at the source center or at representative locations nearest noise-sensitive receptors for the determination of impact significance. Parking lot noise level is based on the sounding of a vehicle horn/alarm. Refer to **Table 4.7-16** for predicted noise levels at receptor locations.*

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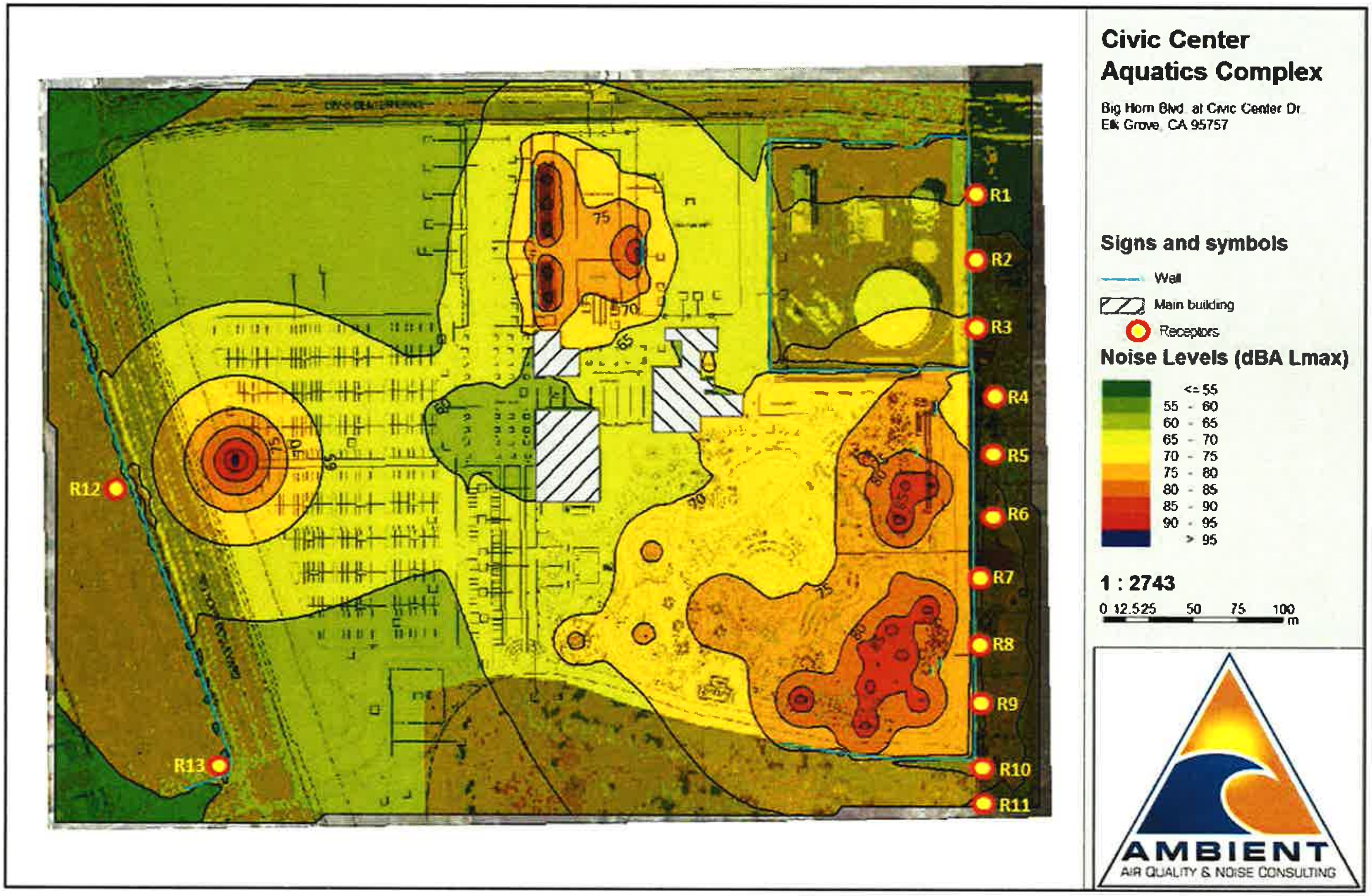
Figure 4.7-6 Maximum Instantaneous Non-Transportation Noise Levels with Mitigation



*Notes: Non-transportation noise sources were predicted using the SoundPlan computer program, version 3.0. Predicted noise contours are approximate based on data obtained from similar land uses (refer to **Table 4.7-10**). Instantaneous noise sources were placed at the source center or at representative locations nearest noise-sensitive receptors for the determination of impact significance. Parking lot noise level is based on the sounding of a vehicle horn/alarm. Refer to **Table 4.7-17** for predicted noise levels at receptor locations.*

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4.7.4 CUMULATIVE SETTING, IMPACTS, AND MITIGATION MEASURES

CUMULATIVE SETTING

The cumulative setting for noise assumes development of land uses in the City and surrounding area. It is anticipated that development would be consistent with the General Plan, including the Laguna Ridge Specific Plan, under cumulative conditions. The land uses in the Laguna Ridge Specific Plan comprise the cumulative development occurring in the Project vicinity. Potential cumulative noise impacts would be primarily associated with traffic noise sources. Cumulative noise impacts can also be assessed for on-site non-transportation noise sources.

CUMULATIVE IMPACTS AND MITIGATION MEASURES

Cumulative Traffic Noise (Standards of Significance 1 and 3)

Impact 4.7.6 The proposed Project could contribute to the cumulative traffic noise environment at nearby land uses. **The proposed Project would not result in an increase in the severity of this impact, which was previously identified in the LRSP EIR as less than cumulatively considerable. There is not a new or substantially more severe significant impact.**

The LRSP EIR included an evaluation of future cumulative traffic noise levels along area roadways and determined that implementation of the LRSP would not result in a significant cumulative increase in traffic noise levels along area roadways. Furthermore, as discussed in Impact 4.7.3, the proposed Project would not contribute to a substantial increase in traffic noise levels along most roadways, when compared to existing conditions. As future development and associated traffic volumes within the LRSP area increase, the proposed Project's contribution to traffic noise levels along area roadways would be projected to decrease. However, as noted in Impact 4.7.3, the Project would be projected to result in a substantial increase in traffic noise levels during Saturday operations along Big Horn Boulevard, between Civic Center Drive and Lotz Parkway. As previously discussed, residential land uses located along this roadway segment are currently shielded by an approximately 8-foot high noise barrier, which typically reduces traffic noise levels by approximately 8 dB. Based on this reduction and assuming a predicted future cumulative Saturday traffic noise level of 69.9 dBA CNEL, predicted exterior noise levels at the nearest residences would be approximately 61.9 dBA CNEL, or less, at the ground level of the nearest structures, which would not exceed the City of Elk Grove's conditionally acceptable noise level of 65 dBA CNEL. Based on these same assumptions and assuming an average exterior-to-interior noise reduction of 25 dB, predicted interior noise levels of these nearest residential structures would be approximately 44.9 dBA CNEL. Predicted future cumulative exterior and interior traffic noise levels at these nearest residences would approach, but would not exceed the City's conditionally acceptable exterior noise standard of 65 dBA CNEL nor the City's interior noise standard of 45 dBA CNEL. For these reasons, the proposed Project would not contribute to a significant increase in future cumulative traffic noise levels along area roadways. Predicted future cumulative traffic noise levels along area roadways are depicted in **Table 4.7-18. For the reasons discussed above, the proposed Project would not result in a substantial increase in the severity of this impact. There is no new or substantially more severe contribution to the cumulative impact that would result from the proposed Project.**

Mitigation Measures

None required.

TABLE 4.7-18
PREDICTED FUTURE CUMULATIVE TRAFFIC NOISE LEVELS

Segment	CNEL/Ldn at 50 Feet from Near-Travel-Lane Centerline[1]	
	Weekday	Saturday
Elk Grove Blvd., West of Big Horn Blvd.	71.6	70.5
Elk Grove Blvd., Big Horn Blvd. to Laguna Springs Dr.	71.3	70.4
Elk Grove Blvd., East of Laguna Springs Dr.	72.7	71.5
Laguna Springs Dr., North of Elk Grove Blvd.	62.5	59.5
Laguna Springs Dr., Elk Grove Blvd. to Civic Center Dr.	66.7	63.5
Laguna Springs Dr., Civic Center Dr. to Lotz Pkwy	65.9	62.5
Laguna Springs Dr., South of Lotz Pkwy.	58.0	52.6
Lotz Pkwy., Big Horn Blvd. to Laguna Springs Dr.	64.9	63.5
Lotz Pkwy., East of Laguna Springs Dr.	99.6	65.4
Big Horn Blvd., Elk Grove Blvd. to Civic Center Dr.	71.1	70.8
Big Horn Blvd., South of Civic Center Dr.	70.6	69.9
Big Horn Blvd., South of Lotz Pkwy.	67.4	67.0
Civic Center Dr., West of Big Horn Blvd.	62.8	61.8
Civic Center Dr., Big Horn Blvd. to Laguna Springs Dr.	51.0	49.5

Source: Ambient 2014

Notes:

1. *Traffic noise levels were calculated using the FHWA roadway noise prediction model and do not include shielding from existing structures, sound barriers, or intervening terrain.*

Refer to **Appendix I** for modeling assumptions and results.

Cumulative Non-Transportation Noise (Standards of Significance 1, 3, and 4)

Impact 4.7.7 Operation of the proposed Project could contribute to the noise environment at nearby land uses. **Cumulative noise levels associated with non-transportation noise sources were not analyzed in the LRSP EIR. Therefore, this impact would constitute a new cumulative impact, and the proposed Project's contribution would be considerable. The impact would remain significant and unavoidable.**

The LRSP EIR did not evaluate cumulative non-transportation noise levels. As noted earlier in this section, existing non-transportation noise sources in the Project area include a water treatment facility located at 8280 Civic Center Drive and a water pump station located at 9751 Big Horn Boulevard. Major noise sources associated with these facilities are enclosed and shielded from direct public exposure. Based on noise measurement surveys conducted for this Project, operational noise levels associated with these existing non-transportation noise sources are not projected to exceed applicable noise standards at the nearest residential land uses and are largely masked by existing traffic noise levels. Based on the surrounding land uses, no other major stationary noise sources are anticipated in the immediate vicinity of the Project site. However, as noted in Impacts 4.7.4 and 4.7.5, the proposed Project would result in increases in non-transportation noise levels that would exceed the City's noise standards and would contribute to existing non-transportation noise levels in the Project area. **Consequently, this impact would be considered potentially significant. Given that cumulative noise levels associated with non-transportation noise sources were not analyzed in the LRSP EIR, this impact would constitute a new cumulative impact.**

Mitigation Measures

Implement mitigation measure **MM 4.7.4**.

Implementation of mitigation measure **MM 4.7.4** would reduce non-transportation noise levels, but not to a less than significant level. **Therefore, the Project's impact would be cumulatively considerable and this impact would be considered significant and unavoidable.**

Cumulative Construction Noise (Standards of Significance 1 and 4)

Impact 4.7.8 The proposed Project would contribute to cumulative construction noise levels at nearby sensitive receptors. **The proposed Project would result in an increase in the severity of this impact, and this would be a more severe significant impact.**

As note earlier in this section, areas located adjacent to and east of the Project site are currently being constructed for residential use. Residential land uses are currently being constructed west of the Project site, across Big Horn Boulevard. Areas north of the Project site are also planned for future construction.

The LRSP EIR included an analysis of cumulative construction noise levels and concluded that simultaneous construction activities could potentially occur in various areas of the Laguna Ridge Specific Plan, which could adversely affect nearby noise-sensitive land uses. While these projects would implement standard construction techniques to reduce noise and would be to the extent feasible adhere to Municipal Code Chapter 6.32 pertaining to the period when construction activities would occur, the combined effect would be considered significant. Implementation of LRSP EIR mitigation measure MM 4.4.1 and mitigation measure **MM 4.7.2** above would reduce construction noise levels associated with the proposed Project, but the Project's contribution would be cumulatively considerable. The cumulative noise impact would remain **cumulatively significant**, and this impact would be considered **significant and unavoidable. The proposed Project would result in an increase in the severity of this significant and unavoidable impact.**

Mitigation Measures

Implement mitigation measure MM 4.7.2.

REFERENCES

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HUD (US Department of Housing and Urban Development, Office of Community Planning and Development). 1985. *The Noise Guidebook.*

4.8 Public Utilities

4.8.1 WATER SERVICE

4.8.1.1 WATER SERVICE EXISTING SETTING

The Project site is located in SCWA Zone 40, which was created by resolution in 1985 for the purpose of acquiring, constructing, maintaining, and operating facilities for the production, conservation, transmittal, distribution, and sale of ground, surface, and recycled water for the present and future beneficial use of the lands and inhabitants in the zone. Upon completion of construction of Zone 40 water facilities, the facilities will be granted to Zone 41 for long-term operation and maintenance and eventually replacement as facilities become older.

Zone 40 is divided into three service areas: North, Central, and South. The Project site is located in the South Service Area, which is located south of the SCWA's Central Service Area and west of State Route (SR) 99. The South Service Area is supplied by a mix of surface water, groundwater, and recycled water and consists of one pressure zone. The area is predominantly residential, with some commercial and institutional customers (SCWA 2011, p. 2-4).

Water Supplies

Surface Water

The SCWA's conjunctive use program includes the delivery of surface water within the Zone 40 boundaries as part of a comprehensive program to maintain the long-term, regional balance of the groundwater basin. Currently, the SCWA has obtained two sources of surface water supplies totaling up to 61,251 acre-feet per year (afy) available on a long-term average, as described below (SCWA 2013, p. 9).

Appropriative Water

In February 2008, the State Water Resources Control Board (SWRCB) approved the SCWA's appropriative right permit application to divert water from the American and Sacramento rivers (Permit 21209). Water under this permit is considered "intermittent water" that is typically available during the winter months of normal or wet years. These flows could range up to 71,000 afy. The long-term average availability of this supply is 21,700 afy (SCWA 2013, p. 9).

Central Valley Project Water

Central Valley Project (CVP) water, another source from which the SCWA receives water, is described under three different contracts, as follows:

- SMUD 1 Assignment – 15,000 afy of SMUD's CVP contract water has been assigned to the SCWA under the terms of an agreement with the Sacramento Municipal Utility District (SMUD). The long-term availability of SMUD 1 water is 13,000 afy.
- SMUD 2 Assignment – 15,000 afy of SMUD's CVP contract water has been assigned to the SCWA under the terms of an agreement with SMUD. The long-term availability of SMUD 2 water is 13,000 afy.
- CVP Water Public Law 101-514 ("Fazio" Water) – The SCWA has entered into a contract with the US Bureau of Reclamation for 22,000 afy. Of this total, 7,000 afy has been subcontracted to the City of Folsom for diversion from Folsom Lake. The remaining 15,000 afy will be diverted by the SCWA from the Sacramento River. The long-term average availability of this supply is 13,551 afy (SCWA 2013, p. 9).

Two future surface water supplies—point of use (POU) water and water transfers— are planned for in the SCWA Water Supply Master Plan (WSMP) to meet buildout water demand. The timing for acquiring these two surface water supplies will be determined by demand growth in Zone 40.

- POU water refers to surface water obtained through a water wholesale agreement with the City of Sacramento whereby the City of Sacramento will sell surface water to the SCWA for use in the portion of Zone 40 that lies within Sacramento's American River POU. The amount of water required to serve the POU area is estimated to be 9,300 afy.
- Water transfers refer to surface water obtained through a water purchase and transfer agreement that the SCWA would enter into with other entities that currently hold surface water rights upstream of the SCWA's points of diversion. According to the WSMP, the amount of water needed is estimated to be 5,200 afy(SCWA 2013, pp. 9–10) .

Table 4.8.1-1 lists all the water entitlements, water rights, and water services contracts to meet the buildout water demand in Zone 40.

TABLE 4.8.1-1
WATER SUPPLY ENTITLEMENTS, WATER RIGHTS, AND WATER SERVICE CONTRACTS TO MEET SCWA ZONE 40 BUILDOUT WATER DEMAND

Water Supply Sources	Wholesaler Supplied Volume	Status	Availability (afy)		Long-Term Average (afy)	Reliability
			Wet Years	Dry Years		
Suppler-produced groundwater to serve Zone 40[1]	No	Existing	27,300	Up to 69,900	40,900	High
Wholesaler – (City of Sacramento) to serve portion of Zone 40 in City of Sacramento's American River POU	Yes	Planned	9,300	9,300	9,300	High
Supplier-produced surface water to serve Zone 40: US Bureau of Reclamation – CVP Supply (SMUD 1, SMUD 2, and Fazio Water)	Yes	Existing	45,000	8,700	38,000	Moderate
Supplier-produced surface water to serve Zone 40: Appropriative Water – SWRCB Permit 21209	No	Existing	Up to 71,000	0	21,700	Low
Other Water – Water Transfer	No	Planned	0	9,600	5,200	Moderate to High
Recycled water for Zone 40	Yes	Existing	4,400	4,400	4,400	High
Remediated groundwater	No	Existing	8,900	8,900	8,900	High
Zone 40 Subtotal			165,900	110,800	128,400	

Source: SCWA 2011, Table 4-3

1. Groundwater pumping rates in wet and dry years are modeling results determined by the buildout demand and the availability of surface water.

Table 4.8.1-2 presents the quantities of surface water supply available under these water rights and contract entitlements in five-year increments beginning in the year 2010 through 2035 under normal, single dry, and multiple dry years.

TABLE 4.8.1-2
ZONE 40 CURRENT AND PROJECTED SURFACE WATER SUPPLY IN FIVE-YEAR INCREMENTS (AFY)

Water Year	2010[1]	2015[2]	2020[3]	2025[4]	2030[5]	2035[6]
Normal Year[7]	12,320	35,000	42,500	50,000	66,800	81,200
Single Dry Year[8]	7,390	8,700	8,700	8,700	18,000	27,600
Multiple Dry Year[9]	11,088	22,500	27,000	31,500	45,300	59,400
Multiple Dry Year[9]	9,856	20,000	24,000	28,000	41,300	54,900
Multiple Dry Year[9]	9,240	18,750	22,500	26,250	39,300	82,650

Source: SCWA 2011

1. *UWMP, Table 4-11*
2. *UWMP, Table 4-12*
3. *UWMP, Table 4-13*
4. *UWMP, Table 4-14*
5. *UWMP, Table 4-15*
6. *UWMP, Table 4-16*
7. *Normal/Average year is a year in the historical sequence that most closely represents median runoff levels and patterns. Average is defined as the median runoff over the previous 30 years or more. By this definition, 1993 is a normal/average year for the Sacramento River watershed.*
8. *Single dry year is generally considered to be the lowest annual runoff for a watershed since the water year beginning in 1903. 1977 is a single dry year for the Sacramento River watershed.*
9. *Multiple dry year period is generally considered to be the lowest average runoff for a consecutive multiple-year period (three years or more) for a watershed since 1903. 1989–1992 is a multiple dry year period for the Sacramento River watershed.*

Groundwater

The SCWA currently exercises, and will continue to exercise, its rights as a groundwater appropriator to extract groundwater from the groundwater basin (Central Basin) underlying Zone 40 for delivery to its customers (SCWA 2013).

The SCWA UWMP identified Zone 40's current and projected groundwater pumping in normal, single dry, and multiple dry years in five-year increments for the 25-year projection (2010 to 2035). A summary of the data is presented in **Table 4.8.1-3**.

TABLE 4.8.1-3
SCWA ZONE 40 CURRENT AND PROJECTED GROUNDWATER PUMPING IN FIVE-YEAR INCREMENTS (AFY)

Water Year	2010[1]	2015[2]	2020[3]	2025[4]	2030[5]	2035[6]
Normal Year[7]	35,000	20,000	15,000	20,000	25,000	15,000
Single Dry Year[8]	39,930	46,300	48,800	61,300	64,500	68,600
Multiple Dry Year[9]	36,232	32,500	30,500	38,500	37,200	36,800
Multiple Dry Year[9]	37,464	35,000	33,500	42,000	41,200	41,300
Multiple Dry Year[9]	38,080	36,250	35,000	43,750	43,200	43,550

Source: SCWA 2011

1. *UWMP, Table 4-11*
2. *UWMP, Table 4-12*
3. *UWMP Table 4-13*

4. *UWMP Table 4-14*
5. *UWMP Table 4-15*
6. *UWMP Table 4-16*
7. *Normal/Average year is a year in the historical sequence that most closely represents median runoff levels and patterns. Average is defined as the median runoff over the previous 30 years or more. By this definition, 1993 is a normal/average year for the Sacramento River watershed.*
8. *Single dry year is generally considered to be the lowest annual runoff for a watershed since the water year beginning in 1903. 1977 is a single dry year for the Sacramento River watershed.*
9. *Multiple dry year period is generally considered to be the lowest average runoff for a consecutive multiple-year period (three years or more) for a watershed since 1903. 1989–1992 is a multiple dry year period for the Sacramento River watershed.*

Groundwater from the Central Basin has been identified in both the Water Forum Agreement (WFA) and the SCWA Water Supply Master Plan as a source of conjunctive use water for the SCWA in Zone 40. As a signatory to the WFA and a member of the Sacramento Central Groundwater Authority, the SCWA recognizes the Water Forum–defined long-term sustainable average annual yield of the Central Basin as 273,000 afy (SCWA 2013, p. 8).

Recycled Water

Recycled water is tertiary-treated wastewater obtained from the Sacramento Regional County Sanitation District (SRCSD) that is supplied to the South Service Area in Zone 40 as a source of non-potable water for irrigation of parks, schools, and rights-of-way. According to the SCWA Water Supply Master Plan, ultimate recycled water use is estimated to be 4,400 afy (SCWA 2013, p. 9).

Water Demands

The SCWA UWMP estimates Zone 40's water demands in normal, single dry, and multiple dry years in five-year increments for the 25-year projection (2010 to 2035). A summary of the data is provided in **Table 4.8.1-4**.

TABLE 4.8.1-4
SCWA ZONE 40 WATER DEMANDS IN FIVE-YEAR INCREMENTS (AFY)

Water Year	2010	2015	2020	2025	2030	2035
Normal Year[1]	34,511	44,425	50,662	57,583	67,565	77,712
Single Dry Year[2]	34,511	44,425	50,662	57,583	67,565	77,712
Multiple Dry Year[3]	34,511	44,425	50,662	57,583	67,565	77,712
Multiple Dry Year[3]	34,511	44,425	50,662	57,583	67,565	77,712
Multiple Dry Year[3]	34,511	44,425	50,662	57,583	67,565	77,712

Source: SCWA 2011, Tables 7-1 through 7-3.

1. *Normal/Average year is a year in the historical sequence that most closely represents median runoff levels and patterns. Average is defined as the median runoff over the previous 30 years or more. By this definition, 1993 is a normal/average year for the Sacramento River watershed.*
2. *Single dry year is generally considered to be the lowest annual runoff for a watershed since the water year beginning in 1903. 1977 is a single dry year for the Sacramento River watershed.*
3. *Multiple dry year period is generally considered to be the lowest average runoff for a consecutive multiple-year period (three years or more) for a watershed since 1903. 1989–1992 is a multiple dry year period for the Sacramento River watershed.*

4.8.1.2 WATER SERVICE REGULATORY FRAMEWORK

State

Urban Water Management Planning Act – Assembly Bill 797

The Urban Water Management Planning Act was established by Assembly Bill (AB) 797 on September 21, 1983. Passage of this law was recognition by State legislators that water is a limited resource and a declaration that efficient water use and conservation would be actively pursued throughout the State. The law requires water suppliers in California providing water for municipal purposes either directly or indirectly to more than 3,000 customers or supplying more than 3,000 afy of water to prepare and adopt a specific plan every five years that defines their current and future water use, sources of supply and reliability, and existing conservation measures. The adopted plan must then be updated at least once every five years on or before December 31 in years ending in five and zero. An urban water supplier that does not prepare, adopt, and submit its urban water management plan to the California Department of Water Resources is ineligible to receive drought assistance from the State of California.

California Water Code

California Water Code Sections 10656 and 10657 restrict State funding and drought assistance for agencies that fail to submit their urban water management plan to the Department of Water Resources. In addition, Water Code Section 10910 describes the water supply assessment that must be undertaken for projects referred to under Public Resources Code Section 21151.9, including an analysis of groundwater supplies. Water agencies are given 90 days from the start of consultation in which to provide a water supply assessment of the CEQA lead agency. Water Code Section 10910 also specifies the circumstances under which a project for which a water supply assessment was once prepared would be required to obtain another assessment. Water Code Section 10631 directs that contents of the urban water management plans include further information on future water supply projects and programs and groundwater supplies.

Local

Sacramento County Water Agency Zone 41 Urban Water Management Plan

The current (2010) Zone 41 Urban Water Management Plan was adopted on June 6, 2011, and serves as the UWMP for the Sacramento County Water Agency and its primary water contractors. The UWMP contains information about water supplies, water supply reliability, water conservation, water shortage contingencies, and recycled water usage and is the foundation document for water supply assessments (SCWA 2011).

Water Forum Agreement and the Sacramento Central Groundwater Authority

The Water Forum was developed to address water-related issues facing the Sacramento region and resulted in the development of the Water Forum Agreement (WFA). The WFA contains seven elements: increased surface water diversions, actions to meet customer needs while reducing diversion impacts in drier years, support for improved pattern of fishery flow releases from Folsom Reservoir, Lower American River habitat management, water conservation, groundwater management, and the Water Forum Successor Effort. The Groundwater Element of the WFA sets out specific recommendations designed to protect groundwater resources, including recommendations on the sustainable yields and groundwater management governance structures for the three Sacramento groundwater subbasins. Elk Grove is in the Central groundwater subbasin (Central Basin). Starting in 2002, stakeholders of the Central Basin began a process of groundwater management planning and development of a governance structure. That effort resulted in the adoption of the Central Sacramento County Groundwater Management Plan in February 2006 and creation of the Sacramento Central Groundwater Authority (SCGA) in August 2006. A goal of the SCGA is to ensure a viable groundwater resource for beneficial uses including water for adjacent purveyors, agricultural, agricultural residential, industrial, and municipal supplies that support the WFA's co-equal objectives of providing a reliable and safe water supply and preserving the fishery, wildlife, recreational, and aesthetic values of the lower American River. The SCGA's groundwater management plan identifies available water supplies to meet the total water demands of users within the basin and partakes in maintaining ecological flows in the Cosumnes River (Water Forum 2013).

Well Protection Program

The SCGA's Well Protection Program is intended to protect domestic and agricultural irrigation wells within the Central Basin. This program establishes a trust fund to cover costs of deepening or replacing any existing well that provides water for agricultural or domestic use that may be impacted by future development. Fees assessed on every new building permit and permit to drill a new well, estimated to be less than $100 per single-family home, will fund the program (SCGA 2006, p. ES-12). This program has not yet been implemented.

Groundwater Contamination Monitoring and Collaboration Program

The intent of SCGA's Groundwater Contamination Monitoring and Collaboration Program is to provide communication between designated responsible parties for groundwater contamination cleanup activities and private well owners. The program promotes the use of remediated groundwater in urbanized areas to keep the groundwater in the basin and envisions the Regional Water Quality Control Board requiring designated responsible parties to survey private wells within 2,000 feet of any identified contamination plume. The Sacramento County Environmental Management Department Assistance will enforce all permitting requirements and undertake whatever rigorous enforcement actions are effective if requirements are not met (SCGA 2006, p. ES-12).

SCWA Zone 40 Water Supply Master Plan

The Water Forum Agreement is the foundation for the Zone 40 Water Supply Master Plan (WSMP), the current version of which was adopted in February of 2005 by the SCWA in order to provide a flexible program of water management alternatives to be implemented and revised, if necessary, as the availability and feasibility of water supply sources change in the future. The WSMP also reflects changes from the 1987 Zone 40 Water Supply Master Plan in the pattern of growth in water demands, water quality treatment requirements, expansion of the original service area, and availability of potential sources of surface water supplies. The WSMP describes the water supply and makes recommendations to meet future water demands in Zone 40 through the year 2030 (SCWA 2005).

City of Elk Grove General Plan

The City of Elk Grove General Plan contains the following policies and actions related to water supply that apply to the proposed Project. These policies and goals are contained in the Conservation and Air Quality Element as well as in the Public Facilities and Finance Element (City of Elk Grove 2003a). The Project does not include any actions or components that conflict with these General Plan policies. However, it should be noted that the final authority for interpretation of a policy statement, determination of the Project's consistency with the General Plan, ultimately rests with the Elk Grove City Council.

"CAQ-1 Reduce the amount of water used by residential and non-residential uses by encouraging water conservation."

"CAQ-1-Action 1 Implement the City's Water Conservation Ordinance."

"CAQ-1-Action 2 Actively encourage water conservation by both agricultural and urban water users."

"CAQ-1-Action 4 Promote the use of drought-tolerant vegetation to minimize water consumption by providing information to developers and designers."

"PF-1 Except when prohibited by state law, the City shall require that sufficient capacity in all public services and facilities will be available on time to maintain desired service levels and avoid capacity shortages, traffic congestion, or other negative effects on safety and quality of life."

"PF-3 Water supply and delivery systems shall be available in time to meet the demand created by new development, or shall be assured through the use of bonds or other sureties to the City's satisfaction."

"PF-3-Action 1 The following shall be required for all development projects, excluding subdivisions:

An assured water supply and delivery system shall be available at the time of project approval. The water agency providing service to the project may provide several alternative methods of supply and/or delivery, provided that each is capable individually of providing water to the project.

All required water infrastructure for the project shall be in place at the time of project approval, or shall be assured through the use of bonds or other sureties to the City's satisfaction. Water infrastructure may be phased to coincide with the phased development of large-scale projects."

"PF-5 The City supports the use of reclaimed water for irrigation wherever feasible."

"PF-7 The City shall require that water flow and pressure be provided at sufficient levels to meet domestic, commercial, industrial, and firefighting needs."

4.8.1.3 WATER SERVICE IMPACTS AND MITIGATION MEASURES

Standards of Significance

The impact analysis provided is based on the following CEQA Guidelines Appendix G thresholds of significance. A public utilities impact with regard to water supply is considered significant if implementation of the Project would result in any of the following:

1) Require or result in the construction of new water treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects.

2) Have insufficient water supplies available to serve the project from existing entitlements and resources, or require new or expanded entitlements.

Methodology

The information used in the preparation of this subsection includes the Sacramento County Water Agency (SCWA) Zone 40 Water Supply Master Plan (2005), Central Sacramento County Groundwater Management Plan (2006), 2010 Zone 41 Urban Water Master Plan (2011), and the Water Supply Assessment for Elk Grove Southeast Policy Area (2013), and other sources, which are cited and listed in the references.

The following impact analysis is based primarily on the Water Supply Assessment for the proposed Project by the SCWA (2014) as well as Project water demands provided by the applicant, and the water supply analysis provided in the Laguna Ridge Specific Plan EIR.

Project Impacts and Mitigation Measures

Increase Water Demand (Standards of Significance 1 and 2)

Impact 4.8.1.1 Implementation of the proposed Project would increase demand for domestic water supply. **The proposed Project would result in an increase in the severity of this impact, which was previously identified in the LRSP EIR as less than significant with mitigation. There are no new or substantially more severe significant impacts.**

The proposed Project plans for development of the Project site to be served by a combination of potable and reclaimed water supplies. The competition venue has a capacity to accommodate up to 3,100 competitors and spectators over the course of an entire day for a large special event; however, an event of this size would be infrequent.

As discussed in Section 4.0, Introduction to the Environmental Analysis, the proposed Project, including the water and adventure parks and the competition venue, would have typical daily attendance in the summer months of 3,230, with peak attendance at the water and adventure parks and competition venue on hot summer weekends of 5,500. While peak water demand affects the overall annual usage, daily peak demands are a function of infrastructure; that is, whether the pipes are adequately sized to supply the peak demand. Prior to connecting to existing infrastructure, SCWA would review improvement plans to ensure connections are adequately sized to accommodate the Project.

Based on rates from similar facilities provided by P3 International (P3 International 2014), the following assumptions were used to determine water demand for the Project:

- During the 120 days that the water park, adventure park, and competition venue would all operate:
  - There would be 20 peak days of 5,500 attendance consisting of:
    - A regional swim meet with 2,500 competitors and spectators
    - 3,000 visitors at the water and adventure park
  - There would be an average of 3,320 attendees for the remaining 100 days consisting of
    - A local high school competition and/or recreation league practice with 500 people (300 swimmers, 200 spectators)
    - 2,730 visitors at the water and adventure park
- For the remaining 245 days per year when the water park is not operating:
  - 250 people per day at the competition venue for practice or competition (200 swimmers, 50 spectators)
  - 1,600 people per day at the adventure park
- Annual competition venue pool consumption through pool fill, backwash, and pool evaporation would be 10.31 afy
- Water and adventure park rough pool fill, backwash, and pool evaporation would be 15.65 afy
- Average daily water use per person per day at the water park is 11.45 gallons
- Average daily water use per person per day at the adventure park is 5.2 gallons
- Average daily water use per swimmer per day at the competition venue is 13.15 gallons
- Average daily water use per spectator per day at the competition venue is 1.91 gallons

Table 4.8.1-5 summarizes the Project's estimated water demand. The water demand of the proposed Project is estimated at approximately 87.1 afy, including 38.7 afy for landscape areas that would be irrigated with reclaimed water once reclaimed water infrastructure is in place. The Project's demand for potable water would be 48.4 afy once the necessary reclaimed water infrastructure is extended onto the Project site. The LRSP EIR assumed a water demand of 4.28 afy per acre of park land, so the Civic Center Aquatic Complex site was assumed to generate a water demand of 128.4 afy as part of the LRSP's total demand of 7,063 afy of water. The LRSP EIR assumed recycled water would be available to meet demands for park use, which reduced the potable demand disclosed in the LRSP EIR. The Project's water demand would be less than disclosed in the LRSP EIR, but approximately 48.4 acre-feet would be potable water, which is an increase from the LRSP EIR. However, Zone 40 surface and groundwater supplies exceed demands in each of the scenarios (during normal, single dry, and multiple dry years) through 2035. Consequently, the additional demand generated by the Project would not be significant.

TABLE 4.8.1-5
CIVIC CENTER AQUATIC COMPLEX WATER DEMAND

Project Attendance Assumptions[1]	Annual Water Demand Acre-Feet		
	Competition Venue	**Water/Adventure Park**	**Total**
20-day peak, 5,500 attendance	1.26	2.11	3.37
100-day 3,320 attendance	1.16	9.59	10.75
245-day non-summer attendance	2.05	6.26	8.31
Pool consumption	10.31	15.65	25.96
Landscape Irrigation	-	-	38.71
Total	**14.78**	**33.61**	**87.1**

Source: Rates from P3 International 2014.

1. *See individual assumptions described above.*

One of the water treatment facilities identified in the LRSP EIR has been constructed and is in operation immediately adjacent to the Project site. Implementation of the proposed Project would require the extension of existing water supply infrastructure onto and within the Project site from the water treatment facility. No offsite improvements would be necessary. Potential impacts associated with construction of necessary on-site water system facilities described herein are addressed in the individual technical sections of this Draft SEIR (Sections 4.1 through 4.9). Potential impacts of the provision of water to the Project site could include onsite disturbance of biological and/or cultural resources, conversion of agricultural land, construction-related emissions, soil erosion and water quality degradation, handling of hazardous materials (e.g., fuels), temporary excessive noise, and temporary construction traffic. Where necessary, mitigation measures are provided to reduce impacts. The provision of water supply infrastructure is considered as part of the development of the Project site; there would be no additional impact beyond that identified for the Project as a whole. In addition, LRSP EIR mitigation measures 4.6.1.1a and b require that the Project obtain verification of adequate water supply and implement water conservation measures.

The proposed Project's impact would be less than significant, but because the proposed project would result in an increase in demand for potable water compared to the LRSP EIR, **the proposed Project would result in an increase in the severity of this impact. This impact was previously identified in the LRSP EIR as less than significant with mitigation. There are no new or substantially more severe significant impacts.**

Mitigation Measures

None required.

4.8.1.4 WATER SERVICE CUMULATIVE SETTING, IMPACTS, AND MITIGATION MEASURES

Cumulative Setting

The cumulative setting for water supply is the SCWA's Zone 40, which encompasses a portion of central Sacramento County including Elk Grove and portions of the cities of Sacramento and Rancho Cordova (SCWA 2005, p. ES-2).

Cumulative Impacts and Mitigation Measures

Cumulative Water Service Impacts

Impact 4.8.1.2 Implementation of the proposed Project, in combination with other development within the SCWA's Zone 40, would increase demand for domestic water supply. The proposed Project's contribution to this impact would be less than cumulatively considerable. **The proposed Project would result in an increase in the severity of this impact, which was previously identified in the LRSP EIR as less than significant with mitigation. However, the proposed Project's contribution to cumulative water supply impacts would be less than cumulatively considerable. There are no new or substantially more severe significant impacts.**

As described under Impact 4.8.1.1, the proposed Project's projected total water demand would be approximately 87.1 afy, which is less than that assumed for the Project site in the LRSP EIR. The Project's demand for 48.4 afy of potable water is considered a new potable water demand. As discussed above, SCWA has adequate supplies to meet this demand, in addition to its other existing and projected demands, during normal, single dry, and multiple dry years. In addition, the SCWA has demonstrated that its water supply program is reliable and that a financing plan is in place for planned capital improvement projects. **The proposed Project would result in an increase in the severity of this impact, which was previously identified in the LRSP EIR as less than significant with mitigation. However, the proposed Project's contribution to cumulative water supply impacts would be less than cumulatively considerable. There are no new or substantially more severe significant impacts.**

Mitigation Measures

None required.

4.8.2 WASTEWATER SERVICE

4.8.2.1 WASTEWATER SERVICE EXISTING SETTING

Sacramento Regional County Sanitation District

Treatment of wastewater generated on the Project site would be provided by the Sacramento Regional County Sanitation District (SRCSD), which serves approximately 1.4 million people. The SRCSD owns and operates the regional wastewater conveyance system and the Sacramento Regional Wastewater Treatment Plant (SRWTP), located at 8521 Laguna Station Road. The SRCSD's contributing agencies—the Sacramento Area Sewer District (SASD) (which serves the City of Elk Grove) and the Cities of Folsom, West Sacramento, and Sacramento—each collect wastewater, while the SRCSD is responsible for major conveyance, treatment, and disposal (SRCSD 2014).

Sacramento Area Sewer District

The Sacramento Area Sewer District (SASD), formerly known as County Sanitation District-1, provides wastewater collection services in the urbanized unincorporated area of Sacramento County, in the cities of Citrus Heights, Elk Grove, and Rancho Cordova, and in a portion of the cities of Sacramento and Folsom. The SASD owns, operates, and maintains a network of 4,400 miles of main line and lower lateral pipes in a 270-square-mile area (SASD 2014).

Collection system pipelines are categorized and based on size, function, and hydraulic capacity. Trunk sewers are pipes that function as conveyance facilities to transport the collected wastewater flows to the SRCSD interceptor system. Trunks carry flows from 1 to 10 million gallons per day (mgd), and laterals carry flows of less than 1 mgd. The existing Elk Grove trunk line extends southeast from the Sacramento Regional Wastewater Treatment Plant influent diversion structure to Laguna Boulevard, then parallel to SR 99 along East Stockton Boulevard extending close to the southern City boundary (SASD 2014).

Sacramento Regional Wastewater Treatment Plant

The Sacramento Regional Wastewater Treatment Plant (SRWTP), operated by the SRCSD, is located on 900 acres of a 3,550-acre site between Interstate 5 and Franklin Boulevard, north of Laguna Boulevard. The remaining 2,650 acres serve as a "bufferland" between the SRWTP and nearby residential areas (SRCSD 2014). The SRWTP operates in accordance with a National Pollutant Discharge Elimination System (NPDES) permit and waste discharge requirements issued in December 2010 by the Central Valley California Regional Water Quality Control Board (Order No. R5-2010-0114-1, NPDES No. CA0077682, as amended by Order R5-2011-0083).

The SRWTP treats an average 150 million gallons of wastewater per day and is capable of treating up to 400 million gallons per day during peak wet weather flow. Wastewater is treated by accelerated physical and natural biological processes before it is discharged to the Sacramento River. The SRWTP provides secondary treatment using an activated sludge process (SRCSD 2014).

The SRWTP's NPDES permit requires ammonia removal, filtration, and higher levels of disinfection. Pursuant to the discharge permit, SRCSD is required to begin the necessary activities, studies, and projects to meet the new permit conditions. The new ammonia and nitrate removal requirements need to be completed by May 2021, while the disinfection and filtration requirements must be completed by 2023.

4.8.2.2 WASTEWATER SERVICE REGULATORY FRAMEWORK

Federal

Clean Water Act

In the 1970s, the Clean Water Act (CWA) established the legal authority in the United States to develop water quality standards to ensure the protection of human health and the environment. The Clean Water Act made grant funds available for wastewater treatment plant construction and upgrades, and the act also implemented the requirement for waste discharge permits for every discharge to land and water bodies, such as oceans, rivers, lakes, or creeks. The US Environmental Protection Agency (EPA) is the federal agency responsible for implementing the act and has delegated authority to the State to regulate water quality. The NPDES program is the permitting system for discharges to water bodies. The goal of the NPDES is to protect beneficial uses of the receiving water body.

State

Regional Water Quality Control Board

The Central Valley Regional Water Quality Control Board (CVRWQCB) regulates and enforces the NDPES program in California. Beneficial uses of the Sacramento River include, but are not limited to, agricultural irrigation, drinking water supply, recreation, and freshwater habitat. The

SRWTP's NPDES permit requires specific, measurable quality assurance and is updated every five years to accommodate new environmental concerns and larger wastewater flows. Permit limitations explain the quality that the SRWTP's discharge must achieve. Permit monitoring requirements provide a basis for systematic sampling of the discharge and the Sacramento River to monitor water quality. In addition to limitations and monitoring requirements, the CVRWQCB requires several studies to evaluate the impacts of the SRWTP's discharge to the Sacramento River.

Local

Sacramento Regional County Sanitation District

Sacramento Regional Wastewater Treatment Plant 2020 Master Plan

The 2020 Master Plan for the SRWTP provides a phased program of recommended wastewater treatment facilities and management programs to accommodate planned growth and to meet existing and anticipated regulatory requirements through the year 2020. The Master Plan addresses both public health and environmental protection issues while ensuring reliable service at affordable rates for SRCSD customers. The Master Plan's key goals are to provide sufficient capacity to meet growth projections and an orderly expansion of SRWTP facilities, to comply with applicable water quality standards, and to provide for the most cost-effective facilities and programs from a watershed perspective (SRCSD 2008).

Interceptor Sequencing Study

The SRSCD Board of Directors adopted the Interceptor Sequencing Study (ISS) in February 2013. The ISS modified the previous Regional Interceptor Master Plan 2000. The ISS aids SRCSD in planning and implementing regional conveyance projects and assists the SASD in coordinating collection system facilities.

Sacramento Area Sewer District

The most current SASD planning document, the 2010 System Capacity Plan Update (SCP), was approved by the SASD Board of Directors in January 2012. The SCP is a high-level planning and dynamic sewer capacity plan that addresses existing, midrange, and buildout sewer capacity needs.

City of Elk Grove General Plan

The City of Elk Grove General Plan contains the following policies and actions related to wastewater that apply to the proposed Project. These policies and goals are contained in the Public Facilities and Finance Element (City of Elk Grove 2003a). The Project does not include any actions or components that conflict with these General Plan policies. However, it should be noted that the final authority for interpretation of a policy statement, determination of the Project's consistency with the General plan, ultimately rests with the Elk Grove City Council.

"PF-8 Sewage conveyance and treatment capacity shall be available in time to meet the demand created by new development, or shall be assured through the use of bonds or other sureties to the City's satisfaction."

"PF-8-Action 1 The following shall be required for all development projects, excluding subdivisions:

- Sewer/wastewater treatment capacity shall be available at the time of project approval.
- All required sewer/wastewater infrastructure for the project shall be in place at the time of project approval, or shall be assured through the use of bonds or other sureties to the City's satisfaction."

4.8.2.3 WASTEWATER SERVICE IMPACTS AND MITIGATION MEASURES

Standards of Significance

The impact analysis provided below is based on the following CEQA Guidelines Appendix G thresholds of significance. A public utilities impact with regard to wastewater is considered significant if implementation of the Project would result in any of the following:

1) Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board.
2) Require or result in the construction of new wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects.
3) Result in a determination by the wastewater treatment provider which serves or may serve the project that it does not have adequate capacity to serve the project's projected demand in addition to the provider's existing commitments.

Methodology

The following impact analysis is based on wastewater flow estimates provided by the project applicant, review of relevant SRCSD and SASD documents, and other sources as referenced in this section.

Project Impacts and Mitigation Measures

Increase Demand for Wastewater Treatment (Standards of Significance 1, 2, and 3)

Impact 4.8.2.1 Implementation of the proposed Project would result in the generation of wastewater, which would require conveyance to and treatment at the Sacramento Regional Wastewater Treatment Plant. There is adequate capacity within the SRCSD's existing treatment plant. **The proposed Project would not result in a substantial increase in the severity of this impact, which was previously identified in the LRSP EIR as less than significant with mitigation. There are no new or substantially more severe significant impacts.**

The Project wastewater generation estimates are based on wastewater flows of approximately 80 percent of potable water use (potable water use includes water lost due to evaporation and swimmer loss, so the calculation for wastewater is conservative). The proposed Project would generate estimated wastewater flows of approximately 5.85 million gallons annually or approximately 0.016 million gallons per day. The addition of Project-generated wastewater would not exceed capacity of the treatment plant and would not result in the need to expand the plant.

The SRWTP currently operates in compliance with all applicable existing NDPES regulatory requirements. In addition, the SRWTP 2020 Master Plan includes recommended facility and management program upgrades to ensure compliance with anticipated future regulatory requirements. Therefore, the proposed Project would not result in the exceedance of any wastewater treatment requirements of the CVRWQCB. This impact would be **less than significant**.

Proposed onsite wastewater conveyance infrastructure would be located within the proposed service/fire lane and would connect to existing public sewer lines at the site's northern boundary (within Civic Center Drive). No offsite improvements would be necessary. Potential impacts associated with construction of necessary onsite wastewater conveyance facilities described herein are addressed in the individual technical sections of this Draft SEIR (Sections 4.1 through 4.9). Potential impacts could include disturbance of biological and/or cultural resources, conversion of agricultural land, construction-related emissions, soil erosion and water quality degradation, handling of hazardous materials (e.g., fuels), temporary excessive noise, and temporary construction traffic. Where necessary, mitigation measures are provided to reduce impacts. The provision of wastewater conveyance infrastructure is considered as part of the development of the Project site; there would be no additional impact beyond that identified for the Project as a whole. In addition, the Project is subject to mitigation measures MM 4.6.2.1 and MM 4.6.2.2 that require confirmation of adequate wastewater facilities to serve the development. As noted above, wastewater infrastructure exists adjacent to the Project that would provide service. Impacts would be **less than significant.**

The proposed Project would not result in a substantial increase in the severity of this impact, which was previously identified in the LRSP EIR as less than significant with mitigation. There are no new or substantially more severe significant impacts.

Mitigation Measures

None required.

4.8.2.4 WASTEWATER SERVICE CUMULATIVE SETTING, IMPACTS, AND MITIGATION MEASURES

Cumulative Setting

The cumulative setting for wastewater impacts is the service area of the Sacramento Regional County Sanitation District, which includes portions of unincorporated Sacramento County as well as the cities of Citrus Heights, Elk Grove, Folsom, Rancho Cordova, Sacramento, and West Sacramento and the communities of Courtland and Walnut Grove.

Cumulative Impacts and Mitigation Measures

Cumulative Wastewater Impacts

Impact 4.8.2.2 Implementation of the proposed Project, in combination with other development in the SRCSD service area, would generate significant new **wastewater flows requiring conveyance and treatment. The proposed Project could increase in the severity of this impact, which was previously identified in the LRSP EIR as less than significant with mitigation. This impact would be cumulatively considerable.**

As described under Impact 4.8.2.1, the proposed Project is projected to generate approximately 5.85 million gallons annually or approximately 0.016 million gallons per day. The plant has been master planned to accommodate 350 mgd average dry weather flow and would be expanded and upgraded to respond to future growth. Similarly, the SRCSD has prepared a master plan for the district's regional interceptors that would ensure adequate capacity for future growth to 2035.

However, SASD staff identified a downstream deficiency from the 2010 Sewer Capacity Study, which will require improvements in the future to accommodate development in the LRSP shed, but the precise improvements necessary to address the deficiency are not known at this time (Carlson 2014). In addition, the location of any future off-site improvements is unknown, so this analysis cannot adequately assess the potential impacts. For this reason, this would be a significant cumulative impact, and no mitigation can be provided at this time. **This is new information since certification of the LRSP EIR. While the proposed Project would not substantially alter wastewater demands and associated impacts anticipated in the LRSP and its EIR, this change in future circumstances would result in a significant and unavoidable impact until SASD resolves this conveyance issue.**

Mitigation Measures

None available.

4.8.3 SOLID WASTE SERVICE

4.8.3.1 SOLID WASTE EXISTING SETTING

Existing Solid Waste Collection and Disposal

Solid waste collection and disposal in Elk Grove is an "open market," meaning that commercial waste in the City is hauled by any permitted hauler selected by the development and is hauled to a variety of permitted landfills chosen by the hauler (City of Elk Grove 2014).

Landfill Capacity

Solid waste generated in Elk Grove is taken to a variety of landfills. **Table 4.8.3-1** shows the landfills used and the permitted and remaining capacities of those landfills. As shown, the majority of the landfills serving Elk Grove waste haulers have over 70 percent remaining capacity (CalRecycle 2014a).

TABLE 4.8.3-1
DISPOSAL FACILITIES AND REMAINING CAPACITIES

Facility	Total Estimated Permitted Capacity (in cubic yards)	Total Estimated Capacity Used		Remaining Estimated Capacity		Estimated Closure Year
		Cubic Yards	Percentage	Cubic Yards	Percentage	
Altamont Landfill & Resource Recovery (01-AA-0009)	62,000,000	16,280,000	26.3%	45,720,000	73.7%	2025
Recology Hay Road (48-AA-0002)	37,000,000	6,567,000	17.7%	30,433,000	82.3%	2077
Bakersfield	53,000,000	20,191,740	38.1%	32,808,260	61.9%	2046

Facility	Total Estimated Permitted Capacity (in cubic yards)	Total Estimated Capacity Used		Remaining Estimated Capacity		Estimated Closure Year
		Cubic Yards	Percentage	Cubic Yards	Percentage	
Metropolitan SLF (15-AA-0273)						
Foothill Sanitary Landfill (39-AA-0004)	138,000,000	13,000,000	9.4%	125,000,000	90.6%	2082
Forward Landfill, Inc. (39-AA-0015)	51,040,000	27,340,000	53.6%	23,700,000	46.4%	2020
Keller Canyon Landfill (07-AA-0032)	75,018,280	11,609,870	15.5%	63,408,410	91%	2030
L and D Landfill Co. (34-AA-0020)	6,031,055	1,931,055	32%	4,100,000	84.5%	2023
North County Landfill (39-AA-0022)	41,200,000	5,800,000	14.1%	35,400,000	85.9%	2048
Potrero Hills Landfill (48-AA-0075)	83,100,000	69,228,000	83.3%	13,872,000	16.7%	2048
Sacramento County Landfill (Kiefer) (34-AA-0001)	117,400,000	4,500,000	3.8%	112,900,000	96.2%	2064

Source: CalRecycle 2014a

4.8.3.2 SOLID WASTE SERVICES REGULATORY FRAMEWORK

State

California Integrated Waste Management Act

The California Integrated Waste Management Act of 1989 (AB 939) requires all California cities and counties to reduce the volume of waste deposited in landfills by 50 percent by the year 2000 and continue to remain at 50 percent or higher for each subsequent year. The purpose of AB 939 is to reduce, recycle, and reuse solid waste generated in the State to the maximum extent feasible.

The California Integrated Waste Management Act requires each California city and county to prepare, adopt, and submit to the California Integrated Waste Management Board [now the California Department of Resources Recycling and Recovery (CalRecycle)] a source reduction and recycling element (SRRE) that demonstrates how the jurisdiction will meet the act's mandated diversion goals. Each jurisdiction's SRRE must include specific components, as defined in Public Resources Code (PRC) Sections 41003 and 41303. In addition, the SRRE must include a program for management of solid waste generated within the jurisdiction that is consistent with the following hierarchy: (1) source reduction, (2) recycling and composting, and (3) environmentally safe transformation and land disposal. Included in this hierarchy is the requirement to emphasize and maximize the use of all feasible source reduction, recycling, and composting options in order to reduce the amount of solid waste that must be disposed of by transformation and land disposal (PRC Sections 40051, 41002, and 41302) (CalRecycle 2014b).

CalRecycle Model Ordinance

Subsequent to the Integrated Waste Management Act, additional legislation was passed to assist local jurisdictions in accomplishing the goals of AB 939. The California Solid Waste Re-use and Recycling Access Act of 1991 (AB 1327) (PRC Sections 42900–42911) required the California Integrated Waste Management Board (now CalRecycle) to approve a model ordinance for adoption by any local government for the transfer, receipt, storage, and loading of recyclable materials in development projects by March 1, 1993. The act also required local agencies to adopt a local ordinance by September 1, 1993, or to allow the model ordinance to take effect (CIWMB 1993). Chapter 30.90 of the Elk Grove Municipal Code provides the City's space allocation and enclosure design guidelines for trash and recycling.

Local

City of Elk Grove Source Reduction and Recycling Element (SRRE)

The City's SRRE was prepared in response to AB 939. The SRRE provides policies and programs that will be implemented by the City to achieve the State waste reduction mandates. As required by AB 939, the SRRE projects disposal capacity needs for a 15-year period beginning in 2001.

Space Allocation and Enclosure Design Guidelines for Trash and Recycling

The Space Allocation and Enclosure Design Guidelines for Trash and Recycling, contained in Chapter 30.90 of the Elk Grove Municipal Code, provide recycling and waste collection requirements for all developments in the City. Integrated collection areas with recycling components assist in the reduction of waste materials, thereby prolonging the life of landfills and promoting environmentally sound practices, and help the City meet the State-mandated recycling requirements described previously in this subsection.

The guidelines provide information and resources for designing trash and recycling sites that will be used by building occupants in new developments or significant remodels. Conventional recycling and greenwaste recycling must be designed into the site along with the trash capacity. The California Solid Waste Reuse and Recycling Access Act of 1991 requires new commercial and multi-family developments of five units or more, or improvements that add 30 percent or more to the existing floor area, to include adequate, accessible, and convenient areas for collecting and loading recyclable materials (City of Elk Grove 2014).

Construction and Demolition Debris Reduction, Reuse, and Recycling

The Construction and Demolition Debris Reduction, Reuse, and Recycling Ordinance (City Municipal Code Chapter 30.70), adopted on July 1, 2010, makes construction and demolition debris recycling mandatory for all new construction (with a valuation greater than $250,000) and demolition projects. Materials required to be recycled include scrap metal, inert materials (concrete, asphalt paving, bricks, etc.), corrugated cardboard, wooden pallets, and clean wood waste. A Waste Management Plan must be completed to identify waste that would be generated by a project as well as the proposed recycling and hauling methods. During construction and/or demolition, a waste log must be maintained on the project area and submitted to the City at project completion (City of Elk Grove 2014).

Commercial Refuse Hauler Fee

Chapter 30.50 (Nonresidential Haulers) of the City Municipal Code provides information relating to the setting, charging, collecting, and enforcement of nonresidential refuse hauler fees and establishing nonresidential refuse hauler registration requirements, which require that all nonresidential waste haulers operating, conducting business, or providing solid waste services within the City boundaries register with the City and receive a registration decal to operate and remit an amount based on their diversion performance (City of Elk Grove 2014).

City of Elk Grove General Plan

The City of Elk Grove General Plan contains the following policies and actions related to solid waste that apply to the proposed Project. These policies and goals are contained in the Public Facilities and Finance Element (City of Elk Grove 2003a). The Project does not include any actions or components that conflict with these General Plan policies. However, it should be noted that the final authority for interpretation of a policy statement, determination of the Project's consistency with the General Plan, ultimately rests with the Elk Grove City Council.

"CAQ-25 The City shall encourage:

- Recycling,
- Reduction in the amount of waste, and
- Re-use of materials to reduce the amount of solid waste generated in Elk Grove."

"CAQ-25-Action 1 The City shall comply with the requirements of AB939 with regard to meeting state-mandated targets for reductions in the amount of solid waste generated in Elk Grove."

"CAQ-25-Action 2 The City shall provide information to businesses and residents on available options to implement the City's waste reduction targets."

"CAQ-25-Action 3 Encourage the use of recycled concrete in all base material utilized in City and private road construction."

"CAQ-25-Action 7 The City shall actively promote a comprehensive, consistent and effective recycled materials procurement effort among other governmental agencies and local businesses."

4.8.3.3 SOLID WASTE IMPACTS AND MITIGATION MEASURES

Standards of Significance

The impact analysis provided below is based on the following CEQA Guidelines Appendix G Thresholds of significance. A public utilities impact with regard to solid waste is considered significant if implementation of the Project would result in either of the following:

1) Be served by a landfill without sufficient permitted capacity to accommodate the project's solid waste disposal needs.

2) Failure to comply with federal, State, and local statutes and regulations related to solid waste.

Methodology

The following impact analysis is based on a review of available landfill capacity data, discussions with City staff, and guest and employee projections for the proposed Project.

Project Impacts and Mitigation Measures

Increase Demand for Solid Waste Collection Services and Landfill Capacity (Standards of Significance 1 and 2)

Impact 4.8.3.1 Construction and operation of the proposed Project would generate solid waste, thereby increasing demand for waste collection and disposal services. **The proposed Project would not result in a substantial increase in the severity of this impact, which was previously identified in the LRSP EIR as less than significant. There are no new or substantially more severe significant impacts.**

Operation of the proposed Project would generate solid waste. The Project design team has provided solid waste generation estimates for the proposed Project based on operations of other similar existing facilities. These estimates are shown in **Table 4.8.3-2.**

TABLE 4.8.3-2
PROJECT SOLID WASTE GENERATION

Project Component	Daily Generation Rate (tons)[1]	Days of Operation	Total Annual Solid Waste Generation (tons)
Water Park	0.69	120	82.8
Adventure Park	0.34	363	123.4
Competition Venue[2]	0.34	100[1]	34.0
Project Total			**240.2**

Source: P3 International 2014

Note:

1. Sources of the waste includes kitchen(s), restrooms, on-site office, and other Project components.

2. The Competition Venue would operate year-round; however, regular practices are not anticipated to generate significant amounts of solid waste. This number represents an estimate of the total swim competitions that would be held at the facility each year, which would draw significant numbers of athletes, spectators, and coaches.

The proposed Project would be required to comply with the City's Space Allocation and Enclosure Design Guidelines for Trash and Recycling. With implementation of the City's recycling program, actual total solid waste from the proposed Project that would be disposed at a landfill would be less than shown in **Table 4.8.3-2**.

Solid waste generated by the proposed Project could be hauled by any of a number of permitted haulers as selected by the operator of the Project, and waste would be hauled to a variety of permitted landfills for disposal as selected by the chosen hauler. The permitted hauler(s) that would serve the Project would expand services to meet this projected future demand funded by the service fees. As shown in **Table 4.8.3-1**, the majority of the landfills serving Elk Grove waste haulers have over 70 percent remaining capacity and the combined remaining capacity of these landfills is more than 73 percent. Therefore, the proposed Project would be served by a solid waste management company and landfill(s) with sufficient capacity to serve the future development. Impacts would be **less than significant.**

Therefore, the proposed Project would not result in a substantial increase in the severity of this impact, which was previously identified in the LRSP EIR as less than significant. There are no new or substantially more severe significant impacts.

Mitigation Measures

None required.

4.8.3.4 SOLID WASTE CUMULATIVE SETTING, IMPACTS, AND MITIGATION MEASURES

Cumulative Setting

The cumulative setting for solid waste impacts is the service areas of the landfills that serve Elk Grove. **Table 4.8.3-1** lists the landfills that receive waste from the City, including an estimated remaining capacity and estimated closure date for each.

Cumulative Impacts and Mitigation Measures

Cumulative Solid Waste Service (Standards of Significance 1 and 2)

Impact 4.8.3.2 Implementation of the proposed Project, in combination with other development in the City, would generate solid waste, thereby increasing demand for hauling and disposal services. This impact would be **less than cumulatively considerable. The proposed Project would not result in a substantial increase in the severity of this impact, which was previously identified in the LRSP EIR as less than significant. There are no new or substantially more severe significant impacts.**

Development projects within the City would be reviewed during the development review process to ensure they are designed to comply with all applicable solid waste regulations, including the City's Space Allocation and Enclosure Design Guidelines for Trash and Recycling. In addition, the City implements Municipal Code Chapter 30.70, Construction and Demolition Debris, and regularly reviews solid waste disposal data provided by its contracted haulers to ensure that it achieves the mandated diversion rate.

As described under Impact 4.8.3.1, the proposed Project would generate an estimated 240.2 tons of solid waste each year. However, the City exceeds the minimum State-mandated diversion rate, so the amount of material reaching the landfills could be less than this estimate if the Project also exceeds the minimum rate. Solid waste generated in the City is ultimately disposed of in a variety of landfills. As shown in **Table 4.8.3-1**, the landfills that serve the City have significant remaining capacity (a total of over 487 million cubic yards) as well as estimated remaining years of operation (up to 68 years) to serve cumulative development in the region. The proposed Project represents a small percentage of the overall remaining capacity of the landfills and would not substantially shorten the life of the landfills. In addition, several other landfills in Northern California and northwestern Nevada with adequate capacity could serve cumulative development. Therefore, this impact would be **less than cumulatively considerable and the proposed Project would not result in a substantial increase in the severity of this impact. There are no new or substantially more severe significant impacts.**

Mitigation Measures

None required.

4.8.4 ELECTRIC, NATURAL GAS, AND TELEPHONE SERVICES

4.8.4.1 ELECTRIC, NATURAL GAS, AND TELEPHONE SERVICES EXISTING SETTING

Electric Service

All electric service in the City is provided by the Sacramento Municipal Utility District (SMUD), an independent operator. SMUD generates, transmits, and distributes electricity to an approximately 900-square-mile area that includes most of Sacramento County and small portions of Placer and Yolo counties. With 598,205 total customers, SMUD is the nation's sixth largest community-owned electric utility in terms of customers served (SMUD 2014).

SMUD gets its electricity from a variety of resources, including hydropower, natural-gas-fired generators, renewable energy such as solar and wind power, and power purchased on the wholesale market. SMUD's largest single source of electricity is the 500-megawatt Cosumnes Power Plant located in southern Sacramento County (SMUD 2014).

SMUD owns and operates the Upper American River Project (UARP), which consists of 11 reservoirs and 8 powerhouses. In a normal water year, the UARP provides approximately 1.8 billion kilowatt-hours of electricity—enough energy to power approximately 180,000 homes—and provides operational flexibility, system reliability, and economical power generation for SMUD. The value of the UARP also extends beyond the boundaries of SMUD's service territory by assisting in the maintenance of integrity for Northern California's entire electric transmission system (SMUD 2014).

Table 4.8.4-1 shows the breakdown of SMUD's power supply in 2012.

TABLE 4.8.4-1
SMUD'S 2012 POWER MIX

Power Supply Source	Percentage
Renewables	24
Biomass and Waste	12
Geothermal	0
Small Hydroelectric	3
Solar	2
Wind	7
Coal	0
Large Hydroelectric	17
Natural Gas	36
Nuclear	0
Other	0
Unspecified	23

Source: SMUD 2013a

Electrical Distribution Facilities

There are existing SMUD electrical distribution facilities in the vicinity of the Project site including an overhead 12 kV electrical distribution line on the Project site (serving the existing residences) as well as 12 kV underground distribution facilities along the east and west side of Big Horn Boulevard, along the north site of Civic Center Drive, and at the southeast corner of Civic Center Drive (SMUD 2013b).

Natural Gas Service

Pacific Gas and Electric Company (PG&E) provides natural gas and electric service to approximately 15 million people throughout a 70,000-square-mile service area in Central and Northern California. PG&E provides natural gas service to customers in Sacramento County, including Elk Grove. PG&E maintains 42,141 miles of natural gas distribution pipelines and 6,438 miles of transportation pipelines and provides natural gas service to 4.3 million customer accounts (PG&E 2014). Existing facilities in Elk Grove consist of 4.5-inch to 16-inch pipelines delivering service to customers not using propane tanks (City of Elk Grove 2003b, p. 11-22).

Telephone Service

Frontier provides traditional telephone service throughout much of the City. It is not known at this time what provider would serve the project; however, there are a wide range of service providers for the City for telephone service in addition to Frontier, including SureWest, Comcast, and AT&T.

4.8.4.2 ELECTRIC, NATURAL GAS, AND TELEPHONE SERVICES REGULATORY FRAMEWORK

State

California Public Utilities Commission

The California Public Utilities Commission (CPUC) regulates privately owned telecommunications, electric, natural gas, water, railroad, rail transit, and passenger transportation companies, in addition to authorizing video franchises. The CPUC seeks to ensure that consumers have safe, reliable utility service at reasonable rates. The CPUC also protects against fraud and promotes the health of California's economy.

California Building Energy Efficiency Standards

Energy conservation standards for new residential and commercial buildings were originally adopted by the California Energy Resources Conservation and Development Commission in June 1977 and most recently revised in 2008 (Title 24, Part 6 of the California Code of Regulations). In general, Title 24 requires the design of building shells and building components to conserve energy. The standards are updated periodically to allow consideration and possible incorporation of new energy efficiency technologies and methods.

On July 17, 2008, the California Building Standards Commission adopted the nation's first green building standards. The California Green Building Standards Code (Part 11, Title 24) was adopted as part of the California Building Standards Code (Title 24, California Code of Regulations). Part 11 establishes voluntary standards on planning and design for sustainable site development, energy efficiency (in excess of the California Energy Code requirements), water conservation, material conservation, and internal air contaminants. Some of these standards have become mandatory in the 2010 edition of the Part 11 code. Current mandatory standards include:

- Twenty (20) percent mandatory reduction in indoor water use, with voluntary goal standards for 30, 35, and 40 percent reductions
- Separate water meters for nonresidential buildings' indoor and outdoor water use, with a requirement for moisture-sensing irrigation systems for larger landscape projects
- Diversion of 50 percent of construction waste from landfills, increasing voluntarily to 65 and 75 percent for new homes and 80 percent for commercial projects
- Mandatory inspections of energy systems (i.e., heat furnace, air conditioner, mechanical equipment) for nonresidential buildings over 10,000 square feet to ensure that all are working at their maximum capacity according to their design efficiencies
- Low-pollutant-emitting interior finish materials such as paints, carpet, vinyl flooring, and particleboard

The California Energy Commission has opened a public process and rulemaking proceeding for the adoption of changes to the 2013 Building Energy Efficiency Standards contained in the California Code of Regulations, Title 24, Part 6 (also known as the California Energy Code) and associated administrative regulations in Part 1 (collectively referred to here as the standards). The proposed amended standards were adopted in 2014. The 2013 Building Energy Efficiency Standards are 25 percent more efficient than previous standards for residential construction and 30 percent better for nonresidential construction. The standards, which took effect on January 1, 2014, will offer builders better windows, insulation, lighting, ventilation systems, and other features that reduce energy consumption in homes and businesses. All Project components will be developed in compliance with Title 24 standards, ensuring that no wasteful, inefficient, or unnecessary consumption of energy would occur. See Section 5.0, Other CEQA Considerations, for an evaluation of the Project's energy consumption and conservation pursuant to CEQA Guidelines Appendix F.

Local

City of Elk Grove General Plan

The City of Elk Grove General Plan contains the following policy related to electric, natural gas, and telephone services that applies to the proposed Project. This policy is contained in the Public Facilities and Finance Element (City of Elk Grove 2003a). The Project does not include any actions or components that conflict with this General Plan policy. However, it should be noted that the final authority for interpretation of a policy statement, determination of the Project's consistency with the General Plan, ultimately rests with the Elk Grove City Council.

"PF-4 The City shall require new utility infrastructure for electrical, natural gas and other infrastructure services avoid sensitive resources, be located so as to not be visually obtrusive, and, if possible, be located within roadway rights-of-way or existing utility easements."

4.8.4.3 ELECTRIC, NATURAL GAS, AND TELEPHONE IMPACTS AND MITIGATION MEASURES

Standards of Significance

The impact analysis provided below is based on the following CEQA Guidelines Appendix G thresholds of significance. A public utilities impact with regard to electrical, natural gas, and telephone service is considered significant if implementation of the Project would result in the following:

1) Substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times, or other performance objectives for other public facilities.

Methodology

The following impact analysis is based on Project plans and visitor and employment projections provided by P3 International (P3 International 2014).

Project Impacts and Mitigation Measures

Impacts to Electric, Natural Gas, and Telephone Services (Standards of Significance 1 and 2)

Impact 4.8.4.1 Implementation of the proposed Project would increase demand for electric, natural gas, and telephone services. **The proposed Project would not result in a substantial increase in the severity of this impact, which was previously identified in the LRSP EIR as less than significant. There are no new or substantially more severe significant impacts.**

Construction and operation of the proposed Project would increase demand for electric, natural gas, and telephone services and require the extension of related infrastructure onto and within the Project site.

Electric Service

Under the adopted Elk Grove General Plan, it was determined that buildout of the General Plan, which includes development of the Project site, would generate an ultimate electrical demand of approximately 150.5 megawatts (MW) daily. With development of the Cosumnes Power Plant, a 1,000 MW facility that came online in 2006, SMUD determined that it had adequate electrical supply to accommodate the growth proposed under the General Plan.

As described previously, the Project site is part of the LRSP area, which has been identified as a major growth area, and its development and associated increases in population were anticipated in the City's General Plan and General Plan EIR. Furthermore, the LRSP EIR (Section 4.6.8) concluded that SMUD would have adequate power supplies to meet the LRSP's 23.7 MW daily demand, with a total of approximately 2,386 MW of electricity available for distribution each day. However, these previous analyses assumed development of the Project site as what is sometimes thought of as traditional park uses and didn't consider a more intense use that could constitute a park with greater electrical demand. For a discussion of whether the Project's use of energy is wasteful or inefficient, refer to Section 5.0, Other CEQA Considerations.

The Project designer projects that, once operational, the Project would consume approximately 2,400 MW annually, or an average of 6.6 MW daily. SMUD (2013b) provided a comment letter in response to the Notice of Preparation for this Project (see **Appendix C**), which stated that, based on review of the proposed uses, the Project would affect SMUD's electricity system. The comment acknowledged the existing 12 kV facilities on and adjacent to the Project site, but stated that new distribution facilities would be required to serve the Project consisting of 12 kV transmission lines requiring a minimum standard 12.5-foot overhead/underground public utility easement along all streets within the Project site (SMUD 2013b). Given these required improvements are within the Project site, their construction is considered in the technical sections of this Draft SEIR. There would be no additional impact.

Potential environmental effects of obtaining power through the development of additional power lines include, but are not limited to, air quality (during construction), biological resources (depending on location), cultural resources (depending on location), hazardous materials, land use, noise and vibration (during construction), traffic, visual resources, solid waste, water and soil resources, and health hazards. All required infrastructure would be provided on the Project site and connections to existing infrastructure would occur within the rights-of-way of the roadways in and immediately surrounding the Project site. Therefore, these potential impacts are addressed as part of the overall development of the Project site throughout the technical sections of this Draft SEIR (Sections 4.1 through 4.9).

Natural Gas Service

The General Plan also identified that buildout of the City would increase demand for natural gas service and related facilities. The General Plan anticipated that existing infrastructure would be extended to serve the area planned for development, such as the Project site.

The Project designer projects that, once operational, the Project would consume approximately 11,514,244 cubic feet of natural gas, or 11.5 billion BTU, annually.

Potential environmental effects associated with construction of gas lines include, but are not limited to, air quality (during construction), biological resources (depending on location), cultural resources (depending on location), hazardous materials, land use, noise and vibration (during construction), traffic, and health hazards.

Telephone Service

The General Plan also identified that buildout of the City would increase demand for telephone service and related facilities. Most underground and aerial telephone transmission lines are co-located with other utilities on poles or in underground trenches and are constructed in public and roadway rights-of-way to reduce visual and aesthetic impacts and potential safety hazards. However, construction of such infrastructure could result in impacts on the physical environment similar to those described previously for electrical and natural gas infrastructure.

Summary

Development of the Project site was anticipated in the City's General Plan and General Plan EIR, which determined that electric, natural gas, and telephone service capacity would be available to meet the associated demand. The Project would also be required to comply with Title 24 of the California Code of Regulations regarding energy efficiency. These energy efficiency standards were developed to improve residential and nonresidential building energy efficiency, minimize impacts to peak energy usage periods, and reduce impacts on overall

State energy needs. All Project components would be developed in compliance with Title 24 standards, ensuring that no wasteful, inefficient, or unnecessary consumption of energy would occur (see Section 5.0, Other CEQA Considerations, for the evaluation of Project energy usage and conservation in accordance with Appendix F of the CEQA Guidelines). The Proposed Project would not increase the demand for utilities such that there would be a substantial increase in physical effects for the provision of those utilities. Therefore, impacts would be **less than significant. The proposed Project would not result in a substantial increase in the severity of this impact, which was previously identified in the LRSP EIR as less than significant. There are no new or substantially more severe significant impacts.**

Mitigation Measures

None required.

4.8.4.4 ELECTRIC, NATURAL GAS, AND TELEPHONE SERVICE CUMULATIVE SETTING, IMPACTS, AND MITIGATION MEASURES

Cumulative Setting

The cumulative setting for electric, natural gas, and telephone service impacts would be the service areas of the respective service providers as described previously in this subsection.

Cumulative Impacts and Mitigation Measures

Cumulative Impacts to Electric, Telephone, and Natural Gas Service (Standards of Significance 1 and 2)

Impact 4.8.4.2 Implementation of the proposed Project, in combination with other development within the service areas of the providers, would increase demand for electric, natural gas, and telephone services. This impact would be **less than cumulatively considerable. The proposed Project would not result in a substantial increase in the severity of this impact, which was previously identified in the LRSP EIR as less than significant. There are no new or substantially more severe significant impacts.**

As described under Impact 4.8.4.1, construction and operation of the proposed Project would increase demand for electric, natural gas, and telephone services. As discussed previously, the General Plan EIR determined that buildout of the General Plan would generate a daily demand for electricity of approximately 150.5 MW that would be provided by SMUD, and the Project's daily demand would be approximately 6.6 MW, or approximately 4.4 percent of the expected General Plan buildout demand. However, since then, the Cosumnes Power Plant, a 1,000 MW facility, has come online, adding to SMUD's ability to generate electricity. Furthermore, SMUD did not indicate any potential issues with supplying electricity for buildout of the General Plan, although new electricity transmission infrastructure would be needed to supply the proposed Project. The Proposed Project would not increase the demand for utilities such that there would be a substantial increase in physical effects for the provision of those utilities, so no additional cumulative impacts are expected. This growth and consumption of energy was accounted for in the City's General Plan and General Plan EIR, as well as the LRSP EIR, which determined that the respective service providers would have sufficient capacity to serve anticipated growth. Therefore, this impact would be **less than cumulatively considerable, and the proposed Project**

would not result in a substantial increase in the severity of this impact. There are no new or substantially more severe significant impacts.

Mitigation Measures

None required.

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4.9 TRANSPORTATION

This section evaluates traffic impacts associated with implementation of the proposed Project, including impacts to study intersections, freeway facilities, and pedestrian, bicycle, and transit facilities. This section is based on the Draft Transportation Impact Analysis, Civic Center Aquatics Complex prepared by Fehr & Peers in May 2014 (**Appendix J**).

4.9.1 EXISTING SETTING

Elk Grove is located in the southern portion of Sacramento County about 15 miles south of the City of Sacramento. Regional freeway access to Elk Grove is provided by State Route (SR) 99 and Interstate 5 (I-5). Grant Line Road provides access to regional destinations north and south of Elk Grove such as the cities of Rancho Cordova and Folsom and the community of El Dorado Hills. Elk Grove is generally served by a network of arterial-level roadways on a 1-mile grid with interchanges on SR 99. I-5 has two interchanges that provide direct access to the City. The following are descriptions of the major roadways in the area.

- **Elk Grove Boulevard** is an east–west road extending from I-5 to Grant Line Road. It is six lanes from I-5 to East Stockton Boulevard, four lanes to Elk Grove Florin Road, and two lanes to Grant Line Road. Elk Grove Boulevard is constructed to its General Plan designation between I-5 and Waterman Road. The roadway is designated in the General Plan as a four-lane arterial east of Waterman Road.

- **Civic Center Drive** is a two-lane (with center turn lane) commercial street extending from Bruceville Road to Laguna Springs Drive. Civic Center Drive is constructed to its General Plan designation.

- **Lotz Parkway** is a four-lane arterial street extending from Big Horn Boulevard to just east of Laguna Springs Drive. Lotz Parkway is constructed to its General Plan designation. The parkway will continue east and south and connect to and extend south of Whitelock Parkway.

- **Whitelock Parkway** is an east–west road extending from West Stockton Boulevard to Bruceville Road. The parkway is improved with four travel lanes between Bruceville Road and Big Horn Boulevard. East of Big Horn Boulevard, Whitelock Parkway is two lanes. It is planned as a four-lane arterial with a partial access interchange at SR 99 that will serve travel to/from the west only.

- **Bruceville Road** is a north–south road extending from Valley Hi Drive near the Kaiser-Permanente complex in unincorporated Sacramento County to south of Kammerer Road. It is four lanes between Sheldon Road and Laguna Boulevard, six lanes between Laguna Boulevard and Elk Grove Boulevard, four lanes between Elk Grove Boulevard and Whitelock Parkway, and two lanes south of Whitelock Parkway. Bruceville Road is designated as a six-lane arterial in the General Plan.

- **Big Horn Boulevard** is a four-lane arterial street extending from Franklin Boulevard to Whitelock Parkway. It is constructed to its General Plan designation.

- **Laguna Springs Drive** is a four-lane arterial street extending from Laguna Boulevard to Lotz Parkway. It is constructed to its General Plan designation.

- **State Route 99** is a north–south freeway that provides a connection between all of the major cities in the Central Valley, from Sacramento and Stockton in the north to the cities of Modesto, Merced, Fresno, and Bakersfield in the south. Access to SR 99 is provided through interchanges at Grant Line Road, Elk Grove Boulevard, Laguna Boulevard/Bond Road, and Sheldon Road. This section of SR 99 has two mainline travel lanes and one high occupancy vehicle (HOV) lane in either direction with a posted speed limit of 65 mph.

- **Interstate 5** is a north–south freeway that traverses California and is a major national freeway that connects Mexico and Canada. Near the Hood Franklin Road interchange, I-5 is a four-lane freeway. (Fehr & Peers 2014, pp. 14–15)

STUDY AREA

The study area for the traffic impact analysis was selected based on the expected travel characteristics of the Project (i.e., Project location), as well as the nearby transportation facilities' susceptibility to Project impacts. Within the study area, 21 intersections and 17 freeway facilities were selected for analysis.

Study Area Intersections

The following 21 intersections were selected for analysis:

1. Elk Grove Boulevard/I-5 SB Ramps
2. Elk Grove Boulevard/I-5 NB Ramps
3. Elk Grove Boulevard/Franklin Boulevard
4. Elk Grove Boulevard/Bruceville Road
5. Elk Grove Boulevard/Wymark Drive
6. Elk Grove Boulevard/Big Horn Boulevard
7. Elk Grove Boulevard/Laguna Springs Drive
8. Elk Grove Boulevard/Auto Center Drive
9. Elk Grove Boulevard/SR 99 SB Ramps
10. Elk Grove Boulevard/SR 99 NB On-Ramp
11. Elk Grove Boulevard/East Stockton Boulevard
12. East Stockton Boulevard/SR 99 NB Off-Ramp
13. Civic Center Drive/Bruceville Road
14. Civic Center Drive/Wymark Drive
15. Civic Center Drive/Big Horn Boulevard
16. Civic Center Drive/Laguna Springs Drive
17. Lotz Parkway/Big Horn Boulevard
18. Lotz Parkway/Laguna Springs Drive
19. Whitelock Parkway/Bruceville Road
20. Whitelock Parkway/Big Horn Boulevard
21. Denali Circle/Big Horn Boulevard

Study Area Freeway Facilities

The following 17 freeway facilities were selected for analysis:

1. NB SR 99 South of Elk Grove Boulevard
2. NB SR 99 Elk Grove Boulevard Off-Ramp
3. NB SR 99 Elk Grove Boulevard Loop On-Ramp
4. NB SR 99 Elk Grove Boulevard Slip On-Ramp
5. NB SR 99 North of Elk Grove Boulevard
6. SB SR 99 North of Elk Grove Boulevard
7. SB SR 99 Elk Grove Boulevard Off-Ramp
8. SB SR 99 Elk Grove Boulevard Slip On-Ramp
9. SB SR 99 South of Elk Grove Boulevard
10. NB I-5 South of Elk Grove Boulevard
11. NB I-5 Elk Grove Boulevard Off-Ramp
12. NB I-5 Elk Grove Boulevard Slip On-Ramp
13. NB I-5 North of Elk Grove Boulevard
14. SB I-5 North of Elk Grove Boulevard
15. SB I-5 Elk Grove Boulevard Off-Ramp
16. SB I-5 Elk Grove Boulevard Loop On-Ramp
17. SB I-5 South of Elk Grove Boulevard

EXISTING TRAFFIC OPERATIONS

Data Collection

To provide a baseline for the transportation analysis, traffic counts were collected at the existing study intersections in May 2014 and April 2013. The intersection turning movement counts were conducted during the PM (4:00 to 6:00) peak period (mid-week) and between 9:00 AM and 11:00 AM on Saturday. The AM peak hour is between 7:00 AM and 8:00 AM. Because the water park and adventure park would not open until after the AM weekday peak, weekday AM peak hour trips were not considered in the analysis. During the counts, weather conditions were generally dry, no unusual traffic patterns were observed, and the Elk Grove Unified School District was in full session. Pedestrians were also counted at each of the study intersections.

Each intersection's peak hour within the peak period was used for the analysis. For most study intersections, the counts indicate that the mid-week PM peak hour begins at 4:45 or 5:00 PM.

In addition to the intersection counts, the following additional data sources were used in the analysis of study facilities:

- Freeway traffic count data provided by the California Department of Transportation (Caltrans) and available through the Caltrans Performance Measurement System (PeMS)
- Traffic signal timings provided by the City of Elk Grove

Intersection Operations

Existing weekday PM and Saturday peak-hour intersection turning movement volumes, lane configurations, and traffic controls present at each of the study intersections are provided in **Appendix J. Table 4.9-1** summarizes the existing peak-hour intersection operations at the study intersections. As shown, most study intersections currently operate acceptably at level of service (LOS) D or better during both peak hours, except for the Elk Grove Boulevard/I-5 SB Ramps intersection. The controlled eastbound and westbound movements at the intersection operate at LOS F due to uncontrolled southbound left-turn movement from southbound I-5, continuing east to Elk Grove. However, the west leg of the intersection is undeveloped and the volumes for turn movements to/from the west are low.

During field operations, significant vehicle queuing was observed during the PM peak hour near the SR 99/Elk Grove Boulevard interchange. The Synchro intersection operations documented in **Table 4.9-1** are based on the number of vehicles that served during the peak conditions and do not include the operational effects of these closely spaced intersections. Therefore, conditions experienced by motorists may be worse than reported on Elk Grove Boulevard between Big Horn Boulevard and SR 99.

TABLE 4.9-1
PEAK HOUR INTERSECTION LEVEL OF SERVICE – EXISTING CONDITIONS

Intersection	Traffic Control	Weekday PM		Saturday	
		Delay	LOS	Delay	LOS
1. Elk Grove Boulevard/I-5 SB Ramps	Side-Street Stop	**>50**	**F**	30	D
2. Elk Grove Boulevard/I-5 NB Ramps	Side-Street Stop	29	D	11	B
3. Elk Grove Boulevard/Franklin Boulevard	Signal	37	D	35	C
4. Elk Grove Boulevard/Bruceville Road	Signal	37	D	39	D
5. Elk Grove Boulevard/Wymark Drive	Signal	13	B	14	B
6. Elk Grove Boulevard/Big Horn Boulevard	Signal	25	C	29	C
7. Elk Grove Boulevard/Laguna Springs Drive	Signal	22	C	14	B
8. Elk Grove Boulevard/Auto Center Drive	Signal	25	C	28	C
9. Elk Grove Boulevard/SR 99 SB Ramps[1]	Signal	36	D	34	C
10. Elk Grove Boulevard/SR 99 NB On-Ramp[1]	Signal	13	B	15	B
11. Elk Grove Boulevard/East Stockton Boulevard	Signal	39	D	35	C
12. East Stockton Boulevard/SR 99 NB Off-Ramp	Side-Street Stop	22	C	15	B
13. Civic Center Drive/Bruceville Road	Signal	26	C	19	B
14. Civic Center Drive/Wymark Drive	All-way Stop	8	A	8	A
15. Civic Center Drive/Big Horn Boulevard	Signal	16	B	14	B
16. Civic Center Drive/Laguna Springs Drive	Signal	20	C	15	B
17. Lotz Parkway/Big Horn Boulevard	Signal	18	B	18	B
18. Lotz Parkway/Laguna Springs Drive	Signal	36	D	23	C
19. Whitelock Parkway/Bruceville Road	Signal	26	C	26	C
20. Whitelock Parkway/Big Horn Boulevard	Signal	16	B	16	B
21. Denali Circle/Big Horn Boulevard	Signal	5	A	6	A

Source: Fehr & Peers 2014, p. 13-14

Notes:

[1] *During field observations, significant vehicle queuing was observed during the PM peak hour near the SR 99/Elk Grove Boulevard interchange. The Synchro intersection operations are based on the number of vehicles that are served during the PM peak hour and does not include the operational effects of these closely spaced intersections. Therefore, conditions experienced by motorists may be worse than expected.*

Bold text *indicates LOS worse than established threshold. Italic and underlined text identifies a potential impact.*

Freeway Facility Operations

Table 4.9-2 summarizes the existing weekday PM and Saturday peak-hour freeway operations on SR 99 and I-5. As shown, most of the freeway facilities operate acceptably at LOS D or better during both peak hours, except the SB I-5 Elk Grove Boulevard Off-ramp diverge, which operates at the LOS D/E threshold during the weekday PM peak hour.

However, peak period operations on SR 99 may be worse than reported due to reoccurring bottlenecks. As documented in the Caltrans Mobility Performance Report, several bottleneck locations exist on SR 99 that meter traffic northbound in the morning and southbound in the evening. These bottlenecks cause congested conditions (i.e., vehicle speed of 35 miles per hour of less) and vehicle queuing on northbound SR 99 during the AM peak period. Similarly, bottlenecks on southbound SR 99 in the evening meter traffic on SR 99 through Elk Grove.

TABLE 4.9-2
FREEWAY ANALYSIS – EXISTING CONDITIONS

Freeway Facility	Type	Weekday PM Peak Hour		Saturday Peak Hour	
		Density	LOS	Density	LOS
1. NB SR 99 South of Elk Grove Boulevard	Basic Segment	12.5	B	11.5	B
2. NB SR 99 Elk Grove Boulevard Off-Ramp	Diverge	16.5	B	16.1	B
3. NB SR 99 Elk Grove Boulevard Loop On-Ramp	Merge	Cumulative Conditions Only			
4. NB SR 99 Elk Grove Boulevard Slip On-Ramp	Merge	19.5	B	19.3	B
5. NB SR 99 North of Elk Grove Boulevard	Basic Segment	17.8	B	17.6	B
6. SB SR 99 North of Elk Grove Boulevard	Basic Segment	20.3	C	16.5	B
7. SB SR 99 Elk Grove Boulevard Off-Ramp	Diverge	13.7	B	10.5	B
8. SB SR 99 Elk Grove Boulevard Slip On-Ramp	Merge	22.2	C	19.2	B
9. SB SR 99 South of Elk Grove Boulevard	Basic Segment	18.6	C	14.8	B
10. NB I-5 South of Elk Grove Boulevard	Basic Segment	17.1	B	13.7	B
11. NB I-5 Elk Grove Boulevard Off-Ramp	Diverge	20.5	C	17.5	B
12. NB I-5 Elk Grove Boulevard Slip On-Ramp	Merge	19.1	B	18.0	B
13. NB I-5 North of Elk Grove Boulevard	Basic Segment	19.9	C	18.0	C
14. SB I-5 North of Elk Grove Boulevard	Basic Segment	32.4	D	15.1	B
15. SB I-5 Elk Grove Boulevard Off-Ramp	Diverge	**35.1**	**E**	20.9	C
16. SB I-5 Elk Grove Boulevard Loop On-Ramp	Merge	18.9	B	14.2	B
17. SB I-5 South of Elk Grove Boulevard	Basic Segment	17.9	B	12.4	B

Source: Fehr & Peers 2014

BICYCLE AND PEDESTRIAN FACILITIES

Bicycle and pedestrian trips account for approximately 2.8 percent of all work trips and 4.9 percent of all non-work trips made by residents and employees in suburban areas. This estimate is from the Pre-Census Travel Behavior Report Analysis of the 2000 SACOG Household Travel Survey (SACOG 2001).

The majority of the bike paths in the City limits are Class II lanes, which are located on existing streets or highways and are striped for one-way bicycle travel. Below are descriptions of bicycle paths and their classifications.

- Class I Bike Paths provide a completely separated right-of-way for the exclusive use of bicycles and pedestrian with cross-flow minimized.
- Class II Bike Lanes are striped lanes for one-way bike travel on a street or highway.
- Class III Bike Routes provide for shared use with pedestrians or motor vehicle traffic.

The City adopted the City of Elk Grove Bicycle and Pedestrian Master Plan (BPMP) in July 2004. The BPMP identifies existing facilities opportunities, constraints, and destination points for bicycle users and pedestrians in Elk Grove. Existing and proposed bicycle and pedestrian facilities documented in the BPMP are shown in **Figure 4.9-1** (Figure 2 of the BPMP).

TRANSIT FACILITIES

The City of Elk Grove is served by its own transit system, e-Tran, including e-Tran neighborhood shuttle service (ez-tran), limited local transit service, and commuter routes. Local transit service is provided on weekdays (six routes) and weekends (three routes). E-Tran provides nine commuter routes that operate mid-week, including two reverse commuter routes. The current e-Trans system map is shown in **Figure 4.9-2**.

4.9.2 REGULATORY FRAMEWORK

STATE

California Department of Transportation

Caltrans operates and maintains State Route 99 and Interstate 5, which provide regional access to Elk Grove and the adjacent areas. Additionally, the Caltrans Division of Planning has four major functions: the Office of Advance Planning, Regional Planning/Metropolitan Planning Organization, Local Assistance/IGR/CEQA, and System Planning Public Transportation.

The Office of System Planning Public Transportation prepares Transportation Concept Reports in coordination with the regional planning partners and other district divisions. The Transportation Concept Reports (TCRs) are long-term planning documents that evaluate current and projected conditions along specified routes. The TCRs establish 20-year planning visions and concepts and recommend long-term improvements to achieve the concept. The TCRs also reflect the plans of the applicable Regional Transportation Planning Agencies (RTPAs, SACOG) and Metropolitan Planning Organizations (MPOs) for managing local and regional travel demand on state routes. Caltrans has established a concept level of service for all roadways under its jurisdiction. The concept LOS assumes a 20-year horizon and improvements to the identified facility. The Concept LOS for SR 99 from Elk Grove Boulevard to Martin Luther King Jr. Boulevard is LOS F (Caltrans 2004).

LOCAL

Sacramento Area Council of Governments

The Sacramento Area Council of Governments (SACOG) adopted the 2035 Metropolitan Transportation Plan/Sustainable Communities Strategy (MTP/SCS) in April 2012. The 2035 MTP/SCS provides a long-range framework to minimize transportation impacts on the environment, improve regional air quality, protect natural resources, and reduce GHG emissions. The MTP/SCS intends to make investments totaling $35.2 billion to improve the regional transportation system. The general level, type, and extent of investments covered by the MTP/SCS consist of $11.5 billion for road and highway maintenance and rehabilitation; $11.3 billion for transit investments, including rail extension and a 95 percent increase in bus service hours; $7.4 billion for road and highway capital improvements; $2.8 billion for bicycle and pedestrian improvements; and $2.2 billion for other types of improvements important to achieving regional goals (SACOG 2011).

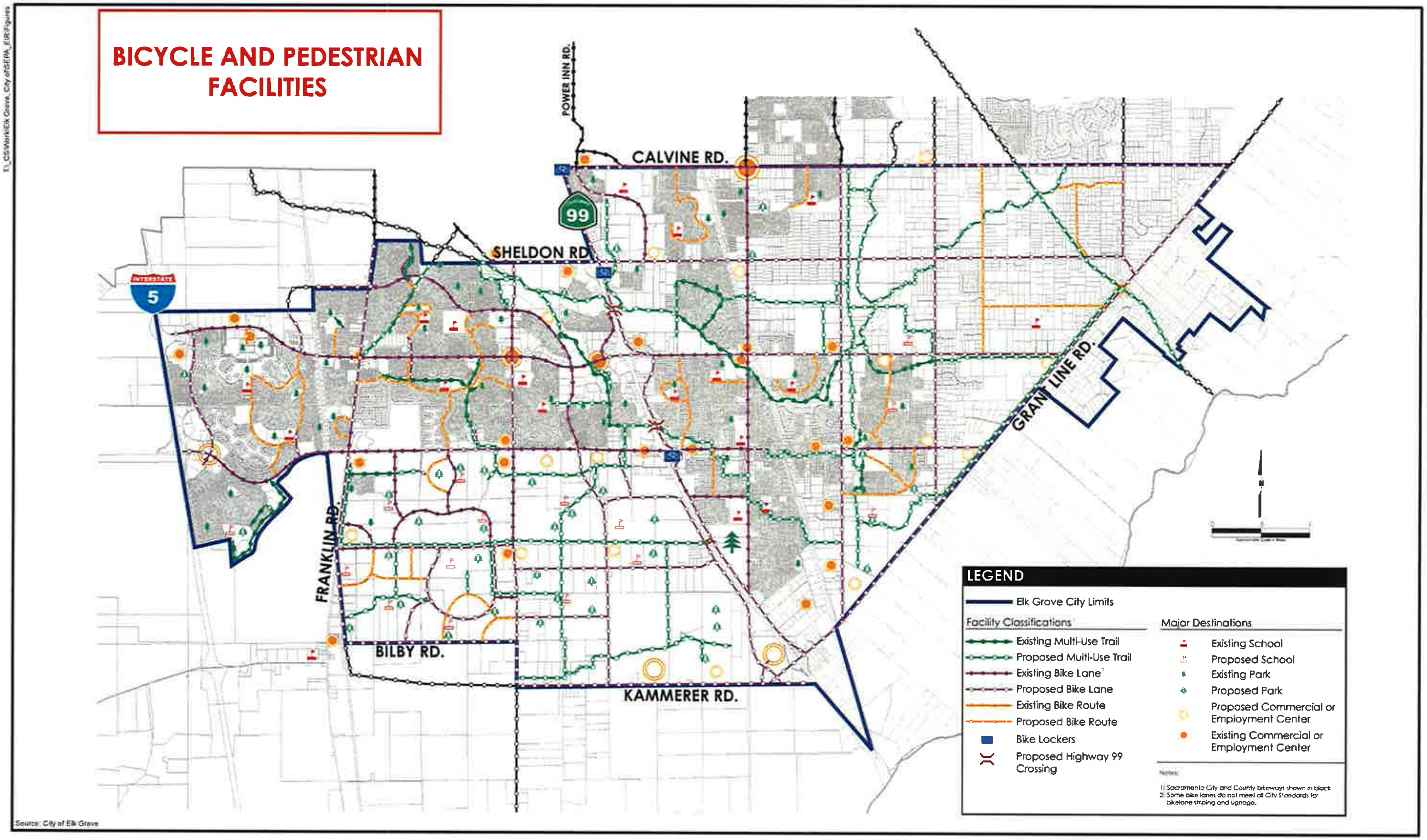

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FIGURE 4.9-1
Elk Grove Bicycle and Pedestrian Facilities

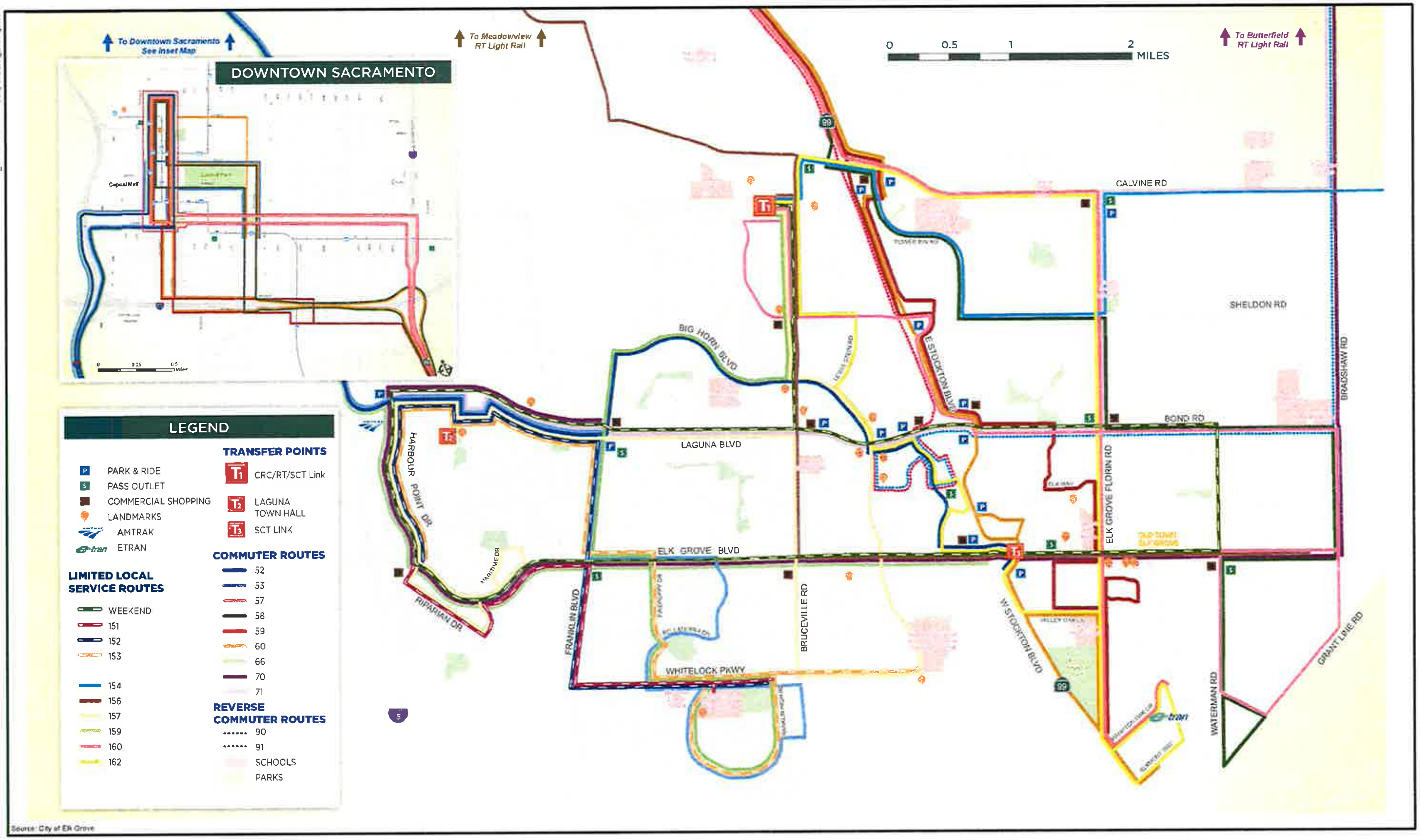

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FIGURE 4.9-2
Elk Grove Transit System Map

City of Elk Grove General Plan

The General Plan identifies specific policies regarding transportation. The Project does not include any actions or components that conflict with these General Plan policies. However, it should be noted that the final authority for interpretation of a policy statement, determination of the Project's consistency with the General Plan, ultimately rests with the Elk Grove City Council. The following policies are applicable to the proposed Project:

"**Policy CI-2**: The City shall coordinate and participate with the City of Sacramento, Sacramento County and Caltrans on roadway improvements that are shared by the jurisdictions in order to improve operations."

Policy CI-4: Specific Plans, Special Planning Areas, and development projects shall be designed to promote pedestrian movement through direct, safe, and pleasant routes that connect destinations inside and outside the plan or project area."

"**Policy CI-8**: The City shall encourage the extension of bus rapid transit and/or light rail service to the planned office and retail areas north of Kammerer Road and west of Hwy 99."

"**Policy CI-10-Action 1**:

Require the dedication of right of way and the installation of roadway improvements as part of the review and approval of development projects. The City shall require the dedication of major road rights of way (generally, arterials and thoroughfares) at the earliest opportunity in the development process in order to implement this policy."

"**Policy CI-11**: The City shall assist Caltrans in implementing improvements to I-5 and Hwy 99 within the city."

"**Policy CI-12**: The City supports efforts to locate an alternative route for a future regional roadway connecting Hwy 99 and Hwy 50 in order to reduce the need for widening of Grant Line Road, particularly in the 'Sheldon town' area."

"**Policy CI-13**: The City shall require that all roadways and intersections in Elk Grove operate at a minimum Level of Service 'D' at all times."

"**Policy CI-14**: The City recognizes that Level of Service D may not be achieved on some roadway segments, and may also not be achieved at some intersections. Roadways on which LOS D is projected to be exceeded are shown in the General Plan Background Report, based on the latest traffic modeling conducted by the City. On these roadways, the City shall ensure that improvements to construct the ultimate roadway system as shown in this Circulation Element are completed, with the recognition that maintenance of the desired level of service may not be achievable."

"**Policy CI-15**: Development projects shall be required to provide funding or to construct roadway/intersection improvements to implement the City's Circulation Master Plan. The payment of established traffic impact or similar fees shall be considered to provide compliance with the requirements of this policy with regard to those facilities included in the fee program, provided that the City finds that the fee adequately funds all required roadway and intersection improvements. If payment of established fees is used to provide compliance with this policy, the City may also require the payment of additional fees if necessary to cover the fair share cost of facilities not included in the fee program."

"**Policy CI-16:** Where a development project is required to perform new roadway construction or road widening, the entire roadway shall be completed to its planned width from curb-to-curb prior to the operation of the project for which the improvements were constructed, unless otherwise approved by the City Engineer. Such roadway construction shall also provide facilities adequate to ensure pedestrian safety as determined by the City Engineer."

"**Policy CI-18:** To the extent possible, major traffic routes for residential areas should be separate from those used by the city's industrial areas, with the purpose of avoiding traffic conflicts and potential safety problems."

"**Policy CI-19:** The circulation system serving the city's industrial areas should be designed to safely accommodate heavy truck traffic."

"**Policy CI-21:** The City shall require the installation of traffic pre-emption devices for emergency vehicles (police and fire) at all newly constructed intersections, and shall seek to retrofit all existing intersections to incorporate these features."

"**Policy CI-22:** Where traffic calming devices or techniques are employed, the City shall coordinate design and implementation with the Elk Grove Police Department and the Elk Grove CSD to ensure adequate access for police and fire vehicles."

"**Policy CI-23:** All public streets should have sufficient width to provide for parking on both sides of the street and enough remaining pavement width to provide for fire emergency vehicle access."

Elk Grove Bicycle and Pedestrian Master Plan

The Bicycle and Pedestrian Master Plan (BPMP) identifies existing facilities, opportunities, constraints, and destination points for bicycle users and pedestrians in the Elk Grove that served as the basis for developing BPMP goals and supporting policies for planning and implementation of bikeway and pedestrian facilities within the public right-of-way. The BPMP includes an implementation program, phasing priorities, and a map showing recommended locations of bicycle and pedestrian paths. The BPMP includes future bicycle lanes and multiuse trails in the Project area.

Elk Grove Trails Master Plan

The Elk Grove Trails Master Plan (EGTMP) is the expression of the City's desire to have an exemplary off-street multi-use trail system that provides connectivity throughout the City and the wider Sacramento region in order to offer recreational opportunities and an alternative method for transportation for Elk Grove residents. In order to achieve this system, the City acknowledges that it is necessary to provide direction on where trails should be located, design standards and guidelines to describe the desired characteristics of trails, identify funding sources for trail planning, construction, and maintenance, establish prioritization criteria regarding which trail projects to implement first, and describe the City and inter-agency collaborative actions required to create the trail system. The EGTMP was adopted by the City Council in January 2007, but will be continually updated as goals are achieved, as new funding sources become available, and in order to ensure consistency with the Elk Grove General Plan. The EGTMP includes future multiuse trails in the Project area.

4.9.3 IMPACTS AND MITIGATION MEASURES

CEQA Thresholds

STANDARDS OF SIGNIFICANCE

The impact analysis provided below is based on the following California Environmental Quality Act (CEQA) Guidelines Appendix G thresholds of significance. A transportation impact is considered significant if implementation of the Project would result in any of the following:

1) Conflict with an applicable plan, ordinance, or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant components of the circulation system, including but not limited to intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit.

2) Conflict with an applicable congestion management program, including, but not limited to, level of service standards and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways.

3) Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks.

4) Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment).

5) Result in inadequate emergency access.

6) Conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities.

The Project site is not located in the vicinity of an airport and would have no effect on air traffic patterns. Therefore, Standard of Significance 3 would not apply and is not addressed further in this Draft SEIR.

City of Elk Grove Thresholds

Consistent with the City of Elk Grove's Traffic Impact Analysis Guidelines, the following evaluation criteria were also used to determine the significance of Project impacts:

Intersections

An impact to a roadway segment is considered significant, and mitigation measures must be identified when:

- The traffic generated by the Project degrades the level of service from an acceptable LOS D or better (without the Project) to an unacceptable LOS E or LOS F (with the Project)
- The level of service (without Project) is unacceptable and Project-generated traffic increases the average vehicle delay by more than 5 seconds.

Freeway Facilities

An impact is considered significant on freeway facilities if the Project causes the facility to change from an acceptable to unacceptable level of service.

For facilities that are or will be (in the cumulative condition) operating at unacceptable level of service without the Project, an impact is considered significant if the Project:

- Increases the volume-to-capacity (V/C) ratio on a freeway mainline segment or freeway ramp junction by 0.05
- Increases the number of peak-hour vehicles on a freeway mainline segment or freeway ramp junction ramp junction by more than 5 percent

According to the Guide for the Preparation of Traffic Impact Studies, Caltrans strives to maintain a target level of service at the transition between LOS C and LOS D on State highway facilities; therefore, LOS D was selected as the minimum standard for all study freeway facilities.

Bicycle/Pedestrian/Transit Facilities

An impact is considered significant if implementation of the Project would disrupt or interfere with existing or planned bicycle, pedestrian, or transit facilities.

METHODOLOGY

Trip Generation

Table 4.9-3 summarizes weekday and Saturday trip generation for the proposed Project. While the Aquatics Complex would have an estimated total capacity of 7,100 attendees, given the differing hours of operation for the competition venue and the water and adventure park that would result in patrons arriving and leaving at different times during the day, the average weekday Project attendance is estimated at 3,230; peak attendance is estimated at 5,500, occurring on a Saturday. Due to the unique composition of Project uses, trip generation from comparable sites was not available. Therefore, the trip generation presented in **Table 4.9-3** was developed using the estimated attendance levels for average weekday conditions and the maximum attendance scenario, operational characteristics, and available trip generation characteristics for comparable land uses documented in Trip Generation, 9th Edition (ITE 2012). The following outlines the steps used to develop the Project trip generation presented in **Table 4.9-3**.

- Project Attendance – Identified weekday and maximum attendance scenarios.
- Auto Occupancy – Calculated expected auto occupancy using Project auto occupancy based on the ratio of total visitors (adults and youth under the age of 13) to adult chaperones developed by Hotel & Leisure Advisors (for estimating Project demand) assuming all adult chaperones drive.
- Daily Vehicle Trips – Calculated daily vehicle trips by dividing Project attendance by auto occupancy and multiplied by two to account for vehicles entering/exiting the Project.
- Peak-Hour Trips – Calculated peak-hour vehicle trips by multiplying daily vehicle trips by the peak-to-daily factor and directional distribution from Trip Generation (ITE 2012) for Water Slide Park (Land Use: 414), for weekday and Saturday scenarios.

As shown in **Table 4.9-3**, the Project is projected to generate about 2,810 vehicle trips during an average weekday and 4,780 vehicle trips during a peak attendance of 5,500. On an average weekday, the Project would generate about 340 trips during the PM peak hour (i.e., peak hour of adjacent street traffic). During maximum attendance, the Project would generate about 620 PM peak-hour trips. **Figure 4.9-3** illustrates the Project's trip distribution under existing conditions, while **Figure 4.9-4** illustrates the Project's trip distribution under cumulative conditions.

TABLE 4.9-3
PROPOSED PROJECT TRIP GENERATION

Scenario[1]	Daily Attendance[2] (Persons)	Auto Occupancy[3] (Persons/Vehicle)	Total Vehicles	Trips			
				Daily[4]	Peak Hour[5,6] (Weekday = PM, Saturday = Generator)		
					Total	In	Out
Weekday	3,230	2.3	1,404	2,808	337	162	175
Saturday	5,500	2.3	2,391	4,782	622	429	193

Source: Fehr & Peers 2014, p. 21

Notes:

1 Hours of operation – Waterpark/Adventure Park – 10:00 AM to 10:00 PM Monday through Sunday. Analysis scenarios include mid-week (Tuesday, Wednesday, or Thursday) PM peak-hour conditions and a peak hour on Saturday. Aquatic Complex – 7:00 AM to 9:00 PM.

2 Attendance estimate based on usage levels developed by Hotel & Leisure Advisors.

3 Auto occupancy based on the ratio of total visitors (adults and youth under the age of 13) to adult chaperones developed by Hotel & Leisure Advisors (for estimating Project demand) assuming all adult chaperones drive.

4 Daily vehicle trips developed by multiplying total vehicles by two to account for vehicles entering and exiting the Project.

5 Total peak hour trips based on the peak-to-daily factor and directional distribution from Trip Generation, 9th Edition (ITE) for Water Slide Park (Land Use: 414), for weekday and Saturday scenarios.

6 Weekday peak-hour trip generation represents the peak hour of adjacent street traffic. Saturday peak hour is the peak hour of the generator (i.e., the highest hour of trip generation for the proposed Project).

Travel Demand Forecasting

A modified version of SACOG's MTP/SCS travel demand forecasting (TDF) model was used to develop traffic volumes for the study facilities. The base year model is generally representative of 2008 conditions and the future year model has a 2035 forecast year. The TDF model was used to develop traffic volume forecasts cumulative conditions without the proposed Project. The TDF model was modified to reflect buildout development levels in Elk Grove, including buildout of the Laguna Ridge Specific Plan, Southeast Policy Area, Sterling Meadows, the Elk Grove Promenade, and Lent Ranch Marketplace. Year 2035 levels of development are assumed outside the City of Elk Grove. All forecasts are adjusted using a growth increment method (i.e., the different method) that adds the growth in forecast travel demand to existing traffic counts. The base year TDF model transportation network (in the study area) was modified to account for changes to the network that have occurred between 2008 and 2014 (i.e., when the traffic counts were collected). The 2035 transportation network is consistent with programmed improvements listed in the Final MTP/SCS project list. Forecasts for Saturday conditions were developed by factoring weekday PM peak-hour forecasts based on existing weekday and Saturday traffic counts. Factors were applied by intersection, considering total volume using intersection and individual turn movements.

Freeway Facilities Analysis

SR 99 from just south of Elk Grove Boulevard through the City includes one high occupancy vehicle (HOV) lane and two general purpose lanes in each direction. Therefore, to account for HOV lane utilization, the freeway segment analysis is based on the traffic volumes in the general purpose lanes, by removing vehicles using the HOV lanes from the analysis, based on measured HOV volumes documented in Caltrans' District 3 High Occupancy Vehicle Lanes Status Report, Sacramento Metropolitan Area (2011).

Improvement Assumptions

The following analysis assumes transportation improvements needed to support the Project, including site access improvements, parking facilities, bicycle, and pedestrian connections. This includes construction of the east (i.e., fourth) leg of the Denali Circle/Big Horn Boulevard intersection, which includes turn lane modifications and signal system modifications.

Intersections

All intersections were analyzed using procedures and methodologies contained in the Highway Capacity Manual (HCM) (Transportation Research Board 2000). These methodologies were applied using Synchro, a traffic operations analysis software package. HCM 2010 was not used for intersection operations analysis due to software errors that prevent the accurate analysis of some shared turn lane configurations present in the study area. Use of HCM 2000 methods for study intersections was approved by City staff.

The HCM methodologies determine a level of service for each study intersection. Level of service is a qualitative measure of traffic operating conditions whereby a letter grade, from A to F, is assigned. These grades represent the perspective of drivers and are an indication of the comfort and convenience associated with driving. In general, LOS A represents free-flow conditions with no congestion, and LOS F represents severe congestion and delay under stop-and-go conditions. **Table 4.9-4** presents the intersection LOS thresholds for signal- and stop-controlled intersections.

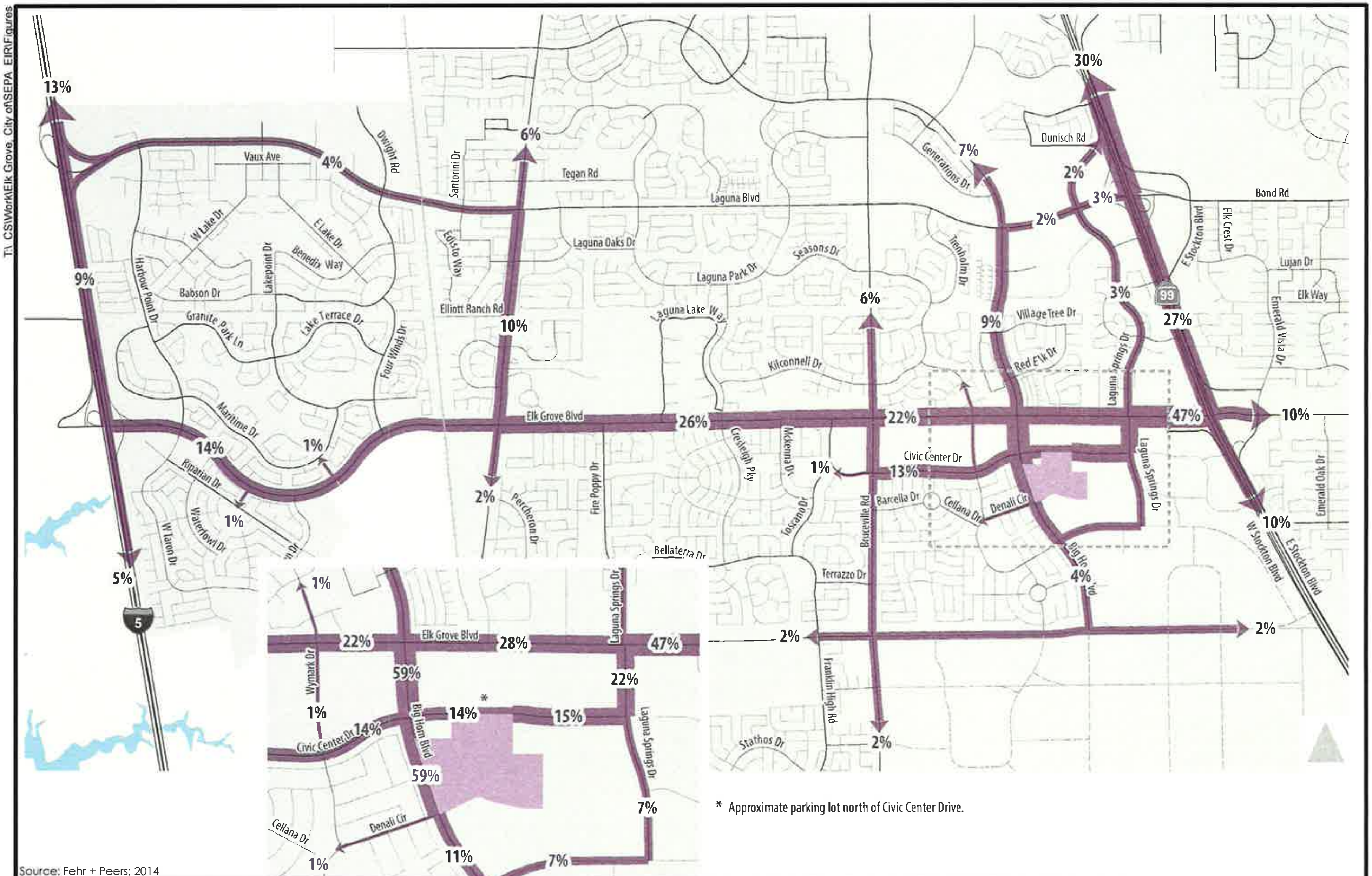

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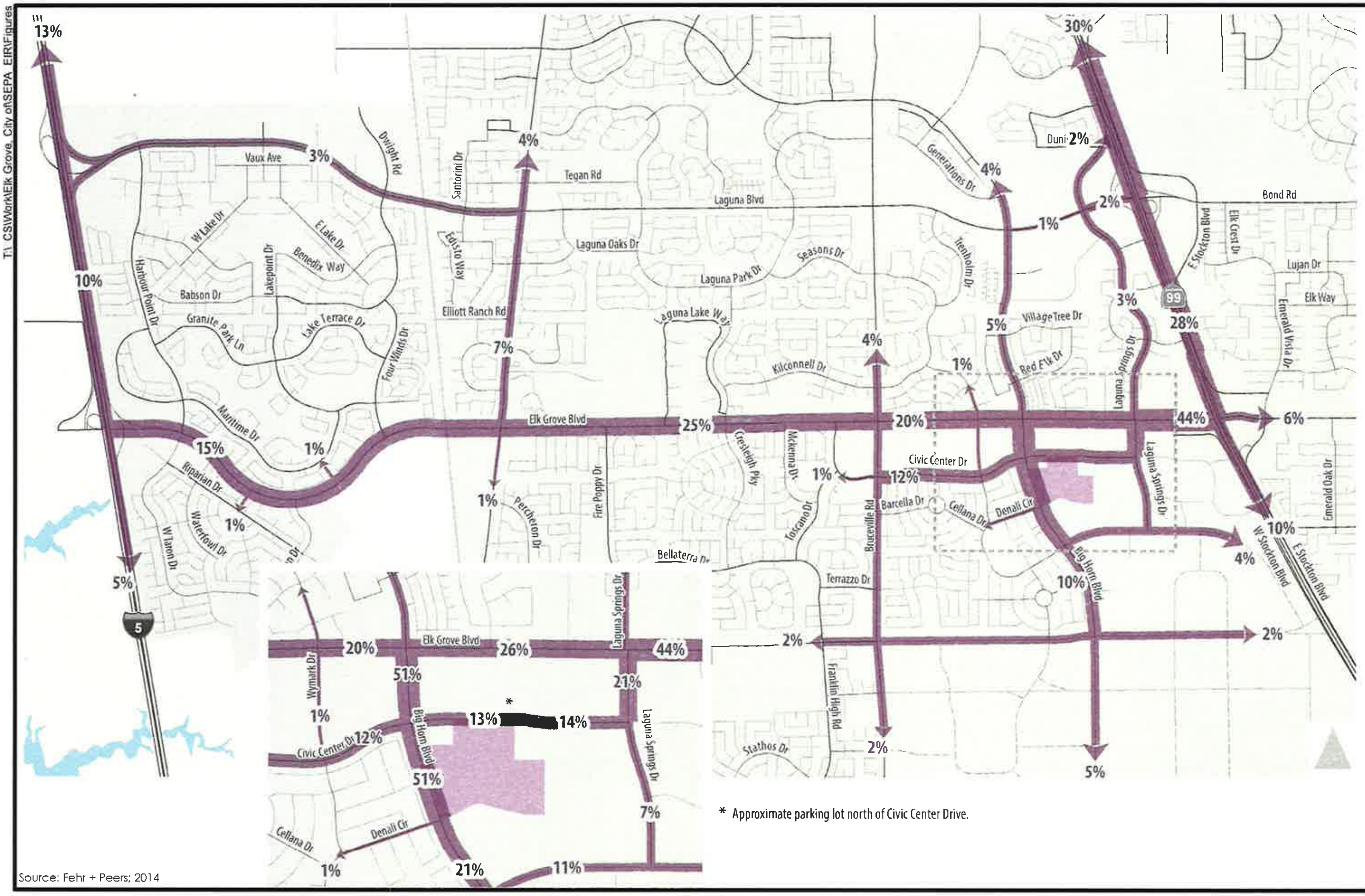
FIGURE 4.9-3
Project Trip Distribution



Source: Fehr + Peers; 2014

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FIGURE 4.9-4
Cumulative Conditions Project Trip Distribution

TABLE 4.9-4
INTERSECTION LEVEL OF SERVICE THRESHOLDS

Level of Service	Average Control Delay (Seconds/Vehicle)[1]	
	Signal Control	Stop Control
A	≤10.0	≤10.0
B	10.1–20.0	10.1–15.0
C	20.1–35.0	15.1–25.0
D	35.1–55.0	25.1–35.0
E	55.1–80.0	35.1–50.0
F	>80.0	>50.0

Source: Fehr & Peers 2014, p. 5

Notes: [1]Control delay includes initial deceleration delay, queue move-up time, stopped delay, and acceleration delay

Freeway Facilities

Pursuant to Caltrans standards, the freeway ramps and mainline were analyzed using procedures from the Highway Capacity Manual. This procedure determines the level of service based on the computed density, which is expressed in passenger cars per lane, per mile. **Table 4.9-5** displays the density ranges associated with each LOS category for basic segments and ramp merge/diverge movements. Consistent with the methodology described in the Caltrans Highway Design Manual, the Leisch Method was used to analyze weaving areas.

TABLE 4.9-5
FREEWAY LEVEL OF SERVICE DEFINITIONS

Level of Service	Density (Passenger Cars per Mile per Lane)[1]	
	Basic Segments	Ramp Merge/Diverge
A	<11	<10
B	>11–18	>10–20
C	>18–26	>20–28
D	>26–35	>28–35
E	>35–45	>35
F	> 45 or any v/c ratio > 1.00[1]	Demand exceeds capacity[2]

Source: Fehr & Peers 2014, p. 6

Notes:

[1] *v/c ratio = demand flow rate divided by the capacity of a given segment.*

[2] *Occurs when freeway demand exceeds upstream (diverted) or downstream (merge) freeway segment capacity, or if off-ramp demand exceeds off-ramp capacity.*

IMPACTS AND MITIGATION MEASURES

Intersection Operations (Standards of Significant 1 and 2)

Impact 4.9.1 Implementation of the proposed Project would result in a decline in service at the Elk Grove Boulevard/I-5 SB Ramps intersection. **This impact was identified in the LRSP EIR as significant and unavoidable. The proposed Project would result in a potential increase in the severity of this impact.**

The existing PM weekday peak-hour intersection turning movement volumes, lane configurations, and traffic controls present at each of the study intersections are provided in **Appendix J. Table 4.9-6** summarizes the intersection operations under existing conditions with the addition of the proposed Project. As shown, most study intersections currently operate acceptably at LOS D or better during both peak hours, except for the Elk Grove Boulevard/I-5 SB Ramps intersection.

The previous analysis in the Laguna Ridge Specific Plan Environmental Impact Report (LRSP EIR) determined that operations at the Elk Grove Boulevard/I-5 Southbound Ramps during the PM peak hour would operate at an acceptable LOS A, under both existing and existing plus project conditions. It was also determined that operations at the Elk Grove Boulevard/SR 99 Southbound and Northbound Ramps during the PM peak hour would operate at acceptable levels of service (A and C, respectively) under existing conditions. However, the southbound ramps would operate at an unacceptable LOS F under existing plus project conditions. Pursuant to LRSP EIR mitigation measure MM 4.2.2e, improvements to the Elk Grove Boulevard/SR 99 Southbound Ramps to reduce delay and improve the level of service were constructed, but they did not reduce the impact to an acceptable level, and further improvements were deemed infeasible due to right-of-way constraints. The impact at this intersection was determined to be significant and unavoidable; a statement of overriding considerations was adopted for the impact as part of project approval. Operations of the northbound ramps were projected to improve to LOS A under existing plus project conditions.

Elk Grove Boulevard/I-5 SB Ramps Intersection

The Elk Grove Boulevard/I-5 SB Ramps intersection has side-street stop control. The controlled eastbound and westbound movements at the intersection operate at LOS F due to the much higher volume uncontrolled southbound off-ramp left-turn movement from Interstate 5. The project would add traffic to the uncontrolled on-ramp movements at the intersection, which would increase delay for the controlled eastbound and westbound movements at the intersection. However, based on the intersection traffic control, lane configurations, and volumes using the intersection, the traffic analysis software cannot report delay for the controlled movements, so this is a potentially significant impact.

The west leg of the intersection provides access to the Stone Lakes National Wildlife Refuge and is and will remain undeveloped, so the volumes for turn movements to/from the west are low. A review of the latest three-year collision records from the Statewide Integrated Traffic Records System (SWITRS) database revealed no reported collision at or near the intersection. Although the Project would add traffic to the uncontrolled on- and off-ramp movements at this intersection, no mitigation are recommended based on the following factors:

- The west leg of the intersection is and will remain undeveloped.

- Volumes are low on the controlled movements and will remain low without development.
- There were no reported collisions at the intersection indicating need for modified intersection traffic control.
- Traffic volumes on the controlled movements would not warrant installation of traffic signal control.

The proposed Project would result in an increase in the severity of this impact, and this impact would remain significant and unavoidable.

Elk Grove Boulevard Corridor (Near SR 99/Elk Grove Boulevard Interchange)

As noted under existing conditions, during field observations, significant vehicle queuing was observed during the PM peak hour near the SR 99/Elk Grove Boulevard intersection. The Synchro intersection operations documented in **Table 4.9-6** represent isolated intersection operation and are based on the number of vehicles served during the peak-hour conditions. The analysis does not account for the operational effects of these closely spaced intersections, like vehicle queuing extending between intersections. Therefore, conditions experienced by motorists may be worse than reported at the intersections on Elk Grove Boulevard near the SR 99 interchange. Implementation of the Project would add traffic to the Elk Grove Boulevard corridor near the SR 99 interchange. Therefore, this impact would be **significant**.

TABLE 4.9-6
PEAK HOUR INTERSECTION LEVEL OF SERVICE – EXISTING PLUS PROJECT CONDITIONS

Intersection	Traffic Control	Weekday PM		Saturday		Weekday PM		Saturday	
		Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
		Existing Conditions				*Existing Plus Project Conditions*			
1. Elk Grove Boulevard/I-5 SB Ramps	Side-Street Stop	**>50**	**F**	30	D	**>50**	**F**	35	D
2. Elk Grove Boulevard/I-5 NB Ramps	Side-Street Stop	29	D	11	B	31	D	11	B
3. Elk Grove Boulevard/Franklin Boulevard	Signal	37	D	35	C	38	D	35	C
4. Elk Grove Boulevard/Bruceville Road	Signal	37	D	39	D	37	D	39	D
5. Elk Grove Boulevard/Wymark Drive	Signal	13	B	14	B	13	B	15	B
6. Elk Grove Boulevard/Big Horn Boulevard	Signal	25	C	29	C	27	C	32	C
7. Elk Grove Boulevard/Laguna Springs Drive	Signal	22	C	14	B	23	C	18	B
8. Elk Grove Boulevard/Auto Center Drive	Signal	25	C	28	C	26	C	29	C
9. Elk Grove Boulevard/SR 99 SB Ramps	Signal	36	D	34	C	41	D	49	D
10. Elk Grove Boulevard/SR 99 NB On-Ramp	Signal	13	B	15	B	13	B	16	B
11. Elk Grove Boulevard/East Stockton Boulevard	Signal	39	D	35	C	39	D	35	D
12. East Stockton Boulevard/SR 99 NB Off-Ramp	Side-Street Stop	22	C	15	B	23	C	16	C
13. Civic Center Drive/Bruceville Road	Signal	26	C	19	B	28	C	21	C
14. Civic Center Drive/Wymark Drive	All-way Stop	8	A	8	A	8	A	8	A
15. Civic Center Drive/Big Horn Boulevard	Signal	16	B	14	B	19	B	17	B
16. Civic Center Drive/Laguna Springs Drive	Signal	20	C	15	B	18	B	15	B
17. Lotz Parkway/Big Horn Boulevard	Signal	18	B	18	B	19	B	18	B
18. Lotz Parkway/Laguna Springs Drive	Signal	36	D	23	C	35	D	21	C
19. Whitelock Parkway/Bruceville Road	Signal	26	C	26	C	27	C	26	C
20. Whitelock Parkway/Big Horn Boulevard	Signal	16	B	16	B	16	B	16	B
21. Denali Circle/Big Horn Boulevard	Signal	5	A	6	A	18	B	28	C

Source: Fehr & Peers 2014, p. 25-26

Notes:

[1] *During field observations, significant vehicle queuing was observed during the PM peak hour near the SR 99/Elk Grove Boulevard interchange. The Synchro intersection operations are based on the number of vehicles that are served during the PM peak hour and does not include the operational effects of these closely spaced intersections. Therefore, conditions experienced by motorists may be worse than expected*

Bold *text indicates LOS worse than established threshold. Italic and underlined text identifies a potential impact.*

There is limited right-of-way for physical (i.e., capacity) improvements along the Elk Grove Boulevard corridor. The corridor is largely constructed to its General Plan designation as a six-lane arterial. However, the City completed construction of the SR 99/Elk Grove Boulevard interchange Northbound Loop On-Ramp, which is the final phase of the interchange project. In addition, the SR 99/Whitelock Parkway interchange that is planned between Elk Grove Boulevard and Grant Line Road would provide an alternative to Elk Grove Boulevard and Big Horn Boulevard for trips with an origin and destination west of SR 99 in the Laguna Ridge Specific Plan. Elk Grove Boulevard, between Bruceville Road and East Stockton Boulevard, is identified in the General Plan Background Report as operating worse than LOS D during the PM peak hour. Consistent with Elk Grove General Plan Policy CI-14, the City recognizes that LOS D may not be achieved on these roadway segments.

Mitigation Measures

None available.

Implementation of the improvements outlined above and routine traffic signal coordination in response to planned growth and changing travel patterns would improve operations and provide an alternative to the Elk Grove Boulevard corridor for some travel. However, these improvements would not improve intersection spacing. Consequently, Elk Grove Boulevard is still expected to experience congested conditions due to poor vehicle progression through the corridor. **This would be a new significant and unavoidable impact.**

Freeway Facility Operations (Standards of Significance 1 and 2)

Impact 4.9.2 Implementation of the proposed Project would worsen existing unacceptable conditions along SR 99. **The proposed Project would result in an increase in the severity of this impact, which was previously identified in the LRSP EIR as less than significant. This is a new significant and unavoidable impact.**

The previous analysis in the LRSP EIR determined that operations along the SR 99 and I-5 corridors through the City would operate at acceptable levels of service, under both existing and existing plus project conditions.

Table 4.9-7 summarizes the existing PM peak-hour freeway operations on SR 99 and I-5. As shown, most of the study freeway facilities would operate acceptably at LOS D or better during both peak hours, except for the SB I-5 Elk Grove Boulevard Off-ramp diverge, which operates at the LOS D/E threshold during the weekday PM peak hour. The Project would add traffic to the SB I-5 Elk Grove Boulevard Off-ramp diverge. The addition of Project traffic would result in the following potential impacts.

SB I-5 Elk Grove Boulevard Off-Ramp Diverge

Implementation of the Project would add traffic to the SB I-5 Elk Grove Boulevard Off-ramp diverge, which would operate unacceptably at LOS E under existing conditions. The addition of Project traffic would result in an increase in density of the weave area at the southbound off-ramp from 35.1 to 35.3, corresponding to an increase in the volume-to-capacity ratio of the diverge from 0.85 to 0.86 (i.e., a volume-to-capacity increase of 0.01). Based on the City analysis evaluation criteria (i.e., a volume-to-capacity increase of 0.05), this is a **less than significant** impact. No mitigation is required.

SR 99 Freeway Operations

Peak period operations on SR 99 may be worse than reported due to reoccurring bottlenecks. As documented in the Caltrans Mobility Performance Report (2009), several bottleneck locations exist on SR 99 that meter traffic northbound in the morning and southbound in the evening. These bottlenecks cause congested conditions (i.e., vehicle speed of 35 miles per hour or less) and these bottlenecks on southbound SR 99 in the evening meter traffic on SR 99 through Elk Grove. The Project would add approximately 16 trips to southbound SR 99; however, because the Project would contribute trips to an already impacted segment, this is a **potentially significant** impact.

Mitigation Measures

None available.

General Plan Policy CI-2 relates to coordination and participation with the City of Sacramento, Sacramento County, and Caltrans on roadway improvements that are shared by the jurisdictions in order to improve operations, including joint transportation planning efforts, roadway construction, and funding. The City is currently working with Caltrans on an I-5 subregional fee for improvements to Caltrans facilities, but the fee has not been adopted by the City Council as of the release of this EIR. Should the fee be in effect prior to Project construction and the Project meets the thresholds for payment of the fee, the City will pay the fee. Consistent with Policy CI-2, the City should continue to work with Caltrans and other affected agencies to address operational conditions on SR 99, which may include the extension of HOV lanes from their current terminus just south of Elk Grove Boulevard to south of Grant Line Road, which would ensure additional capacity on SR 99 through the City. However, this improvement would not address the impact of existing bottleneck locations that cause reoccurring congestion on SR 99. This commitment to improving operations on SR 99 in the City is also demonstrated with General Plan Policy CI-11, related to implementing improvements to I-5 and SR 99, and Policy CI-12, related to the Capital SouthEast Connector project. However, since SR 99 is under the jurisdiction of Caltrans, these facilities are outside the City's jurisdiction to implement improvements that would mitigate these impacts. **The proposed Project would result in a new significant impact, which would remain significant and unavoidable.**

TABLE 4.9-7
FREEWAY ANALYSIS – EXISTING PLUS PROJECT CONDITIONS

Intersection	Traffic Control	Weekday PM Peak Hour		Saturday Peak Hour		Weekday PM Peak Hour		Saturday Peak Hour	
		Density	LOS	Density	LOS	Density	LOS	Density	LOS
		Existing Conditions				*Existing Plus Project Conditions*			
1. NB SR 99 South of Elk Grove Boulevard	Basic Segment	12.5	B	11.5	B	12.6	B	11.8	B
2. NB SR 99 Elk Grove Boulevard Off-Ramp	Diverge	16.5	B	16.1	B	16.6	B	16.4	B
3. NB SR 99 Elk Grove Boulevard Loop On-Ramp	Merge	Cumulative Conditions Only							
4. NB SR 99 Elk Grove Boulevard Slip On-Ramp	Merge	19.5	B	19.3	B	19.9	B	19.7	B
5. NB SR 99 North of Elk Grove Boulevard	Basic Segment	17.8	B	17.6	B	18.0	C	17.9	B
6. SB SR 99 North of Elk Grove Boulevard	Basic Segment	20.3	C	16.5	B	20.5	C	17.1	B
7. SB SR 99 Elk Grove Boulevard Off-Ramp	Diverge	13.7	B	10.5	B	13.9	B	11.3	B
8. SB SR 99 Elk Grove Boulevard Slip On-Ramp	Merge	22.2	C	19.2	B	22.3	C	19.3	B
9. SB SR 99 South of Elk Grove Boulevard	Basic Segment	18.6	C	14.8	B	18.7	C	14.9	B
10. NB I-5 South of Elk Grove Boulevard	Basic Segment	17.1	B	13.7	B	17.1	B	13.9	B
11. NB I-5 Elk Grove Boulevard Off-Ramp	Diverge	20.5	C	17.5	B	20.6	C	17.7	B
12. NB I-5 Elk Grove Boulevard Slip On-Ramp	Merge	19.1	B	18.0	B	19.3	B	18.2	B
13. NB I-5 North of Elk Grove Boulevard	Basic Segment	19.9	C	18.0	C	20.0	C	18.2	C
14. SB I-5 North of Elk Grove Boulevard	Basic Segment	32.4	D	15.1	B	32.7	D	15.4	B
15. SB I-5 Elk Grove Boulevard Off-Ramp	Diverge	**35.1**	**E**	20.9	C	**35.3**	**E**	21.3	C
16. SB I-5 Elk Grove Boulevard Loop On-Ramp	Merge	18.9	B	14.2	B	19.0	B	14.3	B
17. SB I-5 South of Elk Grove Boulevard	Basic Segment	17.9	B	12.4	B	18.0	B	12.5	B

Source: Fehr & Peers 2014, p. 30-31

*Notes: **Bold** text indicates LOS worse than established threshold. Italic and underlined text identifies a potential impact.*

Emergency Access (Standards of Significant 4 and 5)

Impact 4.9.3 Implementation of the proposed Project would not result in inadequate emergency access within the Project area. **This impact was not addressed in the LRSP EIR. This would be a new less than significant impact.**

Emergency access to the Project site would be provided at the main entrance from Big Horn Boulevard as well as via the proposed service/fire lane off Civic Center Drive to the north and Big Horn Boulevard to the west. In accordance with General Plan Policy CI-21, traffic preemption devices for emergency vehicles would be installed at these new intersections. In addition, in accordance with Policy CI-23, all internal streets have been designed with sufficient width to accommodate emergency vehicle access. The proposed site design and roadway improvements have also been reviewed by the Elk Grove Policy Department and the Cosumnes Community Services District (CCSD) Fire Department to ensure they provide adequate emergency access and by the City Public Works Department to ensure they are designed in accordance with City standards. Therefore, this impact would be **less than significant**.

Mitigation Measures

None required

Bicycle, Pedestrian, and Transit Facilities (Standard of Significant 6)

Impact 4.9.4 Implementation of the proposed Project would not disrupt or interfere with existing or planned bicycle, pedestrian, or transit facilities, **which was previously identified in the LRSP EIR as less than significant**. This impact would be **less than significant**.

The proposed Project would allow integration with existing bicycle and pedestrian facilities. Implementation of the proposed Project would not disrupt or interfere with existing bicycle or pedestrian facilities and would not disrupt or interfere with the implementation of any planned bicycle or pedestrian facilities. Similarly, implementation of the proposed Project would not disrupt or interfere with existing or planned transit operations or facilities. Attendees parking at the proposed overflow parking areas north of Civic Center Drive would utilize the existing pedestrian crosswalk at the intersection of Big Horn Boulevard and Civic Center Drive to safely cross Civic Center Drive. This impact would be **less than significant.**

Mitigation Measures

None required.

4.9.4 CUMULATIVE IMPACTS AND MITIGATION MEASURES

CUMULATIVE SETTING

Existing AM and PM weekday peak-hour intersection turning movement volumes, lane configurations, and traffic controls at each of the study intersections under cumulative conditions are provided in **Appendix J**.

Improvement Assumptions

The following analysis assumes transportation improvements within the Project area and the following transportation improvements identified with reasonably foreseeable funding consistent with the region's Final Metropolitan Transportation Plan/Sustainable Communities Strategy Project List. Key transportation projects from the MTP/SCS in the Project area include:

- Bruceville Road – Widen from two to four lanes between Whitelock Parkway and Kammerer Road
- Grant Line Road (SouthEast Connector Segment) – Widen from two to four lanes between East Stockton Boulevard and Calvine Road
- Kammerer Road Extension (SouthEast Connector Segment) – Construct new four-lane Kammerer Road from Bruceville Road to I-5 at Hood Franklin Road
- Kammerer Road (SouthEast Connector Segment) – Widen from two to four then four to six lanes from west of SR 99 (unimproved portion) to Bruceville Road
- Willard Parkway – Extend Willard Parkway from current terminus to the new Kammerer Road extension as a four-lane roadway with a follow on project to complete widening of Willard Parkway to six lanes

CUMULATIVE IMPACTS AND MITIGATION MEASURES

Cumulative Intersection Operations (Standards of Significance 1 and 2)

Impact 4.9.5 Implementation of the proposed Project, in combination with other recently constructed, planned, approved, and reasonably foreseeable projects, would result in a decline of service at six intersections in the study area. **The proposed Project would result in an increase in the severity of this impact, which was previously identified in the LRSP EIR as significant. This Project's contribution to this impact would be cumulatively considerable.**

Table 4.9-8 summarizes the peak-hour intersection operations at the study intersections under cumulative conditions. The following intersections would operate unacceptably (LOS E or F) during at least one peak hour without the addition of project traffic:

- Elk Grove Boulevard/I-5 SB Ramps – LOS F during the weekday PM peak hour
- Elk Grove Boulevard/Bruceville Road – LOS E during the weekday PM peak hour
- Elk Grove Boulevard/Big Horn Boulevard – LOS E during the weekday PM peak hour and LOS F on Saturday
- Elk Grove Boulevard/Laguna Springs Drive – LOS E during the weekday PM peak hour
- Elk Grove Boulevard/SR 99 Southbound Ramps – LOS E during the weekday PM and Saturday peak hours
- Elk Grove Boulevard/East Stockton Boulevard – LOS E during the weekday PM peak hour

- Civic Center Drive/Big Horn Boulevard – LOS F during the weekday PM peak hour and LOS F on Saturday

As noted previously, significant vehicle queuing was observed during field observations during the PM peak hour near the SR 99/Elk Grove Boulevard intersection. The Synchro intersection operations documented in **Table 4.9-8** are based on the number of vehicles served during the PM peak hour, plus traffic added by the proposed Project. The analysis does not account for the operational effects of these closely spaced intersections. Therefore, conditions experienced by motorists may be worse than reported at the intersections on Elk Grove Boulevard between Big Horn Boulevard and SR 99.

Elk Grove Boulevard/I-5 SB Ramps Intersection

This intersection has side-street stop control. The controlled eastbound and westbound movements at the intersection operate at LOS F due to the much higher volume uncontrolled southbound off-ramp left-turn movement from I-5. However, the west leg of the intersection provides access to the Stone Lakes National Wildlife Refuge and is and will remain undeveloped, so the volumes for turn movements to/from the west are low. A review of the latest three-year collision records from the SWITRS database revealed no reported collision at or near the intersection. Although the project would add traffic to the uncontrolled on- and off-ramp movements at this intersection, this impact is considered **less than significant**, based on the following factors:

- The west leg of the intersection is and will remain undeveloped.
- Volumes are low on the controlled movements and will remain low without development.
- There were no reported collisions at the intersection indicating need for modified intersection traffic control.
- Traffic volumes on the controlled movements would not warrant installation of traffic signal control.

Mitigation Measures

None required.

Elk Grove Boulevard/Bruceville Road

The addition of Project traffic would worsen weekday PM peak-hour operations at this intersection. However, the volume increase would only increase control delay by 1 second. Based on City of Elk Grove significance criteria, this is a **less than significant** impact, since the addition of Project traffic would not increase control delay by more than 5 seconds, which is the City's significance criterion.

Mitigation Measures

None required.

TABLE 4.9-8
PEAK HOUR INTERSECTION LEVEL OF SERVICE – CUMULATIVE PLUS PROJECT CONDITIONS

Intersection	Traffic Control	Weekday PM		Saturday		Weekday PM		Saturday	
		Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
		Cumulative Conditions				*Cumulative Plus Project Conditions*			
1. Elk Grove Boulevard/I-5 SB Ramps	Side-Street Stop	***>50***	***F***	29	D	***>50***	***F***	34	D
2. Elk Grove Boulevard/I-5 NB Ramps	Side-Street Stop	32	D	11	B	34	D	11	B
3. Elk Grove Boulevard/Franklin Boulevard	Signal	48	D	45	D	49	D	45	D
4. Elk Grove Boulevard/Bruceville Road	Signal	***57***	***E***	49	D	***58***	***E***	49	D
5. Elk Grove Boulevard/Wymark Drive	Signal	19	B	15	B	18	B	14	B
6. Elk Grove Boulevard/Big Horn Boulevard	Signal	***78***	***E***	***89***	***F***	***83***	***F***	***100***	***F***
7. Elk Grove Boulevard/Laguna Springs Drive	Signal	***57***	***E***	26	C	***65***	***E***	28	C
8. Elk Grove Boulevard/Auto Center Drive	Signal	34	C	51	D	37	D	54	D
9. Elk Grove Boulevard/SR 99 SB Ramps	Signal	***78***	***E***	***59***	***E***	***88***	***F***	***77***	***E***
10. Elk Grove Boulevard/SR 99 NB On-Ramp	Signal	-	-	-	-	-	-	-	-
11. Elk Grove Boulevard/East Stockton Boulevard	Signal	***67***	***E***	27	C	***72***	***E***	27	C
12. East Stockton Boulevard/SR 99 NB Off-Ramp	Signal	50	D	35	D	53	D	36	D
13. Civic Center Drive/Bruceville Road	Signal	32	C	21	C	32	C	22	C
14. Civic Center Drive/Wymark Drive	Signal	43	D	34	D	44	D	36	D
15. Civic Center Drive/Big Horn Boulevard	Signal	***91***	***F***	***77***	***E***	***104***	***F***	***96***	***F***
16. Civic Center Drive/Laguna Springs Drive	Signal	22	C	17	B	24	C	18	B
17. Lotz Parkway/Big Horn Boulevard	Signal	44	D	43	D	45	D	46	D
18. Lotz Parkway/Laguna Springs Drive	Signal	34	C	23	C	36	D	24	C
19. Whitelock Parkway/Bruceville Road	Signal	30	C	30	C	31	C	30	C
20. Whitelock Parkway/Big Horn Boulevard	Signal	27	C	32	C	27	C	34	C
21. Denali Circle/Big Horn Boulevard	Signal	10	B	11	B	27	C	53	D

Source: Fehr & Peers 2014, p. 36-37

Notes:

[1] *During field observations, significant vehicle queuing was observed during the PM peak hour near the SR 99/Elk Grove Boulevard interchange. The Synchro intersection operations are based on the number of vehicles that are served during the PM peak hour and does not include the operational effects of these closely spaced intersections. Therefore, conditions experienced by motorists may be worse than expected*

Bold *text indicates LOS worse than established threshold. Italic and underlined text identifies a potential impact.*

Elk Grove Boulevard (Near SR 99/Elk Grove Boulevard Interchange)

The addition of Project traffic would worsen unacceptable operations near the SR 99/Elk Grove Boulevard interchange (intersections of Elk Grove Boulevard/Big Horn Boulevard, Elk Grove Boulevard/Laguna Springs Drive, and Elk Grove Boulevard/SR 99 SB Ramps). This is a **potentially significant** impact.

Mitigation Measures

None available.

Under cumulative conditions, the intersection operations were conducted assuming modified traffic signal timings, consistent with the City's ongoing traffic signal coordination and maintenance in response to traffic growth.

There is limited right-of-way for physical (i.e., capacity) improvements along the Elk Grove Boulevard corridor. The corridor is largely constructed to its General Plan designation as a six-lane arterial. The City completed the SR 99/Elk Grove Boulevard interchange Northbound Loop On-Ramp improvements in May 2014, which is the final phase of the interchange project. In addition, the planned SR 99/Whitelock Parkway that is planned between Elk Grove Boulevard and Grant Line Road would provide an alternative to Elk Grove Boulevard and Grant Line Road for trips with an origin/destination west of SR 99 in the Laguna Ridge Specific Plan. Implementation of the SR 99/Northbound Loop On-Ramp and the planned SR 99/Whitelock Parkway interchange would reduce delay at most of the study intersections identified in **Table 4.9-9**, except for the Elk Grove Boulevard/Big Horn Boulevard intersection. The effect of these improvements diminishes as one travels west of Elk Grove Boulevard. With these improvement, volume would increase on the westbound left-turn lane (a critical turn movement), increasing average intersection delay.

TABLE 4.9-9
IMPLEMENTATION OF NORTHBOUND LOOP ON-RAMP AND WHITELOCK PARKWAY INTERCHANGE

Intersection	Weekday PM[1]	
	Before	After
Elk Grove Boulevard/Big Horn Boulevard	F (83)	F (94)
Elk Grove Boulevard/Laguna Springs Drive	E (65)	D (48)
Elk Grove Boulevard/Auto Center Drive	D (37)	C (29)
Elk Grove Boulevard/SR 99 Southbound Ramps	F (88)	E (57)
Elk Grove Boulevard/East Stockton Boulevard	E (72)	D (45)
East Stockton Boulevard/SR 99 Ramps	D (53)	D (42)
Civic Center Drive/Big Horn Boulevard	F (104)	E (68)
Denali Circle/Big Horn Boulevard	C (27)	C (27)
Lotz Parkway/Big Horn Boulevard	D (45)	D (40)
Whitelock Parkway/Big Horn Boulevard	C (27)	C (27)

Fehr & Peers 2014, p. 40

Notes: [1] Level of Service (Delay)

Elk Grove Boulevard between Bruceville Road and East Stockton Boulevard is identified in the General Plan Background Report as operating worse than LOS D during the PM peak hour. Consistent with General Plan Policy CI-14, the City recognizes that LOS D may not be achieved on these roadway segments.

Implementation of the improvements outlined above would reduce delay along the Elk Grove Boulevard and Kammerer Road corridors, including operations near the SR 99/Elk Grove Boulevard interchange, which experiences congested conditions due to closely spaced intersections that are characterized by long vehicle queues. However, implementation of these improvements would not result in acceptable LOS D or better operations. **The proposed Project would result in an increase in a new significant impact, which would remain significant and unavoidable. This Project's contribution to this impact would be cumulatively considerable.**

Elk Grove Boulevard/Laguna Springs Drive

The addition of Project traffic would worsen weekday PM peak-hour operations at this intersection. The volume increase would increase control delay by more than 5 seconds. Based on City of Elk Grove significance criteria, this is a **potentially significant** impact.

Mitigation Measures

MM 4.9.5 Provide right-turn overlap phasing for the northbound right-turn movement at the intersection or Elk Grove Boulevard and Laguna Springs Drive and prohibit westbound U-turn movements at the intersection.

Timing/Implementation: *Prior to Project operation*

Enforcement/Monitoring: *City of Elk Grove Development Services*

Providing right-turn overlap phasing for the northbound right-turn movement would improve operations to acceptable LOS D conditions during the weekday PM peak hour. Right-turn overlap phasing would require prohibiting westbound U-turn movements at the intersection. With this improvement, this impact would be **less than significant**. Also refer to the mitigation for Elk Grove Boulevard (near SR 99/Elk Grove Boulevard Interchange), which relates to operations at this intersection.

Elk Grove Boulevard/East Stockton Boulevard

The addition of Project traffic would worsen weekday PM peak-hour operations at this intersection. However, the volume increase would only increase control delay by 5 seconds. Based on City of Elk Grove significance criteria, this is a **less than significant** impact, since the addition of Project traffic would not increase control delay by more than 5 seconds.

Mitigation Measures

None required.

Civic Center/Big Horn Boulevard

The addition of Project traffic would worsen weekday PM and Saturday peak-hour operations at this intersection. The volume increase would increase control delay by more than 5 seconds. Based on City of Elk Grove significance criteria, this is a **potentially significant** impact.

Mitigation Measures

None available.

There is limited right-of-way for physical (i.e., capacity) improvements along Big Horn Boulevard, which is constructed to its General Plan designation as a four-lane arterial. However, the planned SR 99/Whitelock Parkway to be located between Elk Grove Boulevard and Grant Line Road would provide an alternative to Elk Grove Boulevard and Grant Line Road for trips with an origin/destination west of SR 99 in the Laguna Ridge Specific Plan. Implementation of the planned SR 99/Whitelock Parkway interchange would reduce delay at this intersection, as identified in **Table 4.9-10**.

TABLE 4.9-10
IMPLEMENTATION OF THE WHITELOCK PARKWAY INTERCHANGE

Intersection	Weekday PM1	
	Before	After
Civic Center Drive/Big Horn Boulevard	F (104)	E (68)

Source: Fehr & Peers 2014, p. 42
Notes: [1]Level of Service (Delay)

However, implementation of these improvements would not result in acceptable LOS D or better operations. **The proposed Project would result in a new significant, which would remain significant and unavoidable. This Project's contribution to this impact would be cumulatively considerable.**

Cumulative Freeway Facility Operations (Standards of Significance 1 and 2)

Impact 4.9.6 Implementation of the proposed Project, in combination with other planned, approved, and reasonably foreseeable projects, would worsen existing unacceptable conditions along SR 99. **The proposed Project would contribute to a new significant and unavoidable impact, which was previously identified in the LRSP EIR as less than significant. This Project's contribution to this impact would be cumulatively considerable.**

Table 4.9-11 summarizes the cumulative PM peak-hour freeway operations on SR 99 and I-5. As shown, most of the study freeway facilities would operate acceptably at LOS D or better during both peak hours with the addition of Project traffic, except for the SB I-5 mainline (north of Elk Grove Boulevard) and the SB I-5 Elk Grove Boulevard Off-ramp diverge area.

TABLE 4.9-11
FREEWAY ANALYSIS – CUMULATIVE PLUS PROJECT CONDITIONS

Freeway Facility	Type	Weekday PM Peak Hour		Saturday Peak Hour	
		Density	LOS	Density	LOS
1. NB SR 99 South of Elk Grove Boulevard	Basic Segment	19.1	C	17.7	B
2. NB SR 99 Elk Grove Boulevard Off-Ramp	Diverge	23.7	C	23.1	C
3. NB SR 99 Elk Grove Boulevard Loop On-Ramp	Merge	32.9	D	30.3	D
4. NB SR 99 Elk Grove Boulevard Slip On-Ramp	Merge	27.6	C	23.8	C
5. NB SR 99 North of Elk Grove Boulevard	Basic Segment	29.5	D	24.8	C
6. SB SR 99 North of Elk Grove Boulevard	Basic Segment	24.2	C	19.7	C
7. SB SR 99 Elk Grove Boulevard Off-Ramp	Diverge	17.5	B	13.8	B
8. SB SR 99 Elk Grove Boulevard Slip On-Ramp	Merge	25.8	C	21.7	C
9. SB SR 99 South of Elk Grove Boulevard	Basic Segment	22.7	C	17.5	B
10. NB I-5 South of Elk Grove Boulevard	Basic Segment	22.4	C	18.4	C
11. NB I-5 Elk Grove Boulevard Off-Ramp	Diverge	26.4	C	22.5	C
12. NB I-5 Elk Grove Boulevard Slip On-Ramp	Merge	26.2	C	24.6	C
13. NB I-5 North of Elk Grove Boulevard	Basic Segment	28.5	D	26.1	D
14. SB I-5 North of Elk Grove Boulevard	Basic Segment	-	*F*	20.9	C
15. SB I-5 Elk Grove Boulevard Off-Ramp	Diverge	-	*F*	26.2	C
16. SB I-5 Elk Grove Boulevard Loop On-Ramp	Merge	27.0	C	19.2	B
17. SB I-5 South of Elk Grove Boulevard	Basic Segment	27.6	D	18.0	C

Source: Fehr & Peers, 2014, p. 43

Notes: ***Bold text*** *indicates LOS worse than established threshold. Italic and underlined text identifies a potential impact.*

SB I-5 Mainline and Off-Ramp Diverge to Elk Grove Boulevard

Implementation of the Project would add traffic to the SB I-5 mainline and off-ramp diverge, which would operate unacceptably at LOS F under cumulative conditions. The addition of Project traffic would increase the density of the I-5 mainline (north of Elk Grove Boulevard) and the I-5 SB off-ramp diverge influence area to Elk Grove Boulevard. This is a **potentially significant** impact.

Mitigation Measures

None available.

Poor operation of the SB I-5 mainline (north of Elk Grove Boulevard) and the SB I-5 off-ramp diverge influence area to Elk Grove Boulevard is due to capacity constraints on southbound Interstate 5. Extending the third southbound lane on I-5 from its current terminus just south of Laguna Boulevard to just south of Elk Grove Boulevard would improve operations of these facilities to LOS D or better. Since this impact occurs under cumulative conditions, a fair share contribution to these improvements, based on the Project's share of traffic using the facility under cumulative conditions, would mitigate this impact. However, since I-5 is under the jurisdiction of Caltrans, these facilities are outside the City's jurisdiction to implement improvements that would mitigate these impacts, and the impact would remain significant and unavoidable. The Project would add approximately 16 trips to SB I-5 under cumulative conditions, which represents approximately 0.37 percent of cumulative traffic volumes. The Project contribution to volumes on this portion of I-5 would result in minimal increases in density on I-5. While the cumulative conditions would include greater density on these segments, the Project's contribution to the volumes would be minimal. Therefore, the Project's contribution to the cumulative increase would not be cumulatively considerable. The City is currently working with Caltrans on an I-5 subregional fee for improvements to Caltrans facilities, but the fee has not been adopted by the City Council as of the release of this EIR. Should the fee be in effect prior to Project construction, the City will pay the fee if it reaches the thresholds established by the fee. **The proposed Project would result in an increase in the severity of this impact, which was previously identified in the LRSP EIR as less than significant. Therefore, this is a new significant impact. The Project's contribution would not be cumulatively considerable, but this cumulative impact would be considered significant and unavoidable.**

SR 99 Freeway Operations

Peak period operations on SR 99 may be worse than reported due to reoccurring bottlenecks. As documented in the Caltrans Mobility Performance Report (2009), several bottleneck locations exist on SR 99 that meter traffic northbound in the morning and southbound in the evening. These bottlenecks cause congested conditions (i.e., vehicle speed of 35 miles per hour or less) and vehicle queuing on northbound SR 99 during the AM peak period. Similarly, bottlenecks on southbound SR 99 in the evening meter traffic on SR 99 through Elk Grove. This is a **potentially significant** impact.

Mitigation Measures

None available.

General Policy CI-2 relates to coordination and participation with the City of Sacramento, Sacramento County, and Caltrans on roadway improvements that are shared by the jurisdictions in order to improve operations, including joint transportation planning efforts, roadway construction, and funding. Consistent with Policy CI-2, the City should continue to work with Caltrans and other affected agencies to address operational conditions on SR 99, which may include the extension of HOV lanes from their current terminus just south of Elk Grove Boulevard to south of Grant Line Road, which would ensure additional capacity on SR 99 through the City. However, this improvement would not address the impact of existing bottleneck locations that cause reoccurring congestion on SR 99. This commitment to improving operation on SR 99 in the City is also demonstrated with General plan Policy CI-11, related to implementing improvements to I-5 and SR 99, and Policy CI-12, related to the Capital SouthEast Connector project. However, since SR 99 is under the jurisdiction of Caltrans, these facilities are outside the City's jurisdiction to implement improvements that would mitigate these impacts, and the impact would remain significant and unavoidable. **The proposed Project would result in an increase in the severity of this impact, which was previously identified in the LRSP EIR as less than significant. Therefore, this is a new significant impact. The Project's contribution would be cumulatively considerable, and this impact would be considered significant and unavoidable.**

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5.0 OTHER CEQA CONSIDERATIONS

This section discusses additional topics statutorily required by the California Environmental Quality Act (CEQA), including growth-inducing impacts, significant irreversible environmental effects, significant and unavoidable environmental effects, and a summary of cumulative effects.

5.1 GROWTH-INDUCING IMPACTS

INTRODUCTION

CEQA Guidelines Section 15126.2(d) requires that an EIR evaluate the growth-inducing impacts of a proposed action. A growth-inducing impact is defined by CEQA Guidelines as:

> *...the ways in which a proposed project could foster economic or population growth, or the construction of additional housing, either directly or indirectly, in the surrounding environment. Included in this are projects which would remove obstacles to population growth...It must not be assumed that growth in an area is necessarily beneficial, detrimental, or of little significance to the environment.*

A project can have direct and/or indirect growth inducement potential. Direct growth inducement would result if, for example, a project involved construction of new housing. A project would have indirect growth inducement potential if, for example, it established substantial new permanent employment opportunities (e.g., commercial, industrial, or governmental enterprises) or if it would involve a construction effort with substantial short-term employment opportunities that would indirectly stimulate the need for additional housing and services to support the new employment demand. Similarly, a project would indirectly induce growth if, for example, it would remove an obstacle to additional growth and development, such as removing a constraint on a required public service. A project providing an increased water supply in an area where water service historically limited growth could be considered growth inducing.

CEQA Guidelines further explain that the environmental effects of induced growth are considered indirect impacts of the proposed action. These indirect impacts or secondary effects of growth may result in significant, adverse environmental impacts. Potential secondary effects of growth include increased demand on community and public services and infrastructure, increased traffic and noise, and adverse environmental impacts such as degradation of air and water quality, degradation or loss of plant and animal habitat, and conversion of agricultural and open space land to developed uses.

Growth inducement may constitute an adverse impact if the growth is not consistent with or accommodated by the land use plans and growth management plans and policies for the area affected. Local land use plans provide for land use development patterns and growth policies that allow for the orderly expansion of urban development supported by adequate urban public services, such as water supply, roadway infrastructure, sewer service, and solid waste service.

COMPONENTS OF GROWTH

As required by Government Code Section 65300, the General Plan is intended to serve as the overall plan for the physical development of the City of Elk Grove. While the General Plan does not specifically propose any development projects, it does regulate the location and type of future development and thus controls future population and economic growth of the City that would result in indirect growth-inducing effects.

The Laguna Ridge Specific Plan (LRSP) (City of Elk Grove 2004a) is a policy and regulatory document. As a policy document, the LRSP amplifies the broader goals and policies contained in the General Plan through the establishment of policies for the Specific Plan area. As a regulatory document, the LRSP identifies the land use and zoning designations for all land in the plan area and lists development standards applicable solely to the plan area, while incorporating certain existing zoning standards of the Zoning Code by reference.

The Project site is designated Community Park (CP), Open Space (OS), Civic Center (LP), Multi-Family Residential (RD-20), and Office Park (BP) by the LRSP. The portion of the Project site that is proposed for development of the competition venue is designated Community Park and was not assumed to generate substantial employment opportunities in the LRSP EIR (City of Elk Grove 2004b).

GROWTH EFFECTS OF THE PROPOSED PROJECT

Changes in population and employment are not in and of themselves environmental impacts. However, they may result in the need for the construction of new housing, businesses, infrastructure, and services that provide for increases in population and employment.

The proposed Project would not result in the development of any residential uses but would create new employment opportunities in the City. During the peak summer season, the Project would employ as many as 500 people, with a reduced number of year-round employees. This is an increase compared to that evaluated for the Project site in the LRSP EIR, but it would not substantially increase employment opportunities such that the City's population would be significantly increased beyond that anticipated by the General Plan or LRSP EIR or result in the need for housing beyond that assumed in the LRSP EIR. This is due to the fact that the jobs created are mostly part-time and seasonal, so the existing population can fill these positions.

Historically, Elk Grove has had a jobs/housing imbalance, with more households in the City than jobs available for the households. The increase in employment opportunities associated with the proposed Project would serve to improve the jobs/housing balance by increasing job opportunities for local residents. Furthermore, due to the seasonal nature and type of jobs to be created, it is anticipated that these jobs would be filled by existing area residents. Therefore, the Project is not anticipated to result in the need for the construction of any new housing, businesses, infrastructure, or services to support new growth. The Project's potential impacts on the physical environment are evaluated in Sections 4.1 through 4.9 of this Draft SEIR.

5.2 SIGNIFICANT IRREVERSIBLE ENVIRONMENTAL EFFECTS

CEQA Sections 21100(b)(2) and 21100.1(a) require that EIRs prepared for the adoption of a plan, policy, or ordinance of a public agency must include a discussion of significant irreversible environmental changes of project implementation. In addition, CEQA Guidelines Section 15126.2(c) describes irreversible environmental changes as:

> *Uses of nonrenewable resources during the initial and continued phases of the project may be irreversible since a large commitment of such resources makes removal or nonuse thereafter unlikely. Primary impacts and, particularly, secondary impacts (such as highway improvement which provides access to a previously inaccessible area) generally commit future generations to similar uses. Also irreversible damage can result from environmental accidents associated with the project. Irretrievable commitments of resources should be evaluated to assure that such current consumption is justified.*

The Elk Grove General Plan EIR (SCH Number 2002062082) evaluated significant irreversible environmental effects associated with implementation of the adopted General Plan and the Laguna Ridge Specific Plan EIR (SCH No. 2000082139) evaluated significant irreversible environmental effects associated with implementation of the Laguna Ridge Specific Plan. Those EIRs identified that the conversion of undeveloped land would occur with implementation of those plans.

Development of the City of Elk Grove Land Use Policy Plan Map constitutes a long-term commitment to developed land uses. It is unlikely that circumstances would arise that would justify the return of the land to its original condition.

Development of the City, including the Project site, would irretrievably commit building materials and energy to the construction and maintenance of buildings and infrastructure proposed. Renewable, nonrenewable, and limited resources would likely be consumed as part of the development of the proposed Project and would include, but not be limited to, oil, gasoline, lumber, sand and gravel, asphalt, water, steel, and similar materials. In addition, development of the Project site would result in increased demand on public services and utilities.

The Project site is designated for urban development on the General Plan Land Use Policy Map and the Laguna Ridge Specific Plan land use map. Therefore, development of the Project site would be consistent with existing plans and would result in significant irreversible impacts similar to those discussed in the Laguna Ridge Specific Plan EIR. However, while the Project is allowed use in the LRSP, the proposed Project would result in some of the more intensive items listed and that was not fully analyzed in the LRSP EIR. Therefore, the proposed Project could consume more energy and natural resources and result in significant irreversible impacts slightly greater than those discussed in the Laguna Ridge Specific Plan EIR.

5.3 ENERGY CONSERVATION

INTRODUCTION

Public Resources Code Section 21100(b)(3) and CEQA Guidelines Section 15126.4 require EIRs to describe, where relevant, the wasteful, inefficient, and unnecessary consumption of energy caused by a project. In 1975, largely in response to the oil crisis of the 1970s, the State Legislature adopted Assembly Bill (AB) 1575, which created the California Energy Commission (CEC). The statutory mission of the CEC is to forecast future energy needs, license thermal power plants of 50 megawatts or larger, develop energy technologies and renewable energy resources, plan for and direct State responses to energy emergencies, and—perhaps most importantly—promote energy efficiency through the adoption and enforcement of appliance and building energy efficiency standards. AB 1575 also amended Public Resources Code Section 21100(b)(3) to require EIRs to consider the wasteful, inefficient, and unnecessary consumption of energy caused by a project. Thereafter, the State Resources Agency created Appendix F of the CEQA Guidelines.

CEQA Guidelines Appendix F is an advisory document that assists EIR preparers in determining whether a project will result in the inefficient, wasteful, and unnecessary consumption of energy. For the reasons set forth below, this EIR concludes that the proposed Project would not result in the wasteful, inefficient, and unnecessary consumption of energy and therefore would not create a significant impact on energy resources.

BACKGROUND

Energy usage is typically quantified using the British thermal unit (BTU). As a point of reference, the approximate amounts of energy contained in common energy sources are as follows:

Energy Source	BTUs
Gasoline	124,000 per gallon
Diesel Fuel	139,000 per gallon
Natural Gas (compressed gas)	1,000 per cubic foot
Electricity	3,414 per kilowatt-hour

Sources: USDOE 2013

Total energy usage in California was 7,858 trillion BTUs in 2011, which equates to an average of 209 million BTUs per capita. Of California's total energy usage, the breakdown by sector is 38.3 percent transportation, 22.8 percent industrial, 19.6 percent commercial, and 19.3 percent residential. Petroleum satisfies 43 percent of California's energy demand, natural gas 28 percent, electricity 11 percent, and renewables 12 percent. Nuclear electric power accounts for less than 5 percent and coal fuel less than 1 percent of California's total energy demand. Electricity and natural gas in California are generally consumed by stationary users such as residences and commercial and industrial facilities, whereas petroleum consumption is generally accounted for by transportation-related energy use (EIA 2014).

Given the nature of the proposed Project, the following discussion focuses on the three sources of energy that are most relevant to the Project—electricity and natural gas for the proposed facility, and transportation fuel for vehicle trips associated with the Project.

Current Energy Use

The Project site has historically been used for agricultural purposes and is primarily undeveloped. At the time the Notice of Preparation (NOP) was published, there were three vacant houses on the site. Therefore, current energy use on the Project site can be assumed to be zero.

APPLICABLE REGULATIONS

Federal and state agencies regulate energy use and consumption through various means and programs. At the federal level, the US Department of Transportation, the US Department of Energy, and the US Environmental Protection Agency (EPA) are three agencies with substantial influence over energy policies and programs. Generally, federal agencies influence and regulate transportation energy consumption through establishment and enforcement of fuel economy standards for automobiles and light trucks, through funding of energy-related research and development projects, and through funding for transportation infrastructure improvements. At the state level, the California Public Utilities Commission (CPUC) and the California Energy Commission (CEC) are two agencies with authority over different aspects of energy. The CPUC regulates privately owned utilities in the energy, rail, telecommunications, and water fields. The CEC collects and analyzes energy-related data, prepares statewide energy policy recommendations and plans, promotes and funds energy efficiency programs, and adopts and enforces appliance and building energy efficiency standards. California is exempt under federal law from setting State fuel economy standards for new on-road motor vehicles. Some of the more relevant federal and State energy-related laws and plans are discussed below.

FEDERAL

Federal Energy Policy and Conservation Act

The Federal Energy Policy and Conservation Act of 1975 sought to ensure that all vehicles sold in the United States would meet certain fuel economy goals. Through this act, Congress established the first fuel economy standards for on-road motor vehicles in the country. Pursuant to the act, the National Highway Traffic and Safety Administration, which is part of the US Department of Transportation, is responsible for establishing additional vehicle standards and for revising existing standards. Since 1990, the fuel economy standard for new passenger cars has been 27.5 miles per gallon. Since 1996, the fuel economy standard for new light trucks (gross vehicle weight of 8,500 pounds or less) has been 20.7 miles per gallon. Heavy-duty vehicles (i.e., vehicles and trucks over 8,500 pounds gross vehicle weight) are not currently subject to fuel economy standards. Compliance with federal fuel economy standards is not determined for each individual vehicle model; rather, compliance is determined based on each manufacturer's average fuel economy for the portion of their vehicles produced for sale in the United States. The Corporate Average Fuel Economy (CAFE) program, which is administered by the EPA, was created to determine vehicle manufacturers' compliance with the fuel economy standards. The EPA calculates a CAFE value for each manufacturer, based on city and highway fuel economy test results and vehicle sales. On the basis of the information generated under the CAFE program, the US Department of Transportation is authorized to assess penalties for noncompliance. In the course of its over 30-year history, this regulatory program has resulted in vastly improved fuel economy throughout the nation's vehicle fleet.

Intermodal Surface Transportation Efficiency Act of 1991

The Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA) promoted the development of intermodal transportation systems to maximize mobility as well as address national and local interests in air quality and energy. ISTEA contained factors that metropolitan planning organizations (MPOs) such as the Sacramento Area Council of Governments (SACOG) were required to address in developing transportation plans and programs, including some energy-related factors. To meet the new ISTEA requirements, MPOs adopted explicit policies defining the social, economic, energy, and environmental values that were to guide transportation decisions in that metropolitan area. The planning process for specific projects would then address these policies. Another requirement was to consider the consistency of transportation planning with federal, State, and local energy goals. Through these requirements, energy consumption was expected to become a decision criterion, along with cost and other values that determine the best transportation solution.

The Transportation Equity Act for the 21st Century

The Transportation Equity Act for the 21st Century (TEA-21) was signed into law in 1998 and builds on the initiatives established in the ISTEA legislation discussed above. TEA-21 authorizes highway, highway safety, transit, and other efficient surface transportation programs. TEA-21 continues the program structure established for highways and transit under ISTEA, such as flexibility in the use of funds, emphasis on measures to improve the environment, and focus on a strong planning process as the foundation of good transportation decisions. TEA-21 also provides for investment in research and its application to maximize the performance of the transportation system through, for example, deployment of intelligent Transportation Systems, to help improve operations and management of transportation systems and vehicle safety.

STATE

State of California Energy Plan

The CEC is responsible for preparing the State Energy Plan, which identifies emerging trends related to energy supply, demand, conservation, public health and safety, and the maintenance of a healthy economy. The plan calls for the State to assist in the transformation of the transportation system to improve air quality, reduce congestion, and increase the efficient use of fuel supplies with the least environmental and energy costs. To further this policy, the plan identifies a number of strategies, including providing assistance to public agencies and fleet operators, encouraging urban designs that reduce vehicle miles traveled, and accommodating pedestrian and bicycle access.

Title 24, Energy Efficiency Standards

The California Energy Code (Title 24, Part 6, of the California Code of Regulations, California's Energy Efficiency Standards for Residential and Nonresidential Buildings) provides energy conservation standards for all new and renovated commercial and residential buildings constructed in California. The provisions of the California Energy Code apply to the building envelope, space-conditioning systems, and water-heating and lighting systems of buildings and appliances; they also give guidance on construction techniques to maximize energy conservation. Minimum efficiency standards are given for a variety of building elements, including appliances, water and space heating and cooling equipment, and insulation for doors, pipes, walls, and ceilings. The CEC adopted the 2005 changes to the Building Efficiency Standards, which emphasized saving energy during peak periods and seasons, and improving the quality of installation of energy efficiency measures. It is estimated that implementation of the 2005 Title 24 standards has resulted in an increased energy savings of 8.5 percent relative to the previous Title 24 standards. Compliance with Title 24 standards is verified and enforced through the local building permit process. The 2008 Title 24 Standards, which had an effective date beginning August 1, 2009, include added provisions that require, for example, "cool roofs" on commercial buildings; increased efficiency in heating, ventilating, and air conditioning systems; and increased use of skylights and more efficient lighting systems. California's Building Energy Efficiency Standards are updated on an approximately three-year cycle. The 2013 Standards will continue to improve upon the current 2008 Standards for new construction of, and additions and alterations to, residential and nonresidential buildings. The 2013 Standards go into effect on July 1, 2014.

LOCAL

Elk Grove General Plan

The City of Elk Grove General Plan contains the following policies and actions related to energy conservation that apply to the proposed Project. These policies and goals are contained in the Conservation and Air Quality Element (City of Elk Grove 2003a). The Project does not include any actions or components that conflict with these General Plan policies. However, it should be noted that the final authority for interpretation of a policy statement, determination of the Project's consistency with the General Plan, ultimately rests with the Elk Grove City Council.

"CAQ-25: The City shall encourage:

- Recycling,

- Reduction in the amount of waste, and
- Re-use of materials to reduce the amount of solid waste generated in Elk Grove."

"CAQ-25-Action 3: Encourage the use of recycled concrete in all base material utilized in City and private road construction."

"CAQ-25-Action 4: Include a requirement for the use of recycled base material in all requests for bids for City roadway construction projects."

"CAQ-25-Action 5: Establish procurement policies and procedures, which facilitate purchase of recycled, recyclable or reusable products and materials where feasible."

"CAQ-26: It is the policy of the City of Elk Grove to minimize air pollutant emissions from all City facilities and operations to the extent feasible and consistent with the City's need to provide a high level of public service."

"CAQ-27: The City shall promote energy conservation measures in new development to reduce on-site emissions and power plant emissions. The City shall seek to reduce the energy impacts from new residential and commercial projects through investigation and implementation of energy efficiency measures during all phases of design and development."

"CAQ-27-Action 1: Provide information to the public and builders on available energy conservation techniques and products."

"CAQ-27-Action 2: Encourage the use of trees planted in locations that will maximize energy conservation and air quality benefits. Encourage the use of landscaping materials which produce lower levels of hydrocarbon emissions."

"CAQ-27-Action 3: During project review, City staff shall consider energy conservation and, where appropriate, suggest additional energy conservation techniques."

"CAQ-27-Action 4: During project review, ensure that "Best Available Control Technology" is properly used and implemented."

"CAQ-28: The City shall emphasize "demand management" strategies which seek to reduce single-occupant vehicle use in order to achieve state and federal air quality plan objectives."

"CAQ-29: The City shall seek to ensure that public transit is a viable and attractive alternative to the use of private motor vehicles."

"CAQ-30: All new development projects which have the potential to result in substantial air quality impacts shall incorporate design, construction, and/or operational features to result in a reduction in emissions equal to 15 percent compared to an "unmitigated baseline" project. An "unmitigated baseline project" is a development project which is built and/or operated without the implementation of trip-reduction, energy conservation, or similar features, including any such features which may be required by the Zoning Code or other applicable codes."

"CAQ-32: As part of the environmental review of projects, the City shall identify the air quality impacts of development proposals to avoid significant adverse impacts and require appropriate mitigation measures, potentially including—in the case of projects which may conflict with applicable air quality plans—emission reductions in addition to those required by Policy CAQ-30."

CEQA GUIDELINES

CEQA Guidelines Appendix F advises that EIRs contain a discussion of the potential energy impacts of a project with an emphasis on reducing the wasteful, inefficient, or unnecessary consumption of energy. CEQA Guidelines Appendix F further states that the means of achieving the goal of energy conservation includes the following:

- Decreasing overall per capita energy consumption.
- Decreasing reliance on fossil fuels such as coal, natural gas, and oil.
- Increasing reliance on renewable energy sources.

PROJECT ENERGY CONSUMPTION AND CONSERVATION

As described previously, the proposed Project would introduce energy usage on a site that is currently primarily undeveloped and thus uses no energy. The Project would consume large amounts of energy in both the short term during Project construction and in the long term during Project operation.

Construction Phase

During construction, the Project would consume energy in two general forms: (1) the fuel energy consumed by construction vehicles and equipment; and (2) bound energy in construction materials, such as asphalt, steel, concrete, pipes, and manufactured or processed materials, such as lumber and glass.

Energy Consumed by Construction Vehicles and Equipment

Fossil fuels used for construction vehicles and other energy-consuming equipment would be used during site grading, paving, and construction and would be temporary in nature. Fuel use was quantified for Project construction as part of the air quality analysis for the Project (see Section 4.2, Air Quality, and **Appendix D**). Fuel use associated with construction activities was based on estimated equipment assumptions provided by the Project designer, as well as vehicle trips identified in the CalEEMod computer modeling conducted for the Project. In total, Project construction would use approximately 49,716 gallons of gasoline (6.2 billion BTU) and approximately 133,990 gallons of diesel fuel (18.6 billion BTU) for an estimated total of approximately 24.8 billion BTU [British thermal units].

Energy Conservation During Construction

Some incidental energy conservation would occur during construction through implementation of mitigation measures identified in Sections 4.2, Air Quality, and 4.5, Greenhouse Gases and Climate Change. For example, using engines that generate fewer NO_x emissions, as required by LSRP MM 4.3.1f, would reduce fuel consumption, as these low emission engines are more efficient. Ridesharing for contractors, as required by LRSP MM 4.3.1g, would reduce overall vehicle miles traveled, which would reduce consumption of fuel for transportation. In addition, Title 24 Building Energy Efficiency Standards, which are required for the Project, provide guidance on construction techniques to maximize energy conservation.

Bound Energy Contained in Construction Materials

Construction of the proposed Project would require large amounts of construction materials such as concrete, asphalt, steel, lumber, and glass, which require energy to acquire, manufacture, process, and transport. Substantial reductions in energy inputs for construction materials can be achieved by selecting building materials composed of recycled materials that require substantially less energy to produce than non-recycled materials. Elk Grove General Plan Policy CAQ-25-Action 3 requires the use of recycled concrete in public road construction and encourages its use in private road construction. In addition, given high fuel prices, contractors and owners have a strong financial incentive to use recycled materials and products originating from nearby sources in order to reduce the costs of transportation. Furthermore, it is reasonable to assume that production of building materials would employ all reasonable energy conservation practices in the interest of minimizing the cost of doing business. Therefore, it is expected that materials used in construction would not involve the wasteful, inefficient, or unnecessary consumption of energy.

Operational Phase

The operational phase of the proposed Project would consume energy for multiple purposes including, but not limited to, building heating and cooling, water heating, pumping, and filtration, lighting, electronics, and office equipment. As shown in **Table 5.0-1**, the Project would consume a total of approximately 17.24 billion BTU annually.

Operational energy would also be consumed during each vehicle trip associated with the proposed uses. Transportation energy is discussed separately.

TABLE 5.0-1
PROJECT OPERATION ANNUAL ENERGY CONSUMPTION

Energy Source	BTU (billion)
Electricity	5.73
Natural Gas	11.51
Total	**17.24**

Source: P3 international, 2014.

On-Site Operational Energy Consumption

As shown in greater detail in Section 2.0, Project Description, the proposed Project would allow for the development of a competition venue, water and adventure parks, and family entertainment center with ancillary uses, parkland, and parking areas.

Electricity

Based on energy consumption at a similar aquatic complex, the Project proponent estimated the Project's operational electricity consumption at approximately 300,000 kilowatt-hours (kWh) per month while the water park is in operation (approximately 120 days during May through October). The remainder of the year (244 days during October through April), only the competition venue and adventure park would operate with an estimated electric consumption of approximately 60,000 Kwh per month. Based on these assumptions, the overall facility would consume approximately 1,680,000 Kwh or 5.73 billion BTU annually.

Natural Gas

Based on proposed building sizes, pool heater operations, kitchen equipment, and restroom facilities as well as known operations of similar facilities, the Project proponent has estimated the Project's total annual natural gas consumption at approximately 11,514,243 cubic feet or 11.51 billion BTU.

Energy Conservation During Operation

The Project would be required to comply with Title 24 Building Energy Efficiency Standards, which provide minimum efficiency standards related to various building features, including appliances, water and space heating and cooling equipment, building insulation and roofing, and lighting. Implementation of the Title 24 standards significantly reduces energy usage, and it is generally assumed that compliance with Title 24 ensures projects will not result in the inefficient, wasteful, or unnecessary consumption of energy.

The Project would incorporate a commercial swimming pool filtration system that uses approximately 90 percent less water in backwashing and filter regeneration, which also reduces the amount of energy used for filtration. The Project would also include "variable frequency drive" technology in the water pumping system, which adjusts the speed up the pump based on condition of filters. This prevents the need for oversizing pumps, and thus reduces energy needed for pumping.

Transportation

Transportation Energy Consumption and Conservation

Using conversion ratios for carbon dioxide equivalents contained in the California Climate Action registry, the 2,695 metric tons of carbon dioxide equivalents generated by Project auto trips, the Proposed Project would result in the consumption of 305,902 gallons of fuel annually. While these trips would be new trips to the Project site, as noted above, the vehicle fleet is subject to the Federal Energy Policy and Conservation Act, which regulates fuel efficiency for automobiles. Therefore, the fuel use by automobiles traveling to and from the Project would improve as the vehicle fleet improves and would not be considered wasteful or inefficient. The Project would also reduce vehicle miles traveled associated with residents seeking water-based recreation opportunities by providing a recreational use in the City that is currently not available In addition, the project includes pedestrian and bicycle facility improvements to promote alternative forms of transportation to the site.

CONCLUSION

In summary, operation of the proposed Project would result in the consumption of electricity, natural gas, and renewable energy for project operation. Additional BTUs of gasoline and diesel fuels would be consumed during construction and for auto trips of visitors during operation of the proposed Project. However, a number of energy conservation measures would be incorporated into the design, construction, and operational aspects of the Project, as discussed above, which would result in a reduction in Project energy consumption. Therefore, although the Project would result in the consumption of a significant amount of energy from multiple sources, it would not result in a significant impact to energy resources as it would not use energy in an inefficient, wasteful, or unnecessary manner.

5.4 SIGNIFICANT AND UNAVOIDABLE ENVIRONMENTAL EFFECTS

CEQA Guidelines Section 15126.2(b) requires an EIR to discuss unavoidable significant environmental effects, including those that can be mitigated but not reduced to a level of insignificance. In addition, Section 15093(a) of the CEQA Guidelines allows the decision-making agency to determine whether the benefits of a proposed project outweigh the unavoidable adverse environmental impacts of implementing the project. The City can approve a project with unavoidable adverse impacts if it prepares a Statement of Overriding Considerations setting forth the specific reasons for making such a judgment.

LAGUNA RIDGE SPECIFIC PLAN

On June 16, 2004, the City Council certified the Laguna Ridge Specific Plan Final EIR and adopted the associated Findings of Fact regarding environmental effects. A Statement of Overriding Considerations was adopted for the following impacts that were identified as significant and unavoidable:

- Conversion of Important Farmland
- Unacceptable levels of service on area roadway segments
- Unacceptable levels of service at area intersections and freeway ramps
- Unacceptable levels of service on area roadway segments under cumulative conditions
- Unacceptable levels of service at area intersections and freeway ramps under cumulative conditions
- Unacceptable levels of service on area freeway segments under cumulative conditions
- Unacceptable levels of service at area freeway ramps under cumulative conditions
- Construction air quality impacts
- Operational air quality impacts
- Construction air quality impacts under cumulative conditions

- Operational air quality impacts under cumulative conditions
- Construction noise
- Noise associated with agricultural operations
- Construction noise under cumulative conditions
- Increased water demand under cumulative conditions
- Loss of biological resources under cumulative conditions
- Substantial alteration of visual character
- Introduction of new sources of light and glare
- Alteration of visual character within scenic State Route (SR) 99 corridor
- Substantial alteration of visual character under cumulative conditions
- Land use incompatibility

PROPOSED PROJECT

The following identifies areas where the Project would result in significant and unavoidable impacts not previously identified in the LRSP EIR or areas where the proposed Project would increase the severity of a significant impact previously identified for the LRSP. The reader is referred to Sections 4.1 through Section 4.9 of this Draft DEIR for a discussion of these various environmental issue areas.

AESTHETICS, LIGHT, AND GLARE

Impact 4.1.2 Implementation of the proposed Project would result in substantial changes to the existing visual character and quality of the site not consistent with the changes assumed in the LRSP EIR. **The proposed Project would be one of the more intense uses allowed in the Community Park district, which would alter the type of use compared to that assumed in the LRSP EIR and result in an increase in the impact disclosed in the LRSP EIR. This is a new significant impact.**

Impact 4.1.3 Implementation of the proposed Project would introduce new sources of light and glare in and around the area. **The proposed Project would result in an increase in the severity of this impact, which was previously identified in the LRSP EIR as significant and unavoidable. This is a new significant impact.**

AIR QUALITY

Impact 4.2.1 Construction activities associated with the development of the proposed Project would result in a short-term increase in criteria air pollutants within the Laguna Ridge Specific Plan area. **The proposed Project would result in an increase in the severity of this impact, which was previously identified in the LRSP EIR as significant and unavoidable.**

NOISE

Impact 4.7.4 Average-hourly non-transportation noise levels would exceed the City's noise standard at residential land uses located along the eastern Project site property line. **The proposed Project would result in an increase in the severity of this impact, which was previously identified in the LRSP EIR as less than significant. This is a new significant impact.**

Impact 4.7.5 Maximum instantaneous non-transportation noise levels would exceed the City's noise standard at residential land uses located along the eastern Project site property line. **Because maximum instantaneous noise levels from non-transportation noise sources were not evaluated in the LRSP EIR, this represents a new significant impact.**

TRAFFIC AND CIRCULATION

Impact 4.9.1 Implementation of the proposed Project would result in a decline in service at the Elk Grove Boulevard/I-5 SB Ramps intersection. **This impact was identified in the LRSP EIR as significant and unavoidable. The proposed Project would result in an increase in the severity of this impact.**

Impact 4.9.2 Implementation of the proposed Project would worsen existing unacceptable conditions along SR 99. **The proposed Project would result in an increase in the severity of this impact, which was previously identified in the LRSP EIR as less than significant. This is a new significant and unavoidable impact.**

5.5 CUMULATIVE IMPACTS SUMMARY

This section summarizes the cumulative impacts associated with the proposed Project that are identified in the environmental issue areas in Section 4.0. Cumulative impacts are the result of combining the potential effects of the proposed Project with other recently approved, planned, and reasonably foreseeable development projects in the region. The reader is referred to Sections 4.1 through 4.9 for a full discussion of the proposed Project's cumulative impacts.

INTRODUCTION

CEQA requires that an EIR contain an assessment of the cumulative impacts that could be associated with the proposed project. According to CEQA Guidelines Section 15130(a), "an EIR shall discuss cumulative impacts of a project when the project's incremental effect is cumulatively considerable." *Cumulatively considerable* means that the incremental effects of an individual project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects (as defined by Section 15130). As defined in CEQA Guidelines Section 15355, a cumulative impact consists of an impact that is created as a result of the combination of the project evaluated in the EIR together with other projects causing related impacts. A cumulative impact occurs from:

> *...the change in the environment which results from the incremental impact of the project when added to other closely related past, present, and reasonably foreseeable future projects. Cumulative impacts can result from individually minor but collectively significant projects taking place over a period of time.*

In addition, Section 15130(b) identifies that the following three elements are necessary for an adequate cumulative analysis:

1) Either:

   a. A list of past, present, and probable future projects producing related or cumulative impacts, including, if necessary, those projects outside the control of the agency; or

   b. A summary of projections contained in an adopted general plan or related planning document, or in a prior environmental document which has been adopted or certified, which described or evaluated regional or area wide conditions contributing to the cumulative impact. Any such planning document shall be referenced and made available to the public at a location specified by the lead agency.

2) A summary of the expected environmental effects to be produced by those projects with specific reference to additional information stating where that information is available; and

3) A reasonable analysis of the cumulative impacts of the relevant projects. An EIR shall examine reasonable, feasible options for mitigating or avoiding the project's contribution to any significant cumulative effects.

Where a lead agency is examining a project with an incremental effect that is not cumulatively considerable, a lead agency is not required to consider that effect significant, but must briefly describe its basis for concluding that the incremental effect is not cumulatively considerable.

CUMULATIVE SETTING

A general description of the cumulative setting is provided in Section 4.0, Introduction to the Environmental Analysis and Assumptions Used**.** In addition, the cumulative setting for environmental issue areas evaluated in the Draft SEIR is described in the section specific to the issue area (see Sections 4.1 through 4.9).

CUMULATIVE IMPACTS

The following identifies the areas where the proposed Project's contribution to a cumulative impact would result in an impact that was not previously identified in the LRSP EIR or increase the severity of a cumulative impact previously identified in the LRSP EIR as significant. As described above, cumulative impacts are two or more effects that, when combined, are considerable or compound other environmental effects.

NOISE

Impact 4.7.7 Operation of the proposed Project could contribute to the noise environment at nearby land uses. **Cumulative noise levels associated with non-transportation noise sources were not analyzed in the LRSP EIR. Therefore, this impact would constitute a new cumulative impact, and the proposed Project's contribution would be considerable. The impact would remain significant and unavoidable.**

Impact 4.7.8 The proposed Project would contribute to cumulative construction noise levels at nearby sensitive receptors. **The proposed Project would result in an increase in the severity of this impact, and this would be a substantially more severe significant impact.**

PUBLIC UTILITIES

Impact 4.8.2.2 Implementation of the proposed Project, in combination with other development in the SRCSD service area, would generate significant new wastewater flows requiring conveyance and treatment. **The proposed Project could increase in the severity of this impact, which was previously identified in the LRSP EIR as less than significant with mitigation. This impact would be cumulatively considerable.**

TRANSPORTATION

Impact 4.9.5 Implementation of the proposed Project, in combination with other planned, approved, and reasonably foreseeable projects, would result in a decline of service at six intersections in the study area. **The proposed Project would result in an increase in the severity of this impact, which was previously identified in the LRSP EIR as significant. This Project's contribution to this impact would be cumulatively considerable.**

Impact 4.9.6 Implementation of the proposed Project, in combination with other planned, approved, and reasonably foreseeable projects, would worsen existing unacceptable conditions along SR 99. **The proposed Project would contribute to a new significant and unavoidable impact, which was previously identified in the LRSP EIR as less than significant. This Project's contribution to this impact would be cumulatively considerable.**

REFERENCES

City of Elk Grove. 2003a. *City of Elk Grove General Plan.*

———. 2003b. *Elk Grove General Plan Draft Environmental Impact Report* (SCH No. 2002062082).

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———. 2004b. *Laguna Ridge Specific Plan Environmental Impact Report* (SCH No. 2000082139).

USDOE (US Department of Energy). Alternative Fuels Data Center. 2013. *Alternative Fuels Data Center – Fuel Properties Comparison.* Accessed May 7, 2014. http://www.afdc.energy.gov/fuels/fuel_comparison_chart.pdf

EIA (US Energy Information Administration). 2014. *California State Profile and Energy Estimates.* Accessed March 12. http://www.eia.gov/state/?sid=CA#tabs-1.

6.0 PROJECT ALTERNATIVES

6.1 INTRODUCTION

The purpose of this section is to identify and describe alternatives to the proposed Project. Project alternatives are developed to reduce or eliminate the significant or potentially significant adverse environmental effects identified as a result of the proposed Project, while still meeting most if not all of the basic Project objectives.

An EIR must evaluate a reasonable range of alternatives to the proposed project, or to the location of the proposed project, that could feasibly attain most of the basic objectives of the project but would avoid or substantially lessen any of the significant effects of the project, and evaluate the comparative merits of the alternatives (CEQA Guidelines Section 15126.6). The EIR need not evaluate the environmental effects of alternatives in the same level of detail as the proposed Project, but must include enough information to allow meaningful evaluation, analysis, and comparison with the proposed project.

The primary intent of the alternatives analysis is to disclose other ways that the objectives of the Project could be attained while reducing the magnitude of, or avoiding, the environmental impacts of the proposed Project. Alternatives that are included and evaluated in the EIR must be feasible alternatives. However, the Public Resources Code and the CEQA Guidelines direct that the EIR need "set forth only those alternatives necessary to permit a reasoned choice." The CEQA Guidelines provide a definition for "a range of reasonable alternatives" and, thus, limit the number and type of alternatives that need to be evaluated in a given EIR. An EIR is not required to analyze alternatives when the effects of the alternative "cannot be reasonably ascertained and whose implementation is remote and speculative" (Section 15126.6(f)(3)).

SUMMARY OF SIGNIFICANT AND UNAVOIDABLE IMPACTS

This Draft SEIR concluded there would be significant and unavoidable impacts for several resources areas; however, in some cases, the resources affected and the levels of significance for those impacts would not differ from those previously identified in the Laguna Ridge Specific Plan (LRSP) EIR. The last column in **Table ES-1** in the Executive Summary indicates impacts that would not result in a new significant or more severe significant impact. As such, the comparative analysis of alternatives focuses on impacts that, as summarized in **Table ES-1** in the Executive Summary, would be a new significant impact or a more severe significant impact than previously disclosed.

The analysis presented in the technical sections of this Draft SEIR (Sections 4.1 through 4.9) determined that the following new significant and/or more severe significant and unavoidable project and cumulative impacts would result from implementation of the proposed Project.

Project-Specific Impacts

AESTHETICS, LIGHT, AND GLARE

Impact 4.1.2 Implementation of the proposed Project would result in substantial changes to the existing visual character and quality of the site not consistent with the changes assumed in the LRSP EIR. **The proposed Project would be one of the more intense uses allowed in the Community Park district, which would alter the type of use compared to that assumed in the LRSP EIR and result in an increase in the impact disclosed in the LRSP EIR. This is a new significant impact.**

Impact 4.1.3 Implementation of the proposed Project would introduce new sources of light and glare in and around the area. **The proposed Project would result in an increase in the severity of this impact, which was previously identified in the LRSP EIR as significant and unavoidable. This is a new significant impact.**

AIR QUALITY

Impact 4.2.1 Construction activities associated with the development of the proposed Project would result in a short-term increase in criteria air pollutants within the Laguna Ridge Specific Plan area. **The proposed Project would result in an increase in the severity of this impact, which was previously identified in the LRSP EIR as significant and unavoidable.**

NOISE

Impact 4.7.4 Average-hourly non-transportation noise levels would exceed the City's noise standard at residential land uses located along the eastern Project site property line. **The proposed Project would result in an increase in the severity of this impact, which was previously identified in the LRSP EIR as less than significant. This is a new significant impact.**

Impact 4.7.5 Maximum instantaneous non-transportation noise levels would exceed the City's noise standard at residential land uses located along the eastern Project site property line. **Because maximum instantaneous noise levels from non-transportation noise sources were not evaluated in the LRSP EIR, this represents a new significant impact.**

TRAFFIC AND CIRCULATION

Impact 4.9.1 Implementation of the proposed Project would result in a decline in service at the Elk Grove Boulevard/I-5 SB Ramps intersection. **This impact was identified in the LRSP EIR as significant and unavoidable. The proposed Project would result in an increase in the severity of this impact.**

Impact 4.9.2 Implementation of the proposed Project would worsen existing unacceptable conditions along SR 99. **The proposed Project would result in an increase in the severity of this impact, which was previously identified in the LRSP EIR as less than significant. This is a new significant and unavoidable impact.**

Cumulative Impacts

NOISE

Impact 4.7.7 Operation of the proposed Project could contribute to the noise environment at nearby land uses. **Cumulative noise levels associated with non-transportation noise sources were not analyzed in the LRSP EIR. Therefore, this impact would constitute a new cumulative impact, and the proposed Project's contribution would be considerable. The impact would remain significant and unavoidable.**

Impact 4.7.8 The proposed Project would contribute to cumulative construction noise levels at nearby sensitive receptors. **The proposed Project would result in an increase in the**

severity of this impact, and this would be a substantially more severe significant impact.

PUBLIC UTILITIES

Impact 4.8.2.2 Implementation of the proposed Project, in combination with other development in the SRCSD service area, would generate significant new wastewater flows requiring conveyance and treatment. **The proposed Project could increase in the severity of this impact, which was previously identified in the LRSP EIR as less than significant with mitigation. This impact would be cumulatively considerable.**

TRANSPORTATION

Impact 4.9.5 Implementation of the proposed Project, in combination with other planned, approved, and reasonably foreseeable projects, would result in a decline of service at six intersections in the study area. **The proposed Project would result in an increase in the severity of this impact, which was previously identified in the LRSP EIR as significant. This Project's contribution to this impact would be cumulatively considerable**.

Impact 4.9.6 Implementation of the proposed Project, in combination with other planned, approved, and reasonably foreseeable projects, would worsen existing unacceptable conditions along SR 99. **The proposed Project would contribute to a new significant and unavoidable impact, which was previously identified in the LRSP EIR as less than significant. This Project's contribution to this impact would be cumulatively considerable**.

PROJECT ALTERNATIVES ANALYZED IN THE DEIR

The alternatives to the proposed Project analyzed in this Draft SEIR were developed with the aim of minimizing environmental impacts while still meeting the basic objectives of the Project. The City has established the following objectives for the Project for the purposes of CEQA.

1) Develop an aquatics complex in the Laguna Ridge Specific Plan area with a competitive swimming and diving components, including an Olympic-size competition swimming pool, a warm-up pool, and a diving tower, that can host up to 2,000 swimmers for each meet and seating for up to 1,100 spectators under a shaded structure.

2) Develop a facility that can support multiple aquatic team programs for schools and a variety of regional club teams for practices and meets and for regional, state, and national events.

3) Provide necessary amenities to support athletes and spectators, such as concessions, hot tub, locker rooms, meeting room, office space, and storage.

4) Develop a commercial recreation facility to entertain 250,000 guests annually with outdoor activities such as a water park, adventure theme park, miniature golf course, and fun center with a family focus, targeted at both youth- and adult- age guests.

5) Provide dining/concessions component including meals, snacks, and beverages.

6) Provide landscaping, parking, lighting, and security, as required by City code.

In accordance with the provisions of CEQA Guidelines Section 15126.6, the following alternatives are evaluated at a qualitative level of detail:

- Alternative 1 – No Project Alternative
- Alternative 2 – Modified Project Design Alternative
- Alternative 3 – Reduced Project Alternative
- Alternative 4 – Competition Venue Only Alternative

The environmental effects of each of these alternatives are identified and compared with those resulting from the proposed Project. A table at the end of this section provides a summary of the comparisons and, per CEQA Guidelines Section 15126.6(e)(2), an "environmentally superior" alternative is identified.

6.2 ALTERNATIVE 1 – NO PROJECT ALTERNATIVE

Alternative 1 is the No Project Alternative. CEQA Guidelines Section 15126.6(e)(1) states that a No Project Alternative shall be analyzed. The purpose of describing and analyzing a No Project Alternative is to allow decision-makers to compare the impacts of approving the proposed Project with the impacts of not approving the proposed Project. The No Project Alternative analysis is not the baseline for determining whether the environmental impacts of the proposed Project may be significant. For the proposed Project, a No Project Alternative would result in the Project site remaining in the condition as described in the existing setting. This alternative was analyzed in the LRSP EIR. There would be no change to the Project site under this alternative and no physical effects. This alternative is not analyzed further.

CHARACTERISTICS

Under the No Project Alternative, the Project would not be approved and assumes the site would be developed according to the land use designations as adopted under the Laguna Ridge Specific Plan (LRSP): community park (CP) – approximately 48 acres, and open space (OS) – 7.7 acres. The following highlights the elements of the CP and OS designations.

The CP zoning allows active public recreation/civic uses including lighted tennis courts and other sports facilities, water play (as appropriate), a mix of youth and adult ball fields (softball, baseball, and soccer fields), restrooms/concession buildings, on-site parking, per City of Elk Grove requirements, and security and sports facility lighting. The LRSP identifies that the purpose of the larger parks is to encourage multiple uses and allow active recreation, including lighted fields to allow leagues to play in the evenings. This alternative assumes the Project site would be developed with softball, baseball, and soccer fields, restrooms/concession buildings, on-site parking per City of Elk Grove requirements, and security and sports facility lighting.

The northern portion of the site, north of Civic Center Drive is proposed as temporary overflow parking. One parcel for this parking is identified in the LRSP as the Civic Center site, the underlying zoning for which is Shopping Commercial (SC); the remaining two parcels are zoned, Multi-Family Residential (RD-20), and Office Park (BP). The No Project Alternative would not require the use of the area north of Civic Center Drive for parking. Development of this portion of the Project site is not considered for this alternative.

The wetland preserve on the Project site (designated OS) is currently restricted by a US Army Corps of Engineer (USACE) permit, limiting the use of that portion of the site for wetland preserve only. Under the LRSP (and the No Project Alternative), this area would remain a preserved area, unless the USACE restrictions are removed, at which time this area could be developed for parkland usage. Consistent with the current USACE permit, this area could include an informal pedestrian walkway leading to an overlook near the wetland preserve, providing a view into the preserved area. Impacts to this area would be the same as the proposed Project.

COMPARATIVE ANALYSIS

Impacts Reduced Compared to the Proposed Project

Aesthetics – Visual Character

The No Project Alternative would include less intense development of the site, with turf for fields and structures only for restrooms and concession buildings, which would be less intense than the proposed Project. With fewer structures, it would avoid the new and more severe significant and unavoidable aesthetics impact of the proposed Project related to changes in visual character and views of the Project site due to the height of the proposed water and adventure park recreational features and their proximity to residential uses. The No Project Alternative would include lighted ball fields, which require tall, high-intensity lighting in order to light large expanses of turf. Therefore, this alternative of the site consistent with the CP designation would result in light and glare impacts that exceed the potential impacts of the proposed Project, which would include tall attractions that are lighted, but with less intense lighting, as it would be for smaller areas (e.g., wayfinding).

Air Quality

Development of uses consistent with the CP designation would result in significant and unavoidable construction-related air quality impacts, as identified in the LRSP EIR. However, the quantity of emissions would be expected to be less with the No Project Alternative because the installation of lighted turf/play areas and related amenities would require less extensive earthwork and minimal equipment, as compared to the proposed Project that would include a substantial amount of paving, which is a generator of criteria emissions. Operational emissions from visitor and spectator vehicle trips would also be less than the proposed Project, because ball fields would generate fewer vehicle trips than the proposed Project.

Hazards

The No Project Alternative would not include swimming pools or water play areas that would require water purification or other water treatment chemicals. While the use and handing of these chemicals would not be significant for the proposed Project, the use and handling of these chemicals under the proposed Project would represent a greater risk than under the No Project Alternative.

Noise

Under the No Project Alternative, there would be less intense development, because it would include grading for turf fields, and minimal construction for restrooms and concession buildings, relative to construction of the proposed Project. As a result, it is expected that construction noise and vibration would be less than the proposed Project. There would be fewer visitor and spectator trips, which would result in less operational noise associated with vehicle use. Crowd noise could be intense at times and at particular fields (associated with different games), but it would be distributed over the site and would not likely exceed that of the proposed Project due to fewer people on the site. The No Project Alternative would also avoid Project significant noise impacts associated with extended hours of operation (till 10:00 p.m.) and noise sources associated with the water and adventure park facilities adjacent to residential uses to the east.

Public Utilities

Development consistent with the CP designation, assuming the range of uses summarized above, would result in less potable water demand than the proposed Project. Water demand associated irrigated turf would be consistent with demand assumed in the LRSP. If any artificial turf would be used for this alternative, it would further reduce potable water demand. This alternative would require substantially less potable water. Because there would be fewer people on the site using restrooms and there would be no shower facilities required, there would be less wastewater generated, as well as less solid waste. Demand for electricity and natural gas would also be reduced, as it would only be required for lighting and concessions, and no water pumping would be required.

Transportation

Traffic impacts would be reduced compared to the proposed Project because there would be fewer visitor and spectator trips to the sports facilities, compared to the proposed Project. This would avoid increased impacts to the operation of the Elk Grove Boulevard/I-5 Southbound Ramp intersection, Civic Center Drive/Big Horn Boulevard intersection, Elk Grove Boulevard corridor, and I-5 and SR 99 freeway mainline operations.

Impacts Identical or Similar to the Proposed Project

The No Project Alternative would result in similar biological resources and cultural resources impacts as the proposed Project because this alternative would result in disturbance to the same area as the proposed Project; therefore the same resources would be affected.

Impacts More Severe Than the Proposed Project

Under the No Project Alternative, no environmental impacts would be more severe than those identified for the proposed Project.

Conclusion

The No Project Alternative (Alternative 1) would result in fewer impacts compared to the proposed Project. This alternative, however, would not achieve any of the Project objectives.

6.3 ALTERNATIVE 2 – MODIFIED PROJECT DESIGN ALTERNATIVE

CHARACTERISTICS

The Modified Project Design Alternative would relocate the two easternmost water slides and zip line recreational features in to the center and northern part of the complex. The aquatic competition venue would be situated in the eastern part of the site. Lighting in the water and adventure park and the competition venue would be the same as with the proposed Project.

COMPARATIVE IMPACTS

Impacts Reduced Compared to the Proposed Project

Aesthetics, Light, and Glare

As described in Impact 4.1.2, the Project would be visually intrusive to residential uses to the east (currently under construction), because slide complexes and zip line towers would be located along the eastern boundary of the water and adventure park. These recreational features could be up to 79 feet tall (see **Table 4.1-1**). The landscaping proposed for the eastern boundary of the Project site includes large evergreen conifer trees that would ultimately reach 80 feet in height and have a 40-foot spread. Tall shrubs are proposed to provide further screening.

Under the Modified Project Design Alternative, the slide complexes and zip line towers would be situated approximately 350 feet west from the eastern boundary in the center of the complex, compared to the proposed Project. These features would be less visible, and the landscaping boundary would provide greater screening through a combination of density, height, and distance from the observer. The tallest feature in the competition venue would be the 10-meter dive platform. Relocation of the slides complexes and zip line towers farther west would reduce the visual impact, but it would not completely eliminate views of the tallest water and adventure park recreational features.

Light and glare impacts of the proposed Project were determined to be significant and unavoidable even with implementation of mitigation measures identified in the certified LRSP EIR. Under the Modified Project Design Alternative, the tallest sources of light (i.e., lighting on the recreational features) would be farther away, compared to the Project, which would reduce the impact, but it would still remain significant and unavoidable.

Noise

Relocation of the water and adventure park to the center of the Project site and the competition venue to the east would still generate the same hourly and maximum non-transportation noise levels as the proposed Project. However, the water and adventure park would be farther away from residences to the east (approximately 350 feet west). This would shift the highest noise-level sources (i.e., the areas shown in red on **Figures 4.7-5 and 4.7-7** in Section 4.7, Noise) west. With implementation of mitigation measure **MM 4.7.4** (sound barriers) and landscaping, some reduction in off-site noise levels at the nearest residences could be achieved. However, additional analysis would be required to determine whether the levels would be below City standards. For purposes of this analysis, it is conservatively concluded this would still be a significant and unavoidable impact, but it would be reduced in magnitude.

Impacts Identical or Similar to the Proposed Project

Under the Modified Project Design Alternative, the ground disturbance footprint, water and adventure park recreational features, competition venue components, operational characteristics, and parking would be identical to the proposed Project. Development of this alternative would result in the same air quality, biological resources, cultural resources, greenhouse gas, hazardous materials, public utilities, and transportation impacts as the proposed Project.

Impacts More Severe Than the Proposed Project

Under the Modified Project Design Alternative, no environmental impacts would be more severe than those identified for the proposed Project.

Conclusion

The Modified Project Design Alternative (Alternative 2) would reduce aesthetics and noise impacts. However, aesthetics impacts related to the height of the water and adventure park recreational features relative to adjacent residential development and nighttime lighting would still be significant and unavoidable. With regard to non-transportation noise, the sound barrier proposed in mitigation measure MM 4.7.4 may provide additional attenuation of noise levels relative to off-site residences because there would be more separation between the water and adventure park features and the residences to the east. However, with the competition venue amplification system and spectator seating in the eastern part of the site, noise levels at the eastern property boundary could still exceed City standards, but the levels may be less than estimated for the proposed Project. This alternative would achieve all of the Project objectives.

6.4 ALTERNATIVE 3 – REDUCED PROJECT ALTERNATIVE

CHARACTERISTICS

The Reduced Project Alternative would include a water and adventure park, but at a reduced scale to fit within a smaller site footprint, and situated in the central portion of the Project site. This alternative would include fewer water slides and zipline towers. There would be no development between a line extended south of the water treatment facility and the eastern project boundary adjoining residential development (**Figure 6-1**). The western edge of undeveloped portion would be landscaped as described for the proposed Project. This alternative would include the competition venue identical to the proposed Project in terms of its features and location and related amenities. This alternative would require less overflow parking because there would be fewer guests.

COMPARATIVE ANALYSIS

Impacts Reduced Compared to the Proposed Project

Aesthetics

Under the Reduced Project Alternative, the slide complexes and zip line would be situated approximately 350 feet west from the eastern boundary in the center of the complex, compared to the proposed Project, and there would be fewer features. These features would be less visible to off-site residences because they would be farther away. In addition, the landscaping boundary would also provide greater screening through a combination of density, height, and distance. The tallest feature in the competition venue would be the 10-meter dive platform. This would likely reduce the visual impact, but it would not completely eliminate views of the tallest water and adventure park recreational features.

Air Quality

The Reduced Project Alternative would result in fewer construction emissions because of the smaller site footprint and the construction of fewer water and adventure park recreation features. However, impacts would likely remain significant and unavoidable.

Noise

Relocation of the water and adventure park to the center of the Project site with fewer features and the competition venue to the north would be expected to generate reduced hourly and maximum non-transportation noise levels compared to the proposed Project because there would be fewer guests. In addition, the water and adventure park would be farther away from residences to the east (approximately 350 feet west). This would shift the highest noise-level sources to the west (i.e., the areas shown in red on **Figures 4.7-5 and 4.7-7** in Section 4.7, Noise). With implementation of mitigation measure **MM 4.7.4** (sound barriers) and landscaping, some reduction in off-site noise levels at the nearest residences could be achieved. However, additional analysis would be required to determine whether the levels would be below City standards. For purposes of this analysis, it is conservatively concluded this would still be a significant and unavoidable impact, but it may be reduced in magnitude.

Public Utilities

Because there would be fewer features in the water park, water and utility demand would be reduced compared to the proposed Project. The Reduced Project Alternative would generate wastewater that would be conveyed through SASD systems. The volume would be less than the proposed Project, but it would still contribute to the cumulative significant and unavoidable impact identified for the proposed Project.

Transportation

There would be fewer vehicle trips associated with the Reduced Project Alternative because the reduced-scale water and adventure park features would not accommodate as many guests as the Project. However, it is conservatively assumed that the number of trips may not be reduced to levels that would eliminate the significant and unavoidable project and cumulative impacts. Additional study would be required to quantify specific reductions.

Impacts Identical or Similar to the Proposed Project

As described above, impacts would be reduced compared to the proposed Project.

Impacts More Severe Than Proposed Project

Under the Reduced Project Alternative, no environmental impacts would be more severe than those identified for the proposed Project.

Conclusion

The Reduced Project Alternative (Alternative 3) would reduce aesthetics and noise impacts. However, aesthetics impacts related to the height of the water and adventure park recreational features relative to adjacent residential development and nighttime lighting would still be significant and unavoidable. This alternative would achieve all of the Project objectives.

6.5 COMPETITION VENUE ONLY ALTERNATIVE

CHARACTERISTICS

The Competition Venue Only Alternative would consist of the competition venue identical to the proposed Project in terms of its location, features, and related amenities. The competition venue would consist of a competition swimming pool (50 meters by 25 yards, 2-meter depth) and a dive pool (25 meters by 25 yards, 17-foot depth) with a signature 10-meter diving tower (33 feet in height), a 3-meter springboard, and a 1-meter springboard, and seating for approximately 1,100 spectators. There would be no water and adventure park. The competition venue would operate year-round Monday through Saturday with anticipated hours of 7:00 a.m. to 9:00 p.m., as well as on Sundays during the months of May through July from 7:00 a.m. to 7:00 p.m. This alternative would require less parking than the proposed Project because there would be fewer visitors than would be generated by the competition venue and water and adventure parks combined.

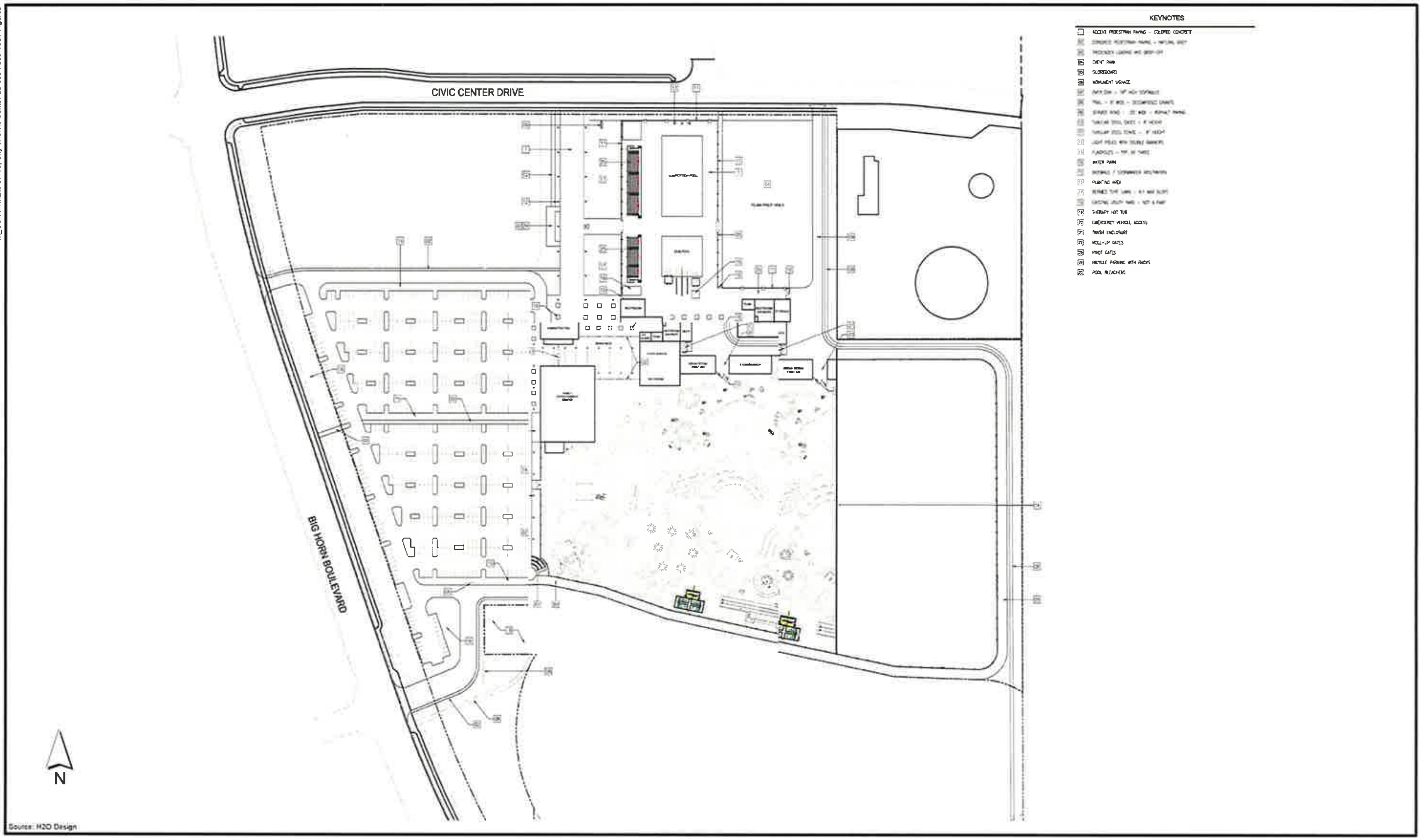
COMPARATIVE ANALYSIS

Impacts Reduced Compared to the Proposed Project

Aesthetics

Under the Competition Venue Only Alternative, there would be a change in visual character of the northern and western part of the site. The tallest components of this alternative would be the 10-meter (approximately 33 feet) dive platform and light poles (20 feet tall). There would be direct views of the site from residential development southwest of the site along Big Horn Boulevard and from future residential development bordering and southeast of the site north of Lotz Parkway. However, the appearance of the venue features when viewed from off-site locations would not be out of scale or inconsistent with surrounding development. Nighttime lighting would be visible to off-site residential areas; however, compared to the proposed Project, the real and perceived amount of light emanating from the site would be reduced and would be limited to the northernmost part of the Project site. Identical to the proposed Project, this alternative would be required to implement LRSP EIR mitigation measures MM 4.11.2a to reduce light "spillage" and glare along the property lines of adjoining land uses and use of a two foot-candle lighting standard where stadium lighting may be installed and used. This alternative would contribute to sky glow effects, but not to same extent as the proposed Project because there would be fewer sources of nighttime lighting. Unlike the proposed Project, this alternative would not result in an increase in the severity of significant and unavoidable light and glare impacts identified in the LRSP EIR, but light and glare impacts would still be significant and unavoidable.

T:_CS\Work\Elk Grove, City of\Civic Center 20-0054 099-1001\Figures



ELK GROVE

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FIGURE 6.1
Reduced Project Alternative

Air Quality

The Competition Venue Only Alternative would result in fewer construction emissions because of the smaller site footprint (competition venue and parking only). However, this alternative would still require a substantial amount of grading and paving, which would generate NO_x emissions. Implementation of LRSP EIR mitigation measures MM 4.3.1a through MM 4.3.1g, which are required to reduce Project impacts, would also apply to this alternative. However, even with implementation of these mitigation measures, construction NO_x impacts would remain significant and unavoidable for this alternative.

Noise

Under the Competition Venue Only Alternative, there would be no water and adventure park generating noise at the eastern Project site boundary adjoining residential development. This alternative would, therefore, avoid the significant and unavoidable Project non-transportation impacts (Impact 4.7.4 and Impact 4.7.5) and cumulative impacts (Impact 4.7.7 and Impact 4.7.8). Because there would be no impact with respect to residential uses on the east side of the Project site, mitigation measure **MM 4.7.4**, which would require tall sound barriers and landscaping, would not be required. As shown in **Table 4.7-10** (Representative Non-Transportation Noise Levels in Section 4.7 [Noise]), typical noise levels for a competitive swim center would be 58.3 dB L_{eq}, with a maximum of 71.3 dB. There are no noise-sensitive receptors adjoining that location in the Project site. Further, implementation of LRSP EIR mitigation measure **MM 4.4.3.b** would ensure the amplified sound system at the competition venue would be operated in accordance with City policies and standards. This alternative would also likely avoid the construction vibration impact of the proposed Project (Impact 4.7.2 and mitigation measure **MM 4.7.2)** because special methods would not be needed to install the pool and related facilities and amenities, and there would be no construction adjacent to residential uses.

Public Utilities

The Competition Venue Only Alternative would generate wastewater that would be conveyed through SASD systems. The volume would be less than the proposed Project, but it would still contribute to the cumulative significant and unavoidable impact identified for the proposed Project regarding conveyance to the SRCSD WWTP (Impact 4.8.2.2).

Transportation

The Competition Venue Only Alternative could generate vehicle trips associated with up to 2,000 swimmers and approximately 1,100 spectators over the course of a day for a large event. The number of vehicle trips would be less than that generated by the proposed Project because there would be no water and adventure park guests. However, it is conservatively assumed that the number of trips may not be reduced to levels that would eliminate the significant and unavoidable Project and cumulative impacts of the proposed Project. Additional study would be required to quantify specific reductions and evaluate resulting levels of service against significance thresholds.

Impacts Identical or Similar to the Proposed Project

As described above, impacts would be avoided and/or reduced compared to the proposed Project.

Impacts More Severe Than Proposed Project

Under the Competition Venue Only Alternative, no environmental impacts would be more severe than those identified for the proposed Project.

Conclusion

The Competition Venue Only Alternative (Alternative 4) would eliminate the significant and unavoidable aesthetic and noise impacts of the proposed Project, and it would reduce, but not to a level of insignificance, the light and glare, construction air emissions (NO_x), wastewater, and traffic impacts. This alternative would achieve all of the Project objectives with the exception of objective 4 (commercial recreation facility).

6.6 ENVIRONMENTALLY SUPERIOR ALTERNATIVE

Table 6.0-1 provides a summary of the potential impacts of the alternatives evaluated in this section, as compared with the potential new significant or more severe significant and unavoidable impacts of the proposed Project.

TABLE 6.0-1
COMPARISON OF ALTERNATIVES TO THE PROPOSED PROJECT

Issue	Alternative 1 (No Project)	Alternative 2 (Modified Project Design)	Alternative 3 (Reduced Project)	Alternative 4 (Competition Venue Only)
Aesthetics, Light, and Glare	R(aesthetics) W (light and glare)	R	R	A (aesthetics) R (light and glare)
Air Quality (Construction NO_x emissions)	R	S	R	R
Hazards and Hazardous Materials	R	S	R	R
Noise (Non-Transportation Noise)	R	S	R	A
Public Utilities (Cumulative Wastewater)	R	S	R	R
Transportation (Intersections and SR 99 operations)	R	S	R	R

A – New significant or significant/Unavoidable impacts avoided
R –Impacts reduced compared to the proposed Project
S –Impacts identical or similar to the proposed Project
W –Impacts more severe than the proposed Project

Based on the evaluation described in this section, Alternative 4 (Competition Venue Only Alternative) is the environmentally superior alternative. It would reduce (but not avoid) the significant and unavoidable aesthetics impact of the proposed Project, it would lessen other environmental impacts, and it would meet all of the Project objectives, with the exception of the annual number of guests for the recreation facility.

6.7 ALTERNATIVE NOT SELECTED FOR DETAILED ANALYSIS

CEQA Guidelines Sections 15126.6(f) establishes that the range of alternatives required in an EIR is governed by "rule of reason" that requires the EIR to set forth only those alternatives necessary to permit a reasoned choice, as noted above. The range of alternatives is limited to those that would avoid or substantially lessen any of the significant effects of the project. As provided in Section 15126.6(f)(1), among the factors the lead agency may consider in addressing the feasibility of an alternative are site suitability, availability of infrastructure, general plan consistency, and whether the project proponent can reasonably acquire, control, or otherwise have access to an alternative site. The key question concerning the consideration of an alternate location to the proposed Project is whether any of the significant effects identified for the Project would be avoided or substantially lessened by putting the Project in another location (Section 15126[f][2]). The CEQA Guidelines also establish that an EIR need not consider an alternative whose effect cannot be reasonably ascertained and whose implementation is remote and speculative.

ALTERNATE/OFF-SITE LOCATION

The proposed Southeast Area Community Plan and SPA currently under consideration by the City includes a Sports Complex Overlay, which provides an opportunity for future siting of a sports complex within the Project area. The Sports Complex Overlay would provide the option to develop this portion of the Southeast Policy Area with a regional complex with tournament-type sports fields and/or a stadium, on-site parking, associated lighting, and support facilities for facility maintenance, concessions, and player support facilities. A specific location or possible locations for a sports complex has not been identified as part of that project. An aquatics complex with a water and adventure park, competition venue, and parking is a type of use that could be generally consistent with a Sports Complex Overlay.

However, at this time, the City has not received any specific development proposals for such a sports complex facility. The Community Plan and SPA provide the facility as a future option, but it is not certain whether such a facility will be developed. It is also unknown what SPA land uses it could displace. The EIR (currently being considered by the City) addresses the potential for the development of a regional sports complex to the greatest extent feasible, but if an application for a sports complex is received, additional environmental review would be required.

An alternate location for the proposed Project was therefore not considered as an alternative to the proposed Project requiring analysis in this Draft SEIR. It cannot be ascertained which impacts, if any, it would avoid or reduce, and it is unknown whether the Project proponent could reasonably acquire, control, or otherwise have access to the alternative site.

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7.0 Report Preparation

CITY OF ELK GROVE

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Leslie Parker .... Biologist

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Ashley Grey.. Publication

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Noise Analysis

Ambient Air Quality & Noise Consulting

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Cultural Resource Analysis

Peak & Associates Consulting Archeology

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APPENDICES

Appendix A - LRSP MMRP Conditions and Mitigation Measures

EXHIBIT "C" CONDITIONS OF APPROVAL – MITIGATION MEASURES

	Conditions of Approval / Mitigation Measure	Timing/ Implementation	Enforcement/ Monitoring	Verification (date and Signature)
1	The development approved by this action is for the Laguna Ridge Specific Plan, as described in the City Council report and associated Exhibits and Attachments dated December 3, 2003.	On-Going	City of Elk Grove Development Services	
2	This action does not relieve the applicant of the obligation to comply with all ordinances, statutes, regulations, and procedures.	On-Going	City of Elk Grove Development Services	
3	The Applicant shall hold harmless the City, its Council Members, its Planning Commission, officers, agents, employees, and representatives from liability for any award, damages, costs and fees incurred by the City and/or awarded to any plaintiff in an action challenging the validity of this permit or any environmental or other documentation related to approval of this permit. Applicant further agrees to provide a defense for the City in any such action.	On-Going	City of Elk Grove Development Services	
4	Comply with, record, and pay fees for the Mitigation Monitoring and Reporting Program (MMRP) associated with the Laguna Ridge Specific Plan. Until the MMRP has been recorded and the estimated MMRP fee of $10,000 has been paid, no final parcel map for the subject property shall be approved and no grading, building, sewer connection, water connection, or occupancy permit from the City or County will be approved. (Planning)	Prior to Issuance of Grading Permit	City of Elk Grove Development Services	

As Part of the Final Approval of the Specific Plan				
MM 4.2.4a	All internal intersections shall be designed to meet City Level of Service Standards (LOS D or better). This requirement shall be incorporated into the specific plan.	As part of the final approval of the Specific Plan	City of Elk Grove Development Services	
Prior to Approval of Subsequent Development Projects				
MM 4.2.1a	Elk Grove Boulevard shall be widened between Bruceville Road and Auto Center Drive to three lanes in each direction. Fair-share funding for the above roadway improvement shall be determined by the modification of the Interim Roadway Fee Program (Elk Grove Municipal Code Chapter 16.89) or its successor roadway fee program. The project applicant shall pay its fair share as well as any established City of Elk Grove development impact fees for roadway facilities. Project public facility financing plans and/or programs shall establish the timing of this improvement to ensure it is in place prior to LOS E operations and consistent with the Specific Plan's infrastructure phasing provisions.	Prior to approval of subsequent development projects.	City of Elk Grove Development Services.	

MM 4.2.1c	Grant Line Road between SR 99 and Waterman Road shall be widened from one to two lanes in each direction. Fair-share funding for the above roadway improvement shall be determined by the modification of the Interim Roadway Fee Program (Elk Grove Municipal Code Chapter 16.89) or its successor roadway fee program. The project applicant shall pay its fair share as well as any established City of Elk Grove development impact fees for roadway facilities. Project and/or public facility financing plans and/or programs shall establish the timing of this improvement to ensure it is in place prior to LOS E operations.	Prior to approval of subsequent development projects	City of Elk Grove Development Services	
MM 4.2.1d	Poppy Ridge Road between Bruceville Road and West Stockton Boulevard shall be reconstructed to provide 12-foot travel lanes and minimum 6-foot paved shoulder. Fair-share funding for the above roadway improvement shall be determined by the modification of the Interim Roadway Fee Program (Elk Grove Municipal Code Chapter 16.89) or its successor roadway fee program. The project applicant shall pay its fair share as well as any established City of Elk Grove development impact fees for roadway facilities. Project public facility financing plans and/or programs shall establish the timing of this improvement to ensure it is in place prior to LOS E operations and consistent with the Specific Plan's infrastructure phasing provisions.	Prior to approval of subsequent development projects	City of Elk Grove Development Services	

MM 4.2.1e	West Stockton Boulevard between Kammerer Road and Poppy Ridge Road shall be reconstructed to provide 12-foot travel lanes and minimum 6-foot paved shoulder. Fair-share funding for the above roadway improvement shall be determined by the modification of the Interim Roadway Fee Program (Elk Grove Municipal Code Chapter 16.89) or its successor roadway fee program. The project applicant shall pay its fair share as well as any established City of Elk Grove development impact fees for roadway facilities. Project and/or public facility financing plans and/or programs shall establish the timing of this improvement to ensure it is in place prior to LOS E operations and consistent with the Specific Plan's infrastructure phasing provisions.	Prior to approval of subsequent development projects	City of Elk Grove Development Services	
MM 4.2.1f	West Stockton Boulevard between Poppy Ridge Road and the Auto Mall Access to provide 12-foot travel lanes and minimum 6-foot paved shoulder. Fair-share funding for the above roadway improvement shall be determined by the modification of the Interim Roadway Fee Program (Elk Grove Municipal Code Chapter 16.89) or its successor roadway fee program. The project applicant shall pay its fair share as well as any established City of Elk Grove development impact fees for roadway facilities. Project public facility financing plans and/or programs shall establish the timing of this improvement to ensure it is in place prior to LOS E operations and consistent with the Specific Plan's infrastructure phasing provisions.	Prior to approval of subsequent development projects	City of Elk Grove Development Services	

MM 4.2.2a	The following lane configurations shall be provided at the Elk Grove Boulevard/Bruceville Road intersection. • One shared through/right-turn lane, one through lane, and one left-turn lane on the northbound approach. • One right-turn lane, two through lanes, and two left-turn lanes on the southbound approach. • One right-turn lane, two through lanes, and one left-turn lane on the westbound approach. Fair-share funding for the above roadway improvement shall be determined by the modification of the Interim Roadway Fee Program (Elk Grove Municipal Code Chapter 16.89) or its successor roadway fee program. The project applicant shall pay its fair share as well as any established City of Elk Grove development impact fees for roadway facilities. Project public facility financing plans and/or programs shall establish the timing of this improvement to ensure it is in place prior to LOS E operations and consistent with the Specific Plan's infrastructure phasing provisions.	Prior to approval of subsequent development projects	City of Elk Grove Development Services	

MM 4.2.2b	The following lane configurations shall be provided at the Elk Grove Boulevard/Big Horn Boulevard intersection. • One right-turn lane, two through lanes, and one left-turn lane on the northbound approach. • One right-turn lane, two through lanes, and two left-turn lanes on the southbound approach. • One shared through/right-turn lane, two through lanes, and two left-turn lanes on the eastbound approach. • One shared through/right-turn lane, two through lanes, and two left-turn lanes on the westbound approach. Fair-share funding for the above roadway improvement shall be determined by the modification of the Interim Roadway Fee Program (Elk Grove Municipal Code Chapter 16.89) or its successor roadway fee program. The project applicant shall pay its fair share as well as any established City of Elk Grove development impact fees for roadway facilities. Project public facility financing plans and/or programs shall establish the timing of this improvement to ensure it is in place prior to LOS E operations and consistent with the Specific Plan's infrastructure phasing provisions.	Prior to approval of subsequent development projects	City of Elk Grove Development Services	

MM 4.2.2c	The following lane configurations shall be provided at the Elk Grove Boulevard/West Laguna Springs Drive intersection. • Two right-turn lanes, two through lanes, and one left-turn lane on the northbound approach. • One right-turn lane, one through lanes, and two left-turn lanes on the southbound approach. • One right-turn lane, three through lanes, and two left-turn lanes on the eastbound approach. • One right-turn lane, three through lanes, and two left-turn lanes on the westbound approach. • Right-turn overlap phasing for the northbound right-turn lane at the Elk Grove Boulevard/West Laguna Springs Drive intersection. Fair-share funding for the above roadway improvement shall be determined by the modification of the Interim Roadway Fee Program (Elk Grove Municipal Code Chapter 16.89) or its successor roadway fee program. The project applicant shall pay its fair share as well as any established City of Elk Grove development impact fees for roadway facilities._ Project public facility financing plans and/or programs shall establish the timing of this improvement to ensure it is in place prior to LOS E operations and consistent with the Specific Plan's infrastructure phasing provisions.	Prior to approval of subsequent development projects	City of Elk Grove Development Services	

MM 4.2.2d	Right-turn overlap phasing for the northbound right-turn movement shall be provided at the Elk Grove Boulevard/Auto Center Drive intersection. This improvement would require modification of the existing signal equipment and signal phasing. Fair-share funding for the above roadway improvement shall be determined by the modification of the Interim Roadway Fee Program (Elk Grove Municipal Code Chapter 16.89) or its successor roadway fee program. The project applicant shall pay its fair share as well as any established City of Elk Grove development impact fees for roadway facilities. Project and/or public facility financing plans and/or programs shall establish the timing of this improvement to ensure it is in place prior to LOS E operations.	Prior to approval of subsequent development projects	City of Elk Grove Development Services	
MM 4.2.2f	Install traffic signal and provide the following lane configurations at the Elk Grove Boulevard/Waterman Road intersection. • A shared through/right-turn lane and an exclusive left-turn lane on all approaches. Fair-share funding for the above roadway improvement shall be determined by the modification of the Interim Roadway Fee Program (Elk Grove Municipal Code Chapter 16.89) or its successor roadway fee program. The project applicant shall pay its fair share as well as any established City of Elk Grove development impact fees for roadway facilities. Project and/or public facility financing plans and/or programs shall establish the timing of this improvement to ensure it is in place prior to LOS E operations.	Prior to approval of subsequent development projects	City of Elk Grove Development Services	

MM 4.2.2g	Install a traffic signal and provide the following lane configurations at the Poppy Ridge Road/Bruceville Road intersection. • A shared through/right-turn lane and an exclusive left-turn lane on the northbound, southbound, and eastbound approaches. • One right-turn lane, one through lane, and one left-turn lane on the westbound approach. Fair-share funding for the above roadway improvement shall be determined by the modification of Interim Roadway Fee Program (Elk Grove Municipal Code Chapter 16.89) or its successor roadway fee program. The project applicant shall pay its fair share as well as any established City of Elk Grove development impact fees for roadway facilities. Project public facility financing plans and/or programs shall establish the timing of this improvement to ensure it is in place prior to LOS E operations and consistent with the Specific Plan's infrastructure phasing provisions.	Prior to approval of subsequent development projects	City of Elk Grove Development Services	
MM 4.2.2h	The applicant shall participate in the Interim Roadway Fee Program (Elk Grove Municipal Code Chapter 16.89) or its successor roadway fee program which includes reconstruction of the SR 99/Grant Line Road interchange. Fair-share funding for the SR 99/Grant Line Road improvement project shall be determined by the modification of the Interim Roadway Fee Program (Elk Grove Municipal Code Chapter 16.89) or its successor roadway fee program. The project applicant shall pay its fair share as well as any established City of Elk Grove development impact fees for roadway facilities.	Prior to approval of subsequent development projects	City of Elk Grove Development Services	

MM 4.2.2i	Right-turn overlap phasing for the southbound right-turn movement shall be provided at the Laguna Boulevard/Franklin Boulevard intersection. Fair-share funding for the above roadway improvement shall be determined by the modification of the Interim Roadway Fee Program (Elk Grove Municipal Code Chapter 16.89) or its successor roadway fee program. The project applicant shall pay its fair share as well as any established City of Elk Grove development impact fees for roadway facilities. Project and/or public facility financing plans and/or programs shall establish the timing of this improvement to ensure it is in place prior to LOS E operations.	Prior to approval of subsequent development projects	City of Elk Grove Development Services	
MM 4.2.2j	Right-turn overlap phasing shall be provided for the northbound right-turn movement at the intersection of Laguna Boulevard with Big Horn Boulevard. Fair-share funding for the above roadway improvement shall be determined by the modification of the Interim Roadway Fee Program (Elk Grove Municipal Code Chapter 16.89) or its successor roadway fee program. The project applicant shall pay its fair share as well as any established City of Elk Grove development impact fees for roadway facilities. Project and/or public facility financing plans and/or programs shall establish the timing of this improvement to ensure it is in place prior to LOS E operations.	Prior to approval of subsequent development projects	City of Elk Grove Development Services	

MM 4.2.2k	The following lane configurations shall be provided at the Elk Grove Boulevard/Elk Grove-Florin Road intersection. • A shared through/right-turn lane, one through lane, and two left-turn lanes on the northbound approach. • In addition, provide protected left-turn phasing on the northbound and southbound approaches. Fair-share funding for the above roadway improvement shall be determined by the modification of the Interim Roadway Fee Program (Elk Grove Municipal Code Chapter 16.89) or its successor roadway fee program. The project applicant shall pay its fair share as well as any established City of Elk Grove development impact fees for roadway facilities. Project and/or public facility financing plans and/or programs shall establish the timing of this improvement to ensure it is in place prior to LOS E operations. If the additional right-of-way necessary for the improvement cannot be obtained, the project applicant shall pay their fair-share of the estimated cost of the improvement and cost of the right-of-way into the City's future Traffic Impact Fund.	Prior to approval of subsequent development projects	City of Elk Grove Development Services	

MM 4.2.3d	Bruceville Road between Elk Grove Boulevard and Laguna Boulevard shall be widened from two to three lanes in each direction. Fair-share funding for the above roadway improvement shall be determined by the modification of the Interim Roadway Fee Program (Elk Grove Municipal Code Chapter 16.89) or its successor roadway fee program. The project applicant shall pay its fair share as well as any established City of Elk Grove development impact fees for roadway facilities. Project and/or public facility financing plans and/or programs shall establish the timing of this improvement to ensure it is in place prior to LOS E operations.	Prior to approval of subsequent development projects	City of Elk Grove Development Services	
MM 4.2.5a	Right-turn overlap phasing for the southbound right-turn movement at the Laguna Boulevard/Franklin Boulevard intersection. Fair-share funding for the above roadway improvement shall be determined by the modification of the Interim Roadway Fee Program (Elk Grove Municipal Code Chapter 16.89) or its successor roadway fee program. The project applicant shall pay its fair share as well as any established City of Elk Grove development impact fees for roadway facilities. Project and/or public facility financing plans and/or programs shall establish the timing of this improvement to ensure it is in place prior to LOS E operations.	Prior to approval of subsequent development projects	City of Elk Grove Development Services	

MM 4.2.5b	The following lane configurations shall be provided at the Elk Grove Boulevard/Big Horn Boulevard intersection. • One right-turn lane, two through lanes, and two left-turn lanes on the northbound approach. • One right-turn lane, two through lanes, and two left-turn lanes on the southbound approach. • One right-turn lane, three through lanes, and two left-turn lanes on the eastbound approach. • One right-turn lane, three through lanes, and two left-turn lanes on the westbound approach. • Right-turn overlap phasing on all approaches to the intersection, which would require modification of the existing signal equipment and signal phasing. Fair-share funding for the above roadway improvement shall be determined by the modification of the Interim Roadway Fee Program (Elk Grove Municipal Code Chapter 16.89) or its successor roadway fee program. The project applicant shall pay its fair share as well as any established City of Elk Grove development impact fees for roadway facilities. Project public facility financing plans and/or programs shall establish the timing of this improvement to ensure it is in place prior to LOS E operations and consistent with the Specific Plan's infrastructure phasing provisions.	Prior to approval of subsequent development projects	City of Elk Grove Development Services	

MM 4.2.5c	The following lane configurations shall be provided at the Elk Grove Boulevard/West Laguna Springs Drive intersection. • One right-turn lane, two through lanes, and one left-turn lane on the southbound approach. • Two right-turn lanes, two through lanes and one left-turn lane on the northbound approach. • One right-turn lane, three through lanes, and two left-turn lanes on the westbound approach. • One right-turn lane, three through lanes, and one left-turn lane on the eastbound approach. • Protected left-turn phasing for the north and southbound left-turn movements. • Provide right-turn overlap phasing on the northbound and southbound approaches, which would require modification of the existing signal equipment and signal phasing. Fair-share funding for the above roadway improvement shall be determined by the modification of the Interim Roadway Fee Program (Elk Grove Municipal Code Chapter 16.89) or its successor roadway fee program. The project applicant shall pay its fair share as well as any established City of Elk Grove development impact fees for roadway facilities. Project public facility financing plans and/or programs shall establish the timing of this improvement to ensure it is in place prior to LOS E operations and consistent with the Specific Plan's infrastructure phasing provisions.	Prior to approval of subsequent development projects	City of Elk Grove Development Services	

MM 4.2.5d	The following lane configurations shall be provided at the Elk Grove Boulevard/Auto Center Drive intersection. • Two right-turn lanes, one through lane, and one left-turn lane on the northbound approach. • Provide protected left-turn phasing on the northbound and southbound approaches. • Provide right-turn overlap phasing on the northbound approach. Right-turn overlap phasing would require modification of the existing signal equipment and signal phasing. Fair-share funding for the above roadway improvement shall be determined by the modification of the Interim Roadway Fee Program (Elk Grove Municipal Code Chapter 16.89) or its successor roadway fee program. The project applicant shall pay its fair share as well as any established City of Elk Grove development impact fees for roadway facilities. Project and/or public facility financing plans and/or programs shall establish the timing of this improvement to ensure it is in place prior to LOS E operations.	Prior to approval of subsequent development projects	City of Elk Grove Development Services	

MM 4.2.5f	The following lane configurations shall be provided at the Elk Grove Boulevard/East Stockton Boulevard intersection. • One right-turn lane, one through lane, and one left-turn lanes on the southbound approach. • A shared through/right-turn lane and two left-turn lanes on the northbound approach. • Provide protected left-turn phasing on the northbound and southbound approaches. Fair-share funding for the above roadway improvement shall be determined by the modification of the Interim Roadway Fee Program (Elk Grove Municipal Code Chapter 16.89) or its successor roadway fee program. The project applicant shall pay its fair share as well as any established City of Elk Grove development impact fees for roadway facilities. Project and/or public facility financing plans and/or programs shall establish the timing of this improvement to ensure it is in place prior to LOS E operations.	Prior to approval of subsequent development projects	City of Elk Grove Development Services.	

MM 4.2.5g	The following lane configurations shall be provided at the Elk Grove Boulevard/Bruceville Road intersection. • One right-turn lane on the westbound approach. Fair-share funding for the above roadway improvement shall be determined by the modification of the Interim Roadway Fee Program (Elk Grove Municipal Code Chapter 16.89) or its successor roadway fee program. The project applicant shall pay its fair share as well as any established City of Elk Grove development impact fees for roadway facilities. Project public facility financing plans and/or programs shall establish the timing of this improvement to ensure it is in place prior to LOS E operations.	Prior to approval of subsequent development projects	City of Elk Grove Development Services	
MM 4.2.5j	Install a traffic signal and coordinate it with the Hood-Franklin Road/I-5 Northbound Ramps intersection. This improvement will require coordination and approval from Caltrans and Sacramento County. Fair-share funding for the above roadway improvement shall be determined by the modification of the Interim Roadway Fee Program (Elk Grove Municipal Code Chapter 16.89) or its successor roadway fee program. The project applicant shall pay its fair share as well as any established City of Elk Grove development impact fees for roadway facilities.	Prior to approval of subsequent development projects	City of Elk Grove Development Services	

MM 4.2.5k	Install a traffic signal and coordinate it with the Hood-Franklin Road/I-5 Southbound Ramps intersection. This improvement will require coordination and approval from Caltrans and Sacramento County. Fair-share funding for the above roadway improvement shall be determined by the modification of the Interim Roadway Fee Program (Elk Grove Municipal Code Chapter 16.89) or its successor roadway fee program. The project applicant shall pay its fair share as well as any established City of Elk Grove development impact fees for roadway facilities.	Prior to approval of subsequent development projects	City of Elk Grove Development Services	
MM 4.2.5i	A traffic signal shall be installed and the following lane configurations shall be provided at the Elk Grove-Florin Road/East Stockton Boulevard intersection. • One through lane and one left-turn lane on the southbound approach. • One right-turn lane and two left-turn lanes on the westbound approach. • One right-turn lane and one through lane on the northbound approach. • This improvement would require 3-phase signal operation. Fair-share funding for the above roadway improvement shall be determined by the modification of the Interim Roadway Fee Program (Elk Grove Municipal Code Chapter 16.89) or its successor roadway fee program. The project applicant shall pay its fair share as well as any established City of Elk Grove development impact fees for roadway facilities. Project and/or public facility financing plans and/or programs shall establish the timing of this improvement to ensure it is in place prior to LOS E operations.	Prior to approval of subsequent development projects	City of Elk Grove Development Services	

MM 4.2.5l	Right-turn overlap phasing shall be provided for the southbound right-turn movement at the intersection of Grant Line Road and Waterman Road. Fair-share funding for the above roadway improvement shall be determined by the modification of the Interim Roadway Fee Program (Elk Grove Municipal Code Chapter 16.89) or its successor roadway fee program. The project applicant shall pay its fair share as well as any established City of Elk Grove development impact fees for roadway facilities. Project and/or public facility financing plans and/or programs shall establish the timing of this improvement to ensure it is in place prior to LOS E operations.	Prior to approval of subsequent development projects	City of Elk Grove Development Services	
MM 4.2.5m	Right-turn overlap phasing shall be provided for the northbound right-turn movement at the intersection of Laguna Boulevard with West Laguna Springs Drive. Fair-share funding for the above roadway improvement shall be determined by the modification of the Interim Roadway Fee Program (Elk Grove Municipal Code Chapter 16.89) or its successor roadway fee program. The project applicant shall pay its fair share as well as any established City of Elk Grove development impact fees for roadway. Project and/or public facility financing plans and/or programs shall establish the timing of this improvement to ensure it is in place prior to LOS E operations.	Prior to approval of subsequent development projects	City of Elk Grove Development Services	

MM 4.2.5n	Right-turn overlap phasing shall be provided for the southbound right-turn movement at the intersection of Elk Grove and Franklin Boulevards. Fair-share funding for the above roadway improvement shall be determined by the modification of the Interim Roadway Fee Program (Elk Grove Municipal Code Chapter 16.89) or its successor roadway fee program. The project applicant shall pay its fair share as well as any established City of Elk Grove development impact fees for roadway facilities. Project and/or public facility financing plans and/or programs shall establish the timing of this improvement to ensure it is in place prior to LOS E operations.	Prior to approval of subsequent development projects	City of Elk Grove Development Services	
MM 4.2.5o	Right-turn overlap phasing shall be provided for the southbound right-turn movement at the Grant Line Road/Bradshaw Road intersection. Fair-share funding for the above roadway improvement shall be determined by the modification of the Interim Roadway Fee Program (Elk Grove Municipal Code Chapter 16.89) or its successor roadway fee program. The project applicant shall pay its fair share as well as any established City of Elk Grove development impact fees for roadway facilities. Project and/or public facility financing plans and/or programs shall establish the timing of this improvement to ensure it is in place prior to LOS E operations.	Prior to approval of subsequent development projects	City of Elk Grove Development Services	

MM 4.7.3b	Subsequent non-residential projects shall be required to locate all storage areas away from any drainage features and provide water quality control measures in storm drainage facilities such as grease and sediment traps, vegetative filters, and containment structures for hazardous materials. This requirement shall be reflected on site plans and improvement plans. Water quality control features shall be consistent with the City's NPDES permit (NPDES No. CAS082597).	As a condition of approval of subsequent non-residential projects.	City of Elk Grove Public Works and Development Services	
MM 4.8.5	The project applicant shall design the subsequent public and private projects within the plan area to avoid impacts to potential habitat for VELB (elderberry shrubs; see Figure 4.8-1 of the Draft EIR), if feasible. If project development is required in areas that may impact elderberry shrubs containing stems measuring 1.0 inch or greater in diameter at ground level (development within 100 feet of shrub dripline), the project applicant shall perform one of the following measures: 1. Fence and flag all areas to be avoided during construction activities. In areas where encroachment on the 100-foot buffer has been approved by the USFWS, provide a minimum setback of at least 20 feet from the dripline of each elderberry plant. 2. Brief contractors on the need to avoid damaging the elderberry plants and the possible penalties for not complying with these requirements. 3. Erect signs every 50 feet along the edge of the avoidance area with the following information: "This area is habitat of the valley elderberry longhorn beetle, a threatened species, and must not be disturbed. This species is protected by the Endangered Species Act of 1973, as amended. Violators are subject to prosecution, fines and	Prior to approval of subsequent development and prior to and during construction activities	U.S. Fish and Wildlife Service and City of Elk Grove Development Services	

	imprisonment." The signs should be clearly readable from a distance of 20 feet and must be maintained for the duration of construction. 4. Instruct work crews about the status of the beetle and the need to protect its elderberry host plant. Restoration and Maintenance 1. Restore any damage done to the buffer area (area within 100 feet of elderberry plants) during construction. Provide erosion control and re-vegetate with appropriate native plants. 2. Buffer areas must continue to be protected after construction from adverse effects of the project. Measures such as fencing, signs, weeding and trash removal are usually appropriate. 3. No insecticides, herbicides, fertilizers or other chemicals that might harm the beetle or its host plant should be used in the buffer areas, or within 100 feet of any elderberry plant with one or more stems measuring 1.0 inch or greater in diameter at ground level. 4. The applicant must provide a written description of how the buffer areas are to be restored, protected and maintained after construction is completed. 5. Mowing of grasses/ground cover may occur from July through April to reduce fire hazard. No mowing should occur within five feet of elderberry plant stems. Mowing must be done in a manner that avoids damaging plants (e.g., striping away bark through careless use of mowing/trimming equipment).			

	If the shrub cannot be avoided, then a mitigation plan shall be developed and implemented in consultation with USFWS consistent with the conservation guidelines for the valley elderberry longhorn beetle, which likely includes one or more of the following: • Obtain credits at an approved mitigation bank; or • Implement an onsite mitigation and monitoring plan that includes transplantation of the shrub and planting of elderberry seedlings. The mitigation plan shall be approved by the USFWS prior to acceptance by the City. Any required onsite mitigation shall be incorporated into subsequent improvement and construction plans.			
MM 4.8.6	The project applicant shall design the subsequent public and private projects within the plan area to avoid impacts to potential habitat for vernal pool invertebrates by providing an appropriate setback from the edge of each pool, as determined by the City in consultation with the U.S. Fish and Wildlife Service, if feasible. If pools impacted cannot be avoided, the project proponent shall implement the following measures: 1. Completion of an onsite mitigation and monitoring plan that includes onsite creation/preservation of the pools. Mitigation shall be to the satisfaction of the U.S. Fish and Wildlife Service, the U.S. Army Corps of Engineers (as part of Section 404 permitting), and the City, or 2. Credits may be obtained at an approved mitigation bank.	Prior to the approval of subsequent development and prior to construction activities	U.S. Fish and Wildlife Service, U.S. Army Corps of Engineers, and City of Elk Grove Development Services	

As Part of Subsequent Development Application Submittals				
MM 4.5.3a	As part of subsequent applications on non-participating properties, the project applicant shall provide the City with a Phase I Site Assessment to determine whether ash or a former burn site is present on the subject property.	Prior to acceptance of an application for subsequent development on non-participating properties as complete.	City of Elk Grove Development Services	
MM 4.8.1a	A tree survey shall be conducted by an arborist certified by the International Society of Arboriculture (ISA) to enumerate and evaluate all trees on the site that meet the standards in the City Tree Ordinance (as amended). All tree locations shall be mapped onto all subsequent improvement and construction plans, tentative subdivision maps, and maps associated with development projects and rezones. Direct loss of protected trees shall be clearly identified on all subsequent maps and plans.	As part of the subsequent development application submittals and prior to construction activities	City of Elk Grove Development Services	
MM 4.8.1b	Unless identified for removal as described in MM 4.8.1, all trees that meet the following criteria shall be avoided by construction and protected during all construction activity: • Native and Non-Native Oak Trees with a trunk at least six inches (6") in diameter at a height of 4.5 feet. • All other trees with a trunk diameter of twelve inches (12") at a height of 4.5 feet. Trees to be retained shall be protected by implementation of the following measures: 1. Before initiating any construction activity near protected trees, install chain link fencing or a	As part of the subsequent development application submittals and prior to and during construction activities	City of Elk Grove Development Services	

	similar protective barrier at least one foot outside the dripline of each tree or as far as possible from the tree trunk where the existing road is within the tree dripline. The barrier fencing will remain in place for the duration of construction activity. 2. Any required pruning of oak trees shall be conducted before construction activity begins. Oak trees that require pruning of branches larger than two inches in diameter shall be pruned by a certified arborist. No pruning of the six-foot-diameter tree will be permitted. 3. No signs, ropes, cables (except cable that may be installed by a certified arborist or other professional tree expert), or other items shall be attached to the oak trees. 4. No vehicles, construction equipment, mobile home/office, supplies, materials, or facilities shall be driven, parked, stockpiled, or located within the driplines of oak trees. 5. No grading shall be allowed within the driplines of oak trees except where paved roadway already exists and where it can be demonstrated that the health of the tree will not be significantly impacted. Removal of pavement and grading within the driplines of oak trees shall be conducted in the presence of a certified arborist to ensure that damage and stress to any oak tree is minimized. 6. Any work necessary within the driplines shall be conducted by hand. 7. Paving within the driplines of oak trees shall be stringently minimized. When paving is			

	absolutely necessary, porous material shall be used or a piped aeration system shall be installed under the supervision of a certified arborist. 8. Landscaping beneath oak trees may include non-plant material such as boulders, cobbles, and wood chips. The only plant species that shall be planted within the driplines of oak trees are those that are tolerant of the natural semi-arid environs of the trees. Limited drip irrigation approximately twice per summer is recommended for understory plants. 9. No sprinkler system shall be installed in such a manner that it irrigates within the driplines of oak trees. Trees that are subject to protection and which cannot be protected shall be replaced with in-kind species in accordance with established tree planting specifications, the combined diameter of which shall equal the combined diameter of the trees removed. If trees cannot be preserved or replaced onsite, off-site mitigation or the payment of an in-lieu fee shall be provided in accordance with the provisions of the City Tree Preservation Ordinance (as amended). The above requirements shall be implemented prior to and during construction activities for all subsequent public and private projects. Improvement and construction plans shall specifically note this measure.			

MM 4.8.3	As part of each subsequent project application submittal to the City, the project applicant shall identify all potential wetland resources that occur on-site for City review (such as those identified in Figure 4.8-1 of the Draft EIR. If wetland resources are proposed to be impacted, the project applicant shall do the following: 1. The applicant shall delineate the extent of jurisdictional waters of the U.S. to be impacted by the proposed project and, if required, apply for a Section 404 permit from the U.S. Army Corps of Engineers (Corps). Wetland areas that would be lost or disturbed shall be replaced or rehabilitated on a "no-net-loss" basis. Onsite creation of wetland habitat is preferred to offsite mitigation. Habitat restoration, rehabilitation, and/or replacement shall be at a location and by methods agreeable to the Corps and City. 2. The applicant shall obtain a Section 401 water quality waiver of certification from the RWQCB. 3. A mitigation plan shall be implemented that includes <u>one</u> of the following: (a) Completion of an onsite Mitigation and Monitoring Plan that includes onsite creation/preservation of the wetlands. (b) Credits may be obtained at an approved mitigation bank. The project applicant shall provide written evidence to the City from the Corps and the RWQCB that this measure has been complied with prior to recordation of final maps.	A part of subsequent tentative map applications and completed prior to final map recordation.	City of Elk Grove Development Services, Corps, and RWQCB.	

Prior to Approval of Tentative Subdivision Maps, Parcel Maps, and Site Plans				
MM 4.2.8	Prior to the approval of tentative subdivision, parcel maps and subsequent development associated with land areas along Big Horn Blvd and Bruceville Road right-of-way for future light rail stations and lines at locations along either Big Horn Boulevard or Bruceville Road shall be dedicated based on consultation with the City of Elk Grove and Sacramento Regional Transit.	Prior to approval of tentative subdivision and parcel maps and subsequent development	City of Elk Grove Development Services and Sacramento Regional Transit	
MM 4.4.3a	When residential tentative subdivision maps include and/or are located adjacent to school and park sites, the residential subdivisions shall be designed to meet City noise standards set forth in Table 4.4-6 of the Draft EIR. If the noise levels from the school and park facilities is expected to exceed the applicable standard, the project applicant shall implement appropriate mitigation measures. Appropriate mitigation measures include walls, berms, and buffers that would ensure compliance with applicable standards, as determined through the adopted Design Review procedures. Evidence of compliance shall be provided to the City.	Prior to approval of residential tentative subdivision maps	City of Elk Grove Development Services, Elk Grove Unified School District, and Elk Grove Community Services District	
MM 4.4.3b	Prior to approval of a non-residential use that will abut a residential use and has the potential to generate noise, the project applicant shall demonstrate compliance with City noise standards set forth in Table 4.4-6 of the Draft EIR. If the noise levels from the facility exceed the applicable standard, the project applicant shall implement appropriate mitigation measures. Appropriate mitigation measures include walls, berms, and buffers that would ensure compliance with applicable standards, as determined through the adopted Design Review procedures.	Prior to approval of permits and/or plans for non-residential uses adjacent to existing or planned residential uses	City of Elk Grove Development Services	

MM 4.4-5	Prior to development of any noise-sensitive uses (as defined by the City of Elk Grove Noise Element) along Elk Grove Boulevard, Big Horn Road and Poppy Ridge Road, the project applicant shall identify specific noise mitigation measures for areas that would be located within the 60 dB Ldn traffic noise contours shown in **Table 4.4-12** of the Draft EIR that would attenuate noise levels in compliance with City noise standards for traffic noise as shown in **Table 4.4-9** of the Draft EIR. Potential design features for noise attenuation are listed below. a. <u>Setbacks</u> (i.e., open space, frontage roads, recreational areas, and storage yards) typically reduce noise attenuation by 4 to 6 dB per doubling of distance from the source. b. <u>Barriers</u> (i.e., walls, berms, or structures) to achieve a noise reduction ranging from 5 to 15 dB. Earth berms provide approximately 3 dB more attenuation than a wall. c. <u>Site design</u> (i.e., building location) to reduce noise levels. d. <u>Building design</u> (i.e., location of noise-sensitive uses within a building) to reduce the impact of noises on inhabitants. e. <u>Building façades</u> (i.e., utilizing all features of the building façade including the closed windows) to reduce noise. f. <u>Vegetation</u> (i.e., trees and other vegetation) 100 feet of dense foliage can achieve a 5 dB attenuation of traffic noise. g. <u>Noise-reducing paving materials</u> (i.e., rubberized asphalt) reduce traffic noise by approximately 4 dB.	Prior to approval of tentative subdivision maps and development projects along Elk Grove Boulevard, Big Horn Road and Poppy Ridge Road.	City of Elk Grove Development Services	

MM 4.6.1.1a	Prior to each tentative subdivision and/or parcel map approval, the project applicant shall submit to the City, information documenting adequate availability of water supplies and associated infrastructure facilities for the proposed development consistent with facilities and phasing set forth in the Laguna Ridge Specific Plan water study (Wood-Rogers, 2000). Subsequent project applications shall not be approved by the City until proof has been provided that water supplies are available and approval from SCWA has been received.	Prior to tentative subdivision and/or parcel map approval	City of Elk Grove Development Services and Sacramento County Water Agency	
MM 4.6.2.1	Prior to each tentative subdivision or parcel map, the project applicant shall be required to demonstrate that the permanent sewer system, consistent with the Preliminary Sewer Master Plan for the Laguna Ridge Specific Plan (Wood-Rodgers, 2002) adequately serves the subsequent project. This demonstration may take the form of plans and/or reports, which shall be reviewed and approved by the City consistent with the Specific Plan infrastructure phasing provisions. The project applicant shall also pay the required sewer connection and capacity fees that are used to fund expansion of trunk and interceptor facilities.	Prior to the approval of each tentative subdivision or parcel map	City of Elk Grove Development Service, Sacramento Regional County Sanitation District and County Sanitation District.	
MM 4.6.2.2	Prior to approval of each tentative subdivision or parcel map that would utilize the interim sewer facilities, the project applicant shall be required to demonstrate that there is adequate sewer capacity to support the proposed project. This will include confirmation from Sacramento Regional County Sanitation District and County Sanitation District-1 on the availability of sewer capacity.	Prior to approval of each tentative subdivision and parcel map	City of Elk Grove Development Services, Sacramento Regional County Sanitation District, and County Sanitation District-1	

MM 4.7.2	Prior to the approval of each subsequent tentative subdivision map, the project applicant shall be required to demonstrate that drainage facilities, consistent with the Storm Drainage Master Plan for Laguna Ridge Specific Plan (Wood-Rogers, 2002), will adequately serve the subsequent project, consistent with City standards and off-site flooding impacts would not result, and that such facilities are either available or will be available upon site development. This demonstration may take the form of plans and/or reports, which shall be reviewed and approved by the City consistent with the Specific Plan infrastructure phasing provisions.	Prior to the approval of each subsequent tentative parcel and/or subdivision map	City of Elk Grove Public Works	
MM 4.8.2a	Prior to approval of site plans and/or tentative subdivision maps for each parcel proposed for development within 50 feet of the perennial marsh shown in **Figure 4.8-1** of the Draft EIR, a focused plant survey for Sanford's arrowhead is required to determine the presence/absence of this species. The surveys shall be conducted by a qualified botanist retained by the City and funded by the project applicant during the blooming period (May-August) for this species.	Prior to approval of site plans and/or tentative subdivision map for parcels proposed for development within 50 feet of the perennial marsh.	City of Elk Grove Development Services	

MM 4.8.2b	If this species is not found onsite, no further measures are required. However, if Sanford's arrowhead is found, each population shall be mapped and technical assistance from CNPS and the U.S. Fish and Wildlife Service shall be requested. To the maximum extent feasible, plant populations shall be preserved within open space non-disturbance areas. However, if these areas cannot be avoided, land-supporting populations of the impacted species shall be purchased and shall be permanently protected. Under the direction of CNPS and the U.S. Fish and Wildlife Service, preservation strategies shall be implemented, which may include seed and soil collection or plant transplant. At a minimum, mitigation shall occur at a 1:1 ratio (one plant preserved for every plant impacted). A detailed mitigation plan that includes species, habitat, preserve management, and monitoring strategies shall be developed in consultation with the U.S. Fish and Wildlife Service.	Prior to approval of site plans and/or tentative subdivision maps for parcels proposed for development within 50 feet of the perennial marsh.	City of Elk Grove Development Services and U.S. Fish and Wildlife Service	

MM 4.10.1a	Prior to subsequent approvals on non-participating properties, a detailed cultural resources field survey of the subject property shall be conducted by the City and funded by the project applicant. The cultural resources field survey shall identify any cultural resource finds and will set out measures to mitigate any impacts to any significant resources as defined by CEQA, California Register of Historic Resources and/or National Historic Preservation Act. Mitigation methods to be employed include, but are not limited to, the following: • Redesign of the subsequent development project to avoid the resource. The resource site shall be deeded to a non-profit agency to be approved by the City for maintenance of the site. • If avoidance is determined infeasible by the City, then the resource shall be mapped, stabilized, and capped pursuant to appropriate standards. • If the City determines capping infeasible, then the resource shall be excavated and recorded to appropriate standards.	Prior to subsequent approvals on non-participating properties	City of Elk Grove Development Services	
MM 4.10.2	Prior to subsequent approvals on non-participating properties that include the buildings at 8533 and 8551 Poppy Ridge Road, a detailed evaluation of the historical significance of the structures at the two sites listed above shall be conducted by the City and funded by the project applicant. If the evaluation is negative (i.e., not historically significant), no further mitigation is required. If the evaluation determines that the two sites are historically significant, the subsequent development project shall be redesigned to avoid the building site(s). The building site(s) will be deeded to a non-profit agency to be approved by the City for the maintenance of the site(s). If avoidance is	Prior to subsequent approvals on non-participating properties associated with 8533 and 8551 Poppy Ridge Road	City of Elk Grove Development Services	

	determined to be infeasible by the City, all required documentation (in addition to the items above) shall be conducted in accordance with appropriate standards: • The development of a site-specific history and appropriate contextual information regarding the particular resource; in addition to archival research and comparative studies, this task could involve limited oral history collection; • Accurate mapping of the noted resources, scaled to indicate size and proportion of the structures; • Architectural description of affected structures; • Photo documentation of the designated resources, both in still and video format; • Recordation of measured architectural drawings, in the case of specifically designated buildings of higher architectural merit; and • Any historical significant artifacts within buildings and the surrounding area shall be recorded and deposited with the appropriate museum. These buildings shall be preserved and relocated off-site.			

Prior Final Subdivision Map Approval				
MM 4.6.4.2a	The project applicant shall provide a permanent fire station within the plan area and sufficient funds to purchase associated facilities including an aerial truck, and urban interface engine. These improvements and facilities, included in the Laguna South Public Facilities Fee Program, shall be provided to the satisfaction of the Elk Grove Community Services District Fire Department (EGCSDFD). Fair-share funding for the above fire facilities and services improvements shall be determined by the modification of the Laguna South Public Facilities Fee Program by the annexation of the Laguna Ridge Specific Plan into the Fee Program. Project public facility financing plans and/or programs shall establish the timing of these improvements to ensure they are in place to the satisfaction of the EGCSDFD. Establishment of the financing plans and/or programs shall occur prior to the approval of any subsequent development project. Development may occur prior to approval of the project's financing plans and/or programs if the project applicant constructs the EGCSDFD required improvement and purchases associated facilities concurrent with the development of their specific project.	Prior to approval of the Project Financing Program and/or Plan	EGCSD and City of Elk Grove Development Services	
MM 4.6.5.1	The project's general financing program and/or plan shall demonstrate that there are sufficient sources of funding to provide adequate law enforcement facilities and equipment for new officers required to maintain the one officer per 1,000 residents ratio with the addition of the project.	Prior to approval of the Project Financing Program and/or Plan	Elk Grove Police Department and City of Elk Grove Development Services	

MM 4.4.4	The project proponent shall ensure that a disclosure statement shall be recorded against the property and be provided to all prospective buyers of properties within the proposed plan area notifying such persons of the presence of existing and future noise-producing agricultural-related activities in the immediate Specific Plan area. The disclosure statement shall be reviewed and approved by City of Elk Grove Development Services.	Prior to each final subdivision map approval	City of Elk Grove Development Services	
MM 4.1.2b	The project proponent shall ensure that a disclosure statement shall be recorded against the property and be provided to all prospective buyers of properties within the proposed plan area notifying such persons of the presence of existing and future noise-producing agricultural-related activities in the immediate Specific Plan area. The disclosure statement shall be reviewed and approved by City of Elk Grove Development Services.	Prior to the sale to prospective buyers	City of Elk Grove Development Services	
Prior to Issuance of Demolition Permits				
MM 4.5.2	Prior to the issuance of demolition permits for existing onsite structures, asbestos material sampling shall be conducted to determine if materials are present. Any identified asbestos containing building materials present in each of the structures to be dismantled shall be removed under acceptable engineering methods and work practices by a licensed asbestos abatement contractor prior to removal. These practices include, but are not limited to: containment of the area by plastic, negative air filtration, wet removal techniques and personal respiratory protection and decontamination. The process shall be designed and monitored by a California Certified Asbestos Consultant. The abatement and monitoring plan shall be developed and submitted for review and approval by the appropriate regulatory agency (the Sacramento Metropolitan Air Pollution Management District).	Prior to the issuance of demolition permits	Sacramento Metropolitan APMD, City of Elk Grove Development Services	

MM 4.5.4a	Prior to the issuance of demolition permits for existing onsite structures, all loose and peeling paint shall be removed and disposed of by a licensed and certified lead paint removal contractor, in accordance with local, state, and federal regulations.	Prior to issuance of demolition permits	City of Elk Grove Development Services	
MM 4.5.4b	The demolition contractor shall be informed that all paint on the buildings shall be considered as containing lead. The contractor shall take appropriate precautions to protect his/her workers, the surrounding community, and to dispose of construction waste containing lead paint in accordance with local, state, and federal regulations.	Prior to issuance of demolition permits and included in construction contracts.	City of Elk Grove Development Services	
Prior to Issuance of Grading Permits or Approval of Improvement Plans				
MM 4.1.1	The applicant of subsequent projects shall protect one acre of existing farmland land of equal or higher quality for each acre of Prime Farmland, Unique Farmland or Farmland of Statewide Importance that would be developed as a result of the project. Areas of Prime Farmland and Farmland of Statewide Importance within the project site are depicted in Figure 4.1-1 of the Revised Draft EIR. This protection may consist of the establishment of farmland conservation easement, farmland deed restriction or other appropriate farmland conservation mechanism that ensures the preservation of that land from conversion in perpetuity, but may also be utilized for compatible wildlife habitat conservation efforts (e.g., Swainson's hawk foraging habitat mitigation). The farmland/wildlife habitat land to be preserved shall be located within Sacramento County, outside the City of Elk Grove city limits, bounded by Hood-Franklin Road, Kammerer Road, Grant Line Road and the Jackson Highway, by Dillard Road and Clay Station Road, by the Sacramento County line, and by the Sacramento River, and must have adequate water supply to support agricultural use. In deciding whether to approve the land proposed for preservation by the	Prior to the issuance of grading permits	City of Elk Grove Development Services	

	Project applicant, the City shall consider the benefits of preserving farmlands in proximity to other protected lands. The preservation of off-site farmland may be done at one time, prior to the City's approval of the project's first grading permit, or may be done in increments with the build-out of the project, with preservation occurring prior to each grading permit approval. Grading plans shall include the farmland information contained in Figure 4.1-1 of the Revised Draft EIR and the acreage and type of farmland impacted. In addition, the City shall impose the following minimum conservation easement content standards: a) All owners of the agricultural/wildlife habitat mitigation land shall execute the document encumbering the land. b) The document shall be recordable and contain an accurate legal description of the agricultural/wildlife habitat mitigation land. c) The document shall prohibit any activity which substantially impairs or diminishes the agricultural productivity of the land. If the conservation easement is also proposed for wildlife habitat mitigation purposes, the document shall also prohibit any activity which substantially impairs or diminishes the wildlife habitat suitability of the land. d) The document shall protect any existing water rights necessary to maintain agricultural uses on the land covered by the document, and retain such water rights for ongoing use on the agricultural/wildlife habitat mitigation land. e) Interests in agricultural/habitat mitigation land shall be held in trust by an entity acceptable to the City and/or the City in perpetuity. The entity shall not sell, lease, or convey any interest in agricultural/wildlife habitat mitigation land which it shall acquire without the prior written approval of the City. f) The applicant shall pay to the City an			

	agricultural/wildlife habitat mitigation monitoring fee to cover the costs of administering, monitoring and enforcing the document in an amount determined by the receiving entity, not to exceed 10% of the easement price paid by the applicant, or a different amount approved by the City Council, not to exceed 15% of the easement price paid by the applicant. g) The City shall be named a beneficiary under any document conveying the interest in the agricultural/wildlife habitat mitigation land to an entity acceptable to the City. h) If any qualifying entity owning an interest in agricultural/wildlife habitat mitigation land ceases to exist, the duty to hold, administer, monitor and enforce the interest shall be transferred to another entity acceptable to the City or to the City. Before committing to the preservation of any particular farmland pursuant to this measure, the Project proponent shall obtain the City's approval of the farmland proposed for preservation.			
MM 4.4.2	Prior to the commencement of pile driver operations in proximity to residential areas, an assessment of vibrations induced by pile driving at the site shall be completed. During indicator pile driving, vibrations should be measured at regular intervals to determine the levels of vibration at various distances from pile driving equipment. The indicator piles shall be driven at locations at least 400 feet from any existing residents. After monitoring, methods of reducing the peak ground velocities to less than 0.4 inches/second shall be determined and implemented during production pile driving. Methods to reduce vibrations, if needed, could include cut-off trenches, and the use of smaller hammers. The vibration reduction techniques to be used should be described in a note	Prior to any pile driving activities	City of Elk Grove Development Services	

	attached to the construction plans for the project to be reviewed and approved by the appropriate City regulatory agency prior to issuance of building permits. This requirement shall be included as a note in all project construction plans.			
MM 4.3.1f	This mitigation measure shall be implemented by all subsequent projects within the Laguna Ridge Specific Plan. An individual project <u>*may*</u> be exempt from the following mitigation if it is less than 20 acres in size and will generate less than 400 pounds per day of NO_x, as determined by SMAQMD and the City. All other projects (not meeting the two exemption criteria) will be required to implement the following measures. (a) <u>**Category 1**: Reducing NO_x emissions from off-road diesel powered equipment.</u> The prime contractor shall provide a plan for approval by the City of Elk Grove and SMAQMD demonstrating that the heavy-duty (>50 horsepower) off-road vehicles to be used in the construction project, and operated by either the prime contractor or any subcontractor, will achieve a fleet-averaged 20 percent NO_x reduction and a 45 percent particulate reduction compared to the most recent CARB fleet average. The prime contractor shall submit to the City of Elk Grove and SMAQMD a comprehensive inventory of all off-road construction equipment, equal to or greater than 50 horsepower, that will be used an aggregate of 40 or more hours during the construction project. The inventory shall include the horsepower rating, engine production year, and hours of use or fuel throughput for each piece of equipment. The inventory shall be updated and submitted monthly throughout the duration of the project, except that an inventory shall not be required for any 30-day period in which no construction activity occurs; and,	Prior to and during construction activities.	City of Elk Grove Development Services and SMAQMD.	

	(b) **Category 2:** Controlling visible emissions from off-road diesel powered equipment. The prime contractor shall ensure that emissions from all off-road diesel powered equipment used on the Specific Plan area do not exceed 40 percent opacity for more than three minutes in any one hour. Any equipment found to exceed 40 percent opacity shall be repaired immediately, and the City of Elk Grove and SMAQMD shall be notified within 48 hours of identification of non-compliant equipment. A visual survey of all in-operation equipment shall be made at least weekly, and a month summary of the visual results shall be submitted to the City and SMAQMD throughout the duration of the project, except that the monthly summary shall not be required for any 30-day period in which no construction activity occurs. The monthly summary shall include the quantity and type of vehicles surveyed as well as the dates of each survey. The SMAQMD and/or other officials may conduct periodic site inspections to determine compliance. Nothing in this section shall supersede other SMAQMD or state rules or regulation. In the event construction equipment meeting the requirements set forth above is determined not to be available, the project applicant shall notify the City and SMAQMD. Upon verification that required low-emission construction equipment is not available, the City may waive this measure. This requirement shall be included as a note in all project construction plans.			
MM 4.3.2	The project applicant shall implement all measures proposed in the AQ-15 Plan provided in Appendix 4.3 of the Draft EIR for each subsequent project to reduce the emissions from both mobile and stationary sources. Each subsequent development project shall be checked for compliance with the AQ-15 Plan.	During all planning and development phases of the project.	City of Elk Grove Development Services and SMAQMD.	

MM 4.8.4a	Within 30 days prior to commencement of construction activities, a pre-construction survey of land within 200 feet of all wetlands, channels, ponds, and other such waterways within the plan area shall be conducted by a qualified biologist retained by the City and funded by the project applicant who is approved by the Service's Sacramento Fish and Wildlife Office. In order to protect snakes, de-watering of areas within the site shall not occur prior to completion of the pre-construction surveys. The biologist will provide the Service with a field report form documenting the monitoring efforts within 24-hours of commencement of construction activities. The monitoring biologist shall be retained by the City and funded by the project applicant to routinely monitor construction activities. If a snake is encountered during construction activities, the monitoring biologist shall contact the City Development Services and will have the authority to stop construction activities until appropriate corrective measures have been completed or it is determined that the snake will not be harmed. Giant garter snakes encountered during construction activities should be allowed to move away from construction activities on their own. Capture and relocation of trapped or injured individuals can only be attempted by personnel or individuals with current Service recovery permits pursuant to Section 10(a) 1(A) of the Act. The biologist shall be required to report any incidental take to the Service immediately by telephone at (916) 979-2725 and by written letter addressed to the Chief, Endangered Species Division, within one working day. The project area shall be re-inspected whenever a lapse in construction activity of two weeks or greater has occurred. This mitigation measure does not apply to land areas where surveys within the active period of the snake have been conducted and no snakes were found.	30 days prior to grading and commencement of construction activities	USFWS and City of Elk Grove Development Services	

MM 4.8.4b	If a giant garter snake is identified within the plan area either during pre-construction surveys or during construction, the following shall occur: 1. The City of Elk Grove shall be notified; 2. The City shall suspend all construction activities on the site of the sighting and along any water feature within the plan area that is hydrologically connected to the site of the sighting; 3. Protocol surveys shall be conducted by qualified biologists retained by the City and funded by the project applicant who are approved by the Service's Sacramento Fish and Wildlife Office; 4. The project applicant shall consult with the USFWS and CDFG to determine appropriate mitigation for the species and habitat loss, possibly including Section 10 consultation with the USFWS and Section 2081 consultation with the CDFG; and, 5. The project applicant shall provide the City with proof of the consultation and compliance with USFWS and CDFG mitigation requirements before construction activities may resume. This mitigation measure does not apply to land areas where surveys within the active period of the snake have been conducted and no snakes were found.	Prior to and during construction activities	City of Elk Grove Development Services, CDFG and USFWS	
MM 4.8.4c	No grading or other construction activities shall be conducted from October 1 to April 30, which is the inactive period of the giant garter snake. More danger is posed to snakes during their inactive period, because they are occupying underground burrows or crevices and are more susceptible to direct effects, especially during excavation. A "no grading" period from October 1 to April 30 will apply to portions of the plan area located within 1,000 feet of ditches, canals, ponds, wetlands or other such areas. This mitigation	Prior to project grading and during construction activity	City of Elk Grove Development Services	

	measure does not apply to land areas where surveys within the active period of the snake have been conducted and no snakes have been found.			
MM 4.8.4d	Dewatering of ponds, ditches, canals and other such areas may begin any time after November 1, but no later than April 1 of the following year, once the absence of the species is determined or implementation of Mitigation Measure 4.8.4b has been completed. All water must be removed by April 15, or as soon thereafter as weather permits, and the habitat must remain dry without any standing water for 15 consecutive days after April 15 and prior to excavating or filling the dewatered habitat. This mitigation measure does not apply to land areas where surveys within the active period of the snake have been conducted and no snakes were found.	Prior to and during construction activity	City of Elk Grove Development Services and CDFG	
MM 4.8.4e	Construction personnel shall participate in a Service-approved worker environmental awareness program. Under this program, workers shall be informed about the presence of giant garter snakes and habitat associated with the species and that unlawful take of the animal or destruction of its habitat is a violation of the Act. Prior to construction activities, a qualified biologist approved by the Service shall instruct all construction personnel about: (1) the life history of the giant garter snake; (2) the importance of irrigation canals, marshes/wetlands, and seasonally flooded areas, such as rice fields, to the giant garter snake; and (3) the terms and conditions of the biological opinion. Proof of this instruction shall be submitted to the City and the Sacramento U.S. Fish and Wildlife Office. This mitigation measure does not apply to land areas where surveys within the active period of the snake have been conducted and no snakes were found.	Prior to project grading and construction	U.S. Fish and Wildlife Service and City of Elk Grove Development Services	

MM 4.8.7b	Prior to any and all subsequent construction activities in the plan area, a Swainson's hawk nest survey shall be conducted. The nest survey shall be conducted during the Swainson's hawk breeding season (March 15-August 31) and within 30 days of the start of construction activities for a 1/2-mile radius of the project site. In addition, a survey of the project site and areas within 500 feet of the project site shall be conducted once in April and once in May. If active Swainson's hawks nests are found, the applicant shall consult with the Department of Fish and Game and a qualified biologist shall be retained by the City and funded by the project applicant and clearing and construction shall be postponed or halted until additional nesting attempts no longer occur. If a nest tree is found on the subsequent project site prior to construction and is proposed for removal, then appropriate permits from CDFG shall be obtained and mitigation implemented pursuant to CDFG guidelines.	Prior to construction activities and throughout project construction	City of Elk Grove Development Services and CDFG	
MM 4.8.8a	If construction is proposed during the raptor-breeding season (February–August), a focused survey for raptors (including burrowing owls), migratory bird nests, and bat roosts shall be conducted within 30 days prior to the beginning of construction activities by a qualified biologist in order to identify active nests onsite. If active nests are found, no construction activities shall take place within *500 feet of the nest until the young have fledged. This 500-foot construction prohibition zone may be reduced based on consultation and approval by the California Department of Fish and Game. Trees containing nests, or burrows that must be removed as a result of project implementation shall be removed during the non-breeding season (late September to March). If no active nests are found during the focused survey, no further mitigation will be required. This mitigation measure does not apply to a Swainson's hawk nest. Because the Swainson's hawk is Federally protected	Prior to construction activities **Note: the city & DFG authorized reduction of the 500-foot no-construction zone to 250-feet. Per T. Echiburu 5-02-05*	City of Elk Grove Development Services and CDFG	

	and a State threatened species, the removal of any tree containing an occupied hawk nest could severely affect nesting raptors, fledgling and/or eggs. Therefore, if an occupied Swainson's hawk nest tree is found on the subsequent project site prior to construction and is proposed for removal, then appropriate permits from CDFG shall be obtained pursuant to CDFG guidelines.			
MM 4.8.8b	Within 30 days prior to the onset of construction activities outside of the breeding season (September–January), a qualified biologist shall conduct a burrow survey to determine if burrowing owls are present in the plan area. If burrowing owls are observed on the site, measures shall be implemented to ensure that no owls or active burrows are inadvertently buried during construction. Such measures include: flagging the burrow and avoiding disturbance; securing and preserving suitable habitat offsite; passive relocation and/or active relocation to move owls from the site. All measures shall be determined by a qualified biologist and approved by the CDFG. All burrowing owl surveys shall be conducted according to CDFG protocol. The protocol requires, at a minimum, four field surveys of the entire site and areas within 500 feet of the site by walking transects close enough that the entire site is visible. The survey shall be at least three hours in length, either from one hour before sunrise to two hours after or two hours before sunset to one hour after. Surveys shall not be conducted during inclement weather, when burrowing owls are typically less active and visible.	Prior to construction activities.	City of Elk Grove Development Services and CDFG	
MM 4.8.8c	Pursuant to the Migratory Bird Treaty Act and the California Fish and Game Code, if active songbird nests or active owl burrows are found within the survey area, clearing and construction within a minimum of 250 feet for owls and 100 feet for songbirds, or as determined by a qualified biologist to ensure	Thirty days prior to construction activities occurring between September 1 through January 31	City of Elk Grove Development Services and CDFG	

	disturbance to the nest will be minimized, shall be postponed or halted. Construction will not resume within the buffer until the nest is vacated and juveniles have fledged, as determined by the biologist, and there is no evidence of a second attempt at nesting. The perimeter of the protected area shall be indicated by bright orange temporary fencing. No construction activities or personnel shall enter the protected area, except with approval of the biologist.			
MM 4.5.1	Soil sampling shall be conducted within the areas of potential herbicide/pesticide contamination as identified in **Figure 4.5-3** of the Draft EIR. The soil samples shall be taken to assess the potential for persistent pesticide or herbicide residuals. If substances are detected at concentrations that could pose a health hazard and/or violate local, State, or Federal health standards, remediation of the affected areas shall be undertaken in accordance with the requirements of the City of Elk Grove and the Sacramento County Environmental Management Department. Development of the site shall not commence until the site is deemed remediated and clear for development by the City in consultation with the Sacramento County Environmental Management Department.	Prior to approval of improvement plans and/or grading plans for areas shown on Figure 4.5-4 of the Draft EIR.	City of Elk Grove Development Services and Sacramento Environmental Management Department.	

MM 4.5.3b	Prior to approval of improvement plans and/or a grading permit, a detailed surface investigation shall be conducted to determine if former burn dumps, chemical dumps or ash are present within each subsequent project site. If any ash or burn sites are identified, surface and subsurface soil sampling shall be conducted to determine if contamination exists. If substances are detected at concentrations that could pose a health hazard and/or violate local, State, or Federal health standards, remediation of the affected areas shall be undertaken in accordance with the requirements of the City of Elk Grove and the Sacramento County Environmental Management Department. Development of the site shall not commence until the site is deemed remediated and clear for development by the City in consultation with the Sacramento County Environmental Management Department.	Prior to approval of improvement plans and/or grading plans.	City of Elk Grove Development Services and Sacramento County Environmental Management Department.	
MM 4.6.4.2b	All signalized intersections installed by the project developer shall be equipped with traffic pre-emption devices at the time of installation.	Prior to improvement plan approval	EGCSD and City of Elk Grove Development Services	
MM 4.6.4.2c	Prior to approval of individual subdivision improvement plans, the water supply system plans for the subdivisions shall be reviewed by the City and Sacramento County Water Agency (SCWA) to ensure adequate fire flows for the project as specified by the EGCSD Fire Department.	Prior to improvement plan approval	EGCSD and City of Elk Grove Development Services& Sacramento County Water Agency (SCWA)	
MM 4.6.4.2d	All dead-end streets in excess of 150 feet in the Laguna Ridge Specific Plan area shall have emergency vehicle turn-arounds approved by the Elk Grove Community Services District Fire Department.	Prior to improvement plan approval	EGCSD and City of Elk Grove Development Services	

MM 4.6.4.2e	Prior to approval of individual subdivision improvement plans, the project applicant shall demonstrate that all required roadways, water mains, fire hydrants, and fire flow necessary to serve the subdivision shall be provided prior to the existence of any combustible construction of storage and that the installation of on-site or off-site fire protection equipment, including fire hydrants and water mains, meets the standards of the EGCSDFD and the Sacramento County Water Agency. The roadways shall be constructed to a 20-foot minimum width with an impervious surface to the satisfaction of the Elk Grove CSD and shall have good drainage.	Prior to improvement plan approval	EGCSD, Sacramento County Water Agency and City of Elk Grove Development Services	
MM 4.7.1	The project applicant shall submit to the City of Elk Grove proof that a Storm Water Pollution Prevention Plan (SWPPP) has been submitted to the California Regional Water Quality Control Board, Central Valley Region. The SWPPP shall be administered throughout all phases of grading and project construction. The SWPPP shall be included with all subsequent project improvement and grading plans and shall incorporate Best Management Practices (BMPs) to ensure that potential water quality impacts during construction phases are minimized. Examples of BMPs that may be implemented during site grading and construction could include inlet filters, filter barriers, silt fences, and sedimentation basins. The SWPPP shall be consistent with the City's NPDES permit (NPDES No. CAS082597).	Prior to the approval of subsequent improvement plans and grading plans and noted on plans	City of Elk Grove Public Works, and RWQCB	
MM 4.7.3a	Biofilter swales and vegetated strips shall be placed in the bottom of channel areas and be designed to provide biofiltration of pollutants in project runoff. The project engineer shall consult with the City when designing these areas, and the developer shall submit designs of the areas to the City for review and approval prior to approval of the improvement plans. Water quality control features shall be consistent with the City's NPDES permit (NPDES No. CAS082597).	Prior to approval of improvement plans for each water quality facility	City of Elk Grove Public Works, and CVRWQCB	

MM 4.6.4.2f	Within the Specific Plan Area, the following requirements will be met: 1. Non-combustible fences shall be provided along all developed areas adjacent to wetlands/creeks/open spaces. 2. Access shall be provided to all wetland corridors at the end of cul-de-sacs via rolled curbs and gates to the satisfaction of the EGCSDFD. Bike lanes adjacent to creeks shall be a minimum of 10 feet wide with a turning radius of not less than 35 feet inside and 45 feet outside. All bike paths shall be paved with 2 inches of AC over 4 inches of AB compacts to 95 percent. 3. Any bridges over creeks or wetland areas shall be capable of supporting 65,000 GVW. 4. At least 10 feet of greenbelt or other defensible space between noncombustible fences and the creek/wetland areas shall be provided.	Prior to improvement plan approval	EGCSD and City of Elk Grove Development Services	
MM 4.7.3c	All plan area storm drains shall provide a permanent storm drain message "No Dumping – Flows to Creek" or other approved message at each storm drain inlet. This may be accomplished with a stamped concrete impression (for curbs) or manufactured colored tiles, which are epoxied in place, adjacent to the inlet (for parking lots and areas without curbs).	Prior to improvement plan approval for drainage facilities	City of Elk Grove Public Works	

MM 4.8.1c	For trees that are planned to be removed and which meet the criteria contained in the City's Tree Preservation Ordinance (as amended) and the City of Elk Grove Draft General Plan Conservation and Air Quality Element, a tree mitigation plan shall be submitted to the City of Elk Grove in accordance with City requirements. Protected trees shall be replaced on a no-net-loss basis. Tree mapping required under mitigation measure MM 4.8.1a will delineate all protected trees planned to be removed. Mitigation areas, if needed, shall be within the plan area limits in landscape corridors and designated open space areas, if feasible. However, if the applicant demonstrates that onsite mitigation is not feasible, offsite mitigation within the city limits will be acceptable. Should the applicant contract with an organization for offsite tree mitigation, the City of Elk Grove shall review and may approve the contract if it meets the no-net-loss requirement and is otherwise deemed appropriate. The mitigation plan shall include the following components: 1. Number, location, size, and species of the replacement trees to be planted; 2. Methods of irrigation for planted trees; 3. Planting and maintenance schedule; and 4. Plan for care of planted trees for a three-year establishment period and replacement of any planted trees that do not survive.	Prior to issuance of grading permit	City of Elk Grove Development Services	

MM 4.8.7a	As a condition of approval of subsequent development (i.e., approval of improvement and construction plans), including offsite improvements, under the Plan, the project applicant shall mitigate the loss of Swainson's hawk foraging and/or nesting habitat by one of the following methods: • Preserve 1.0 acre of similar habitat for each acre lost due to project implementation. This land shall be protected through a fee title or conservation easement acceptable to the CDFG and the City of Elk Grove. The applicant shall be responsible for funding the operation and maintenance and/or monitoring of the protected land. • Prepare and implement a Swainson's hawk mitigation plan to the satisfaction of the CDFG that includes the preservation of Swainson's hawk foraging habitat. • Mitigate impacts in compliance with Chapter 16.130 of the City of Elk Grove Code as such may be amended from time to time and to the extent that said chapter remains in effect. This option shall be suspended until Chapter 16.130 is amended to eliminate the mitigation fee option so that it is available only to projects that do not exceed 50 acres in size. Compliance with this mitigation measure may be fulfilled in combination with the implementation of Mitigation Measure MM 4.1.1 if the CDFG determines that farmland preserved under MM 4.1.1 also qualifies as suitable Swainson's hawk foraging habitat.	Prior to approval of improvement and construction plans	City of Elk Grove Development Services and CDFG	

MM 4.9.1	Prior to issuance of a grading permit for each subsequent project, the project applicant shall submit to the City an erosion control plan, which will utilize best construction practices to limit the erosion effects of the proposed project. Measures shall include, but are not limited to, the following: • Hydro-seeding • Placement of loose straw and/or straw bales within drainage ways and ahead of drop inlets; • The temporary lining (during construction activities) of drop inlets with "filter fabric" (a specific type of geotextile fabric); • The placement of straw wattles along slope contours; • Directing subcontractors to a single designation "wash-out" location (as opposed to allowing them to washout wherever they feel like); and • The use of siltation fences.	Prior to the issue of grading permit and during construction	City of Elk Grove Development Services, Public Works.	
MM 4.11.2a	A lighting plan shall be developed and provided with improvement plans for each subsequent non-residential project to ensure that parking lot pole lights and streetlights shall be fully hooded and back shielded to reduce the light "spillage" and glare, prohibit the illumination from breaking the horizontal plane, and ensure that lighting not exceed the standard illumination of two-foot candles along the property lines of adjoining land uses. The two-foot candle lighting standard shall also apply to all park and school facilities where stadium lighting may be installed and used.	Prior to approval of improvement plans for all subsequent public and private projects.	City of Elk Grove Development Services, Elk Grove Community Services District and Elk Grove Unified School District.	

MM 4.3.1a	The project applicant shall require that the contractors water all exposed surfaces, graded areas, storage piles and haul roads at least twice daily during construction. This requirement shall be included as a note in all project construction plans.	During all grading and construction phases of the project.	City of Elk Grove Development Services and SMAQMD	
MM 4.3.1b	The project applicant shall require that the contractor minimize the amount of material actively worked, the amount of disturbed area, and the amount of material stockpiled. This requirement shall be included as a note in all project construction plans.	During all grading and construction phases of the project.	City of Elk Grove Development Services and SMAQMD.	
MM 4.3.1c	The project applicant shall require that the contractor limit vehicle speed for onsite construction vehicles to 15 mph. This requirement shall be included as a note in all project construction plans.	During all grading and construction phases of the project.	City of Elk Grove Development Services and SMAQMD.	
MM 4.3.1d	The project applicant shall require paved streets adjacent to construction sites to be washed or swept daily to remove accumulated dust. This requirement shall be included as a note in all project construction plans.	During all grading and construction phases of the project.	City of Elk Grove Development Services and SMAQMD	
MM 4.3.1e	The project applicant shall require that, when transporting soil or other materials by truck during construction, two feet of freeboard shall be maintained by the contractor, and that the materials be covered. This requirement shall be included as a note in all project construction plans.	During all grading and construction phases of the project.	City of Elk Grove Development Services and SMAQMD.	
MM 4.3.1g	The project applicant shall require contractors to implement ridesharing programs for construction employees traveling to and from the site. This requirement shall be included as a note in all project construction plans.	During all grading and construction phases of the project.	City of Elk Grove Development Services and SMAQMD.	

MM 4.4.1a	Site preparation and construction activities shall be limited to between the hours of 6:00 A.M. to 8:00 P.M., Monday through Friday, and 7:00 A.M. to 8:00 P.M. on Saturday and Sunday (City of Elk Grove Noise Control Ordinance, Section #6.68.090 (e)). Furthermore, construction equipment maintenance shall be limited to the same hours. This requirement shall be included as a note in all project construction plans.	During all construction phases of the project	City of Elk Grove Development Services	
MM 4.4.1b	All construction equipment shall be equipped with appropriate mufflers in good working condition. This requirement shall be included as a note in all project construction plans.	During all construction phases of the project	City of Elk Grove Development Services	
MM 4.4.1c	Construction staging areas shall be located as far from noise-sensitive uses as is feasible. This requirement shall be included as a note in all project construction plans.	During all construction phases of the project	City of Elk Grove Development Services	
MM 4.4.1d	Stationary construction equipment shall be located as far from noise sensitive uses as feasible, and temporary or portable acoustic barriers shall be installed around the equipment/work area when within 100 feet or less of residential properties or other sensitive uses. This requirement shall be included as a note in all project construction plans.	During all construction phases of the project	City of Elk Grove Development Services	
MM 4.4.1e	Construction hours, allowable workdays, and the phone number of the job superintendent shall be clearly posted on a sign no larger than 4 foot by 8 foot at all construction entrances to allow for surrounding and onsite property owners to contact the job superintendent. If the City or the job superintendent receives a complaint, the superintendent shall investigate, take appropriate corrective action, and report the action taken to the reporting party. This requirement shall be included as a note in all project construction plans.	During all construction phases of the project	City of Elk Grove Development Services	

MM 4.6.4.1	As a condition of subsequent development entitlements, uses constructed in the Plan area shall meet the minimum necessary fire flow and other standard fire protection and life safety requirements identified in the Uniform Fire Code, Uniform Building Code, and other applicable state regulations. Construction sites shall ensure adequate on-site water supply and all-weather access for fire-fighting equipment and emergency vehicles before framing can occur. The applicant shall also pay the Fire Protection Development Fee in effect at the time of building permit issuance. These requirements shall be noted on all construction plans.	During construction activities and prior to improvement plan approval	EGCSD and City of Elk Grove Development Services	
MM 4.10.1b	In the event that any historic surface or subsurface archaeological features or deposits, including locally darkened soil indicative of an archaeological midden that could conceal cultural deposits, animal bone, shell, obsidian, mortars, or human remains, are uncovered during on-site or off-site construction, all work within 100 feet of the find shall cease and Development Services shall be notified. An archaeologist who meets the Secretary of the Interior's Professional Qualifications Standards shall be contacted to determine if the resource is significant and to determine appropriate mitigation. Any artifacts uncovered shall be recorded and removed to a location to be determined by the archaeologist. The discovery of human remains shall also be reported to the County Coroner in accordance with Section 7050.5 the California Health and Safety Code, and the Native American Commission for further investigation. If the remains are determined to be Native American, the Native American Commission shall inform the most likely descendent and will determine the appropriate disposition of the remains and grave goods.	During construction activities	City of Elk Grove Development Services	

Prior to Issuance of Building Permits				
MM 4.6.1.1b	As a condition of subsequent development applications, uses constructed on the property shall incorporate into the building plans water conservation measures including drought tolerant landscaping with low fuel potential, low-flow toilets, urinals, shower heads, lavatory faucets, and sink faucets, as well as insulation to reduce water uses before hot water reaches equipment or fixtures.	Prior to issuance of each building permit	City of Elk Grove Development Services	
Prior To Issuance of Occupancy Permits				
MM 4.1.2a	All of the landscape corridors directly adjacent to the project area that are located between existing agricultural operations or agriculturally zoned properties and the project area shall be fully improved and functional prior to the occupancy of any residence that adjoins the subject corridor.	Prior to issuance of occupancy permits	City of Elk Grove Development Services	
MM 4.11.2.b	Non-glare glass shall be used in all non-residential buildings to minimize and reduce impacts from glare. Office and commercial buildings, which are allowed to use semi-reflective glass, must be oriented so that the reflection of sunlight is minimized. This requirement shall be incorporated into the Specific Plan and reflected in subsequent development applications.	Types of non-glare glass shall be specified on final development plans for subsequent commercial and office projects, and installed prior to building occupancy	City of Elk Grove Development Services	

APPENDIX B - NOTICE OF PREPARATION

Development Services – Planning
8401 Laguna Palms Way • Elk Grove, California 95758
Tel: 916.683.7111 • Fax: 916.691.3175 • www.elkgrovecity.org

NOTICE OF PREPARATION OF A DRAFT SUBSEQUENT ENVIRONMENTAL IMPACT REPORT

DATE:	**September 6, 2013**
TO:	**Office of Planning and Research, Responsible and Trustee Agencies**
LEAD AGENCY:	**City of Elk Grove** **Contact: Sarah Kirchgessner** **8401 Laguna Palms Way** **Elk Grove, CA 95758**
SUBJECT:	**Subsequent Environmental Impact Report for the Civic Center Aquatics Complex**

In discharging its duties under Section 15021 of the California Environmental Quality Act (CEQA) Guidelines, the City of Elk Grove (as lead agency, hereinafter City) intends to prepare a Subsequent Environmental Impact Report (SEIR), consistent with Section 15162 of the State CEQA Guidelines (Division 6 of Chapter 3 of Title 14 of the California Code of Regulations, hereinafter the CEQA Guidelines), for the Civic Center Aquatics Complex Project (the "Project," described later in this document). In accordance with Section 15082 of the CEQA Guidelines, the City of Elk Grove has prepared this Notice of Preparation (NOP) to provide to the Office of Planning and Research, responsible and trustee agencies, and other interested parties with sufficient information describing the Project and its potential environmental effects.

The determination to prepare a Subsequent Environmental Impact Report was made by the City of Elk Grove following preliminary review of the Project. As a SEIR is clearly needed for the Project, no initial study has been prepared for the Project, and is not required, pursuant to CEQA Guidelines Section 15063(a). Probable environmental effects of the Project are described in the attached Project Summary.

As specified by the CEQA Guidelines, the Notice of Preparation shall be circulated for a 30-day review period. **The comment period runs from Friday, September 6, 2013, to Monday, October 7, 2013.** The City of Elk Grove welcomes public input during the review period. In the event no response or a well justified request for additional time is received by any responsible agency prior to the end of the review period, the lead agency may presume that the responsible agency has no response (CEQA Guidelines Section 15082(b)(2)).

Comments may be submitted in writing during the review period and addressed to:

City of Elk Grove
Planning Department
c/o Sarah Kirchgessner
8401 Laguna Palms Way
Elk Grove, CA 95758

Two scoping meetings for the Project will be held at the City of Elk Grove City Council Chambers, located at 8400 Laguna Palms Way in Elk Grove as follows:

- **Thursday September 19, 2013 at 6:00 p.m.**
- **September 26, 2013 at 11:00 a.m.**

A. PROJECT LOCATION AND BACKGROUND

The approximately 30-acre proposed Project site is located at the southwest corner of the intersection of Civic Center Drive and Big Horn Boulevard in the Laguna Ridge Specific Plan area (**Figure 1**). The Project Site is bordered to the north by the future Civic Center site and to the south by the Elizabeth Pinkerton Middle School/Cosumnes Oaks High School. Single-family residential (The Grove subdivision) is located to the west of the Project site. To the east is the approved Allen Ranch subdivision which is currently under construction and a water treatment facility.

The Project area has historically been used for agricultural purposes and is primarily undeveloped with a vacant residence, ornamental landscaping, and outbuildings. There is a wetlands area, which is currently restricted under an Army Corps of Engineer permit limiting the use of the property for wetlands only. The specific plan designation for the Project site is Community Park (CP) with an underlying zoning district of RD-5. The General Plan designation is Public Park.

B. PROJECT DESCRIPTION

The Project includes the construction of a Competition/Training Facility, a commercial recreational facility, associated parking, passive park area, and ancillary services, as described below. The total site area is approximately 30 acres. Maximum annual attendance is anticipated to be approximately 460,000 after five (5) years of operation.

<u>Competition Training/Facility</u>
The competition/training facility consists of an Olympic-size swimming pool (approximately 50 meters by 25 yards, 2 meter depth) and a warm up pool with a signature 10-meter diving tower (approximately 25 meters by 25 yards, 17 foot depth). Additional facility components include:

- seating for 1,000+ under a shaded structure,
- water system,
- concessions,
- hot tub seating for 12 to 20 athletes,
- locker rooms,
- meeting room,
- office space and storage, and
- provisions for the use of a temporary enclosure (large tent/air dome) for larger events.

The competitive facilities are anticipated to be home to multiple Elk Grove high schools and a variety of regional club teams for practices and meets. It is also intended for large scale competitive tournaments drawing people from outside the region.

<u>Commercial Recreational Facility</u>
The commercial recreation facility will consist of a waterpark, which may include, but would not be limited to, a lazy/adventure river, an approximately 20,000 sq. ft. wave pool, slide attractions, children's aquatic play system, family activity pool, and various water feature elements such as spray grounds, geysers, private cabanas, an entertainment stage, a group pavilion, and water play features.
In addition to the standard waterpark elements/amenities, the facility may also include an adventure park, whose elements are weaved throughout the space and may include, but would not be limited to, a challenge ropes course (approximately 60 feet in height), zip lines

(approximately 60 feet in height), family adventure sky trail, climbing wall, 14,000+ sq. ft. arcade and party rooms, and various challenge and team building elements and activities.

The water park/adventure park facility will include support buildings for administration and management, restrooms/showers and changing, lockers, multi-purpose training rooms, lifeguard and first-aid, waterpark retail space, concessions and food/beverage, maintenance, and mechanical/ equipment space.

Support and ancillary elements will be provided, which will include parking, drop-off arrival area, hardscape/landscape elements, pathways & trails, shade amenities, fencing, kiosks, screening, and theming.

Ancillary Components

In addition to the above, the Project is anticipated to include the following ancillary components:

- Parking
- Water Plant/Filtration System
- Alternative Power Source
- Restroom/Locker Facilities
- Team Equipment Storage
- Participants Rest Area
- Park area (approximately 5-acres) – passive park area with appropriate, grading, drainage, irrigation, ground cover/grass, pathways and lighting

Optional Development of Wetlands Area

Development of the wetlands area on the parcel south of Civic Center Drive between Big Horn Boulevard and Laguna Springs Drive (APN 132-1990-009) is currently restricted by an Army Corp of Engineer permit, limiting the use of the property for wetlands only. The permit requires that a path for public viewing of the wetlands be constructed. The City began preliminary design for approximately 900 feet of a 10-foot wide asphalt concrete trail within an "active" open space area that is part of a pond/marsh preserve area. The trail will include placement of a split-rail fence at the perimeter of the active open space area along the length of the trail, and placement of interpretive signs educating the public about wetland functions. However, this project is on hold pending development of the area for the Aquatics Complex.

The wetlands area could be developed as part of the Project if the Army Corp restrictions are removed and this area becomes available in the future for normal parkland usage.

C. PREVIOUS ENVIRONMENTAL DOCUMENTATION

The Laguna Ridge Specific Plan Environmental Impact Report (LRSP EIR) (SCH #2000082139) assessed the environmental impacts resulting from the construction and operation of the Laguna Ridge Specific Plan. The City of Elk Grove approved the Laguna Ridge Specific Plan and certified the Final EIR on June 16, 2004. The Laguna Ridge Specific Plan encompasses approximately 1,900 acres and consists of the development of residential, commercial, park, public school, and mixed-use land uses. The LRSP EIR identified significant and unavoidable impacts related to agricultural resources, transportation and circulation, air quality, noise, and visual resources. A Statement of Overriding Considerations was adopted for these significant and unavoidable impacts. The LRSP EIR also identified impacts to hazards and hazardous materials, public services and utilities, hydrology and water quality, biological resources, geology and geotechnical hazards, and cultural resources. These impacts were reduced to a less than significant level with adoption of the recommended mitigation measures. A Mitigation Monitoring and Reporting Program (MMRP) was prepared and adopted with the Specific Plan. The MMRP is a binding document that runs with the land and would be applicable to the proposed Project.

All documents associated with the Laguna Ridge Specific Plan are available for review at the following location: City of Elk Grove, Development Services – Planning, 8401 Laguna Palms Way, Elk Grove, CA 95758.

D. TYPE OF ENVIRONMENTAL DOCUMENT

The Subsequent EIR (SEIR) will be prepared pursuant to section 15162 of the CEQA Guidelines. A SEIR is prepared for projects that change substantially due to new information, a changed project description, or changed circumstances within which the project would take place. Generally, new information requiring a subsequent EIR would pertain to significant effects that were not previously analyzed. If the City finds pursuant to CEQA Guidelines Section 15162 that no new effects could occur or no new mitigation measures would be required, the City can approve the subsequent activity as being within the scope of the project covered in the Program EIR, and no new environmental document would be required.

E. PROBABLE ENVIRONMENTAL EFFECTS

The SEIR will evaluate whether the proposed Project would result in one or more significant environmental effects. The following issues will be addressed in the SEIR:

- Aesthetics, Light, and Glare
- Agricultural Resources
- Air Quality
- Biological Resources
- Cultural Resources
- Geology, Soils, and Seismicity
- Greenhouse Gas Emissions
- Hazards and Hazardous Materials
- Hydrology and Water Quality
- Land Use
- Noise
- Population and Housing
- Public Services
- Public Utilities
- Recreation
- Transportation

ISSUES SCOPED OUT FROM ANALYSIS IN THE SEIR

Some of the environmental issues would result in less than significant impacts and will not be discussed in theS EIR for the reasons discussed below.

Seiche, Tsunami, and Mudflow

Based on the Project's location (inland, away from any water bodies) and topography (relatively flat), there would be no impacts related to seiche, tsunami, or mudflow. This impact will not be discussed in the SEIR.

Mineral Resources

The Project site is not used for mineral extraction, nor is it designated as an important mineral recovery site. Therefore, there would not be a significant impact on mineral resources, and this issue will not be discussed in the SEIR.

Airports, Airstrips, and Air Traffic Patterns

The airport nearest to the Project site is Sacramento Executive Airport, approximately 10 miles to the north. Because the Project site is not located in the vicinity of any airports, there would be no impacts associated with conflicts with airports or changes in air traffic patterns. This issue will not be discussed in the SEIR.

Use of Septic Systems

The Sacramento Area Sewer District is the agency responsible for providing sewer service within Elk Grove. A wastewater master plan is being developed for the Project. Because septic tanks or alternative wastewater disposal systems are not proposed, there would be no impact related to septic tanks or alternative wastewater disposal systems. Impacts related to septic tanks or alternative wastewater disposal systems will not be discussed in the SEIR.

FIGURE 1 **PROJECT LOCATION**

City of Elk Grove
Development Services

Figure 1
Project Location

APPENDIX C – NOP COMMENTS

STATE OF CALIFORNIA
GOVERNOR'S OFFICE *of* PLANNING AND RESEARCH
STATE CLEARINGHOUSE AND PLANNING UNIT

EDMUND G. BROWN JR.
GOVERNOR

KEN ALEX
DIRECTOR

Notice of Preparation

September 6, 2013

To: Reviewing Agencies

Re: Civic Center Aquatics Complex Project
SCH# 2000082139

Attached for your review and comment is the Notice of Preparation (NOP) for the Civic Center Aquatics Complex Project draft Environmental Impact Report (EIR).

Responsible agencies must transmit their comments on the scope and content of the NOP, focusing on specific information related to their own statutory responsibility, within 30 days of receipt of the NOP from the Lead Agency. This is a courtesy notice provided by the State Clearinghouse with a reminder for you to comment in a timely manner. We encourage other agencies to also respond to this notice and express their concerns early in the environmental review process.

Please direct your comments to:

Sarah Kirchgessner
City of Elk Grove
8401 Laguna Palms Way
Elk Grove, CA 95758

with a copy to the State Clearinghouse in the Office of Planning and Research. Please refer to the SCH number noted above in all correspondence concerning this project.

If you have any questions about the environmental document review process, please call the State Clearinghouse at (916) 445-0613.

Sincerely,

Scott Morgan
Director, State Clearinghouse

Attachments
cc: Lead Agency

Document Details Report
State Clearinghouse Data Base

SCH# **2000082139**
Project Title Civic Center Aquatics Complex Project
Lead Agency Elk Grove, City of

Type **NOP** Notice of Preparation

Description Civic Center Aquatics Complex Project

The project includes the construction of a Competition/Training Aquatics Facility, a commercial recreational facility (water park), associated parking, passive park area, and ancillary services. The total site area is ~30 acres. Maximum annual attendance is anticipated to be ~460,000 after five (5) years of operation.

Lead Agency Contact

Name Sarah Kirchgessner
Agency City of Elk Grove
Phone 916 478 3649 ***Fax***
email
Address 8401 Laguna Palms Way
City Elk Grove ***State*** CA ***Zip*** 95758

Project Location

County Sacramento
City Elk Grove
Region
Cross Streets Civic Center DRive/Big Horn Blvd.
Lat / Long
Parcel No. Various
Township ***Range*** ***Section*** ***Base***

Proximity to:

Highways Hwy 99, I-5
Airports
Railways
Waterways Numerous
Schools Elk Grove Unified
Land Use RD-5; Community Park; Public Park

Project Issues Air Quality; Archaeologic-Historic; Biological Resources; Drainage/Absorption; Economics/Jobs; Noise; Population/Housing Balance; Public Services; Recreation/Parks; Schools/Universities; Sewer Capacity; Solid Waste; Toxic/Hazardous; Traffic/Circulation; Water Quality; Water Supply; Wetland/Riparian; Growth Inducing; Landuse; Cumulative Effects; Aesthetic/Visual

Reviewing Agencies Department of Parks and Recreation; Department of Water Resources; Department of Fish and Wildlife, Region 2; Office of Emergency Management Agency, California; Native American Heritage Commission; California Highway Patrol; Caltrans, District 3 S; Regional Water Quality Control Bd., Region 5 (Sacramento); Resources Agency

Date Received 09/05/2013 ***Start of Review*** 09/06/2013 ***End of Review*** 10/07/2013

NOP Distribution List

County: Sacramento

SCH# 2000082139

Resources Agency SK

- [ ] **Resources Agency** Nadell Gayou
- [ ] **Dept. of Boating & Waterways** Nicole Wong
- [ ] **California Coastal Commission** Elizabeth A. Fuchs
- [ ] **Colorado River Board** Tamya M. Trujillo
- [ ] **Dept. of Conservation** Elizabeth Carpenter
- [ ] **California Energy Commission** Eric Knight
- [ ] **Cal Fire** Dan Foster
- [ ] **Central Valley Flood Protection Board** James Herota
- [ ] **Office of Historic Preservation** Ron Parsons
- [ ] **Dept of Parks & Recreation** Environmental Stewardship Section
- [ ] **California Department of Resources, Recycling & Recovery** Sue O'Leary
- [ ] **S.F. Bay Conservation & Dev't. Comm.** Steve McAdam
- [x] **Dept. of Water Resources** Resources Agency Nadell Gayou

Fish and Game

- [ ] **Depart. of Fish & Wildlife** Scott Flint, Environmental Services Division
- [ ] **Fish & Wildlife Region 1** Donald Koch
- [ ] **Fish & Wildlife Region 1E** Laurie Harnsberger
- [x] **Fish & Wildlife Region 2** Jeff Drongesen
- [ ] **Fish & Wildlife Region 3** Charles Armor
- [ ] **Fish & Wildlife Region 4** Julie Vance
- [ ] **Fish & Wildlife Region 5** Leslie Newton-Reed, Habitat Conservation Program
- [ ] **Fish & Wildlife Region 6** Gabrina Gatchel, Habitat Conservation Program
- [ ] **Fish & Wildlife Region 6 I/M** Heidi Sickler, Inyo/Mono, Habitat Conservation Program
- [ ] **Dept. of Fish & Wildlife M** George Isaac, Marine Region

Other Departments

- [ ] **Food & Agriculture** Sandra Schubert, Dept. of Food and Agriculture
- [ ] **Depart. of General Services** Public School Construction
- [ ] **Dept. of General Services** Anna Garbeff, Environmental Services Section
- [ ] **Dept. of Public Health** Jeffery Worth, Dept. of Health/Drinking Water
- [ ] **Delta Stewardship Council** Kevan Samsam

Independent Commissions, Boards

- [ ] **Delta Protection Commission** Michael Machado
- [x] **Cal EMA (Emergency Management Agency)** Dennis Castrillo
- [x] **Native American Heritage Comm.** Debbie Treadway
- [ ] **Public Utilities Commission** Leo Wong
- [ ] **Santa Monica Bay Restoration** Guangyu Wang
- [ ] **State Lands Commission** Jennifer Deleong
- [ ] **Tahoe Regional Planning Agency (TRPA)** Cherry Jacques

Business, Trans & Housing

- [ ] **Caltrans - Division of Aeronautics** Philip Crimmins
- [ ] **Caltrans - Planning** Terri Pencovic
- [x] **California Highway Patrol** Suzann Ikeuchi, Office of Special Projects
- [ ] **Housing & Community Development** CEQA Coordinator, Housing Policy Division

Dept. of Transportation

- [ ] **Caltrans, District 1** Rex Jackman
- [ ] **Caltrans, District 2** Marcelino Gonzalez
- [x] **Caltrans, District 3** 5 Gary Arnold
- [ ] **Caltrans, District 4** Erik Alm
- [ ] **Caltrans, District 5** David Murray
- [ ] **Caltrans, District 6** Michael Navarro
- [ ] **Caltrans, District 7** Dianna Walson
- [ ] **Caltrans, District 8** Dan Kopulsky
- [ ] **Caltrans, District 9** Gayle Rosander
- [ ] **Caltrans, District 10** Tom Dumas
- [ ] **Caltrans, District 11** Jacob Armstrong
- [ ] **Caltrans, District 12** Marlon Regisford

Cal EPA

Air Resources Board

- [ ] Airport/Energy Projects Jim Lerner
- [ ] Transportation Projects Douglas Ito
- [ ] Industrial Projects Mike Tollstrup
- [ ] **State Water Resources Control Board** Regional Programs Unit, Division of Financial Assistance
- [ ] **State Water Resources Control Board** Student Intern, 401 Water Quality Certification Unit, Division of Water Quality
- [ ] **State Water Resouces Control Board** Phil Crader, Division of Water Rights
- [ ] **Dept. of Toxic Substances Control** CEQA Tracking Center
- [ ] **Department of Pesticide Regulation** CEQA Coordinator

Regional Water Quality Control Board (RWQCB)

- [ ] **RWQCB 1** Cathleen Hudson, North Coast Region (1)
- [ ] **RWQCB 2** Environmental Document Coordinator, San Francisco Bay Region (2)
- [ ] **RWQCB 3** Central Coast Region (3)
- [ ] **RWQCB 4** Teresa Rodgers, Los Angeles Region (4)
- [x] **RWQCB 5S** Central Valley Region (5)
- [ ] **RWQCB 5F** Central Valley Region (5), Fresno Branch Office
- [ ] **RWQCB 5R** Central Valley Region (5), Redding Branch Office
- [ ] **RWQCB 6** Lahontan Region (6)
- [ ] **RWQCB 6V** Lahontan Region (6), Victorville Branch Office
- [ ] **RWQCB 7** Colorado River Basin Region (7)
- [ ] **RWQCB 8** Santa Ana Region (8)
- [ ] **RWQCB 9** San Diego Region (9)
- [ ] **Other** ______
- [ ] ______ Conservancy

Last Updated 08/27/2013

Print Form

Notice of Completion & Environmental Document Transmittal

~~State Clearinghouse, P.O. Box 3044, Sacramento, CA 95812-3044 (916) 445-0613~~
~~1400 Tenth Street, Sacramento, CA 95814~~

SCH #

Project Title: Civic Center Aquatics Complex Project

Lead Agency: City of Elk Grove | Contact Person: Sarah Kirchgessner
Mailing Address: 8401 Laguna Palms Way | Phone: 916-478-3649
City: Elk Grove | Zip: 95758 | County: Sacramento

Project Location: County: Sacramento | City/Nearest Community: Elk Grove
Cross Streets: Civic Center Drive/Big Horn Blvd. | Zip Code:
Longitude/Latitude (degrees, minutes and seconds): ___° ___′ ___″ N / ___° ___′ ___″ W Total Acres: 30 acres
Assessor's Parcel No.: various | Section: | Twp.: | Range: | Base:
Within 2 Miles: State Hwy #: Hwy 99, Interstate 5 | Waterways: numerous
Airports: n/a | Railways: n/a | Schools: Elk Grove Unified

Document Type:

CEQA: [x] NOP [ ] Early Cons [ ] Neg Dec [ ] Mit Neg Dec [ ] Draft EIR [ ] Supplement/Subsequent EIR (Prior SCH No.) ___ Other: ___

NEPA: [ ] NOI [ ] EA [ ] Draft EIS [ ] FONSI

Other: [ ] Joint Document [ ] Final Document [ ] Other: ___

Local Action Type:

[ ] General Plan Update
[ ] General Plan Amendment
[ ] General Plan Element
[ ] Community Plan
[x] Specific Plan
[ ] Master Plan
[ ] Planned Unit Development
[x] Site Plan
[x] Rezone
[ ] Prezone
[ ] Use Permit
[ ] Land Division (Subdivision, etc.)
[ ] Annexation
[ ] Redevelopment
[ ] Coastal Permit
[ ] Other: ___

Development Type:

[ ] Residential: Units ___ Acres ___
[ ] Office: Sq.ft. ___ Acres ___ Employees ___
[ ] Commercial: Sq.ft. ___ Acres ___ Employees ___
[ ] Industrial: Sq.ft. ___ Acres ___ Employees ___
[ ] Educational: ___
[x] Recreational: 30 acres
[ ] Water Facilities: Type ___ MGD ___
[ ] Transportation: Type ___
[ ] Mining: Mineral ___
[ ] Power: Type ___ MW ___
[ ] Waste Treatment: Type ___ MGD ___
[ ] Hazardous Waste: Type ___
[ ] Other: ___

Project Issues Discussed in Document:

[x] Aesthetic/Visual
[ ] Agricultural Land
[x] Air Quality
[x] Archeological/Historical
[x] Biological Resources
[ ] Coastal Zone
[x] Drainage/Absorption
[x] Economic/Jobs
[ ] Fiscal
[ ] Flood Plain/Flooding
[ ] Forest Land/Fire Hazard
[ ] Geologic/Seismic
[ ] Minerals
[x] Noise
[x] Population/Housing Balance
[x] Public Services/Facilities
[x] Recreation/Parks
[x] Schools/Universities
[ ] Septic Systems
[x] Sewer Capacity
[ ] Soil Erosion/Compaction/Grading
[x] Solid Waste
[x] Toxic/Hazardous
[x] Traffic/Circulation
[ ] Vegetation
[x] Water Quality
[x] Water Supply/Groundwater
[x] Wetland/Riparian
[x] Growth Inducement
[x] Land Use
[x] Cumulative Effects
[ ] Other: ___

Present Land Use/Zoning/General Plan Designation:

RD-5; Community Park; Public Park

Project Description: *(please use a separate page if necessary)*

The Project includes the construction of a Competition/Training Aquatics Facility , a commercial recreational facility (water park), associated parking, passive park area, and ancillary services. The total site area is approximately 30 acres. Maximum annual attendance is anticipated to be approximately 460,000 after five (5) years of operation.

Note: The State Clearinghouse will assign identification numbers for all new projects. If a SCH number already exists for a project (e.g. Notice of Preparation or previous draft document) please fill in.

Revised 2010

DEPARTMENT OF TRANSPORTATION
DISTRICT 3-SACRAMENTO AREA OFFICE
2379 GATEWAY OAKS DRIVE, SUITE 150
SACRAMENTO, CA 95833
PHONE (916) 274-0635
FAX (916) 274-0602
TTY 711
www.dot.ca.gov

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OCT 09 2013
CITY OF ELK GROVE
PLANNING

October 7, 2013

032013-SAC-0127
03-SAC-99/PM 12.750
SCH# 200082139

Ms. Sarah Kirchgessner
City of Elk Grove
8401 Laguna Palms Way
Elk Grove, CA 95758

Civic Center Aquatics Complex Project – Notice of Preparation for a Draft Subsequent Environmental Impact Report (NOP-DSEIR)

Dear Ms. Kirchgessner:

Thank you for the opportunity to comment on the NOP-DSEIR for the Civic Center Aquatics Complex Project. The project includes construction of a competition/training facility, a commercial recreational facility, an adventure park, and ancillary services including administrative support buildings, retail space, maintenance equipment storage space, and associated visitor/employee parking areas. The approximate 30-acre site is located in the Laguna Specific Plan area on the southeast corner of the intersection of Civic Center Drive and Big Horn Boulevard approximately 1 mile west of the State Route (SR) 99 Elk Grove Boulevard interchange. The following comments are based on the NOP-DSEIR.

Traffic Impact Analysis

Based on the project location, Caltrans anticipates potential impacts to SR 99 if and when an intensification of traffic-generating development occurs.

Therefore, a Traffic Impact Study (TIS) or a lesser level of analysis may be required to assess the impact of this particular project on the State Highway System (SHS) and adjacent road network. We recommend using Caltrans' Guide for the Preparation of Traffic Impact Studies (TIS Guide) for determining which scenarios and methodologies to use in the analysis. The TIS Guide is a starting point for collaboration between the lead agency and Caltrans in determining when a TIS is needed. It is available at the following website address:
http://www.dot.ca.gov/hq/tpp/offices/ocp/igr_ceqa_files/tisguide.pdf.

In order to determine the projected traffic circulation for the Civic Center Aquatics Complex, we recommend a trip distribution analysis be prepared as part of the analysis.

If the proposed project will not generate the amount of trips needed to meet Caltrans' trip generation thresholds, an explanation of how this conclusion was reached must be provided. If the proposed project requires a TIS, please provide us the opportunity to review the scope before the study begins.

Please provide our office with copies of any further actions regarding this project. We would appreciate the opportunity to review and comment on any changes related to this development.

If you have any questions regarding these comments or require additional information, please contact Arthur Murray, Intergovernmental Review Coordinator at 916-274-0616 or by email at: Arthur.Murray@dot.ca.gov.

Sincerely,

Eric Fredericks

ERIC FREDERICKS, Chief
Office of Transportation Planning – South

c: Scott Morgan, State Clearinghouse

20 September 2013

Sarah Kirchgessner
City of Elk Grove
Planning Department
8401 Laguna Palms Way
Elk Grove, CA 95758

CERTIFIED MAIL
7013 1090 0001 3130 2731

COMMENTS TO NOTICE OF PREPARATION FOR THE DRAFT ENVIRONMENTAL IMPACT REPORT, CIVIC CENTER AQUATICS COMPLEX PROJECT, SACRAMENTO COUNTY

Pursuant to the City of Elk Grove's 13 September 2013 request, the Central Valley Regional Water Quality Control Board (Central Valley Water Board) has reviewed the *Notice of Preparation for the Draft Environmental Impact Report* for the Civic Center Aquatics Complex Project, located in Sacramento County.

Our agency is delegated with the responsibility of protecting the quality of surface and groundwaters of the state; therefore our comments will address concerns surrounding those issues.

Construction Storm Water General Permit

Dischargers whose project disturb one or more acres of soil or where projects disturb less than one acre but are part of a larger common plan of development that in total disturbs one or more acres, are required to obtain coverage under the General Permit for Storm Water Discharges Associated with Construction Activities (Construction General Permit), Construction General Permit Order No. 2009-009-DWQ. Construction activity subject to this permit includes clearing, grading, grubbing, disturbances to the ground, such as stockpiling, or excavation, but does not include regular maintenance activities performed to restore the original line, grade, or capacity of the facility. The Construction General Permit requires the development and implementation of a Storm Water Pollution Prevention Plan (SWPPP).

For more information on the Construction General Permit, visit the State Water Resources Control Board website at:
http://www.waterboards.ca.gov/water_issues/programs/stormwater/constpermits.shtml.

Phase I and II Municipal Separate Storm Sewer System (MS4) Permits[1]

The Phase I and II MS4 permits require the Permittees reduce pollutants and runoff flows from new development and redevelopment using Best Management Practices (BMPs) to the maximum extent practicable (MEP). MS4 Permittees have their own development standards, also known as Low Impact Development (LID)/post-construction standards that include a hydromodification component. The MS4 permits also require specific design concepts for LID/post-construction BMPs in the early stages of a project during the entitlement and CEQA process and the development plan review process.

For more information on which Phase I MS4 Permit this project applies to, visit the Central Valley Water Board website at:
http://www.waterboards.ca.gov/centralvalley/water_issues/storm_water/municipal_permits/.

For more information on the Phase II MS4 permit and who it applies to, visit the State Water Resources Control Board at:
http://www.waterboards.ca.gov/water_issues/programs/stormwater/phase_ii_municipal.shtml

Industrial Storm Water General Permit

Storm water discharges associated with industrial sites must comply with the regulations contained in the Industrial Storm Water General Permit Order No. 97-03-DWQ.

For more information on the Industrial Storm Water General Permit, visit the Central Valley Water Board website at:
http://www.waterboards.ca.gov/centralvalley/water_issues/storm_water/industrial_general_permits/index.shtml.

Clean Water Act Section 404 Permit

If the project will involve the discharge of dredged or fill material in navigable waters or wetlands, a permit pursuant to Section 404 of the Clean Water Act may be needed from the United States Army Corps of Engineers (USACOE). If a Section 404 permit is required by the USACOE, the Central Valley Water Board will review the permit application to ensure that discharge will not violate water quality standards. If the project requires surface water drainage realignment, the applicant is advised to contact the Department of Fish and Game for information on Streambed Alteration Permit requirements.

If you have any questions regarding the Clean Water Act Section 404 permits, please contact the Regulatory Division of the Sacramento District of USACOE at (916) 557-5250.

---

[1] Municipal Permits = The Phase I Municipal Separate Storm Water System (MS4) Permit covers medium sized Municipalities (serving between 100,000 and 250,000 people) and large sized municipalities (serving over 250,000 people). The Phase II MS4 provides coverage for small municipalities, including non-traditional Small MS4s, which include military bases, public campuses, prisons and hospitals.

Clean Water Act Section 401 Permit – Water Quality Certification
If an USACOE permit, or any other federal permit, is required for this project due to the disturbance of waters of the United States (such as streams and wetlands), then a Water Quality Certification must be obtained from the Central Valley Water Board prior to initiation of project activities. There are no waivers for 401 Water Quality Certifications.

Waste Discharge Requirements
If USACOE determines that only non-jurisdictional waters of the State (i.e., "non-federal" waters of the State) are present in the proposed project area, the proposed project will require a Waste Discharge Requirement (WDR) permit to be issued by Central Valley Water Board. Under the California Porter-Cologne Water Quality Control Act, discharges to all waters of the State, including all wetlands and other waters of the State including, but not limited to, isolated wetlands, are subject to State regulation.

For more information on the Water Quality Certification and WDR processes, visit the Central Valley Water Board website at:
http://www.waterboards.ca.gov/centralvalley/help/business_help/permit2.shtml.

If you have questions regarding these comments, please contact me at (916) 464-4684 or tcleak@waterboards.ca.gov.

Elizabeth M. Lee

for Trevor Cleak
Environmental Scientist

Powering forward. Together.

SMUD™

October 7th, 2013

Ms. Sarah Kirchgessner
City of Elk Grove Planning Department,
8401 Laguna Palms Way
Elk Grove, CA 95758

Subject: Notice of Preparation of a Subsequent Environmental Impact Report for the Civic Center Aquatics Complex

Dear Ms. Kirchgessner,

The Sacramento Municipal Utility District (SMUD) appreciates the opportunity to provide comments on the Notice of Preparation (NOP) for the Subsequent Environmental Impact Report (SEIR) for the Civic Center Aquatics Complex. SMUD is the primary energy provider for Sacramento County and the proposed project location. SMUD's vision is to empower our customers with solutions and options that increase energy efficiency, protect the environment, reduce global warming, and lower the cost to serve our region. As a Responsible Agency, SMUD aims to ensure that the proposed project limits the potential for significant environmental effects on SMUD facilities, employees, and customers.

It is our desire that the Civic Center Aquatics Complex SEIR will acknowledge any project impacts related to the following:

- Overhead and or underground transmission line easements
- Electrical load needs/ requirements
- Energy Efficiency
- Utility line routing
- Climate Change

SMUD has recently been collaborating with the Regional Water Authority on the Regional Water & Energy Assessment and Savings Demonstration Project to evaluate the embedded energy in the regional water supply and also the role of water in electrical generation. Based on our review of the NOP and our understanding of the proposed project, SMUD suggests that the project developers also consider and provide information regarding:

- What is the expected facility electricity demand profile, by month, and peak demand forecast.
- Expected water demand, by month, and peak water demand forecast.
- Planned electrical and water metering & sub-metering strategy.
- Opportunity for integration of renewable generation (solar PV, in-conduit hydro, for example) and energy storage to offset load, particularly during peak summer use. SMUD's Savings By Design program can assist with these items.

- Volume of expected withdrawals vs. consumption (including evaporation).

- Planned energy and water conservation measures.
- Planned water treatment system and associated chemical use and electrical demand.
- Planned water source (via County water agency). If the source will be ground water, what will the associated electrical demand be for pumping and associated hydrological impacts.

The Civic Center Aquatic Complex Project will have an impact on SMUD's electrical system. Based on the land use information in the NOP document, the estimated demand for the Civic Center Aquatic Complex Project is approximately 2.4 MW.

New distribution facilities (12 kV) will be required to serve this development and will require a minimum standard 12.5-foot overhead/underground PUE along all streets throughout the development.

Below is a list of the existing sub-transmission and distribution electrical facilities adjacent to the proposed project site.

- Existing overhead distribution (12 kV) electrical overhead line on the property.
- Existing underground distribution (12 kV) facilities along east and west side of Big Horn Boulevard, along north side of the Civic Center Drive and on the south east corner of the Civic Center drive.

SMUD would like to be kept apprised of the planning, development, and completion of this project. We aim to be partners in the efficient and sustainable delivery of the proposed project. Please ensure that the information included in this response is conveyed to the project planners and the appropriate project proponents.

Environmental leadership is a core value of SMUD and we look forward to collaborating with you on this project. Again, we appreciate the opportunity to provide input on the NOP. If you have any questions regarding this letter, please contact Rob Ferrera, SMUD Environmental Specialist at (916) 732-6676. Rob will be the primary environmental point of contact for SMUD on this project.

Sincerely,

Rob Ferrera
Environmental Specialist
Environmental Management
Legislative & Regulatory Affairs
Sacramento Municipal Utility District

Cc: Pat Durham
Steve Johns
Susan Oto
Kathleen Ave
Greg Hribar

APPENDIX D – AIR QUALITY MODEL DATA OUTPUT

Civic Center Aquatics Complex - Earthwork & Underground Work Construction

Sacramento County, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Government (Civic Center)	0.00	1000sqft	57.30	2,495,988.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	3.5	**Precipitation Freq (Days)**	58
Climate Zone	6			**Operational Year**	2016
Utility Company	Sacramento Municipal Utility District				
CO2 Intensity (lb/MWhr)	590.31	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - Project site + overflow parking lot = 57.3 acres

Construction Phase -

Off-road Equipment - Equipment list provided by Project applicant

Grading - Project site + overflow parking lot = 57.3 acres

Construction Off-road Equipment Mitigation -

Table Name	Column Name	Default Value	New Value
tblGrading	AcresOfGrading	495.00	57.30
tblLandUse	LandUseSquareFeet	0.00	2,495,988.00
tblLandUse	LotAcreage	0.00	57.30
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	4.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	4.00	2.00
tblProjectCharacteristics	OperationalYear	2014	2016

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2015	8.3469	98.5062	61.6693	0.0815	6.0829	4.3658	7.2919	3.3264	4.0165	4.4386	0.0000	8,519.929 6	8,519.929 6	2.5025	0.0000	8,572.4824
Total	**8.3469**	**98.5062**	**61.6693**	**0.0815**	**6.0829**	**4.3658**	**7.2919**	**3.3264**	**4.0165**	**4.4386**	**0.0000**	**8,519.929 6**	**8,519.929 6**	**2.5025**	**0.0000**	**8,572.4824**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2015	8.3396	98.4159	61.6137	0.0814	2.7708	4.3618	4.7625	1.5057	4.0129	4.0801	0.0000	8,512.265 3	8,512.265 3	2.5002	0.0000	8,564.7700
Total	**8.3396**	**98.4159**	**61.6137**	**0.0814**	**2.7708**	**4.3618**	**4.7625**	**1.5057**	**4.0129**	**4.0801**	**0.0000**	**8,512.265 3**	**8,512.265 3**	**2.5002**	**0.0000**	**8,564.7700**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.0882**	**0.0917**	**0.0901**	**0.0982**	**54.4498**	**0.0916**	**34.6875**	**54.7332**	**0.0916**	**8.0786**	**0.0000**	**0.0900**	**0.0900**	**0.0915**	**0.0000**	**0.0900**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Site Preparation	Site Preparation	4/9/2015	6/3/2015	5	40	
2	Grading	Grading	6/4/2015	11/4/2015	5	110	

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Site Preparation	Rubber Tired Dozers	1	8.00	255	0.40
Site Preparation	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Grading	Excavators	2	8.00	162	0.38
Grading	Graders	1	8.00	174	0.41
Grading	Rubber Tired Dozers	0	8.00	255	0.40
Grading	Scrapers	4	8.00	361	0.48
Grading	Tractors/Loaders/Backhoes	1	8.00	97	0.37

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Site Preparation	3	8.00	0.00	0.00	10.00	6.50	20.00	LD_Mix	HDT_Mix	HHDT
Grading	8	20.00	0.00	0.00	10.00	6.50	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

Reduce Vehicle Speed on Unpaved Roads

Clean Paved Roads

3.2 Site Preparation - 2015

Unmitigated Construction On-Site

Acres of Grading: 0

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					6.0221	0.0000	6.0221	3.3102	0.0000	3.3102			0.0000			0.0000
Off-Road	1.9939	21.2513	15.8277	0.0151		1.2085	1.2085		1.1118	1.1118		1,588.906 6	1,588.906 6	0.4744		1,598.8680
Total	**1.9939**	**21.2513**	**15.8277**	**0.0151**	**6.0221**	**1.2085**	**7.2306**	**3.3102**	**1.1118**	**4.4221**		**1,588.906 6**	**1,588.906 6**	**0.4744**		**1,598.8680**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category						lb/day								lb/day		
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.1276	0.0323	0.4313	7.8000e-004	0.0609	4.7000e-004	0.0613	0.0161	4.3000e-004	0.0166		66.3780	66.3780	3.4000e-003		66.4494
Total	**0.1276**	**0.0323**	**0.4313**	**7.8000e-004**	**0.0609**	**4.7000e-004**	**0.0613**	**0.0161**	**4.3000e-004**	**0.0166**		**66.3780**	**66.3780**	**3.4000e-003**		**66.4494**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category						lb/day								lb/day		
Fugitive Dust					2.7099	0.0000	2.7099	1.4896	0.0000	1.4896			0.0000			0.0000
Off-Road	1.9921	21.2318	15.8131	0.0151		1.2074	1.2074		1.1108	1.1108	0.0000	1,587.4488	1,587.4488	0.4739		1,597.4011
Total	**1.9921**	**21.2318**	**15.8131**	**0.0151**	**2.7099**	**1.2074**	**3.9174**	**1.4896**	**1.1108**	**2.6004**	**0.0000**	**1,587.4488**	**1,587.4488**	**0.4739**		**1,597.4011**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.1276	0.0323	0.4313	7.8000e-004	0.0609	4.7000e-004	0.0613	0.0161	4.3000e-004	0.0166		66.3780	66.3780	3.4000e-003		66.4494
Total	**0.1276**	**0.0323**	**0.4313**	**7.8000e-004**	**0.0609**	**4.7000e-004**	**0.0613**	**0.0161**	**4.3000e-004**	**0.0166**		**66.3780**	**66.3780**	**3.4000e-003**		**66.4494**

3.3 Grading - 2015

Unmitigated Construction On-Site

Acres of Grading: 57.3

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.5524	0.0000	0.5524	0.0597	0.0000	0.0597			0.0000			0.0000
Off-Road	8.0279	98.4254	60.5912	0.0796		4.3646	4.3646		4.0155	4.0155		8,353.9845	8,353.9845	2.4940		8,406.3588
Total	**8.0279**	**98.4254**	**60.5912**	**0.0796**	**0.5524**	**4.3646**	**4.9171**	**0.0597**	**4.0155**	**4.0751**		**8,353.9845**	**8,353.9845**	**2.4940**		**8,406.3588**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.3191	0.0808	1.0781	1.9500e-003	0.1521	1.1700e-003	0.1533	0.0404	1.0700e-003	0.0414		165.9451	165.9451	8.5000e-003		166.1236
Total	**0.3191**	**0.0808**	**1.0781**	**1.9500e-003**	**0.1521**	**1.1700e-003**	**0.1533**	**0.0404**	**1.0700e-003**	**0.0414**		**165.9451**	**165.9451**	**8.5000e-003**		**166.1236**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.2486	0.0000	0.2486	0.0268	0.0000	0.0268			0.0000			0.0000
Off-Road	8.0205	98.3351	60.5356	0.0795		4.3606	4.3606		4.0118	4.0118	0.0000	8,346.320 2	8,346.320 2	2.4917		8,398.6464
Total	**8.0205**	**98.3351**	**60.5356**	**0.0795**	**0.2486**	**4.3606**	**4.6092**	**0.0268**	**4.0118**	**4.0386**	**0.0000**	**8,346.320 2**	**8,346.320 2**	**2.4917**		**8,398.6464**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.3191	0.0808	1.0781	1.9500e-003	0.1521	1.1700e-003	0.1533	0.0404	1.0700e-003	0.0414		165.9451	165.9451	8.5000e-003		166.1236
Total	**0.3191**	**0.0808**	**1.0781**	**1.9500e-003**	**0.1521**	**1.1700e-003**	**0.1533**	**0.0404**	**1.0700e-003**	**0.0414**		**165.9451**	**165.9451**	**8.5000e-003**		**166.1236**

Civic Center Aquatics Complex - Earthwork & Underground Work Construction

Sacramento County, Winter

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Government (Civic Center)	0.00	1000sqft	57.30	2,495,988.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	3.5	**Precipitation Freq (Days)**	58
Climate Zone	6			**Operational Year**	2016
Utility Company	Sacramento Municipal Utility District				
CO2 Intensity (lb/MWhr)	590.31	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - Project site + overflow parking lot = 57.3 acres

Construction Phase -

Off-road Equipment - Equipment list provided by Project applicant

Grading - Project site + overflow parking lot = 57.3 acres

Construction Off-road Equipment Mitigation -

Table Name	Column Name	Default Value	New Value
tblGrading	AcresOfGrading	495.00	57.30
tblLandUse	LandUseSquareFeet	0.00	2,495,988.00
tblLandUse	LotAcreage	0.00	57.30
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	4.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	4.00	2.00
tblProjectCharacteristics	OperationalYear	2014	2016

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2015	8.3852	98.5257	61.5708	0.0813	6.0829	4.3658	7.2919	3.3264	4.0165	4.4386	0.0000	8,499.7076	8,499.7076	2.5025	0.0000	8,552.2604
Total	**8.3852**	**98.5257**	**61.5708**	**0.0813**	**6.0829**	**4.3658**	**7.2919**	**3.3264**	**4.0165**	**4.4386**	**0.0000**	**8,499.7076**	**8,499.7076**	**2.5025**	**0.0000**	**8,552.2604**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2015	8.3778	98.4354	61.5152	0.0812	2.7708	4.3618	4.7625	1.5057	4.0129	4.0801	0.0000	8,492.043 3	8,492.043 3	2.5002	0.0000	8,544.5480
Total	**8.3778**	**98.4354**	**61.5152**	**0.0812**	**2.7708**	**4.3618**	**4.7625**	**1.5057**	**4.0129**	**4.0801**	**0.0000**	**8,492.043 3**	**8,492.043 3**	**2.5002**	**0.0000**	**8,544.5480**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	0.0878	0.0917	0.0903	0.0984	54.4498	0.0916	34.6875	54.7332	0.0916	8.0786	0.0000	0.0902	0.0902	0.0915	0.0000	0.0902

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Site Preparation	Site Preparation	4/9/2015	6/3/2015	5	40	
2	Grading	Grading	6/4/2015	11/4/2015	5	110	

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Site Preparation	Rubber Tired Dozers	1	8.00	255	0.40
Site Preparation	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Grading	Excavators	2	8.00	162	0.38
Grading	Graders	1	8.00	174	0.41
Grading	Rubber Tired Dozers	0	8.00	255	0.40
Grading	Scrapers	4	8.00	361	0.48
Grading	Tractors/Loaders/Backhoes	1	8.00	97	0.37

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Site Preparation	3	8.00	0.00	0.00	10.00	6.50	20.00	LD_Mix	HDT_Mix	HHDT
Grading	8	20.00	0.00	0.00	10.00	6.50	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

Reduce Vehicle Speed on Unpaved Roads

3.2 Site Preparation - 2015

Unmitigated Construction On-Site

Acres of Grading: 0

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category					lb/day								lb/day			
Fugitive Dust					6.0221	0.0000	6.0221	3.3102	0.0000	3.3102			0.0000			0.0000
Off-Road	1.9939	21.2513	15.8277	0.0151		1.2085	1.2085		1.1118	1.1118		1,588.906 6	1,588.906 6	0.4744		1,598.8680
Total	**1.9939**	**21.2513**	**15.8277**	**0.0151**	**6.0221**	**1.2085**	**7.2306**	**3.3102**	**1.1118**	**4.4221**		**1,588.906 6**	**1,588.906 6**	**0.4744**		**1,598.8680**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category					lb/day								lb/day			
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.1429	0.0402	0.3918	6.8000e-004	0.0609	4.7000e-004	0.0613	0.0161	4.3000e-004	0.0166		58.2893	58.2893	3.4000e-003		58.3606
Total	**0.1429**	**0.0402**	**0.3918**	**6.8000e-004**	**0.0609**	**4.7000e-004**	**0.0613**	**0.0161**	**4.3000e-004**	**0.0166**		**58.2893**	**58.2893**	**3.4000e-003**		**58.3606**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category					lb/day								lb/day			
Fugitive Dust					2.7099	0.0000	2.7099	1.4896	0.0000	1.4896			0.0000			0.0000
Off-Road	1.9921	21.2318	15.8131	0.0151		1.2074	1.2074		1.1108	1.1108	0.0000	1,587.448 8	1,587.448 8	0.4739		1,597.4011
Total	**1.9921**	**21.2318**	**15.8131**	**0.0151**	**2.7099**	**1.2074**	**3.9174**	**1.4896**	**1.1108**	**2.6004**	**0.0000**	**1,587.448 8**	**1,587.448 8**	**0.4739**		**1,597.4011**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.1429	0.0402	0.3918	6.8000e-004	0.0609	4.7000e-004	0.0613	0.0161	4.3000e-004	0.0166		58.2893	58.2893	3.4000e-003		58.3606
Total	**0.1429**	**0.0402**	**0.3918**	**6.8000e-004**	**0.0609**	**4.7000e-004**	**0.0613**	**0.0161**	**4.3000e-004**	**0.0166**		**58.2893**	**58.2893**	**3.4000e-003**		**58.3606**

3.3 Grading - 2015

Unmitigated Construction On-Site

Acres of Grading: 57.3

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.5524	0.0000	0.5524	0.0597	0.0000	0.0597			0.0000			0.0000
Off-Road	8.0279	98.4254	60.5912	0.0796		4.3646	4.3646		4.0155	4.0155		8,353.9845	8,353.9845	2.4940		8,406.3588
Total	**8.0279**	**98.4254**	**60.5912**	**0.0796**	**0.5524**	**4.3646**	**4.9171**	**0.0597**	**4.0155**	**4.0751**		**8,353.9845**	**8,353.9845**	**2.4940**		**8,406.3588**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.3573	0.1004	0.9796	1.7100e-003	0.1521	1.1700e-003	0.1533	0.0404	1.0700e-003	0.0414		145.7231	145.7231	8.5000e-003		145.9016
Total	**0.3573**	**0.1004**	**0.9796**	**1.7100e-003**	**0.1521**	**1.1700e-003**	**0.1533**	**0.0404**	**1.0700e-003**	**0.0414**		**145.7231**	**145.7231**	**8.5000e-003**		**145.9016**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.2486	0.0000	0.2486	0.0268	0.0000	0.0268			0.0000			0.0000
Off-Road	8.0205	98.3351	60.5356	0.0795		4.3606	4.3606		4.0118	4.0118	0.0000	8,346.3202	8,346.3202	2.4917		8,398.6464
Total	**8.0205**	**98.3351**	**60.5356**	**0.0795**	**0.2486**	**4.3606**	**4.6092**	**0.0268**	**4.0118**	**4.0386**	**0.0000**	**8,346.3202**	**8,346.3202**	**2.4917**		**8,398.6464**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.3573	0.1004	0.9796	1.7100e-003	0.1521	1.1700e-003	0.1533	0.0404	1.0700e-003	0.0414		145.7231	145.7231	8.5000e-003		145.9016
Total	**0.3573**	**0.1004**	**0.9796**	**1.7100e-003**	**0.1521**	**1.1700e-003**	**0.1533**	**0.0404**	**1.0700e-003**	**0.0414**		**145.7231**	**145.7231**	**8.5000e-003**		**145.9016**

Civic Center Aquatics Complex - Building Construction

Sacramento County, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Government (Civic Center)	75.00	1000sqft	1.72	75,000.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	3.5	**Precipitation Freq (Days)**	58
Climate Zone	6			**Operational Year**	2016
Utility Company	Sacramento Municipal Utility District				
CO2 Intensity (lb/MWhr)	590.31	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use -

Construction Phase - Building construction, paving, and painting assumed to occur simultaneously

Off-road Equipment -

Grading -

Construction Off-road Equipment Mitigation -

Table Name	Column Name	Default Value	New Value
tblConstructionPhase	NumDays	10.00	200.00
tblConstructionPhase	NumDays	10.00	200.00
tblConstructionPhase	PhaseEndDate	7/21/2016	10/15/2015
tblConstructionPhase	PhaseEndDate	7/21/2016	10/15/2015
tblConstructionPhase	PhaseStartDate	10/16/2015	1/9/2015
tblConstructionPhase	PhaseStartDate	10/16/2015	1/9/2015
tblProjectCharacteristics	OperationalYear	2014	2016

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2015	11.6521	40.0036	30.2766	0.0449	5.8604	2.6192	7.3280	2.9699	2.4963	4.3200	0.0000	4,321.911 5	4,321.911 5	0.9361	0.0000	4,341.5705
Total	**11.6521**	**40.0036**	**30.2766**	**0.0449**	**5.8604**	**2.6192**	**7.3280**	**2.9699**	**2.4963**	**4.3200**	**0.0000**	**4,321.911 5**	**4,321.911 5**	**0.9361**	**0.0000**	**4,341.5705**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2015	11.6471	39.9681	30.2526	0.0448	2.6707	2.6168	4.1368	1.3453	2.4940	2.6942	0.0000	4,318.499 0	4,318.499 0	0.9353	0.0000	4,338.1403
Total	**11.6471**	**39.9681**	**30.2526**	**0.0448**	**2.6707**	**2.6168**	**4.1368**	**1.3453**	**2.4940**	**2.6942**	**0.0000**	**4,318.499 0**	**4,318.499 0**	**0.9353**	**0.0000**	**4,338.1403**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	0.0427	0.0888	0.0790	0.0891	54.4289	0.0912	43.5471	54.7011	0.0913	37.6341	0.0000	0.0790	0.0790	0.0897	0.0000	0.0790

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Site Preparation	Site Preparation	1/1/2015	1/2/2015	5	2	
2	Grading	Grading	1/3/2015	1/8/2015	5	4	
3	Building Construction	Building Construction	1/9/2015	10/15/2015	5	200	
4	Paving	Paving	1/9/2015	10/15/2015	5	200	
5	Architectural Coating	Architectural Coating	1/9/2015	10/15/2015	5	200	

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Site Preparation	Graders	1	8.00	174	0.41
Site Preparation	Rubber Tired Dozers	1	7.00	255	0.40
Site Preparation	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Grading	Graders	1	6.00	174	0.41
Grading	Rubber Tired Dozers	1	6.00	255	0.40
Grading	Tractors/Loaders/Backhoes	1	7.00	97	0.37
Building Construction	Cranes	1	6.00	226	0.29
Building Construction	Forklifts	1	6.00	89	0.20
Building Construction	Generator Sets	1	8.00	84	0.74
Building Construction	Tractors/Loaders/Backhoes	1	6.00	97	0.37
Building Construction	Welders	3	8.00	46	0.45
Paving	Cement and Mortar Mixers	1	6.00	9	0.56

Paving	Pavers	1	6.00	125	0.42
Paving	Paving Equipment	1	8.00	130	0.36
Paving	Rollers	1	7.00	80	0.38
Paving	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Architectural Coating	Air Compressors	1	6.00	78	0.48

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Site Preparation	3	8.00	0.00	0.00	10.00	6.50	20.00	LD_Mix	HDT_Mix	HHDT
Grading	3	8.00	0.00	0.00	10.00	6.50	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	7	24.00	12.00	0.00	10.00	6.50	20.00	LD_Mix	HDT_Mix	HHDT
Paving	5	13.00	0.00	0.00	10.00	6.50	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	5.00	0.00	0.00	10.00	6.50	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

Reduce Vehicle Speed on Unpaved Roads

3.2 Site Preparation - 2015

Unmitigated Construction On-Site

Acres of Grading: 1

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					5.7996	0.0000	5.7996	2.9537	0.0000	2.9537			0.0000			0.0000
Off-Road	2.5362	26.8886	17.0107	0.0171		1.4671	1.4671		1.3497	1.3497		1,801.744 0	1,801.744 0	0.5379		1,813.0398
Total	**2.5362**	**26.8886**	**17.0107**	**0.0171**	**5.7996**	**1.4671**	**7.2666**	**2.9537**	**1.3497**	**4.3034**		**1,801.744 0**	**1,801.744 0**	**0.5379**		**1,813.0398**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category						lb/day								lb/day		
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.1276	0.0323	0.4313	7.8000e-004	0.0609	4.7000e-004	0.0613	0.0161	4.3000e-004	0.0166		66.3780	66.3780	3.4000e-003		66.4494
Total	**0.1276**	**0.0323**	**0.4313**	**7.8000e-004**	**0.0609**	**4.7000e-004**	**0.0613**	**0.0161**	**4.3000e-004**	**0.0166**		**66.3780**	**66.3780**	**3.4000e-003**		**66.4494**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category						lb/day								lb/day		
Fugitive Dust					2.6098	0.0000	2.6098	1.3292	0.0000	1.3292			0.0000			0.0000
Off-Road	2.5339	26.8639	16.9951	0.0171		1.4657	1.4657		1.3484	1.3484	0.0000	1,800.091 0	1,800.091 0	0.5374		1,811.3765
Total	**2.5339**	**26.8639**	**16.9951**	**0.0171**	**2.6098**	**1.4657**	**4.0755**	**1.3292**	**1.3484**	**2.6776**	**0.0000**	**1,800.091 0**	**1,800.091 0**	**0.5374**		**1,811.3765**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.1276	0.0323	0.4313	7.8000e-004	0.0609	4.7000e-004	0.0613	0.0161	4.3000e-004	0.0166		66.3780	66.3780	3.4000e-003		66.4494
Total	**0.1276**	**0.0323**	**0.4313**	**7.8000e-004**	**0.0609**	**4.7000e-004**	**0.0613**	**0.0161**	**4.3000e-004**	**0.0166**		**66.3780**	**66.3780**	**3.4000e-003**		**66.4494**

3.3 Grading - 2015

Unmitigated Construction On-Site

Acres of Grading: 1.5

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					4.9143	0.0000	4.9143	2.5256	0.0000	2.5256			0.0000			0.0000
Off-Road	2.0666	21.9443	14.0902	0.0141		1.1968	1.1968		1.1011	1.1011		1,479.800 0	1,479.800 0	0.4418		1,489.0774
Total	**2.0666**	**21.9443**	**14.0902**	**0.0141**	**4.9143**	**1.1968**	**6.1110**	**2.5256**	**1.1011**	**3.6267**		**1,479.800 0**	**1,479.800 0**	**0.4418**		**1,489.0774**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.1276	0.0323	0.4313	7.8000e-004	0.0609	4.7000e-004	0.0613	0.0161	4.3000e-004	0.0166		66.3780	66.3780	3.4000e-003		66.4494
Total	**0.1276**	**0.0323**	**0.4313**	**7.8000e-004**	**0.0609**	**4.7000e-004**	**0.0613**	**0.0161**	**4.3000e-004**	**0.0166**		**66.3780**	**66.3780**	**3.4000e-003**		**66.4494**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					2.2114	0.0000	2.2114	1.1365	0.0000	1.1365			0.0000			0.0000
Off-Road	2.0647	21.9241	14.0773	0.0141		1.1957	1.1957		1.1000	1.1000	0.0000	1,478.442 4	1,478.442 4	0.4414		1,487.7113
Total	**2.0647**	**21.9241**	**14.0773**	**0.0141**	**2.2114**	**1.1957**	**3.4071**	**1.1365**	**1.1000**	**2.2366**	**0.0000**	**1,478.442 4**	**1,478.442 4**	**0.4414**		**1,487.7113**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.1276	0.0323	0.4313	7.8000e-004	0.0609	4.7000e-004	0.0613	0.0161	4.3000e-004	0.0166		66.3780	66.3780	3.4000e-003		66.4494
Total	**0.1276**	**0.0323**	**0.4313**	**7.8000e-004**	**0.0609**	**4.7000e-004**	**0.0613**	**0.0161**	**4.3000e-004**	**0.0166**		**66.3780**	**66.3780**	**3.4000e-003**		**66.4494**

3.4 Building Construction - 2015

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	3.6000	21.5642	15.0041	0.0220		1.4851	1.4851		1.4344	1.4344		2,055.6247	2,055.6247	0.4741		2,065.5812
Total	**3.6000**	**21.5642**	**15.0041**	**0.0220**		**1.4851**	**1.4851**		**1.4344**	**1.4344**		**2,055.6247**	**2,055.6247**	**0.4741**		**2,065.5812**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.3570	1.1035	1.9372	2.5200e-003	0.0705	0.0189	0.0894	0.0201	0.0173	0.0374		253.8839	253.8839	2.1700e-003		253.9295
Worker	0.3829	0.0970	1.2937	2.3400e-003	0.1826	1.4100e-003	0.1840	0.0484	1.2900e-003	0.0497		199.1341	199.1341	0.0102		199.3483
Total	**0.7398**	**1.2005**	**3.2310**	**4.8600e-003**	**0.2531**	**0.0203**	**0.2733**	**0.0685**	**0.0186**	**0.0871**		**453.0180**	**453.0180**	**0.0124**		**453.2778**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	3.5967	21.5444	14.9903	0.0219		1.4837	1.4837		1.4331	1.4331	0.0000	2,053.7387	2,053.7387	0.4737		2,063.6861
Total	**3.5967**	**21.5444**	**14.9903**	**0.0219**		**1.4837**	**1.4837**		**1.4331**	**1.4331**	**0.0000**	**2,053.7387**	**2,053.7387**	**0.4737**		**2,063.6861**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.3570	1.1035	1.9372	2.5200e-003	0.0705	0.0189	0.0894	0.0201	0.0173	0.0374		253.8839	253.8839	2.1700e-003		253.9295
Worker	0.3829	0.0970	1.2937	2.3400e-003	0.1826	1.4100e-003	0.1840	0.0484	1.2900e-003	0.0497		199.1341	199.1341	0.0102		199.3483
Total	**0.7398**	**1.2005**	**3.2310**	**4.8600e-003**	**0.2531**	**0.0203**	**0.2733**	**0.0685**	**0.0186**	**0.0871**		**453.0180**	**453.0180**	**0.0124**		**453.2778**

3.5 Paving - 2015

Unmitigated Construction On-Site

Acres of Paving: 0

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.4041	14.5959	9.1695	0.0133		0.8919	0.8919		0.8215	0.8215		1,382.4703	1,382.4703	0.4054		1,390.9826
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.4041**	**14.5959**	**9.1695**	**0.0133**		**0.8919**	**0.8919**		**0.8215**	**0.8215**		**1,382.4703**	**1,382.4703**	**0.4054**		**1,390.9826**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.2074	0.0525	0.7008	1.2700e-003	0.0989	7.6000e-004	0.0997	0.0262	7.0000e-004	0.0269		107.8643	107.8643	5.5200e-003		107.9803
Total	**0.2074**	**0.0525**	**0.7008**	**1.2700e-003**	**0.0989**	**7.6000e-004**	**0.0997**	**0.0262**	**7.0000e-004**	**0.0269**		**107.8643**	**107.8643**	**5.5200e-003**		**107.9803**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.4028	14.5826	9.1611	0.0133		0.8911	0.8911		0.8207	0.8207	0.0000	1,381.2019	1,381.2019	0.4050		1,389.7064
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.4028**	**14.5826**	**9.1611**	**0.0133**		**0.8911**	**0.8911**		**0.8207**	**0.8207**	**0.0000**	**1,381.2019**	**1,381.2019**	**0.4050**		**1,389.7064**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.2074	0.0525	0.7008	1.2700e-003	0.0989	7.6000e-004	0.0997	0.0262	7.0000e-004	0.0269		107.8643	107.8643	5.5200e-003		107.9803
Total	**0.2074**	**0.0525**	**0.7008**	**1.2700e-003**	**0.0989**	**7.6000e-004**	**0.0997**	**0.0262**	**7.0000e-004**	**0.0269**		**107.8643**	**107.8643**	**5.5200e-003**		**107.9803**

3.6 Architectural Coating - 2015

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	5.2144					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.4066	2.5703	1.9018	2.9700e-003		0.2209	0.2209		0.2209	0.2209		281.4481	281.4481	0.0367		282.2177
Total	**5.6210**	**2.5703**	**1.9018**	**2.9700e-003**		**0.2209**	**0.2209**		**0.2209**	**0.2209**		**281.4481**	**281.4481**	**0.0367**		**282.2177**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0798	0.0202	0.2695	4.9000e-004	0.0380	2.9000e-004	0.0383	0.0101	2.7000e-004	0.0104		41.4863	41.4863	2.1200e-003		41.5309
Total	**0.0798**	**0.0202**	**0.2695**	**4.9000e-004**	**0.0380**	**2.9000e-004**	**0.0383**	**0.0101**	**2.7000e-004**	**0.0104**		**41.4863**	**41.4863**	**2.1200e-003**		**41.5309**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	5.2144					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.4062	2.5680	1.9000	2.9700e-003		0.2207	0.2207		0.2207	0.2207	0.0000	281.1898	281.1898	0.0366		281.9587
Total	**5.6206**	**2.5680**	**1.9000**	**2.9700e-003**		**0.2207**	**0.2207**		**0.2207**	**0.2207**	**0.0000**	**281.1898**	**281.1898**	**0.0366**		**281.9587**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0798	0.0202	0.2695	4.9000e-004	0.0380	2.9000e-004	0.0383	0.0101	2.7000e-004	0.0104		41.4863	41.4863	2.1200e-003		41.5309
Total	**0.0798**	**0.0202**	**0.2695**	**4.9000e-004**	**0.0380**	**2.9000e-004**	**0.0383**	**0.0101**	**2.7000e-004**	**0.0104**		**41.4863**	**41.4863**	**2.1200e-003**		**41.5309**

Civic Center Aquatics Complex - Building Construction
Sacramento County, Winter

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Government (Civic Center)	75.00	1000sqft	1.72	75,000.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	3.5	**Precipitation Freq (Days)**	58
Climate Zone	6			**Operational Year**	2016
Utility Company	Sacramento Municipal Utility District				
CO2 Intensity (lb/MWhr)	590.31	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use -

Construction Phase - Building construction, paving, and painting assumed to occur simultaneously

Off-road Equipment -

Grading -

Construction Off-road Equipment Mitigation -

Table Name	Column Name	Default Value	New Value
tblConstructionPhase	NumDays	10.00	200.00
tblConstructionPhase	NumDays	10.00	200.00
tblConstructionPhase	PhaseEndDate	7/21/2016	10/15/2015
tblConstructionPhase	PhaseEndDate	7/21/2016	10/15/2015
tblConstructionPhase	PhaseStartDate	10/16/2015	1/9/2015
tblConstructionPhase	PhaseStartDate	10/16/2015	1/9/2015
tblProjectCharacteristics	OperationalYear	2014	2016

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2015	11.7993	40.1253	30.8356	0.0444	5.8604	2.6195	7.3280	2.9699	2.4966	4.3200	0.0000	4,277.247 2	4,277.247 2	0.9362	0.0000	4,296.9074
Total	**11.7993**	**40.1253**	**30.8356**	**0.0444**	**5.8604**	**2.6195**	**7.3280**	**2.9699**	**2.4966**	**4.3200**	**0.0000**	**4,277.247 2**	**4,277.247 2**	**0.9362**	**0.0000**	**4,296.9074**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2015	11.7943	40.0897	30.8116	0.0443	2.6707	2.6171	4.1368	1.3453	2.4943	2.6942	0.0000	4,273.834 7	4,273.834 7	0.9354	0.0000	4,293.4772
Total	**11.7943**	**40.0897**	**30.8116**	**0.0443**	**2.6707**	**2.6171**	**4.1368**	**1.3453**	**2.4943**	**2.6942**	**0.0000**	**4,273.834 7**	**4,273.834 7**	**0.9354**	**0.0000**	**4,293.4772**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	0.0421	0.0885	0.0776	0.0676	54.4289	0.0909	43.5471	54.7011	0.0913	37.6341	0.0000	0.0798	0.0798	0.0897	0.0000	0.0798

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Site Preparation	Site Preparation	1/1/2015	1/2/2015	5	2	
2	Grading	Grading	1/3/2015	1/8/2015	5	4	
3	Building Construction	Building Construction	1/9/2015	10/15/2015	5	200	
4	Paving	Paving	1/9/2015	10/15/2015	5	200	
5	Architectural Coating	Architectural Coating	1/9/2015	10/15/2015	5	200	

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Site Preparation	Graders	1	8.00	174	0.41
Site Preparation	Rubber Tired Dozers	1	7.00	255	0.40
Site Preparation	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Grading	Graders	1	6.00	174	0.41
Grading	Rubber Tired Dozers	1	6.00	255	0.40
Grading	Tractors/Loaders/Backhoes	1	7.00	97	0.37
Building Construction	Cranes	1	6.00	226	0.29
Building Construction	Forklifts	1	6.00	89	0.20
Building Construction	Generator Sets	1	8.00	84	0.74
Building Construction	Tractors/Loaders/Backhoes	1	6.00	97	0.37
Building Construction	Welders	3	8.00	46	0.45
Paving	Cement and Mortar Mixers	1	6.00	9	0.56

Paving	Pavers	1	6.00	125	0.42
Paving	Paving Equipment	1	8.00	130	0.36
Paving	Rollers	1	7.00	80	0.38
Paving	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Architectural Coating	Air Compressors	1	6.00	78	0.48

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Site Preparation	3	8.00	0.00	0.00	10.00	6.50	20.00	LD_Mix	HDT_Mix	HHDT
Grading	3	8.00	0.00	0.00	10.00	6.50	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	7	24.00	12.00	0.00	10.00	6.50	20.00	LD_Mix	HDT_Mix	HHDT
Paving	5	13.00	0.00	0.00	10.00	6.50	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	5.00	0.00	0.00	10.00	6.50	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

Reduce Vehicle Speed on Unpaved Roads

3.2 Site Preparation - 2015

Unmitigated Construction On-Site

Acres of Grading: 1

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					5.7996	0.0000	5.7996	2.9537	0.0000	2.9537			0.0000			0.0000
Off-Road	2.5362	26.8886	17.0107	0.0171		1.4671	1.4671		1.3497	1.3497		1,801.744 0	1,801.744 0	0.5379		1,813.0398
Total	**2.5362**	**26.8886**	**17.0107**	**0.0171**	**5.7996**	**1.4671**	**7.2666**	**2.9537**	**1.3497**	**4.3034**		**1,801.744 0**	**1,801.744 0**	**0.5379**		**1,813.0398**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.1429	0.0402	0.3918	6.8000e-004	0.0609	4.7000e-004	0.0613	0.0161	4.3000e-004	0.0166		58.2893	58.2893	3.4000e-003		58.3606
Total	**0.1429**	**0.0402**	**0.3918**	**6.8000e-004**	**0.0609**	**4.7000e-004**	**0.0613**	**0.0161**	**4.3000e-004**	**0.0166**		**58.2893**	**58.2893**	**3.4000e-003**		**58.3606**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					2.6098	0.0000	2.6098	1.3292	0.0000	1.3292			0.0000			0.0000
Off-Road	2.5339	26.8639	16.9951	0.0171		1.4657	1.4657		1.3484	1.3484	0.0000	1,800.091 0	1,800.091 0	0.5374		1,811.3765
Total	**2.5339**	**26.8639**	**16.9951**	**0.0171**	**2.6098**	**1.4657**	**4.0755**	**1.3292**	**1.3484**	**2.6776**	**0.0000**	**1,800.091 0**	**1,800.091 0**	**0.5374**		**1,811.3765**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category					lb/day								lb/day			
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.1429	0.0402	0.3918	6.8000e-004	0.0609	4.7000e-004	0.0613	0.0161	4.3000e-004	0.0166		58.2893	58.2893	3.4000e-003		58.3606
Total	**0.1429**	**0.0402**	**0.3918**	**6.8000e-004**	**0.0609**	**4.7000e-004**	**0.0613**	**0.0161**	**4.3000e-004**	**0.0166**		**58.2893**	**58.2893**	**3.4000e-003**		**58.3606**

3.3 Grading - 2015

Unmitigated Construction On-Site

Acres of Grading: 1.5

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category					lb/day								lb/day			
Fugitive Dust					4.9143	0.0000	4.9143	2.5256	0.0000	2.5256			0.0000			0.0000
Off-Road	2.0666	21.9443	14.0902	0.0141		1.1968	1.1968		1.1011	1.1011		1,479.8000	1,479.8000	0.4418		1,489.0774
Total	**2.0666**	**21.9443**	**14.0902**	**0.0141**	**4.9143**	**1.1968**	**6.1110**	**2.5256**	**1.1011**	**3.6267**		**1,479.8000**	**1,479.8000**	**0.4418**		**1,489.0774**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.1429	0.0402	0.3918	6.8000e-004	0.0609	4.7000e-004	0.0613	0.0161	4.3000e-004	0.0166		58.2893	58.2893	3.4000e-003		58.3606
Total	**0.1429**	**0.0402**	**0.3918**	**6.8000e-004**	**0.0609**	**4.7000e-004**	**0.0613**	**0.0161**	**4.3000e-004**	**0.0166**		**58.2893**	**58.2893**	**3.4000e-003**		**58.3606**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					2.2114	0.0000	2.2114	1.1365	0.0000	1.1365			0.0000			0.0000
Off-Road	2.0647	21.9241	14.0773	0.0141		1.1957	1.1957		1.1000	1.1000	0.0000	1,478.4424	1,478.4424	0.4414		1,487.7113
Total	**2.0647**	**21.9241**	**14.0773**	**0.0141**	**2.2114**	**1.1957**	**3.4071**	**1.1365**	**1.1000**	**2.2366**	**0.0000**	**1,478.4424**	**1,478.4424**	**0.4414**		**1,487.7113**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.1429	0.0402	0.3918	6.8000e-004	0.0609	4.7000e-004	0.0613	0.0161	4.3000e-004	0.0166		58.2893	58.2893	3.4000e-003		58.3606
Total	**0.1429**	**0.0402**	**0.3918**	**6.8000e-004**	**0.0609**	**4.7000e-004**	**0.0613**	**0.0161**	**4.3000e-004**	**0.0166**		**58.2893**	**58.2893**	**3.4000e-003**		**58.3606**

3.4 Building Construction - 2015

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	3.6000	21.5642	15.0041	0.0220		1.4851	1.4851		1.4344	1.4344		2,055.6247	2,055.6247	0.4741		2,065.5812
Total	**3.6000**	**21.5642**	**15.0041**	**0.0220**		**1.4851**	**1.4851**		**1.4344**	**1.4344**		**2,055.6247**	**2,055.6247**	**0.4741**		**2,065.5812**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.4238	1.1841	2.7031	2.5100e-003	0.0705	0.0192	0.0896	0.0201	0.0176	0.0377		251.6857	251.6857	2.2300e-003		251.7326
Worker	0.4288	0.1204	1.1755	2.0500e-003	0.1826	1.4100e-003	0.1840	0.0484	1.2900e-003	0.0497		174.8677	174.8677	0.0102		175.0819
Total	**0.8526**	**1.3045**	**3.8786**	**4.5600e-003**	**0.2531**	**0.0206**	**0.2736**	**0.0685**	**0.0189**	**0.0874**		**426.5534**	**426.5534**	**0.0124**		**426.8145**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	3.5967	21.5444	14.9903	0.0219		1.4837	1.4837		1.4331	1.4331	0.0000	2,053.7387	2,053.7387	0.4737		2,063.6861
Total	**3.5967**	**21.5444**	**14.9903**	**0.0219**		**1.4837**	**1.4837**		**1.4331**	**1.4331**	**0.0000**	**2,053.7387**	**2,053.7387**	**0.4737**		**2,063.6861**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.4238	1.1841	2.7031	2.5100e-003	0.0705	0.0192	0.0896	0.0201	0.0176	0.0377		251.6857	251.6857	2.2300e-003		251.7326
Worker	0.4288	0.1204	1.1755	2.0500e-003	0.1826	1.4100e-003	0.1840	0.0484	1.2900e-003	0.0497		174.8677	174.8677	0.0102		175.0819
Total	**0.8526**	**1.3045**	**3.8786**	**4.5600e-003**	**0.2531**	**0.0206**	**0.2736**	**0.0685**	**0.0189**	**0.0874**		**426.5534**	**426.5534**	**0.0124**		**426.8145**

3.5 Paving - 2015

Unmitigated Construction On-Site

Acres of Paving: 0

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.4041	14.5959	9.1695	0.0133		0.8919	0.8919		0.8215	0.8215		1,382.4703	1,382.4703	0.4054		1,390.9826
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.4041**	**14.5959**	**9.1695**	**0.0133**		**0.8919**	**0.8919**		**0.8215**	**0.8215**		**1,382.4703**	**1,382.4703**	**0.4054**		**1,390.9826**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.2323	0.0652	0.6367	1.1100e-003	0.0989	7.6000e-004	0.0997	0.0262	7.0000e-004	0.0269		94.7200	94.7200	5.5200e-003		94.8360
Total	**0.2323**	**0.0652**	**0.6367**	**1.1100e-003**	**0.0989**	**7.6000e-004**	**0.0997**	**0.0262**	**7.0000e-004**	**0.0269**		**94.7200**	**94.7200**	**5.5200e-003**		**94.8360**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.4028	14.5826	9.1611	0.0133		0.8911	0.8911		0.8207	0.8207	0.0000	1,381.2019	1,381.2019	0.4050		1,389.7064
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.4028**	**14.5826**	**9.1611**	**0.0133**		**0.8911**	**0.8911**		**0.8207**	**0.8207**	**0.0000**	**1,381.2019**	**1,381.2019**	**0.4050**		**1,389.7064**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category						lb/day							lb/day			
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.2323	0.0652	0.6367	1.1100e-003	0.0989	7.6000e-004	0.0997	0.0262	7.0000e-004	0.0269		94.7200	94.7200	5.5200e-003		94.8360
Total	**0.2323**	**0.0652**	**0.6367**	**1.1100e-003**	**0.0989**	**7.6000e-004**	**0.0997**	**0.0262**	**7.0000e-004**	**0.0269**		**94.7200**	**94.7200**	**5.5200e-003**		**94.8360**

3.6 Architectural Coating - 2015

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category						lb/day							lb/day			
Archit. Coating	5.2144					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.4066	2.5703	1.9018	2.9700e-003		0.2209	0.2209		0.2209	0.2209		281.4481	281.4481	0.0367		282.2177
Total	**5.6210**	**2.5703**	**1.9018**	**2.9700e-003**		**0.2209**	**0.2209**		**0.2209**	**0.2209**		**281.4481**	**281.4481**	**0.0367**		**282.2177**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0893	0.0251	0.2449	4.3000e-004	0.0380	2.9000e-004	0.0383	0.0101	2.7000e-004	0.0104		36.4308	36.4308	2.1200e-003		36.4754
Total	**0.0893**	**0.0251**	**0.2449**	**4.3000e-004**	**0.0380**	**2.9000e-004**	**0.0383**	**0.0101**	**2.7000e-004**	**0.0104**		**36.4308**	**36.4308**	**2.1200e-003**		**36.4754**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	5.2144					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.4062	2.5680	1.9000	2.9700e-003		0.2207	0.2207		0.2207	0.2207	0.0000	281.1898	281.1898	0.0366		281.9587
Total	**5.6206**	**2.5680**	**1.9000**	**2.9700e-003**		**0.2207**	**0.2207**		**0.2207**	**0.2207**	**0.0000**	**281.1898**	**281.1898**	**0.0366**		**281.9587**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0893	0.0251	0.2449	4.3000e-004	0.0380	2.9000e-004	0.0383	0.0101	2.7000e-004	0.0104		36.4308	36.4308	2.1200e-003		36.4754
Total	**0.0893**	**0.0251**	**0.2449**	**4.3000e-004**	**0.0380**	**2.9000e-004**	**0.0383**	**0.0101**	**2.7000e-004**	**0.0104**		**36.4308**	**36.4308**	**2.1200e-003**		**36.4754**

Civic Center Aquatics Complex - Facility Features Construction

Sacramento County, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Government (Civic Center)	0.00	1000sqft	30.00	1,306,800.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	3.5	**Precipitation Freq (Days)**	58
Climate Zone	6			**Operational Year**	2016
Utility Company	Sacramento Municipal Utility District				
CO2 Intensity (lb/MWhr)	590.31	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - Project site = 30 acres

Construction Phase - Project construction estimated to last 14 months

Off-road Equipment - Equipment list provided by Project applicant

Table Name	Column Name	Default Value	New Value
tblConstructionPhase	NumDays	440.00	110.00
tblLandUse	LandUseSquareFeet	0.00	1,306,800.00
tblLandUse	LotAcreage	0.00	30.00
tblOffRoadEquipment	LoadFactor	0.42	0.42
tblOffRoadEquipment	LoadFactor	0.38	0.38
tblOffRoadEquipment	LoadFactor	0.38	0.38
tblOffRoadEquipment	LoadFactor	0.41	0.41
tblOffRoadEquipment	LoadFactor	0.48	0.48
tblOffRoadEquipment	LoadFactor	0.38	0.38
tblOffRoadEquipment	OffRoadEquipmentType		Pavers
tblOffRoadEquipment	OffRoadEquipmentType		Dumpers/Tenders
tblOffRoadEquipment	OffRoadEquipmentType		Dumpers/Tenders
tblOffRoadEquipment	OffRoadEquipmentType		Off-Highway Trucks
tblOffRoadEquipment	OffRoadEquipmentType		Pumps
tblOffRoadEquipment	OffRoadEquipmentType		Excavators
tblOffRoadEquipment	OffRoadEquipmentType		Graders
tblOffRoadEquipment	OffRoadEquipmentType		Scrapers
tblOffRoadEquipment	OffRoadEquipmentType		Rollers
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	4.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblProjectCharacteristics	OperationalYear	2014	2016

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2015	22.6231	125.8726	113.9493	0.1825	4.4368	5.6087	10.0455	1.2013	5.1936	6.3949	0.0000	18,066.94 34	18,066.94 34	3.0866	0.0000	18,131.762 1
Total	**22.6231**	**125.8726**	**113.9493**	**0.1825**	**4.4368**	**5.6087**	**10.0455**	**1.2013**	**5.1936**	**6.3949**	**0.0000**	**18,066.94 34**	**18,066.94 34**	**3.0866**	**0.0000**	**18,131.762 1**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2015	22.6143	125.7767	113.8971	0.1824	4.4368	5.6039	10.0407	1.2013	5.1891	6.3904	0.0000	18,057.70 37	18,057.70 37	3.0840	0.0000	18,122.467 1
Total	**22.6143**	**125.7767**	**113.8971**	**0.1824**	**4.4368**	**5.6039**	**10.0407**	**1.2013**	**5.1891**	**6.3904**	**0.0000**	**18,057.70 37**	**18,057.70 37**	**3.0840**	**0.0000**	**18,122.467 1**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	0.0389	0.0762	0.0458	0.0493	0.0000	0.0859	0.0479	0.0000	0.0859	0.0697	0.0000	0.0511	0.0511	0.0852	0.0000	0.0513

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Building Construction	Building Construction	5/14/2015	10/14/2015	5	110	

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Building Construction	Pavers	1	8.00	125	0.42
Building Construction	Dumpers/Tenders	2	2.00	16	0.38
Building Construction	Dumpers/Tenders	1	8.00	16	0.38
Building Construction	Off-Highway Trucks	4	6.00	400	0.38
Building Construction	Cranes	1	7.00	226	0.29
Building Construction	Forklifts	1	8.00	89	0.20
Building Construction	Generator Sets	0	8.00	84	0.74
Building Construction	Pumps	1	8.00	84	0.74
Building Construction	Excavators	1	8.00	162	0.38
Building Construction	Graders	1	6.00	174	0.41
Building Construction	Scrapers	1	8.00	361	0.48
Building Construction	Tractors/Loaders/Backhoes	4	7.00	97	0.37
Building Construction	Rollers	1	8.00	80	0.38
Building Construction	Welders	0	8.00	46	0.45

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Building Construction	19	418.00	214.00	0.00	10.00	6.50	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

3.2 Building Construction - 2015

Unmitigated Construction On-Site

Acres of Grading: 0

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	9.5888	104.5045	56.8694	0.0968		5.2478	5.2478		4.8623	4.8623		10,071.0955	10,071.0955	2.8702		10,131.3697
Total	**9.5888**	**104.5045**	**56.8694**	**0.0968**		**5.2478**	**5.2478**		**4.8623**	**4.8623**		**10,071.0955**	**10,071.0955**	**2.8702**		**10,131.3697**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	6.3656	19.6790	34.5473	0.0450	1.2570	0.3363	1.5934	0.3579	0.3088	0.6666		4,527.5953	4,527.5953	0.0388		4,528.4093
Worker	6.6687	1.6890	22.5326	0.0407	3.1797	0.0245	3.2043	0.8435	0.0225	0.8659		3,468.2525	3,468.2525	0.1776		3,471.9831
Total	**13.0343**	**21.3680**	**57.0799**	**0.0857**	**4.4368**	**0.3609**	**4.7977**	**1.2013**	**0.3312**	**1.5325**		**7,995.8479**	**7,995.8479**	**0.2164**		**8,000.3924**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	9.5800	104.4087	56.8172	0.0967		5.2430	5.2430		4.8579	4.8579	0.0000	10,061.8558	10,061.8558	2.8676		10,122.0747
Total	**9.5800**	**104.4087**	**56.8172**	**0.0967**		**5.2430**	**5.2430**		**4.8579**	**4.8579**	**0.0000**	**10,061.8558**	**10,061.8558**	**2.8676**		**10,122.0747**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	6.3656	19.6790	34.5473	0.0450	1.2570	0.3363	1.5934	0.3579	0.3088	0.6666		4,527.5953	4,527.5953	0.0388		4,528.4093
Worker	6.6687	1.6890	22.5326	0.0407	3.1797	0.0245	3.2043	0.8435	0.0225	0.8659		3,468.2525	3,468.2525	0.1776		3,471.9831
Total	**13.0343**	**21.3680**	**57.0799**	**0.0857**	**4.4368**	**0.3609**	**4.7977**	**1.2013**	**0.3312**	**1.5325**		**7,995.8479**	**7,995.8479**	**0.2164**		**8,000.3924**

Civic Center Aquatics Complex - Facility Features Construction

Sacramento County, Winter

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Government (Civic Center)	0.00	1000sqft	30.00	1,306,800.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	3.5	**Precipitation Freq (Days)**	58
Climate Zone	6			**Operational Year**	2016
Utility Company	Sacramento Municipal Utility District				
CO2 Intensity (lb/MWhr)	590.31	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - Project site = 30 acres

Construction Phase - Project construction estimated to last 14 months

Off-road Equipment - Equipment list provided by Project applicant

Table Name	Column Name	Default Value	New Value
tblConstructionPhase	NumDays	440.00	110.00
tblLandUse	LandUseSquareFeet	0.00	1,306,800.00
tblLandUse	LotAcreage	0.00	30.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	4.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblProjectCharacteristics	OperationalYear	2014	2016

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2015	24.6020	127.5429	125.4608	0.1771	4.4368	5.6094	10.0462	1.2013	5.1942	6.3956	0.0000	17,583.98 81	17,583.98 81	3.0814	0.0000	17,648.696 8
Total	**24.6020**	**127.5429**	**125.4608**	**0.1771**	**4.4368**	**5.6094**	**10.0462**	**1.2013**	**5.1942**	**6.3956**	**0.0000**	**17,583.98 81**	**17,583.98 81**	**3.0814**	**0.0000**	**17,648.696 8**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2015	24.5932	127.4472	125.4087	0.1770	4.4368	5.6046	10.0414	1.2013	5.1898	6.3911	0.0000	17,574.76 78	17,574.76 78	3.0787	0.0000	17,639.421 3
Total	**24.5932**	**127.4472**	**125.4087**	**0.1770**	**4.4368**	**5.6046**	**10.0414**	**1.2013**	**5.1898**	**6.3911**	**0.0000**	**17,574.76 78**	**17,574.76 78**	**3.0787**	**0.0000**	**17,639.421 3**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	0.0357	0.0750	0.0415	0.0508	0.0000	0.0857	0.0479	0.0000	0.0857	0.0697	0.0000	0.0524	0.0524	0.0854	0.0000	0.0526

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Building Construction	Building Construction	5/14/2015	10/14/2015	5	110	

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Building Construction	Cranes	1	7.00	226	0.29
Building Construction	Dumpers/Tenders	2	2.00	16	0.38
Building Construction	Dumpers/Tenders	1	8.00	16	0.38
Building Construction	Excavators	1	8.00	162	0.38
Building Construction	Forklifts	1	8.00	89	0.20
Building Construction	Generator Sets	0	8.00	84	0.74
Building Construction	Graders	1	6.00	174	0.41
Building Construction	Off-Highway Trucks	4	6.00	400	0.38
Building Construction	Pavers	1	8.00	125	0.42
Building Construction	Pumps	1	8.00	84	0.74
Building Construction	Rollers	1	8.00	80	0.38
Building Construction	Scrapers	1	8.00	361	0.48
Building Construction	Tractors/Loaders/Backhoes	4	7.00	97	0.37
Building Construction	Welders	0	8.00	46	0.45

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Building Construction	19	418.00	214.00	0.00	10.00	6.50	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

3.2 Building Construction - 2015

Unmitigated Construction On-Site

Acres of Grading: 0

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	9.5761	104.3296	56.7817	0.0966		5.2433	5.2433		4.8582	4.8582		10,049.98 07	10,049.98 07	2.8639		10,110.122 5
Total	**9.5761**	**104.3296**	**56.7817**	**0.0966**		**5.2433**	**5.2433**		**4.8582**	**4.8582**		**10,049.98 07**	**10,049.98 07**	**2.8639**		**10,110.122 5**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	7.5579	21.1157	48.2058	0.0448	1.2570	0.3416	1.5986	0.3579	0.3136	0.6714		4,488.394 4	4,488.394 4	0.0398		4,489.2307
Worker	7.4679	2.0977	20.4733	0.0357	3.1797	0.0245	3.2043	0.8435	0.0225	0.8659		3,045.613 1	3,045.613 1	0.1776		3,049.3436
Total	**15.0258**	**23.2133**	**68.6791**	**0.0805**	**4.4368**	**0.3661**	**4.8029**	**1.2013**	**0.3360**	**1.5374**		**7,534.007 4**	**7,534.007 4**	**0.2175**		**7,538.5743**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	9.5674	104.2339	56.7296	0.0965		5.2385	5.2385		4.8537	4.8537	0.0000	10,040.7604	10,040.7604	2.8613		10,100.8470
Total	**9.5674**	**104.2339**	**56.7296**	**0.0965**		**5.2385**	**5.2385**		**4.8537**	**4.8537**	**0.0000**	**10,040.7604**	**10,040.7604**	**2.8613**		**10,100.8470**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	7.5579	21.1157	48.2058	0.0448	1.2570	0.3416	1.5986	0.3579	0.3136	0.6714		4,488.3944	4,488.3944	0.0398		4,489.2307
Worker	7.4679	2.0977	20.4733	0.0357	3.1797	0.0245	3.2043	0.8435	0.0225	0.8659		3,045.6131	3,045.6131	0.1776		3,049.3436
Total	**15.0258**	**23.2133**	**68.6791**	**0.0805**	**4.4368**	**0.3661**	**4.8029**	**1.2013**	**0.3360**	**1.5374**		**7,534.0074**	**7,534.0074**	**0.2175**		**7,538.5743**

Civic Center Aquatics Complex - Asphalt Paving
Sacramento County, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Government (Civic Center)	0.00	1000sqft	57.30	0.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	3.5	**Precipitation Freq (Days)**	58
Climate Zone	6			**Operational Year**	2016
Utility Company	Sacramento Municipal Utility District				
CO2 Intensity (lb/MWhr)	590.31	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - Project site + overflow parking lot = 57.3 acres

Off-road Equipment - Equipment list provided by Project applicant

Table Name	Column Name	Default Value	New Value
tblLandUse	LotAcreage	0.00	57.30
tblOffRoadEquipment	LoadFactor	0.37	0.37
tblOffRoadEquipment	OffRoadEquipmentType		Tractors/Loaders/Backhoes
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblProjectCharacteristics	OperationalYear	2014	2016

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2015	2.2054	20.4493	12.9704	0.0186	0.0989	1.2831	1.3820	0.0262	1.1805	1.2067	0.0000	1,932.1784	1,932.1784	0.5502	0.0000	1,943.7317
Total	**2.2054**	**20.4493**	**12.9704**	**0.0186**	**0.0989**	**1.2831**	**1.3820**	**0.0262**	**1.1805**	**1.2067**	**0.0000**	**1,932.1784**	**1,932.1784**	**0.5502**	**0.0000**	**1,943.7317**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2015	2.2035	20.4305	12.9592	0.0186	0.0989	1.2820	1.3809	0.0262	1.1794	1.2056	0.0000	1,930.5047	1,930.5047	0.5497	0.0000	1,942.0475
Total	**2.2035**	**20.4305**	**12.9592**	**0.0186**	**0.0989**	**1.2820**	**1.3809**	**0.0262**	**1.1794**	**1.2056**	**0.0000**	**1,930.5047**	**1,930.5047**	**0.5497**	**0.0000**	**1,942.0475**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.0834**	**0.0915**	**0.0867**	**0.1074**	**0.0000**	**0.0912**	**0.0847**	**0.0000**	**0.0915**	**0.0895**	**0.0000**	**0.0866**	**0.0866**	**0.0909**	**0.0000**	**0.0866**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Paving	Paving	2/6/2015	5/21/2015	5	75	

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Paving	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Paving	Pavers	2	8.00	125	0.42
Paving	Rollers	2	8.00	80	0.38
Paving	Paving Equipment	0	8.00	130	0.36

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Paving	5	13.00	0.00	0.00	10.00	6.50	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

3.2 Paving - 2015

Unmitigated Construction On-Site

Acres of Grading: 0

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.9980	20.3967	12.2697	0.0174		1.2824	1.2824		1.1798	1.1798		1,824.3141	1,824.3141	0.5446		1,835.7514
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.9980**	**20.3967**	**12.2697**	**0.0174**		**1.2824**	**1.2824**		**1.1798**	**1.1798**		**1,824.3141**	**1,824.3141**	**0.5446**		**1,835.7514**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.2074	0.0525	0.7008	1.2700e-003	0.0989	7.6000e-004	0.0997	0.0262	7.0000e-004	0.0269		107.8643	107.8643	5.5200e-003		107.9803
Total	**0.2074**	**0.0525**	**0.7008**	**1.2700e-003**	**0.0989**	**7.6000e-004**	**0.0997**	**0.0262**	**7.0000e-004**	**0.0269**		**107.8643**	**107.8643**	**5.5200e-003**		**107.9803**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.9961	20.3780	12.2584	0.0174		1.2812	1.2812		1.1787	1.1787	0.0000	1,822.6404	1,822.6404	0.5441		1,834.0672
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.9961**	**20.3780**	**12.2584**	**0.0174**		**1.2812**	**1.2812**		**1.1787**	**1.1787**	**0.0000**	**1,822.6404**	**1,822.6404**	**0.5441**		**1,834.0672**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category					lb/day								lb/day			
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.2074	0.0525	0.7008	1.2700e-003	0.0989	7.6000e-004	0.0997	0.0262	7.0000e-004	0.0269		107.8643	107.8643	5.5200e-003		107.9803
Total	**0.2074**	**0.0525**	**0.7008**	**1.2700e-003**	**0.0989**	**7.6000e-004**	**0.0997**	**0.0262**	**7.0000e-004**	**0.0269**		**107.8643**	**107.8643**	**5.5200e-003**		**107.9803**

Civic Center Aquatics Complex - Asphalt Paving

Sacramento County, Winter

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Government (Civic Center)	0.00	1000sqft	57.30	0.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	3.5	**Precipitation Freq (Days)**	58
Climate Zone	6			**Operational Year**	2016
Utility Company	Sacramento Municipal Utility District				
CO2 Intensity (lb/MWhr)	590.31	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - Project site + overflow parking lot = 57.3 acres

Off-road Equipment - Equipment list provided by Project applicant

Table Name	Column Name	Default Value	New Value
tblLandUse	LotAcreage	0.00	57.30
tblOffRoadEquipment	LoadFactor	0.37	0.37
tblOffRoadEquipment	OffRoadEquipmentType		Tractors/Loaders/Backhoes
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblProjectCharacteristics	OperationalYear	2014	2016

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2015	2.2302	20.4620	12.9064	0.0185	0.0989	1.2831	1.3820	0.0262	1.1805	1.2067	0.0000	1,919.0341	1,919.0341	0.5502	0.0000	1,930.5874
Total	2.2302	20.4620	12.9064	0.0185	0.0989	1.2831	1.3820	0.0262	1.1805	1.2067	0.0000	1,919.0341	1,919.0341	0.5502	0.0000	1,930.5874

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2015	2.2284	20.4433	12.8951	0.0185	0.0989	1.2820	1.3809	0.0262	1.1794	1.2056	0.0000	1,917.3604	1,917.3604	0.5497	0.0000	1,928.9032
Total	2.2284	20.4433	12.8951	0.0185	0.0989	1.2820	1.3809	0.0262	1.1794	1.2056	0.0000	1,917.3604	1,917.3604	0.5497	0.0000	1,928.9032

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	0.0821	0.0914	0.0872	0.1082	0.0000	0.0912	0.0847	0.0000	0.0915	0.0895	0.0000	0.0872	0.0872	0.0909	0.0000	0.0872

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Paving	Paving	2/6/2015	5/21/2015	5	75	

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Paving	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Paving	Pavers	2	8.00	125	0.42
Paving	Rollers	2	8.00	80	0.38
Paving	Paving Equipment	0	8.00	130	0.36

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Paving	5	13.00	0.00	0.00	10.00	6.50	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

3.2 Paving - 2015

Unmitigated Construction On-Site

Acres of Grading: 0

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.9980	20.3967	12.2697	0.0174		1.2824	1.2824		1.1798	1.1798		1,824.314 1	1,824.314 1	0.5446		1,835.7514
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.9980**	**20.3967**	**12.2697**	**0.0174**		**1.2824**	**1.2824**		**1.1798**	**1.1798**		**1,824.314 1**	**1,824.314 1**	**0.5446**		**1,835.7514**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category						lb/day								lb/day		
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.2323	0.0652	0.6367	1.1100e-003	0.0989	7.6000e-004	0.0997	0.0262	7.0000e-004	0.0269		94.7200	94.7200	5.5200e-003		94.8360
Total	**0.2323**	**0.0652**	**0.6367**	**1.1100e-003**	**0.0989**	**7.6000e-004**	**0.0997**	**0.0262**	**7.0000e-004**	**0.0269**		**94.7200**	**94.7200**	**5.5200e-003**		**94.8360**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category						lb/day								lb/day		
Off-Road	1.9961	20.3780	12.2584	0.0174		1.2812	1.2812		1.1787	1.1787	0.0000	1,822.6404	1,822.6404	0.5441		1,834.0672
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.9961**	**20.3780**	**12.2584**	**0.0174**		**1.2812**	**1.2812**		**1.1787**	**1.1787**	**0.0000**	**1,822.6404**	**1,822.6404**	**0.5441**		**1,834.0672**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.2323	0.0652	0.6367	1.1100e-003	0.0989	7.6000e-004	0.0997	0.0262	7.0000e-004	0.0269		94.7200	94.7200	5.5200e-003		94.8360
Total	**0.2323**	**0.0652**	**0.6367**	**1.1100e-003**	**0.0989**	**7.6000e-004**	**0.0997**	**0.0262**	**7.0000e-004**	**0.0269**		**94.7200**	**94.7200**	**5.5200e-003**		**94.8360**

Civic Center Aquatics Complex - Project Traffic

Sacramento County, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Government (Civic Center)	1.00	1000sqft	0.02	1,000.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	3.5	**Precipitation Freq (Days)**	58
Climate Zone	6			**Operational Year**	2016
Utility Company	Sacramento Municipal Utility District				
CO_2 Intensity (lb/MWhr)	590.31	**CH_4 Intensity (lb/MWhr)**	0.029	**N_2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use -

Vehicle Trips - Trip generation per Traffic Impact Report

Table Name	Column Name	Default Value	New Value
tblProjectCharacteristics	OperationalYear	2014	2016
tblVehicleTrips	ST_TR	0.00	4,782.00
tblVehicleTrips	SU_TR	0.00	4,782.00
tblVehicleTrips	WD_TR	27.92	2,808.00

2.0 Operational Detail - Mobile

2.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	39.9109	29.0958	158.8811	0.2894	19.0841	0.4022	19.4864	5.0977	0.3696	5.4672		25,003.25 29	25,003.25 29	1.0645		25,025.60 70
Unmitigated	39.9109	29.0958	158.8811	0.2894	19.0841	0.4022	19.4864	5.0977	0.3696	5.4672		25,003.25 29	25,003.25 29	1.0645		25,025.60 70

2.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Government (Civic Center)	2,808.00	4,782.00	4782.00	6,356,286	6,356,286
Total	2,808.00	4,782.00	4,782.00	6,356,286	6,356,286

2.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Government (Civic Center)	10.00	5.00	6.50	75.00	20.00	5.00	50	34	16

2.4 Fleet Mix

LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
0.504516	0.068219	0.178179	0.147873	0.044976	0.006346	0.020386	0.015946	0.002304	0.002308	0.006193	0.000574	0.002181

Civic Center Aquatics Complex - Project Traffic

Sacramento County, Winter

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Government (Civic Center)	1.00	1000sqft	0.02	1,000.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	3.5	**Precipitation Freq (Days)**	58
Climate Zone	6			**Operational Year**	2016
Utility Company	Sacramento Municipal Utility District				
CO2 Intensity (lb/MWhr)	590.31	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use -

Vehicle Trips - Trip generation per Traffic Impact Report

Table Name	Column Name	Default Value	New Value
tblProjectCharacteristics	OperationalYear	2014	2016
tblVehicleTrips	ST_TR	0.00	4,782.00
tblVehicleTrips	SU_TR	0.00	4,782.00
tblVehicleTrips	WD_TR	27.92	2,808.00

2.0 Operational Detail - Mobile

2.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	42.8330	33.1026	171.8626	0.2614	19.0841	0.4060	19.4901	5.0977	0.3730	5.4707		22,637.26 78	22,637.26 78	1.0654		22,659.64 03
Unmitigated	42.8330	33.1026	171.8626	0.2614	19.0841	0.4060	19.4901	5.0977	0.3730	5.4707		22,637.26 78	22,637.26 78	1.0654		22,659.64 03

2.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Government (Civic Center)	2,808.00	4,782.00	4782.00	6,356,286	6,356,286
Total	2,808.00	4,782.00	4,782.00	6,356,286	6,356,286

2.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Government (Civic Center)	10.00	5.00	6.50	75.00	20.00	5.00	50	34	16

2.4 Fleet Mix

LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
0.504516	0.068219	0.178179	0.147873	0.044976	0.006346	0.020386	0.015946	0.002304	0.002308	0.006193	0.000574	0.002181

Civic Center Aquatics Complex - Area Source

Sacramento County, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Government (Civic Center)	75.00	1000sqft	1.72	75,000.00	0
Parking Lot	2,225.00	Space	20.02	890,000.00	0
Recreational Swimming Pool	30.60	1000sqft	0.70	30,600.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	3.5	**Precipitation Freq (Days)**	58
Climate Zone	6			**Operational Year**	2016
Utility Company	Sacramento Municipal Utility District				
CO2 Intensity (lb/MWhr)	590.31	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use -

Table Name	Column Name	Default Value	New Value
tblProjectCharacteristics	OperationalYear	2014	2016

2.0 Area Detail

2.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	21.8336	2.3400e-003	0.2441	2.0000e-005		8.8000e-004	8.8000e-004		8.8000e-004	8.8000e-004		0.5101	0.5101	1.4400e-003		0.5404
Unmitigated	21.8336	2.3400e-003	0.2441	2.0000e-005		8.8000e-004	8.8000e-004		8.8000e-004	8.8000e-004		0.5101	0.5101	1.4400e-003		0.5404

2.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.5040					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	21.3058					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	0.0238	2.3400e-003	0.2441	2.0000e-005		8.8000e-004	8.8000e-004		8.8000e-004	8.8000e-004		0.5101	0.5101	1.4400e-003		0.5404
Total	**21.8336**	**2.3400e-003**	**0.2441**	**2.0000e-005**		**8.8000e-004**	**8.8000e-004**		**8.8000e-004**	**8.8000e-004**		**0.5101**	**0.5101**	**1.4400e-003**		**0.5404**

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.5040					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	21.3058					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	0.0238	2.3400e-003	0.2441	2.0000e-005		8.8000e-004	8.8000e-004		8.8000e-004	8.8000e-004		0.5101	0.5101	1.4400e-003		0.5404
Total	**21.8336**	**2.3400e-003**	**0.2441**	**2.0000e-005**		**8.8000e-004**	**8.8000e-004**		**8.8000e-004**	**8.8000e-004**		**0.5101**	**0.5101**	**1.4400e-003**		**0.5404**

Civic Center Aquatics Complex - Area Source
Sacramento County, Winter

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Government (Civic Center)	75.00	1000sqft	1.72	75,000.00	0
Parking Lot	2,225.00	Space	20.02	890,000.00	0
Recreational Swimming Pool	30.60	1000sqft	0.70	30,600.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	3.5	**Precipitation Freq (Days)**	58
Climate Zone	6			**Operational Year**	2016
Utility Company	Sacramento Municipal Utility District				
CO2 Intensity (lb/MWhr)	590.31	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use -

Table Name	Column Name	Default Value	New Value
tblProjectCharacteristics	OperationalYear	2014	2016

2.0 Area Detail

2.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	21.8336	2.3400e-003	0.2441	2.0000e-005		8.8000e-004	8.8000e-004		8.8000e-004	8.8000e-004		0.5101	0.5101	1.4400e-003		0.5404
Unmitigated	21.8336	2.3400e-003	0.2441	2.0000e-005		8.8000e-004	8.8000e-004		8.8000e-004	8.8000e-004		0.5101	0.5101	1.4400e-003		0.5404

2.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.5040					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	21.3058					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	0.0238	2.3400e-003	0.2441	2.0000e-005		8.8000e-004	8.8000e-004		8.8000e-004	8.8000e-004		0.5101	0.5101	1.4400e-003		0.5404
Total	**21.8336**	**2.3400e-003**	**0.2441**	**2.0000e-005**		**8.8000e-004**	**8.8000e-004**		**8.8000e-004**	**8.8000e-004**		**0.5101**	**0.5101**	**1.4400e-003**		**0.5404**

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.5040					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	21.3058					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	0.0238	2.3400e-003	0.2441	2.0000e-005		8.8000e-004	8.8000e-004		8.8000e-004	8.8000e-004		0.5101	0.5101	1.4400e-003		0.5404
Total	**21.8336**	**2.3400e-003**	**0.2441**	**2.0000e-005**		**8.8000e-004**	**8.8000e-004**		**8.8000e-004**	**8.8000e-004**		**0.5101**	**0.5101**	**1.4400e-003**		**0.5404**

APPENDIX E – BIOLOGICAL RESOURCES DATABASE SEARCH

Scientific Name	Common Name	Federal Status	State Status	CNPS Rare Plant Rank	Habitat	Habitat Present/ Absent	Potential for Occurrence
Plants							
Astragalus tener var. *ferrisiae*	Ferris' milk-vetch	-	-	1B.1	Vernally mesic meadows and seeps, and subalkaline flats in valley and foothill grasslands. Elev: 7-246 ft. (2-75 m.) Blooms: April-May (CNPS 2014).	P	May occur. Seasonal wetlands provide suitable habitat.
Brasenia schreberi	watershield	-	-	2B.3	Freshwater marshes and swamps. Elev: 98-7,218 feet (30-2,200 m.) Blooms: June-September (CNPS 2014).	A	Not likely to occur. PSA is below species elevation range.
Carex comosa	bristly sedge	-	-	2B.1	Coastal prairies, valley and foothill grasslands, as well as marshes, swamps and lake margins. Elev: 0-2,051 feet (0-625 m.) Blooms: May-September (CNPS 2014).	P	May occur. Seasonal wetlands and seasonal marsh provide suitable habitat.
Castilleja campestris ssp. *succulenta*	succulent owl's-clover	FT	SE	1B.1	Acidic vernal pools. Elev: 164-2,461 ft (50-750m). Blooms: Apr-May (CNPS 2014.	A	Not likely to occur. Suitable habitat not present and PSA is below species elevation range.
Cicuta maculata var. *bolanderi*	Bolander's water-hemlock	-	-	2B.1	Coastal, fresh or brackish marshes and swamps. Elev: 0-656 ft. (0-200 m.) Blooms: July-Sept (CNPS 2014).	A	Not likely to occur. Seasonal marsh too dry to provide suitable habitat.
Cuscuta obtusiflora var. *glandulosa*	Peruvian dodder	-	-	2B.2	Freshwater marshes and swamps. Elev: 49-919 ft. (15-280 m.) Blooms: July-Oct (CNPS 2014).	A	Not likely to occur. Seasonal marsh too dry to provide suitable habitat.
Downingia pusilla	dwarf downingia	-	-	2B.2	Vernal pools and mesic valley and foothill grasslands. Elev: 3-1,459 ft. (1-445 m.) Blooms: Mar-May (CNPS 2014).	P	May occur. Seasonal wetlands provide suitable habitat.
Gratiola heterosepala	Boggs Lake hedge-hyssop	-	SE	1B.2	Clay soils in marshes, swamps, lake margins and vernal pools. Elev: 33-7,792 ft. (10-2,375 m.) Blooms: April-August (CNPS 2014).	P	May occur. Seasonal wetlands provide suitable habitat.
Hibiscus lasiocarpus var. *occidentalis*	woolly rose-mallow	-	-	1B.2	Freshwater marshes and swamps. Elev: 0-394 ft. (0-120 m.) Blooms: June-September (CNPS 2014).	A	Not likely to occur. Seasonal marsh too dry to provide suitable habitat.
Juglans hindsii	Northern California black walnut	-	-	1B.1	Riparian forest/woodland. Elev: 0-1,444 feet (0-440 m.) Blooms: Apr-May (CNPS 2014).	A	Native occurrence not likely to occur. Riparian woodland around perennial marsh was created.
Juncus leiospermus var. *ahartii*	Ahart's dwarf rush	-	-	1B.2	Mesic valley and foothill grasslands. Elev: 98-751 ft. (30-229 m.) Blooms: March-May (CNPS 2014).	A	Not likely to occur. PSA is below species elevation range.
Lathyrus jepsonii var. *jepsonii*	Delta tule pea	-	-	1B.2	Freshwater and brackish marshes and swamps. Elev: 0-13 ft. (0-4 m.) Blooms: May-Sept (CNPS 2014).	A	Not likely to occur. PSA is above species elevation range.
Legenere limosa	legenere	-	-	1B.1	Vernal pools. Elev: 3-2,887 ft (1-880 m) Blooms: Apr-June (CNPS 2014).	P	May occur. Seasonal wetlands provide suitable habitat.
Lepidium latipes var. *heckardii*	Heckard's pepper-grass	-	-	1B.2	Alkaline flats in valley and foothill grasslands. Elev: 7-656 feet (2-200 m.) Blooms: March-May (CNPS 2014).	A	Not likely to occur. Suitabble habitat not present.
Lilaeopsis masonii	Mason's lilaeopsis	-	SR	1B.1	Riparian scrub, and brackish or freshwater marshes and swamps. Elev: 3-33 ft. (0-10 m.) Blooms: Apr-Nov (CNPS 2014).	A	Not likely to occur. Seasonal marsh too dry to provide suitable habitat.
Limosella australis	Delta mudwort	-	-	2B.1	Usually mud banks in riparian scrub, and freshwater or brackish marshes and swamps. Elev: 0-10 ft. (0-3 m.) Blooms: May-Aug (CNPS 2014).	A	Not likely to occur. Seasonal marsh too dry to provide suitable habitat and PSA is above species elevation range.
Orcuttia tenuis	slender Orcutt grass	FT	SE	1B.1	Vernal pools. Elev: 115-5,774 ft. (35-1,760 m.) Blooms: May-October (CNPS 2014).	A	Not likely to occur. PSA is below species elevation range.
	Critical Habitat, slender Orcutt grass	X	-	-		A	Critical habitat not present.
Orcuttia viscida	Sacramento Orcutt grass	FE	SE	1B.1	Vernal pools. Elev: 98-328 ft. (30-100 m.) Blooms: Apr-Sep (CNPS 2014).	A	Not likely to occur. PSA is below species elevation range.
	Critical Habitat, Sacramento Orcutt grass	X	-	-		A	Critical habitat not present.
Sagittaria sanfordii	Sanford's arrowhead	-	-	1B.2	Assorted shallow freshwater marshes and swamps. Elev: 0-2,133 ft. (0-650 m.) Blooms: May-October (CNPS 2014).	A	Not likely to occur. Seasonal marsh too dry to provide suitable habitat.
Scutellaria galericulata	marsh skullcap	-	-	2B.2	Lower montane coniferous forest, meadows, seeps, marshes, and swamps. Elev: 0-6,890 feet (0-2,100 m.) Blooms: Jun-Sep (CNPS 2014).	A	Not likely to occur. Seasonal marsh too dry to provide suitable habitat.
Scutellaria laterifolia	side-flowering skullcap	-	-	2B.2	Marshes, swamps, mesic meadows and seeps. Elev: 0-1,640 feet (0-500 m.) Blooms: Jul-Sep (CNPS 2014).	A	Not likely to occur. Seasonal marsh too dry to provide suitable habitat.
Symphyotrichum lentum	Suisun Marsh aster	-	-	1B.2	Brackish and freshwater marshes and swamps. Elev: 0-10 ft. (0-3 m.) Blooms: May-Nov (CNPS 2014).	A	Not likely to occur. Seasonal marsh too dry to provide suitable habitat and PSA is above species elevation range.
Trifolium hydrophilum	saline clover	-	-	1B.2	Marshes & swamps, valley & foothill grassland (mesic, alkaline), and vernal pools. Elev: 0-984 ft (0-300m) Blooms: Apr-June (CNPS 2014).	P	May occur. Seasonal wetlands and seasonal marsh provide suitable habitat.
Invertebrates							
Branchinecta conservatio	conservancy fairy shrimp	FE	-		Vernal pools, often large and turbid pools (USFWS 2005).	P	May occur. Seasonal wetlands provide suitable habitat.
Branchinecta lynchi	vernal pool fairy shrimp	FT	-		Found only in vernal pools and ephemeral wetlands. Distributed throughout the Central Valley, including Sacramento County (USFWS 2005).	P	May occur. Seasonal wetlands provide suitable habitat.
	Critical Habitat, vernal pool fairy shrimp	X	-			A	Critical habitat not present.

	valley elderberry longhorn beetle	FT	-		Dependent on hostplant, elderberry (Sambucus spp.), which generally grows in riparian woodlands and upland habitats of the Central Valley. Current distribution in the Central Valley from Shasta County to Fresno County (USFWS 1999).	A	Not likely to occur. Elderberry hostplant not present.
Desmocerus californicus dimorphus	Critical Habitat, valley elderberry longhorn beetle	X	-			A	Critical habitat not present.
Elaphrus viridis	delta green ground beetle	FT			Only known from greater Jepson Prairie area in south-central Solano County in grassland areas interspersed with vernal pools (USFWS 2005).	A	Not likely to occur. Outside species range.
	vernal pool tadpole shrimp	FE	-		Wide variety of ephemeral wetland habitats, including vernal pools. Distributed throughout Central Valley and San Francisco Bay area (USFWS 2005).	P	May occur. Seasonal wetlands provide suitable habitat.
Lepidurus packardi	Critical Habitat, vernal pool tadpole shrimp	X	-			A	Critical habitat not present.
Fish							
Acispenser medirostris	green sturgeon	FT	SSC		Entire coast of California. Spawning occurs in Sacramento River and Klamath River (USFWS 1996). Oceanic waters, bays, and estuaries during non-spawning season. Spawning habitat – deep pools in large, turbulent, freshwater mainstems (NMFS 2005).	A	Not likely. Suitable habitat not present.
Archoplites interruptus	Sacramento perch	-	SSC		Historically, Central Valley sloughs, slow-moving rivers, and lakes with beds of rooted emergent aquatic vegetation. Current distribution is artificially stocked farm ponds and reservoirs (USFWS 1995).	A	Not likely. Suitable habitat not present.
	delta smelt	FT	SE		Distribution includes the Sacramento River below Isleton, San Joaquin River below Mossdale, and Suisun Bay. Spawning areas include the Sacramento River below Sacramento, Mokelumne River system, Cache Slough, the delta, and Montezuma Slough (USFWS 1995).	A	Not likely. Suitable habitat not present.
Hypomesus transpacificus	Critical Habitat, delta smelt	X	-			A	Critical habitat not present.
Lampetra ayresii	river lamprey	-	SSC		Adults require clean, gravelly riffles in permanent streams for spawning, while the ammocoetes require sandy backwaters or stream edges in which to bury themselves, where water quality is continuously high and temperatures do not exceed 25°C (Moyle et. al).	A	Not likely. Suitable habitat not present.
Mylopharodon conocephalus	hardhead	-	SSC		Small to large streams in a low to mid-elevation environment. May also inhabit lakes or reservoirs. Their preferred stream temperature might easily exceed 20°C, though these fish do not favor low dissolved oxygen levels. Therefore the hardhead minnow is usually found in clear deep streams with a slow but present flow. Though spawning may occur in pools, runs, or riffles, the bedding area will typically be characterized by gravel and rocky substrate (CalFish 2014).	A	Not likely. Suitable habitat not present.
	Central Valley steelhead	FT	-		Spawning habitat – gravel-bottomed, fast-flowing, well-oxygenated rivers and streams. Non-spawning – estuarine, marine waters (Busby 1996).	A	Not likely. Suitable habitat not present.
Oncorhynchus mykiss	Critical Habitat, Central Valley steelhead	X	-			A	Critical habitat not present.
	Central Valley spring-run chinook salmon	FT	ST		Spawning habitat – fast moving, freshwater streams and rivers. Juvenile habitat – brackish estuaries. Non-spawning – marine waters (Myers 1998).	A	Not likely. Suitable habitat not present.
	Critical Habitat, Central Valley spring-run chinook salmon	X	-			A	Critical habitat not present.
	winter-run chinook salmon, Sacramento River	FE	SE			A	Not likely. Suitable habitat not present.
	Critical Habitat, winter-run chinook salmon, Sacramento River	X	-			A	Critical habitat not present.
Oncorhynchus tshawytscha	chinook salmon, Central Valley fall/late fall-run ESU	-	SSC			A	Not likely. Suitable habitat not present.
Pogonichthys macrolepidotus	Sacramento splittail	-	SSC		Prefer slow-moving sections of freshwater rivers and sloughs. Most abundant in Suisun Bay and Marsh region. Largely absent from Sacramento River except during spawning (USFWS 1995).	A	Not likely. Suitable habitat not present.
Spirinchus thaleichthys	longfin smelt	FC	ST/SSC		Adults and juveniles require salt or brackish estuary waters. Spawning takes place in freshwater over sandy-gravel substrates, rocks, and aquatic plants (Moyle et. al).	A	Not likely. Suitable habitat not present.
Amphibians							

Ambystoma californiense	California tiger salamander, central population	FT	ST		Occurs in grasslands of the Central Valley and oak savannah communities in the Central valley, the Sierra Nevada and Coast ranges, and the San Francisco Bay area. Needs seasonal or semi-permanent wetlands to reproduce, and terrestrial habitat with active ground squirrel or gopher burrows (Bolster 2010).	A	Not likely to occur. History of disturbance precludes the presence of this species.
Rana draytonii	California red-legged frog	FT	SSC		Found mainly near ponds in humid forests, woodlands, grasslands, coastal scrub, and streamsides with plant cover. Most common in lowlands or foothills. Frequently found in woods adjacent to streams. Breeding habitat is in permanent or ephemeral water sources; lakes, ponds, reservoirs, slow streams, marshes, bogs, and swamps. Ephemeral wetland habitats require animal burrows or other moist refuges for estivation when the wetlands are dry. From sea level to 5,000 ft. (1,525 m.) (Nafis 2013).	A	Not likely to occur. Breeding habitat not present. Largely extirpated form the Central Valley.
Spea hammondii	western spadefoot	-	SSC		Open areas with sandy/gravelly soils. Variable habitats including mixed woodlands, grasslands, coastal sage scrub, chaparral, sandy washes, lowlands, river floodplains, alluvial fans, playas, alkali flats, foothills, and mountains. Rainpools which do not contain bullfrogs, fish, or crayfish are necessary for breeding (Nafis 2014).	A	Not likely to occur. Suitable soils not present and history of disturbance.
Reptiles							
Emys marmorata	western pond turtle	-	SSC		Found in ponds, lakes, rivers, streams, creeks, marshes, and irrigation ditches, with abundant vegetation, and either rocky or muddy bottoms, in woodland, forest, and grassland. In streams, prefers pools to shallower areas. Logs, rocks, cattail mats, and exposed banks are required for basking. May enter brackish water and even seawater. Found at elevations from sea level to over 5,900 ft (1,800 m). (Nafis 2014).	A	Not likely to occur. Suitable habitat not present. Seasonal marsh too dry to support species.
Thamnophis gigas	giant garter snake	FT	ST		Marshes, sloughs, ponds, small lakes, low gradient streams, irrigation and drainage canals, rice fields and their associated uplands. Upland habitat should have burrows or other soil crevices suitable for snakes to reside during their dormancy period (November- mid March). Ranges in the Central Valley from Butte County to Buena Vista Lake in Kern County. Endemic to valley floor wetlands (USFWS 2012).	A	Not likely to occur. Suitable habitat not present. Seasonal marsh and drainage ditches too dry to support species.
Birds							
Agelaius tricolor	tricolored blackbird	-	SSC		Nest in wetlands or in dense vegetation near open water. Dominant nesting substrates: cattails, bulrushes, blackberry, agricultural silage. Nesting substrate must either be flooded, spinous, or in some way defended against predators (Hamilton 2004).	P	May occur. Dense vegetaton around seasonal marsh may provide suitable nesting habitat; however, marsh may be too dry to support species.
Ammodramus savannarum	grasshopper sparrow	-	SSC		In the foothills and lowlands west of the Cascades/Sierras. Dry, dense grasslands, especially those with a variety of grasses and tall forbs and scattered shrubs for singing perches (CDFW 2014b)	P	May occur. Suitable habitat present.
Aquila chrysaetos	golden eagle	-	FP		Uncommon resident and migrant throughout California, except center of Central Valley. Habitat typically rolling foothills, mountain areas, sage-juniper flats, desert (CDFW 2014b).	A	Unlikely to occur. Not known to nest in center of Central Valley.
Athene cunicularia	burrowing owl	-	SSC		Open, flat expanses with short, sparse vegetation and few shrubs, level to gentle topography and well-drained soils. Requires underground burrows or cavities for nesting and roosting. Can use rock cavities, debris piles, pipes and culverts if burrows unavailable. Habitats include grassland, shrub steppe, desert, agricultural land, vacant lots and pastures (CDFW 2014b).	P	May occur. Suitable habitat present in open areas throughout PSA.
Buteo swainsoni	Swainson's hawk	-	ST		Nests in stands with few trees in riparian areas, juniper-sage flats, and oak savannah in the Central Valley. Forages in adjacent grasslands, agricultural fields and pastures (CDFW 2014b).	P	May occur. Suitable nesting and foraging habitat throughout PSA.
Chaetura vauxi	Vaux's swift	-	SSC		Prefers redwood and Douglas fir habitats with nest sites in large hollow trees and snags, especially tall, burnt-out stubs (CDFW 2014b).	A	Unlikely to occur. Suitable nesting habitat not present.
Charadrius montanus	mountain plover	-	SSC		Found on short grasslands and plowed fields of the Central Valley from Sutter and Yuba counties southward. Also found in foothill valleys. Avoids high and dense cover. Often roosts in depressions such as ungulate hoof prints and plow furrows (CDFW 2014b).	A	Unlikely to occur. Grassland areas tall and dense.

Circus cyaneus	northern harrier	-	SSC		Nest on the ground in patches of dense, tall vegetation in undisturbed areas. Breed and forage in variety of open habitats such as marshes, wet meadows, weedy borders of lakes, rivers and streams, grasslands, pastures, croplands, sagebrush flats and desert sinks (Shuford 2008).	A	Unlikely to occur due to disturbed nature of the PSA.
Coccyzus americanus occidentalis	western yellow-billed cuckoo	PT	SE		Requires large, dense tracts of riparian woodland with well-developed understories. Occurs in deciduous trees or shrubs. Prefers willow, but will also nest in orchards adjacent to streams in Sacramento Valley. Restricted to moist habitats along slow-moving waterways during breeding season (CDFW 2014b).	A	Unlikely to occur. Suitable habitat not present. Lack of water in marsh precludes presence of this species.
Dendroica petechia brewsteri	yellow warbler	-	SSC		Riparian vegetation along streams and in wet meadows. Willow cover and Oregon ash important predictors of abundance in northern California (CDFW 2014b).	A	Unlikely to occur. Suitable habitat not present. Lack of water in marsh precludes presence of this species.
Elanus leucurus	white-tailed kite	-	FP		Typically nest in the upper third of trees that may be 10-160 ft. (33-525 m.) tall. These can be open-country trees growing in isolation, or at the edge of or within a forest (Cornell 2013).	P	May occur. Suitable nesting and foraging habitat throughout PSA.
Grus canadensis canadensis	lesser sandhill crane	-	SSC		In summer, occurs in and near wet meadow, shallow lacustrine, and fresh emergent wetland habitats. In winter, frequents moist croplands with rice or corn stubble, and open, emergent wetlands. Prefers treeless plains. Nests in remote portions of extensive wetlands or sometimes shortgrass prairies (CDFW 2014b).	A	Unlikely to occur. Suitable nesting habitat not present.
Grus canadensis tabida	greater sandhill crane	-	ST/FP			A	Unlikely to occur. Suitable nesting habitat not present.
Icteria virens	yellow-breasted chat	-	SSC		Nest in early-successional riparian habitats with a well-developed shrub layer and an open canopy. Restricted to narrow border of streams, creeks, sloughs and rivers. Often nest in dense thicket plants such as blackberry and willow (Shuford 2008).	A	Unlikely to occur. Suitable habitat not present. Lack of water in marsh precludes presence of this species.
Ixobrychus exilis	least bittern	-	SSC		Large, freshwater wetlands with dense emergent vegetation (CDFW 2014b).	A	Unlikely to occur. Suitable habitat not present. Lack of water in marsh precludes presence of this species.
Lanius ludovicianus	loggerhead shrike	-	SSC		Breed in shrublands or open woodlands with a fair amount of grass cover and areas of bare ground (Shuford 2008).	P	May occur. Suitable habitat present.
Melospiza melodia	song sparrow ("Modesto" population)	-	SSC		Breeds and winters in riparian, fresh or saline emergent wetland, and wet meadows. Breeds in riparian thickets of willows, other shrubs, vines, tall herbs, and fresh or saline emergent vegetation (CDFW 2014b).	A	Unlikely to occur. Suitable habitat not present. Lack of water in marsh precludes presence of this species.
Progne subis	purple martin	-	SSC		Woodland and forest habitats with numerous suitable nest cavities, open air space above nest sites, and aerial insect prey (Shuford 2008).	A	Not likely to occur. Suitable habitat not present.
Riparia riparia	bank swallow	-	ST		Riparian areas with sandy, vertical bluffs or riverbanks. Also nest in earthen banks and bluffs, as well as sand and gravel pits (CDFW 2014b).	A	Not likely to occur. Suitable habitat not present.
Sternula antillarum browni	California least tern	FE	SE/FP		Nest and roost in colonies on open beaches, forage near shore ocean waters and in shallow estuaries ad lagoons (USFWS 2006).	A	Not likely to occur. Suitable habitat not present.
Vireo bellii pusillus	least Bell's vireo	FE	SE		Willows and other low, dense valley foothill riparian habitat and lower portions of canyons. Usually found near water, but also inhabits thickets along dry, intermittent streams. Ranges 0-2000 feet (CDFW 2014b).	P	May occur. Suitable habitat present.
Xanthocephalus xanthocephalus	yellow-headed blackbird	-	SSC		Nest in marshes with tall, emergent vegetation (e.g., tules and cattails) adjacent to deepwater (Shuford 2008).	A	Not likely to occur. Suitable habitat not present.
Mammals							
Lasiurus blossevillii	western red bat	-	SSC		Roosting habitat includes forests and woodlands, often in edge habitats adjacent to streams, fields, or urban areas (CDFW 2014b).	P	May occur. Abandoned buildings provide suitable habitat for this species.
Taxidea taxus	American badger	-	SSC		Open shrub, forest and herbaceous habitats with friable soils. Associated with treeless regions, prairies, park lands and cold desert areas. Range includes most of California, except the North Coast (CDFW 2014b).	P	May occur. Suitable habitat present.

Sources: CDFW 2014a, CNPS 2014, USFWS 2014

Key
Federal & State Status
(FE) Federal Endangered
(FT) Federal Threatened
(FC) Federal Candidate
(FD) Federally Delisted

(FP) Fully Protected
(SE) State Endangered
(ST) State Threatened
(SR) State Rare
(SSC) State Species of Special Concern
(SCE) State Candidate Endangered
(SCT) State Candidate Threatened
CNPS Rare Plant Rank
Rareness Ranks
(1A) Presumed Extinct in California
(1B) Rare, Threatened, or Endangered in California and Elsewhere
(2B) Rare, Threatened, or Endangered in California, But More Common Elsewhere
Threat Ranks
(0.1) Seriously threatened in California
(0.2) Fairly threatened in California
(0.3) Not very threatened in California

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Scientific Name	Common Name	native?
Achyrachaena mollis	blow wives	yes
Allium sp.	onion	yes
Amsinckia menziesii	fiddleneck	yes
Asclepias fascicularis	narrow leaf milkweed	yes
Avena fatua	wild oats	no
Baccharis pilularis	coyote brush	yes
Brassica nigra	black mustard	no
Briza minor	little rattlesnake grass	no
Brodiaea sp.	brodiaea	yes
Bromus diandrus	ripgut brome	no
Bromus hordeaceus	soft brome	no
Carduus pycnocephalus	Italian thistle	no
Centauria solstitialis	yellow star-thistle	no
Centromadia pungens	common tarweed	yes
Chenopodium album	lamb's quarters	no
Cichorium intybus	chicory	no
Conium maculatum	poison hemlock	no
Convolvulus arvensis	bindweed	no
Croton setigerus	turkey mullein	yes
Epilobium brachycarpum	tall annual willowherb	yes
Erodium botrys	broad leaf filaree	no
Erodium cicutarium	redstem filaree	no
Eryngium sp.	coyote thistle	yes
Eucalyptus sp.	blue gum	no
Festuca myuros	rattail fescue	no
Festuca perennis	Italian ryegrass	no
Foeniculum vulgare	fennel	no
Geranium dissectum	cut-leaf geranium	no
Helminthotheca echioides	bristly ox-tongue	no
Holocarpha sp.	tarweed	yes
Hordeum murinum	foxtail barley	no
Hordeum marinum	seaside barley	no
Juglands hindsii	California black walnut	yes
Lactuca serriola	prickly lettuce	no
Lasthenia glaberrima	rayless goldfields	yes
Leontodon saxatilis	hawkbit	no
Lepidium latifolium	perennial pepperweed	no
Lupinus bicolor	dwarf lupine	yes
Lythrum portula	spatulaleaf loosestrife	no
Melilotus indicus	annual yellow sweetclover	no
Olea europaea	olive	no
Persecaria sp.	smartweed	unknown
Phalaris aquatica	Harding grass	no
Phyla nodiflora	turkey tangle fogfruit	yes
Plagiobothrys stipitatus	slender popcorn flower	yes
Pogogyne zizyphoroides	Sacramento mesamint	yes

Polypogon monspeliensis	rabbitsfoot grass	no
Populus fremontii	Fremont's cottonwood	yes
Psilocarphus brevissimus	woolly marbles	yes
Pyracantha angustifolia	firethorn	no
Quercus lobata	valley oak	yes
Ranunculus muricatus	spinyfruit buttercup	no
Raphanus sativus	wild radish	no
Rubus armeniacus	Himalayan blackberry	no
Rumex crispus	curly dock	no
Salix exigua	narrowleaf willow	yes
Salix laevigata	red willow	yes
Silybum marianum	milk thistle	no
Sonchus asper	sowthistle	no
Sorghum halepense	Johnsongrass	no
Tamarix ramosissima	tamarisk	no
Tragopogon porrifolium	purple salsify	no
Trifolium hirtum	rose clover	no
Veronica peregrina	neckweed	yes
Vicia villosa	hairy vetch	no
Washingtonia filifera	California fan palm	yes
Xanthium strumarium	cocklebur	yes

PMC®

BIOLOGICAL MEMORANDUM

To: CITY OF ELK GROVE

From: Leslie Parker

Cc: Joyce Hunting, Patrick Hindmarsh

Date: May 5, 2014

RE: Civic Center Aquatic Complex Project: Rare Plant Survey

Project Description

On May 2 and 19, 2014, a PMC botanist investigated parcels associated with the Civic Center Aquatic Complex project. A reconnaissance-level survey indicated the presence of urban, grassland, wetland and vernal pool habitats within the project footprint. Several special-status plants have the potential to occur in these habitats in the vicinity of the project:

- Ferris' milk-vetch (*Astragalus tener* var. *ferrissiae*, CNPS 1B)
- watershield (*Brasenia schreberi*, CNPS 2B)
- bristly sedge (*Carex comosa*, CNPS 2B)
- succulent owl's-clover (*Castilleja campestris* ssp. *succulent*, CNPS 1B)
- Bolander's water hemlock (*Cicuta maculate var. bolanderi*, CNPS 2B)
- Peruvian dodder (*Cuscuta obtusiflora var. glandulosa*, CNPS 2B)
- dwarf downingia (*Downingia pusilla*, CNPS 2B)
- Boggs Lake hedge-hyssop (*Gratiola heterosepala*, CA Endangered, CNPS 1B)
- wooly rose-mallow (*Hibiscus lasiocarpus*, CNPS 1B)
- Northern California black walnut (*Juglans hindsii*, CNPS 1B)
- Ahart's dwarf rush (*Juncus leiospermus var. ahartii*, CNPS 1B)
- Delta tule pea (*Lathyrus jepsonii var. jepsonii*, CNPS 1B)
- legenere (*Legenere limosa*, CNPS 1B)
- Heckard's pepper-grass (*Lepidium latipes var. heckardii*, CNPS 1B)
- Mason's lilaeopsis (*Lilaeopsis masonii*, CA Rare, CNPS 1B)
- Delta mudwort (*Limosella australis*, CNPS 2B)
- slender Orcutt grass (*Orcuttia tenuis*, CNPS 1B)
- Sacramento Orcutt grass (*Orcuttia viscid*, CNPS 1B)
- Sanford's arrowhead (*Sagittaria sanfordii*, CNPS 1B)
- marsh skullcap (*Scutellaria galericulata*, CNPS 2B)

- side-flowering skullcap (*Scutellaria laterifolia,* CNPS 2B)
- Suisun Marsh aster (*Symphyotrichum lentum*, CNPS 1B)
- saline clover (*Trifolium hydrophilum*, CNPS 1B)

Methodology

The project study area was systematically surveyed to ensure total search coverage, with special attention given to identifying those portions of the project study area with the potential to support special-status species listed above. The area surveyed during this visit was concentrated around the vernal pool and marsh features; however, large portions of the site outside these features were also walked. The project site was walked during the morning and early afternoon hours of May 2 and 19, 2014, and species encountered were identified to the level of species, when possible.

Results

Much of the habitat of the proposed project occupies land that has been regularly disturbed as a result of farming practices. Many species of plants, both native and non-native have re-colonized the disturbed landscape. A full floristic list of species observed can be found in **Appendix A**.

Conclusions

No special-status species have been found in the vicinity of the project.

APPENDIX F – CULTURAL RESOURCES ASSESSMENT

CULTURAL RESOURCE ASSESSMENT FOR THE CIVIC CENTER AQUATIC COMPLEX PROJECT, CITY OF ELK GROVE, SACRAMENTO COUNTY, CALIFORNIA

Prepared by

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May 28, 2014
(Job #14-029)

INTRODUCTION

Project Location and Background

The approximately 30-acre proposed Project site is located at the southwest corner of the intersection of Civic Center Drive and Big Horn Boulevard in the Laguna Ridge Specific Plan area. The Project site is located in section 2, Township 6 North Range 5 East, mapped on the Florin USGS topographic quadrangle (Figure 1).

The Project Site is bordered to the north by the future Civic Center site and to the south by the Elizabeth Pinkerton Middle School/Cosumnes Oaks High School. Single-family residential (The Grove subdivision) is located to the west of the Project site. To the east is the approved Allen Ranch subdivision which is currently under construction.

The Project area has historically been used for agricultural purposes and is primarily undeveloped with a residence, ornamental landscaping, and outbuildings. A wetlands area is currently restricted under an Army Corps of Engineer permit limiting the use of the property for wetlands only. Existing zoning and specific plan designation provide for Community Park use (CP).

Project Description

The Civic Center Aquatics Complex Project (hereinafter the Project) includes the construction of a Competition/Training Facility, a commercial recreational facility, associated parking, passive park area, and ancillary services, as described below.

Competition Training/Facility

The competition/training facility consists of an Olympic-size swimming pool (50 meters by 25 yards, 2 meter depth) and a warm up pool with a signature 10-meter diving tower (25 meters by 25 yards, 17 foot depth). Additional facility components include:

- seating for 1,000+ under a shaded structure,
- water system,
- concessions,
- hot tub seating for 12 to 20 athletes,
- locker rooms,
- meeting room,
- office space and storage, and
- provisions for the use of a temporary enclosure (large tent/air dome) for larger events.

The competitive facilities are anticipated to be home to multiple Elk Grove high schools and a variety of regional club teams for practices and meets.

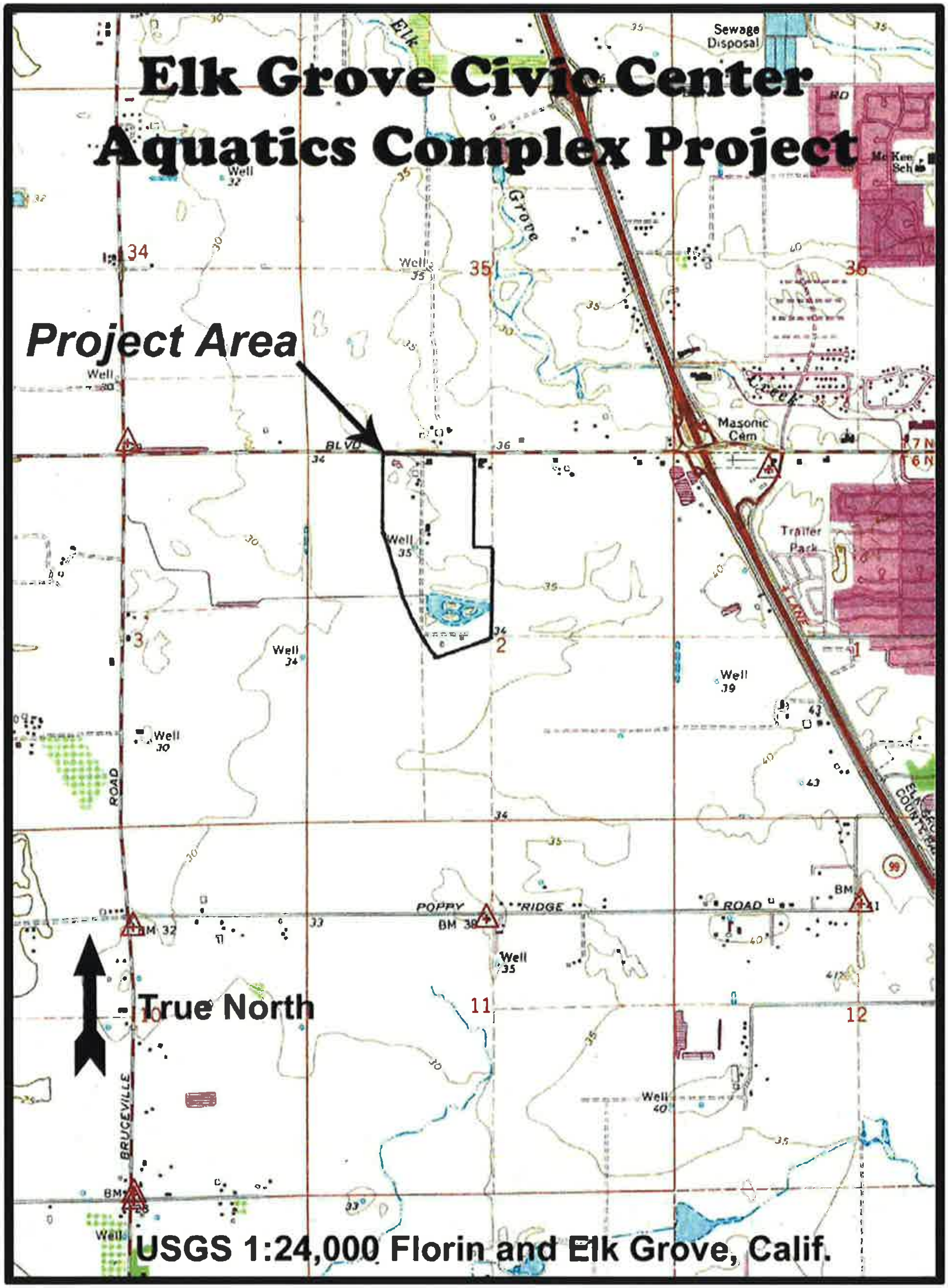
Elk Grove Civic Center
Aquatics Complex Project
Project Area
True North
USGS 1:24,000 Florin and Elk Grove, Calif.
Sewage Disposal
Masonic Cem
Trailer Park
BLVD
POPPY RIDGE ROAD
BRUCEVILLE ROAD
Well
Elk Grove
Creek

Figure 1

Commercial Recreational Facility

The commercial recreation facility will consist of a waterpark, which may include, but would not be limited to, a lazy/adventure river, wave pool, slide attractions, children's aquatic play system, family activity pool, and various water feature elements such as spray grounds, geysers, and water play features. The City anticipates the facility will attract up to 250,000 guests annually.

In addition to the standard waterpark elements/amenities, the facility may also include an adventure park, whose elements are weaved throughout the space and may include, but would not be limited to, a challenge ropes course, zip lines, family adventure sky trail, climbing wall, and various challenge and team building elements and activities.

The water park/adventure park facility will include support buildings for administration and management, restrooms/showers and changing, lockers, multi-purpose training rooms, lifeguard and first-aid, waterpark retail space, concessions and food/beverage, maintenance, and mechanical/ equipment space.

Support and ancillary elements will be provided, which will include parking, drop-off arrival area, hardscape/landscape elements, pathways and trails, shade amenities, fencing, kiosks, screening, cabanas, pavilions and theming.

Maximum daily capacity, including the waterpark and adventure park, is expected to be 3,000 over a 12-hour operating day. The waterpark will operate approximately 120 days per year (May-September) and the adventure park will be open on a year-round basis.

Parking

The primary entrance to the facility would be off of Big Horn Boulevard at the southern end of the Project site. This driveway would lead vehicles to a drop off area near the arrival plaza and the main parking area and eventually to the facility exit also on Big Horn Boulevard north of the entrance.

Parking for the Project will be addressed in two ways - (1) on-site facilities (approximately 725 spaces); and (2) adjacent "overflow" lots (up to 1,500 spaces). The overflow lots would be developed at the City's Civic Center lot (Overflow A; 1,000 spaces) and an adjoining lot to the east (the Pappas site, or Overflow B; up to 500 spaces). The intent of the parking plan is to accommodate users first on-site, then at the Overflow A lot. When larger events occur at the competition facility simultaneous with the commercial operation, the Overflow B site would be used to the extent necessary.

The overflow sites are intended to be temporary facilities until long-term parking solution(s) for the City's Civic Center project are identified, analyzed, and constructed. Therefore, these sites will likely be graded and covered with aggregate materials, allowing for on-site storm water percolation, or could be covered with asphalt. Some landscaping, consistent with City Zoning provisions, will be provided. Ultimately, off-site parking demand will be consolidated to Overflow A (the Civic Center site) once that project is designed, through the use of parking structure(s).

Ancillary Components

In addition to the above, the Project is anticipated to include the following ancillary components:

- Parking
- Water Plant/Filtration System
- Alternative Power Source
- Restroom/Locker Facilities
- Team Equipment Storage
- Participants Rest Area
- Park area (approximately 5-acres) – passive park area with appropriate, grading, drainage, irrigation, ground cover/grass, pathways and lighting

Optional Development of Wetlands Area

Development of the wetlands area on the parcel south of Civic Center Drive between Big Horn Boulevard and Laguna Springs Drive (APN 132-1990-009) is currently restricted by an Army Corp of Engineer permit, limiting the use of the property for wetlands only. The permit requires that a path for public viewing of the wetlands be constructed. The City began preliminary design for approximately 900 feet of a 10-foot wide asphalt concrete trail within an "active" open space area that is part of a pond/marsh preserve area. The trail will include placement of a split-rail fence at the perimeter of the active open space area along the length of the trail, and placement of interpretive signs educating the public about wetland functions. However, this project is on hold pending development of the area for the Aquatics Complex.

The wetlands area could be developed as part of the project if the Army Corps of Engineers restrictions are removed and this area becomes available in the future for normal parkland usage.

Personnel

Melinda Peak (resume, Appendix 1) served as principal investigator for the project, with Michael Lawson and Robert Gerry completing the field survey of the project area in May 2014.

STATE REGULATIONS

State historic preservation regulations affecting this project include the statutes and guidelines contained in the California Environmental Quality Act (CEQA; Public Resources Code sections

21083.2 and 21084.1 and sections 15064.5 and 15126.4 (b) of the CEQA Guidelines). CEQA Section 15064.5 requires that lead agencies determine whether projects may have a significant effect on archaeological and historical resources. Public Resources Code Section 21098.1 further cites: A project that may cause a substantial adverse change in the significance of an historical resource is a project that may have a significant effect on the environment.

An "historical resource" includes, but is not limited to, any object, building, structure, site, area, place, record or manuscript that is historically or archaeologically significant (Public Resources Code section 5020.1).

Advice on procedures to identify such resources, evaluate their importance, and estimate potential effects is given in several agency publications such as the series produced by the Governor's Office of Planning and Research (OPR), *CEQA and Archaeological Resources,* 1994. The technical advice series produced by OPR strongly recommends that Native American concerns and the concerns of other interested persons and corporate entities, including, but not limited to, museums, historical commissions, associations and societies be solicited as part of the process of cultural resources inventory. In addition, California law protects Native American burials, skeletal remains, and associated grave goods regardless of the antiquity and provides for the sensitive treatment and disposition of those remains (California Health and Safety Code Section 7050.5, California Public Resources Codes Sections 5097.94 et al).

The California Register of Historical Resources (Public Resources Code Section 5020 et seq.)

The State Historic Preservation Office (SHPO) maintains the California Register of Historical Resources (CRHR). Properties listed, or formally designated as eligible for listing, on the National Register of Historic Places are automatically listed on the CRHR, as are State Landmarks and Points of Interest. The CRHR also includes properties designated under local ordinances or identified through local historical resource surveys.

For the purposes of CEQA, an historical resource is a resource listed in, or determined eligible for listing in the California Register of Historical Resources. When a project will impact a site, it needs to be determined whether the site is an historical resource. The criteria are set forth in Section 15064.5(a)(3) of the CEQA Guidelines, and are defined as any resource that does any of the following:

- Is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage;

- Is associated with the lives of persons important in our past;

- Embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important creative individual, or possesses high artistic values; or

- Has yielded, or may be likely to yield, information important in prehistory or history.

In addition, the CEQA Guidelines, Section 15064.5(a)(4) states:

The fact that a resource is not listed in, or determined to be eligible for listing in the California Register of Historical Resources, not included in a local register of historical resources (pursuant to section 5020.1(k) of the Public Resources Code), or identified in an historical resources survey (meeting the criteria in section 5024.1(g) of the Public Resources Code) does not preclude a lead agency from determining that the resource may be an historical resource as defined in Public Resources Code section 5020.1(j) or 5024.1.

California Health and Safety Code Sections 7050.5, 7051, And 7054

These sections collectively address the illegality of interference with human burial remains, as well as the disposition of Native American burials in archaeological sites. The law protects such remains from disturbance, vandalism, or inadvertent destruction, and establishes procedures to be implemented if Native American skeletal remains are discovered during construction of a project, including the treatment of remains prior to, during, and after evaluation, and reburial procedures.

California Public Resources Code Section 15064.5(e)

This law addresses the disposition of Native American burials in archaeological sites and protects such remains from disturbance, vandalism, or inadvertent destruction. The section establishes procedures to be implemented if Native American skeletal remains are discovered during construction of a project and establishes the Native American Heritage Commission as the entity responsible to resolve disputes regarding the disposition of such remains.

CULTURAL HISTORY

Archeological Background

The Sacramento Delta was one of the first regions in California to attract intensive archeological fieldwork. Between 1893 and 1901, avocational archeologist J. A. Barr excavated many prehistoric mounds in the Stockton area. He collected nearly 2000 artifacts during the course of his investigations. H. C. Meredith was another avocational archeologist of the period who pursued collecting in the same Stockton locality. Meredith (1899, 1900) did publish a compilation of his own and Barr's findings, and these appear to constitute the earliest accounts of Delta archeology. Holmes (1902), from the Smithsonian Institution, further elaborated on the Delta or "Stockton District" archeology, presenting illustrations of artifacts collected by Meredith and Barr.

It was Elmer J. Dawson who first recognized culture changes through time in delta archeology. Though he was an amateur archeologist, Dawson understood the necessity of keeping accurate notes on grave associations and provenience of artifacts. He collaborated with W. E. Schenck to produce an overview of northern San Joaquin Valley archeology (Schenck and Dawson 1929). The overview contained information on more than 90 prehistoric sites as well as data on previous collectors.

By 1931, the focus of archeological work was directed toward the Cosumnes River locality, where survey and exploration were conducted by Sacramento Junior College (Lillard and Purves 1936). Excavations, especially at the stratified Windmiller mound (CA-SAC-107), suggested three temporally distinct cultural traditions: Early, Transitional, and Late. Information grew as a result of excavations at other mounds in the Delta and lower Sacramento Valley by Sacramento Junior College and the University of California, Berkeley.

Previous investigations in the project region have focused upon very detailed archival research of Spanish sources (Bennyhoff 1977), and the archeological investigations at a number of small sites (Schulz et al. 1979; Schulz and Simons 1973; Soule 1976). A reexamination of earlier work has also been undertaken (Ragir 1972; Schulz 1981; Doran 1980). Several of the previously investigated sites probably represent satellite encampments or small villages associated with major villages.

The majority of the sites appear to be relatively late in time, and probably represent Plains Miwok. As mentioned above, the sites appear to be satellite encampments or small villages. The activities practiced are varied, but detailed studies on the faunal collection suggest seasonality of occupation and a focus on fish species other than the main channel varieties.

Writing the definitive summary of California archeology, Moratto (1984: 529-547) devoted an entire chapter to linguistic prehistory. For the Central Valley region, Moratto points out that some Early Horizon and Middle Horizon central California archeological sites appear at least in part, contemporaneous, based on existing radiocarbon dates. Cultural materials recovered from CA-SJO-68, an Early Horizon site, are thought to date to 4350±250 B.P or 2350 B.C. On the other hand, a Middle Horizon component at CA-CCO-308 dates to 4450±400 B.P. or 2450 B.C. The antiquity of other Early and Middle Horizon sites demonstrate an overlap of the two horizons by a millennium or more.

One explanation proposes that the Middle Horizon represents an intrusion of ancestral Miwok speaking people into the lower Cosumnes, Mokelumne, and Sacramento River areas from the Bay Area. The Early Horizon may represent older Yokuts settlements or perhaps the speakers of an Utian language who were somehow replaced by a shift of population(s) from the bay.

Ethnological Background

The Eastern Miwok represent one of the two main divisions of the Miwokan subgroup of the Utian language family (Levy 1978:398). The Plains Miwok, one of five separate cultural and linguistic groups of the Eastern Miwok, occupied the lower reaches of the Mokelumne, Cosumnes and Sacramento Rivers including the area of south Sacramento County surrounding the project area. Linguistic studies and the application of a lexicostatistic model for language divergence suggest that Plains Miwok was a distinct linguistic entity for the last 2000 years (Levy 1970). This result led researchers such as Richard Levy (1978:398) to conclude that the Plains Miwok inhabited the Sacramento Delta for a considerable period of time.

The political organization of the Plains Miwok centered on the tribelet. Tribelets were comprised of 300 to 500 individuals (Levy 1978:410). Each tribelet was thought to control a specific area of resources and usually consisted of several villages or hamlets. Each tribelet also was divided along lineages. These lineages were apparently localized to a specific geographic setting and most likely represented a village site and their associated satellite sites where the seasonal collection of resources occurred (Levy 1978:398-399). Descent was reckoned through males. Each settlement apparently contained roughly 21 individuals according to data collected by Gifford (Cook 1955:35).

The diet of the Plains Miwok emphasized the collection of floral resources such as acorns, buckeye, digger pine nuts, seeds from the native grasses and various fresh greens. Faunal resources such as tule elk, pronghorn antelope, deer, jackrabbits, cottontails, beaver, gray squirrels, woodrats, quail and waterfowl were hunted. Fishing, particularly salmon and sturgeon, contributed significantly to the Plains Miwok diet (Levy 1978:402-403). The primary method of collecting fish was by nets, but the use of bone hooks, harpoons and obsidian-tipped spears is also known ethnographically (Levy 1978:404)

Both twined and coiled basketry were manufactured by the Eastern Miwok. The uses of baskets included the collection and storage of seeds, basketry cradles and gaming (Levy 1978:406). Tule mats were also known to have been used by the Plains Miwok primarily as a floor covering. Other uses of tule included the manufacture of the tule balsa, a water craft in which native people navigated and exploited adjacent delta and major river systems.

Four main types of structures were known among the Eastern Miwok, depending on the environmental setting. In the mountains, the primary structure was a conical structure of bark slabs. At lower elevations the structures consisted of thatched structures, semi-subterranean earth-covered dwellings and two types of assembly houses used for ceremonial purposes (Levy 1978:408-409).

Bennyhoff (1977:11) characterized the Plains Miwok as intensive hunter-gatherers, with an emphasis upon gathering. The seasonal availability of floral resources defined the limits of the group's economic pursuits. Hunting and fishing subsistence pursuits apparently accommodated the given distribution of resources. The Plains Miwok territory covered six seasonally productive biotic communities and as such native people could apparently afford to pick and choose the resources they ranked highest from each of these zones. The subsequent storage of floral resources (such as acorns in granaries) allowed for a more stable use of the resource base (Bennyhoff 1977:10). The acorn was apparently the subsistence base needed to provide an unusually productive environment as earlier non-acorn using peoples who resided in the same geographic setting apparently suffered some seasonal deprivation (Schulz 1981). Such an emphasis upon the gathering of acorns is consistent with the population increase evident during the Upper Emergent Period in California (Doran 1980).

The study of piscine (fish) remains from both CA-SAC-65 (Schulz et al. 1979) and CA-SAC-145 (Schulz n.d.; Schulz and Simons 1973) indicates that small villages away from the major rivers appear to concentrate on the collection of piscine species (particularly the Sacramento perch) that inhabited slow-moving waters.

Historical Background

The name of Elk Grove was originally applied to a spot about a mile away from the eventual location of the town. James Hall built a hotel there in 1850 and named it after his home town in Missouri. This hotel burned down in 1857. The eventual site of Elk Grove was on the ranch of Major James Buckner, who also built a hotel on the site in 1850. The hotel was owned successively by Buckner, Phineas Woodward, Mrs. Jared Erwin, and Nicholas Christophel (Davis 1890:243).

The site did not really become a town until after the railroad was constructed. A farmer named Everson saw potential commercial opportunities for a town at this location, but none of the residents, including Everson, had the money available to construct the necessary buildings. Everson persuaded the citizens to pool their money to form the Elk Grove Building Company in 1876. The profits from the first building, the Chittenden and Everson general merchandise store, fueled further construction which, in turn, brought in merchants from outside the area.

Only four years later, the town boasted the original general store and one other, two hotels, a flouring mill, the railroad depot, a hardware store, a meat market, a furniture factory, two drug stores, a harness shop, a grain and hay warehouse, a dressmaking shop, two millinery shops, a boot shop, a wagon factory and a blacksmith (Thompson and West 1880:234).

The town continued to grow, first as a commercial center for the farmers in the area and recently as a suburban residential zone for greater Sacramento. The City of Elk Grove incorporated in 2000, and the City has grown to become an important economic power in the region.

The region of the project area was first occupied in the late 1850s or early 1860s. Early large landholdings were common, with hay-raising, wheat and grapes were common crops. In the early 1900s, the large holdings were broken down in smaller subsistence size plots that would allow more efficient use of arable land and an increase in population would speed the pace of development. Dairying became more common on the region (Peak & Associates 1999). The increase in dairying may have also been related to the completion of the Western Pacific Railroad in 1909, with the route lying just over two miles west of the Project site, providing a means of getting dairy production to market in an urban area, the City of Sacramento.

The 1909 Florin map shows two buildings within the project area. The 1942 Franklin 15' USGS topographic map indicates that the two older buildings were no longer present, and there were three building present. By 1953, a number of other buildings were added within the project area along Johnston Road, and the three buildings from the 1942 map were still standing, two apparently residences and one an outbuilding (Florin 7.5' USGS topographic map 1953). In 1968, several of the buildings along Johnston Road had been removed, and another building added on the south side of Elk Grove Boulevard. A shallow pond had been added to the southern portion of the project area (Florin 7.5' USGS topographic map 1968). In the next 12 years, two more buildings were added to the west side of Johnston Road (Florin 7.5' USGS topographic map 1980).

RESEARCH

Records of previously recorded cultural resources and cultural resource investigations were examined by the North Central Information Center of the California Historical Resources Information System on May 2, 2014 (NCIC File No.: SAC-14-67, Appendix 2). The property had been primarily field surveyed in 1999 and 2000 by Peak & Associates with no sites recorded (NCIC Reports #2392 and #2393). The additional portion of the Project site not previously surveyed was covered by Peak & Associates in 2003 and 2004 (NCIC Reports #5976 and #5971).

No prehistoric sites have been recorded on the property. At the time of the property surveys, none of the buildings on the Project site were over 50 years in age, and were therefore, not formally recorded.

With the addition of the parking areas to the project site, an additional records search was conducted through the North Central Information Center on May 19, 2014 (NCIC File No.: SAC-14-76, Appendix 2). The additional portion of project area had been covered by the previous survey efforts, with no sites recorded. A modern produce stand was present.

FIELD SURVEY

Due to the age of the field surveys (over ten years ago), new field survey have been conducted on both the Aquatics Center and the parking areas, using complete coverage techniques (Map 2).

Aquatics Center Survey

On May 5, 2014, Michael Lawson completed a field survey of the southern portion of the property, using complete coverage (transects no wider than 10 meters).

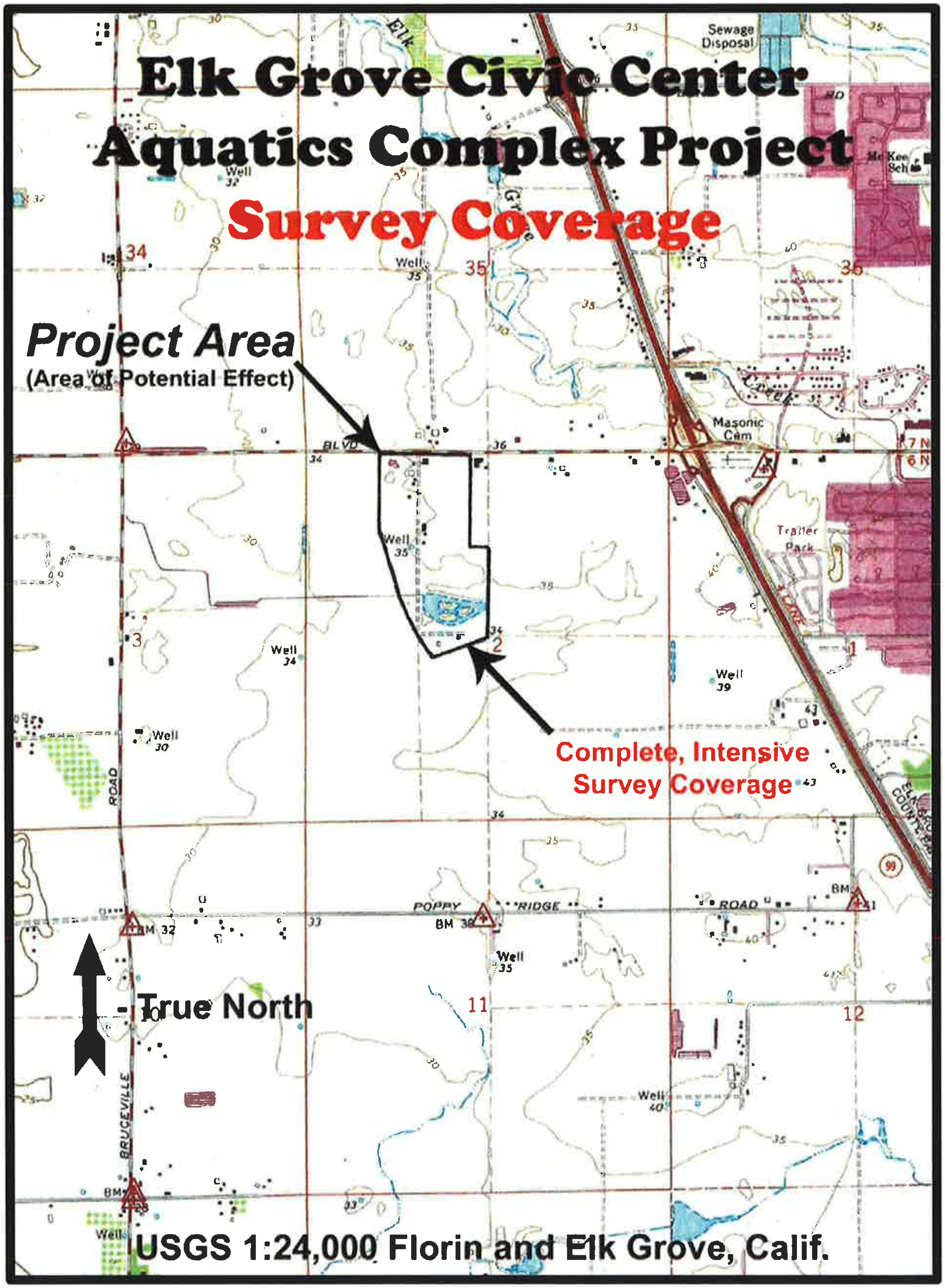
Elk Grove Civic Center
Aquatics Complex Project
Survey Coverage
Project Area
(Area of Potential Effect)
Complete, Intensive
Survey Coverage
True North
USGS 1:24,000 Florin and Elk Grove, Calif.
Sewage Disposal
Masonic Cem
Trailer Park
POPPY RIDGE ROAD
BRUCEVILLE ROAD
BLVD

Figure 2

The northern two-thirds of the Aquatics Center portion of the project area are mostly flat with tall, thick grass and brush, resulting in fair visibility. A few native oaks and non-native trees are along Johnston Road where it meets Civic Center Drive on the north boundary.

Three heavily damaged dwellings are also at this intersection. The three houses have had windows, doors, and most other metal removed. Handwritten notes on an interior garage wall indicate construction on the houses began in 1960. Extensive vandalism and remodeling makes this difficult to confirm visually, but some remaining fixtures and architectural remains tend to confirm the claim.

Behind the third house (southernmost) is a concrete slab with a closed well pipe and a power supply box on a pole a few feet away. The topographic map of the area shows a "well" to the west of this well and the associated house, on the west side of Johnston Road, but careful searching of this area found no evidence of a well, except for a power pole and access box.

In the southern half of the parcel is a former wetland area with raised islands and native oak stands and other trees. Grasses here are also tall and heavy, making visibility only fair.

Along the southern boundary next to Lotz Parkway is an untended pistachio nut orchard, and near the northwest corner of the parcel is the remains of a concrete cylindrical tank or silo, enclosed in a chain link fence. The feature appears about 12' wide and 22' feet tall, with steel bands around its entirety. The feature appears to be in sound condition, but graffiti has been painted on it.

Objects found near the feature include some rusted sheet metal scraps, nails, and modern glass. East of the concrete tank or silo is a 50' x 50' roughly square, slightly concave area where a building may have stood. This is next to a dirt road, and a mature palm tree and other non-native trees border the open area. Objects found within this area include window glass, lumber scraps, small concrete chunks, modern nails, plastic, and porcelain fragments. None of the objects appeared older than 30-40 years.

Parking Areas Survey

On May 19, 2014, Robert Gerry completed a field survey of the northern portion of the project area proposed for use for parking for the Aquatics Center. This portion of the project area contains evidence of the historic period occupancy: two concrete slabs of unknown date, a chicken wire enclosure, a line of wood fence posts, a well with a concrete collar, a pile of stream cobbles that includes a couple of red bricks and a concrete walkway. Consistent with the period of occupancy for the parcels, there are no old artifacts and several very modern ones (PVC pipe, plastic tarps, and plastic beverage containers).

CONCLUSIONS

Prehistoric Period Resources

No evidence of prehistoric period resource has been found in or near the property. The Project site lies on a flat open plain not close to any natural water source. Campsites and villages would more likely be located near the larger, more reliable water sources such as the Cosumnes River. As a result, it is possible that the Native American inhabitants of the region used the Project site for collecting plant foods and for hunting, but such activities leave little physical evidence.

Historic Period Resources

Although earliest occupancy with the overall project area pre-dates 1910, the earlier houses were removed many years ago. Different residential buildings and outbuildings have been added and removed over the years, as the needs of the occupants changed, with several slabs and farm features remaining on the site, with correlation with specific owners not possible.

The residential complex within the northern portion of the proposed Aquatics Center appears to date to about 1960. The complex was photographed in 2000 while still occupied, and now has been abandoned for a number of years, and has been stripped of fixtures and building elements. A great deal of vandalism has occurred. At this point, there is little to be learned from the buildings. They are modern in age, plain and of no particular design or associated with important architects, and not associated with important people or events in Elk Grove's past. All buildings have been altered to some degree over the years, and the complex is not an important resource.

The tank on the southern portion of the project area appears to relate to the water system for the pistachio orchard, and post-dates 1980.

RECOMMENDATIONS

Although no prehistoric sites were found during the survey, there is a slight possibility that a site may exist and be totally obscured by vegetation, fill, or other historic activities, leaving no surface evidence. Should artifacts or unusual amounts of stone, bone, or shell be uncovered during construction activities, an archeologist should be consulted for on-the-spot evaluation of the finding. If the bone appears to be human, state law requires that the Sacramento County Coroner be contacted. If the Coroner determines that the bone is human and is most likely Native American in origin, he must contact the Native American Heritage Commission (916-322-7791).

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APPENDIX 1

Resumes

PEAK & ASSOCIATES, INC.
RESUME

MELINDA A. PEAK **January 2014**
Senior Historian/Archeologist
3941 Park Drive, Suite 20 #329
El Dorado Hills, CA 95762
(916) 939-2405

PROFESSIONAL EXPERIENCE

Ms. Peak has served as the principal investigator on a wide range of prehistoric and historic excavations throughout California. She has directed laboratory analyses of archeological materials, including the historic period. She has also conducted a wide variety of cultural resource assessments in California, including documentary research, field survey, Native American consultation and report preparation.

In addition, Ms. Peak has developed a second field of expertise in applied history, specializing in site-specific research for historic period resources. She is a registered professional historian and has completed a number of historical research projects for a wide variety of site types.

Through her education and experience, Ms. Peak meets the Secretary of Interior Standards for historian, architectural historian, prehistoric archeologist and historic archeologist.

EDUCATION

M.A. - History - California State University, Sacramento, 1989
Thesis: *The Bellevue Mine: A Historical Resources Management Site Study in Plumas and Sierra Counties, California*
B.A. - Anthropology - University of California, Berkeley

RECENT PROJECTS

Ms. Peak completed the cultural resource research and contributed to the text prepared for the DeSabla-Centerville PAD for the initial stage of the FERC relicensing. She also served cultural resource project manager for the FERC relicensing of the Beardsley-Donnells Project. For the South Feather Power Project and the Woodleaf-Palermo and Sly Creek Transmission Lines, her team completing the technical work for the project.

In recent months, Ms. Peak has completed several determinations of eligibility and effect documents in coordination with the Corps of Engineers for projects requiring federal permits, assessing the eligibility of a number of sites for the National Register of Historic Places. She has also completed historical research projects on a wide variety of topics for a number of projects including the development of navigation and landings on the Napa River, farmhouses dating to the

1860s, bridges, an early roadhouse, Folsom Dam and a section of an electric railway line. In recent years, Ms. Peak has prepared a number of cultural resource overviews and predictive models for blocks of land proposed for future development for general and specific plans. She has been able to direct a number of surveys of these areas, allowing the model to be tested.

She served as principal investigator for the multi-phase Twelve Bridges Golf Club project in Placer County. She served as liaison with the various agencies, helped prepare the historic properties treatment plan, managed the various phases of test and data recovery excavations, and completed the final report on the analysis of the test phase excavations of a number of prehistoric sites. She is currently involved as the principal investigator for the Clover Valley Lakes project adjacent to Twelve Bridges in the City of Rocklin, coordinating contacts with Native Americans, the Corps of Engineers and the Office of Historic Preservation.

Ms. Peak has served as project manager for a number of major survey and excavation projects in recent years, including the many surveys and site definition excavations for the 172-mile-long Pacific Pipeline proposed for construction in Santa Barbara, Ventura and Los Angeles counties. She also completed an archival study in the City of Los Angeles for the project. She also served as principal investigator for a major coaxial cable removal project for AT&T.

Additionally, she completed a number of small surveys, served as a construction monitor at several urban sites, and conducted emergency recovery excavations for sites found during monitoring. She has directed the excavations of several historic complexes in Sacramento, Placer and El Dorado Counties.

Ms. Peak is the author of a chapter and two sections of a published history (1999) of Sacramento County, *Sacramento: Gold Rush Legacy, Metropolitan Legacy*. She served as the consultant for a children's book on California, published by Capstone Press in 2003 in the land of Liberty series.

PEAK & ASSOCIATES, INC.
RESUME

ROBERT A. GERRY **January 2014**
Senior Archeologist
3941 Park Drive, Suite 20, #329
El Dorado Hills, CA 95762

PROFESSIONAL EXPERIENCE

Mr. Gerry has over thirty years of extensive experience in both the public and private sectors. He has directed all types of cultural resource-related projects, including field survey, test excavations, data recovery programs, intensive archival research and cultural resource management. He has completed archeological work in most cultural areas of California and in the western Great Basin.

EDUCATION

Graduate studies - Anthropology - California State University, Sacramento
B.A. - Anthropology - University of Illinois, Chicago Circle

RECENT PROJECTS

Mr. Gerry was field director for a cultural resources survey of about 18,640 acres within the Naval Petroleum Reserve No. 1, Kern County, California. The project employed a stratified random sampling strategy and resulted in the recording of 112 cultural resources, and preparation of a management plan. He also directed a subsequent excavation program for evaluation of significance. Additionally, he served as field director for archeological surveys on the Plumas, Stanislaus, El Dorado and Six Rivers National Forests.

He was field director and primary report writer on several linear surveys of considerable length--including the San Joaquin Valley Pipeline (157 miles) for Shell Oil, the Point Arena-Dunnigan fiber optic cable (137 miles) and the Medford, Oregon, to Redding, California fiber optic cable (151 miles), the Oregon and Idaho portions of the Spokane to Boise fiber optic cable, and the San Bernardino to San Diego fiber optic cable, for American Telephone & Telegraph Company. He also assisted on the 170 mile Pacific Pipeline survey on the southern coast of California and conducted several surveys of water pipelines in southern California: La Sierra pipeline (Riverside), Perris Valley, Pico Rivera, Temecula and San Jacinto.

Mr. Gerry supervised the cultural resources assessments and participated in all field surveys for the studies of water supply facilities for seven wildlife refuges in the Sacramento and San Joaquin Valleys. He also took a lead role in field work and report preparation for major residential developments in the Sacramento area, such as the Sunrise Douglas project and the Florin Vineyard project.

Mr. Gerry has developed a specialty in bridge replacement evaluations, completing five such studies in Tuolumne County, two in Santa Barbara County, two in Amador County and ten others in various areas of California.

Mr. Gerry has had extensive experience in the recordation of mining sites in northern California and Nevada for proposed mining undertakings as well as in the course of survey for proposed subdivisions, reservoirs, and other development projects. He directed the survey of two parcels totaling 2,240 acres in the Battle Mountain Mining District in Lander County, recording a number of mining sites and features. Within the Cook Ranch Project area in El Dorado County, he completed the recordation of several gold mines and a cinnabar mine. He has completed three studies involving the American Hill Mine in Nevada City, the location where hydraulic mining began.

Mr. Gerry has directed test excavations for evaluation of significance at a number of sites, both historic and prehistoric. Examples include CA-NAP-261, twelve sites on Naval Petroleum Reserve No. 1, three sites on Russell Ranch in Sacramento County, a midden site near Guinda and a village known through ethnographic literature in Murphys.

His work has included an important role in working with Native American peoples. He has surveyed eight allotments and rancherias in the Pit River area, the Point Arena/Manchester Rancheria in Mendocino County, the Susanville Rancheria in Lassen County, the Rumsey Rancheria in Yolo County, and three rancherias in northwestern California. In each of these projects, he has been closely involved with Native American organizations and individuals, including a number of native people he has directed as surveyor trainees.

PEAK & ASSOCIATES, INC.
RESUME

MICHAEL D. LAWSON
6241 Brantford Way
Citrus Heights, CA 92621
916-765-2441

Professional Experience

Mr. Lawson has 19 years of experience with various private agencies conducting typical fieldwork and laboratory work, as well. Major projects include Twelve Bridges Golf Club and adjacent areas, Clover Valley Lakes, and other smaller projects in several counties.

Survey work includes the following counties: Colusa, Sutter, Yuba, Sacramento, El Dorado, Sierra, Butte, Lake, Fresno, Merced, San Joaquin, Placer, Nevada, Amador, Solano, Tuolumne, Kern, Contra Costa, Sonoma, Kings and Tulare. Additional experience includes mapping and processing field notes and photography. Informal visits in an unpaid capacity include: historic and prehistoric sites in Sacramento, Amador, Placer, Sonoma, Marin, Fresno, Modoc and Lassen.

Other site visits include prehistoric sites in Nevada, Arizona, Oregon, South Dakota, Michigan, Ohio and Texas.

Sites visited in Mexico and Guatemala include: El Ray, Uxmal, Tulum, Escaret, Chitchen-Itza, Carocol, Burial Creek Caves and Tikal.

Mr. Lawson has undertaken extensive survey work throughout the San Joaquin Valley for a number of smaller projects for Peak & Associates. For over a year, he served as lead monitor during the excavations for improvements to Sutter Street in the city of Folsom. He is currently monitoring an excavation for a roadway in El Dorado County

Other recent projects include his participation as a team member on major excavations in San Francisco and Vacaville, involving the removal of Native American interments. Other projects have included historic period excavations. He assisted in an Extended Phase I test in Yuba County, checking for both prehistoric and historic period resources.

APPENDIX 2

Record Searches

California Historical Resources Information System

NORTH CENTRAL INFORMATION CENTER

AMADOR
EL DORADO
NEVADA
PLACER
SACRAMENTO
YUBA

California State University, Sacramento
6000 J Street, Folsom Hall, Suite 2042
Sacramento, California 95819-6100
phone: (916) 278-6217
fax: (916) 278-5162
email: ncic@csus.edu

5/2/2014

NCIC File No.: **SAC-14-67**

Neal Neuenschwander
Peak & Associates, Inc.
3161 Godman Ave.
Chico, CA 95973

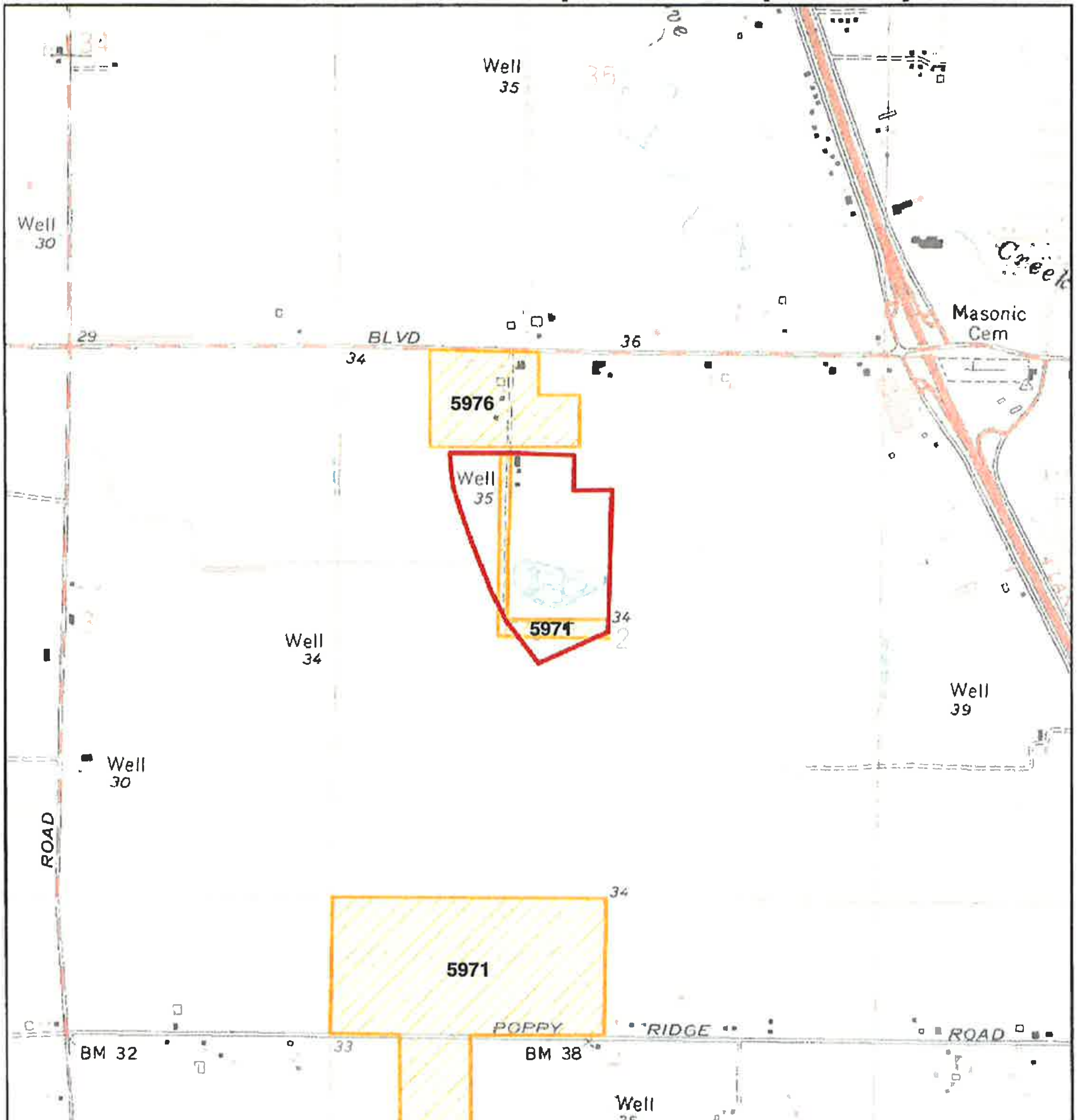
Records Search Results for
Elk Grove Civic Center Aquatics Complex Project
T6N/R5E Section 2
USGS Florin 7.5' Quadrangle, Sacramento County

- **NCIC Resources Within Requested Search Area:**
  There are no resources in the NCIC inventory located within the requested search area.
- **NCIC Reports Within Requested Search Area:**
  2392 5971
  2393 5976
  List and copies of reports within the project area enclosed.

• **OHP Historic Properties Directory:**	☐ enclosed	☐ not requested	☒ nothing listed
• **OHP Determinations of Eligibility:**	☐ enclosed	☐ not requested	☒ nothing listed
• ***CA Inventory of Historical Resources*:**	☐ enclosed	☐ not requested	☒ nothing listed
• **Caltrans Bridge Inventory:**	☐ enclosed	☒ not requested	☐ nothing listed
• **Ethnographic Information:**	☐ enclosed	☒ not requested	☐ nothing listed
• **Historical Literature:**	☐ enclosed	☒ not requested	☐ nothing listed
• **Historical Maps:**	☒ enclosed	☐ not requested	☐ nothing listed
• **Local Inventories:**	☐ enclosed	☐ not requested	☒ nothing listed
• **GLO and/or Rancho Plat Maps:**	☒ enclosed	☐ not requested	☐ nothing listed
• **Shipwreck Inventory:**	☐ enclosed	☒ not requested	☐ nothing listed
• **Soil Survey Maps:**	☐ enclosed	☒ not requested	☐ nothing listed

Thank you for using our services. An invoice confidentiality agreement is enclosed; please sign and return a copy for our files.

Elk Grove Civic Center Aquatics Complex Project



Northeast Information Center
Records Search Results

Florin 7.5' Quadrangle

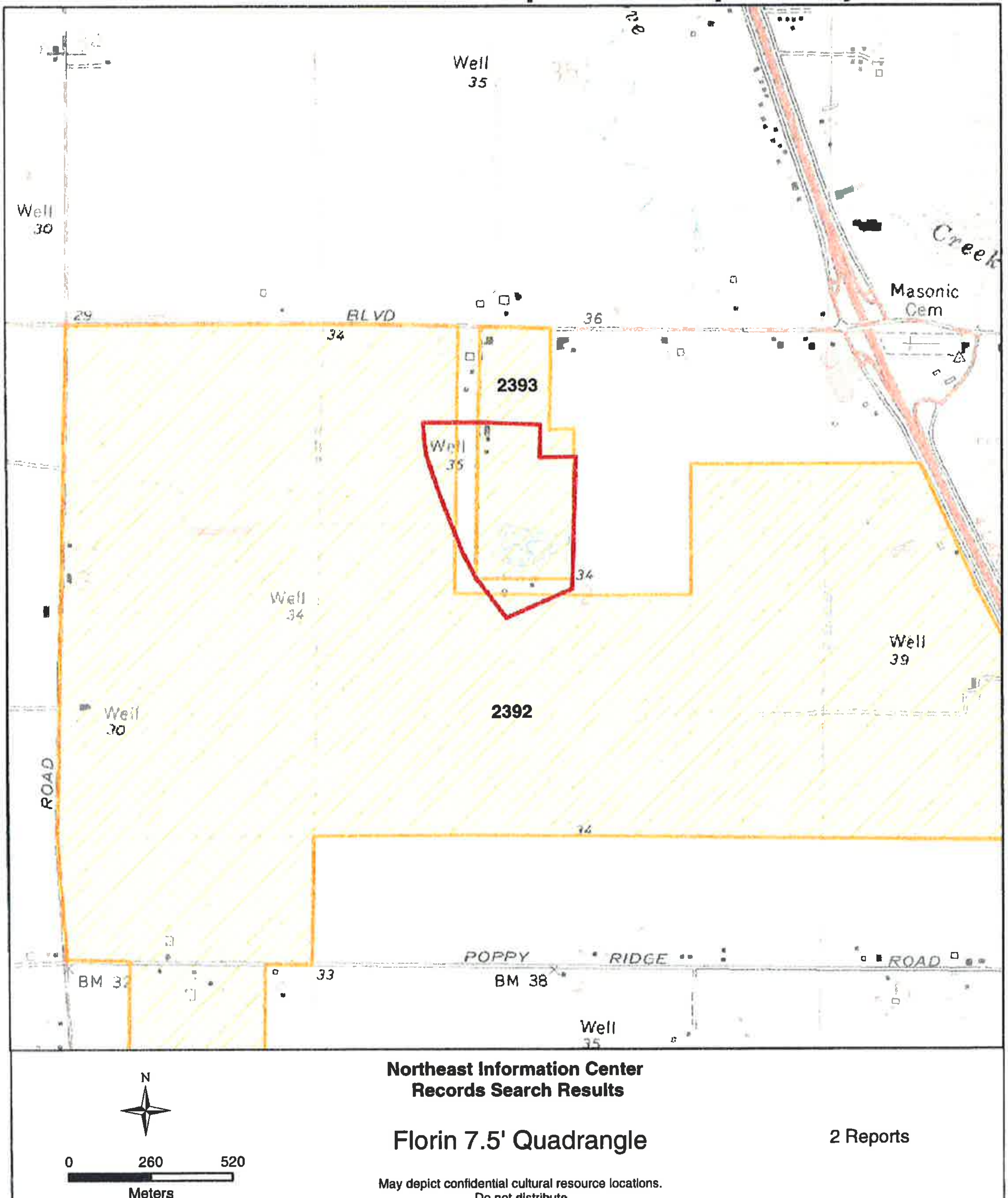
2 Reports

N

0 260 520
Meters

May depict confidential cultural resource locations.
Do not distribute.

Elk Grove Civic Center Aquatics Complex Project



Northeast Information Center
Records Search Results

Florin 7.5' Quadrangle

2 Reports

May depict confidential cultural resource locations.
Do not distribute.

North Central Information Center Report Listing

Doc no.	Year	Author(s)	Title	Affiliation	Client
02392	1999	Peak, Melinda A. and Robert Gerry	Cultural Resource Assessment for the Laguna Ridge Specific Plan and Environmental Impact Report, Sacramento County, California.		Hodgson Company, 7700 College Town Drive, Suite 220, Sacramento, CA 95826-2304.
02393	2000	Gerry, Robert A.	Addendum to Cultural Resource Assessment for the Laguna Ridge Specific Plan and Environmental Impact Report, Sacramento County, California.		Steven A. Gidaro, 2251 Fair Oaks Boulevard, Suite 300, Sacramento, CA 95825.
05971	2004	Peak & Associates, Inc.	Cultural Resource Assessment for the Grove at Laguna Ridge, City of Elk Grove		Reynen & Bardis Development LLC
05976	2003	Peak & Associates, Inc	Cultural Resources Assessment for the Proposed Elk Grove Civic Center, City of Elk Grove		Reynen & Bardis Development LLC

California Historical Resources Information System

NORTH CENTRAL INFORMATION CENTER

AMADOR
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California State University, Sacramento
6000 J Street, Folsom Hall, Suite 2042
Sacramento, California 95819-6100
phone: (916) 278-6217
fax: (916) 278-5162
email: ncic@csus.edu

5/16/2014

NCIC File No.: **SAC-14-76**

Neal Neuenschwander
Peak & Associates, Inc.
3161 Godman Ave.
Chico, CA 95973

Records Search Results for
Elk Grove Civic Center Aquatics Complex Parking Area Project
T6N/R5E Section 2
USGS Florin 7.5' Quadrangle, Sacramento County

- **NCIC Resources Within Requested Search Area:**
  There are no resources in the NCIC inventory located within the requested search area.
- **NCIC Reports Within Requested Search Area:**

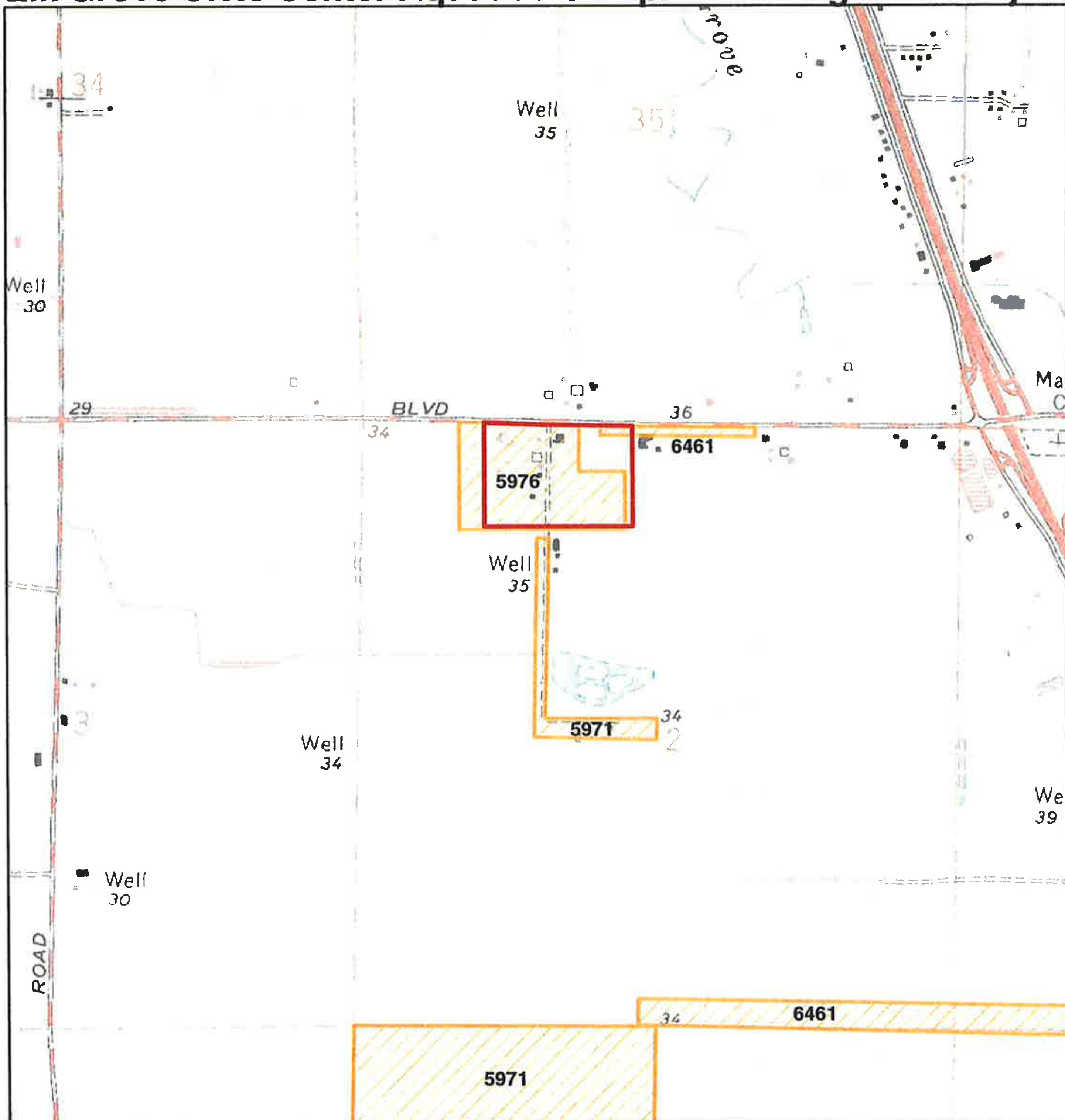
2392	5971	6461
2393	5976	

  List included on disc.

• **OHP Historic Properties Directory:**	☐ enclosed	☐ not requested	☒ nothing listed
• **OHP Determinations of Eligibility:**	☐ enclosed	☐ not requested	☒ nothing listed
• ***CA Inventory of Historical Resources*:**	☐ enclosed	☐ not requested	☒ nothing listed
• **Caltrans Bridge Inventory:**	☐ enclosed	☒ not requested	☐ nothing listed
• **Ethnographic Information:**	☐ enclosed	☒ not requested	☐ nothing listed
• **Historical Literature:**	☐ enclosed	☒ not requested	☐ nothing listed
• **Historical Maps:**	☐ enclosed	☒ not requested	☐ nothing listed
• **Local Inventories:**	☐ enclosed	☒ not requested	☐ nothing listed
• **GLO and/or Rancho Plat Maps:**	☐ enclosed	☒ not requested	☐ nothing listed
• **Shipwreck Inventory:**	☐ enclosed	☒ not requested	☐ nothing listed
• **Soil Survey Maps:**	☐ enclosed	☒ not requested	☐ nothing listed

Thank you for using our services. An invoice confidentiality agreement is enclosed; please sign and return a copy for our files.

Elk Grove Civic Center Aquatics Complex Parking Area Project



Northeast Information Center
Records Search Results

Florin 7.5' Quadrangle

3 Reports

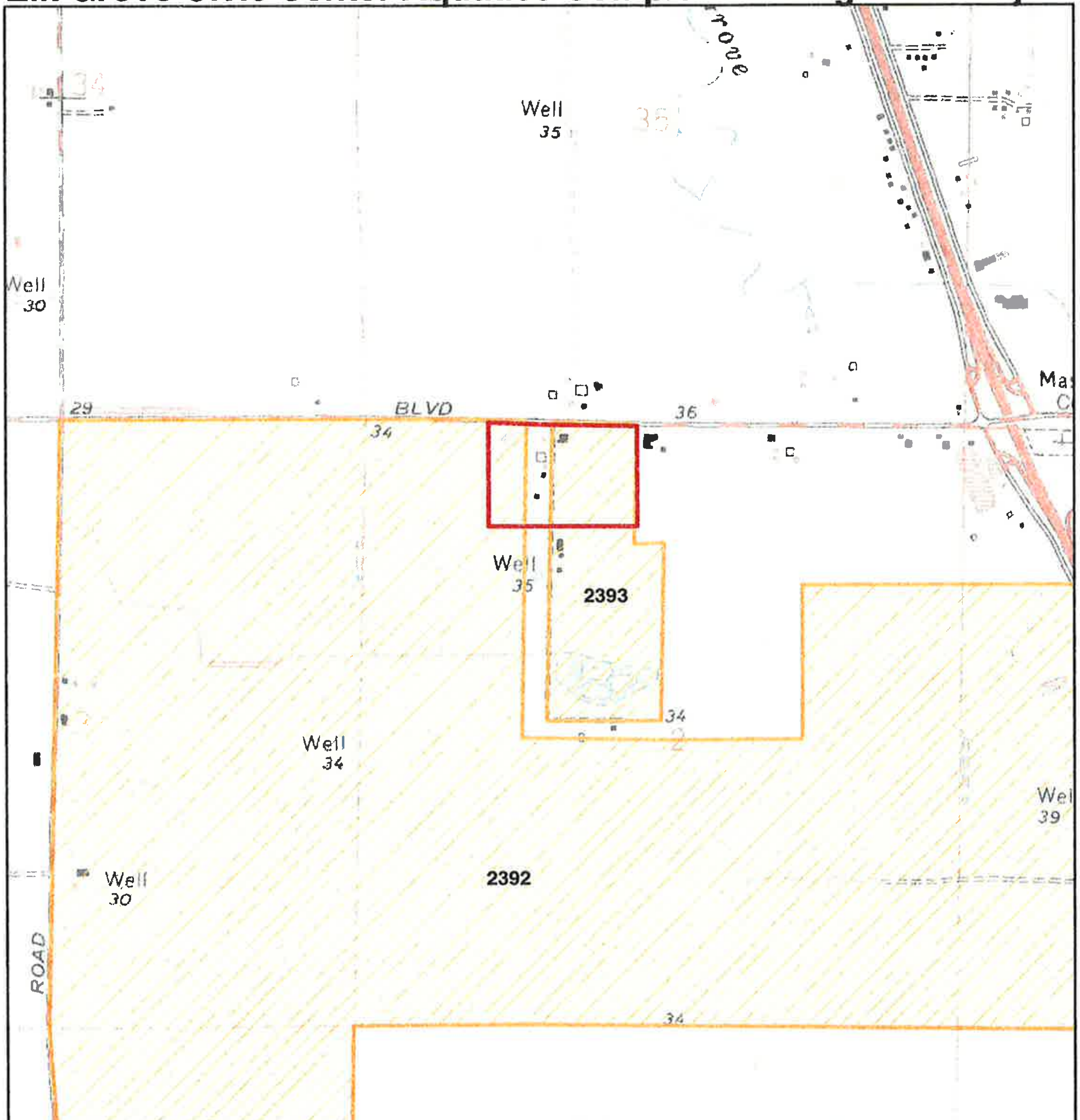
N

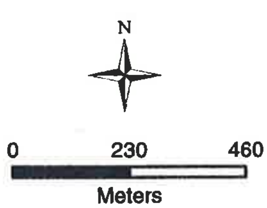
0 230 460

Meters

May depict confidential cultural resource locations.
Do not distribute.

Elk Grove Civic Center Aquatics Complex Parking Area Project





Northeast Information Center
Records Search Results

Florin 7.5' Quadrangle

2 Reports

May depict confidential cultural resource locations.
Do not distribute.

North Central Information Center Report Listing

Doc no.	Year	Author(s)	Title	Affiliation	Client
02392	1999	Peak, Melinda A. and Robert Gerry	Cultural Resource Assessment for the Laguna Ridge Specific Plan and Environmental Impact Report, Sacramento County, California.		Hodgson Company, 7700 College Town Drive, Suite 220, Sacramento, CA 95826-2304.
02393	2000	Gerry, Robert A.	Addendum to Cultural Resource Assessment for the Laguna Ridge Specific Plan and Environmental Impact Report, Sacramento County, California.		Steven A. Gidaro, 2251 Fair Oaks Boulevard, Suite 300, Sacramento, CA 95825.
05971	2004	Peak & Associates, Inc.	Cultural Resource Assessment for the Grove at Laguna Ridge, City of Elk Grove		Reynen & Bardis Development LLC
05976	2003	Peak & Associates, Inc	Cultural Resources Assessment for the Proposed Elk Grove Civic Center, City of Elk Grove		Reynen & Bardis Development LLC
06461	2005	Peak & Associates	Determination of Eligibility and Effect for the Whitelock Parkway and Elk Grove Boulevard Imporvements		Reynen & Bardis Development LLC

Appendix G – Greenhouse Gas Emissions Model Data Output

Civic Center Aquatics Complex - Earthwork & Underground Work Construction

Sacramento County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Government (Civic Center)	0.00	1000sqft	57.30	2,495,988.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	3.5	**Precipitation Freq (Days)**	58
Climate Zone	6			**Operational Year**	2016
Utility Company	Sacramento Municipal Utility District				
CO_2 Intensity (lb/MWhr)	590.31	**CH_4 Intensity (lb/MWhr)**	0.029	**N_2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - Project site + overflow parking lot = 57.3 acres

Off-road Equipment - Equipment list provided by Project applicant

Grading - Project site + overflow parking lot = 57.3 acres

Construction Off-road Equipment Mitigation -

Table Name	Column Name	Default Value	New Value
tblGrading	AcresOfGrading	495.00	57.30
tblLandUse	LandUseSquareFeet	0.00	2,495,988.00
tblLandUse	LotAcreage	0.00	57.30
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	4.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	4.00
tblProjectCharacteristics	OperationalYear	2014	2016

2.0 Emissions Summary

2.1 Overall Construction

<u>**Unmitigated Construction**</u>

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2015	0.5009	5.8441	3.7083	4.7900e-003	0.1601	0.2643	0.4244	0.0720	0.2432	0.3151	0.0000	454.2249	454.2249	0.1335	0.0000	457.0291
Total	**0.5009**	**5.8441**	**3.7083**	**4.7900e-003**	**0.1601**	**0.2643**	**0.4244**	**0.0720**	**0.2432**	**0.3151**	**0.0000**	**454.2249**	**454.2249**	**0.1335**	**0.0000**	**457.0291**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2015	0.5003	5.8371	3.7039	4.7800e-003	0.0771	0.2640	0.3411	0.0337	0.2429	0.2766	0.0000	453.6947	453.6947	0.1334	0.0000	456.4956
Total	**0.5003**	**5.8371**	**3.7039**	**4.7800e-003**	**0.0771**	**0.2640**	**0.3411**	**0.0337**	**0.2429**	**0.2766**	**0.0000**	**453.6947**	**453.6947**	**0.1334**	**0.0000**	**456.4956**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.1138**	**0.1189**	**0.1170**	**0.2088**	**51.8178**	**0.1173**	**19.6216**	**53.1202**	**0.1193**	**12.2183**	**0.0000**	**0.1167**	**0.1167**	**0.1198**	**0.0000**	**0.1167**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Site Preparation	Site Preparation	4/9/2015	6/3/2015	5	40	
2	Grading	Grading	6/4/2015	11/4/2015	5	110	

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Grading	Excavators	2	8.00	162	0.38
Grading	Rubber Tired Dozers	0	8.00	255	0.40
Grading	Graders	1	8.00	174	0.41
Grading	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Site Preparation	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Site Preparation	Rubber Tired Dozers	1	8.00	255	0.40
Grading	Scrapers	4	8.00	361	0.48

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Site Preparation	3	8.00	0.00	0.00	10.00	6.50	20.00	LD_Mix	HDT_Mix	HHDT
Grading	8	20.00	0.00	0.00	10.00	6.50	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

Clean Paved Roads

3.2 Site Preparation - 2015

Unmitigated Construction On-Site

Acres of Grading: 0

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category					tons/yr									MT/yr		
Fugitive Dust					0.1204	0.0000	0.1204	0.0662	0.0000	0.0662	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0399	0.4250	0.3166	3.0000e-004		0.0242	0.0242		0.0222	0.0222	0.0000	28.8286	28.8286	8.6100e-003	0.0000	29.0094
Total	**0.0399**	**0.4250**	**0.3166**	**3.0000e-004**	**0.1204**	**0.0242**	**0.1446**	**0.0662**	**0.0222**	**0.0884**	**0.0000**	**28.8286**	**28.8286**	**8.6100e-003**	**0.0000**	**29.0094**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.4700e-003	7.2000e-004	7.5200e-003	1.0000e-005	1.1800e-003	1.0000e-005	1.1800e-003	3.1000e-004	1.0000e-005	3.2000e-004	0.0000	1.0886	1.0886	6.0000e-005	0.0000	1.0899
Total	**2.4700e-003**	**7.2000e-004**	**7.5200e-003**	**1.0000e-005**	**1.1800e-003**	**1.0000e-005**	**1.1800e-003**	**3.1000e-004**	**1.0000e-005**	**3.2000e-004**	**0.0000**	**1.0886**	**1.0886**	**6.0000e-005**	**0.0000**	**1.0899**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0542	0.0000	0.0542	0.0298	0.0000	0.0298	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0398	0.4245	0.3162	3.0000e-004		0.0241	0.0241		0.0222	0.0222	0.0000	28.7943	28.7943	8.6000e-003	0.0000	28.9749
Total	**0.0398**	**0.4245**	**0.3162**	**3.0000e-004**	**0.0542**	**0.0241**	**0.0783**	**0.0298**	**0.0222**	**0.0520**	**0.0000**	**28.7943**	**28.7943**	**8.6000e-003**	**0.0000**	**28.9749**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.4700e-003	7.2000e-004	7.5200e-003	1.0000e-005	1.1800e-003	1.0000e-005	1.1800e-003	3.1000e-004	1.0000e-005	3.2000e-004	0.0000	1.0886	1.0886	6.0000e-005	0.0000	1.0899
Total	**2.4700e-003**	**7.2000e-004**	**7.5200e-003**	**1.0000e-005**	**1.1800e-003**	**1.0000e-005**	**1.1800e-003**	**3.1000e-004**	**1.0000e-005**	**3.2000e-004**	**0.0000**	**1.0886**	**1.0886**	**6.0000e-005**	**0.0000**	**1.0899**

3.3 Grading - 2015

Unmitigated Construction On-Site

Acres of Grading: 57.3

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0304	0.0000	0.0304	3.2800e-003	0.0000	3.2800e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.4415	5.4134	3.3325	4.3800e-003		0.2401	0.2401		0.2209	0.2209	0.0000	416.8234	416.8234	0.1244	0.0000	419.4366
Total	**0.4415**	**5.4134**	**3.3325**	**4.3800e-003**	**0.0304**	**0.2401**	**0.2704**	**3.2800e-003**	**0.2209**	**0.2241**	**0.0000**	**416.8234**	**416.8234**	**0.1244**	**0.0000**	**419.4366**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0170	4.9400e-003	0.0517	1.0000e-004	8.0800e-003	6.0000e-005	8.1400e-003	2.1500e-003	6.0000e-005	2.2100e-003	0.0000	7.4842	7.4842	4.2000e-004	0.0000	7.4931
Total	**0.0170**	**4.9400e-003**	**0.0517**	**1.0000e-004**	**8.0800e-003**	**6.0000e-005**	**8.1400e-003**	**2.1500e-003**	**6.0000e-005**	**2.2100e-003**	**0.0000**	**7.4842**	**7.4842**	**4.2000e-004**	**0.0000**	**7.4931**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0137	0.0000	0.0137	1.4800e-003	0.0000	1.4800e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.4410	5.4070	3.3286	4.3700e-003		0.2398	0.2398		0.2206	0.2206	0.0000	416.3275	416.3275	0.1243	0.0000	418.9377
Total	**0.4410**	**5.4070**	**3.3286**	**4.3700e-003**	**0.0137**	**0.2398**	**0.2534**	**1.4800e-003**	**0.2206**	**0.2221**	**0.0000**	**416.3275**	**416.3275**	**0.1243**	**0.0000**	**418.9377**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0170	4.9400e-003	0.0517	1.0000e-004	8.0800e-003	6.0000e-005	8.1400e-003	2.1500e-003	6.0000e-005	2.2100e-003	0.0000	7.4842	7.4842	4.2000e-004	0.0000	7.4931
Total	**0.0170**	**4.9400e-003**	**0.0517**	**1.0000e-004**	**8.0800e-003**	**6.0000e-005**	**8.1400e-003**	**2.1500e-003**	**6.0000e-005**	**2.2100e-003**	**0.0000**	**7.4842**	**7.4842**	**4.2000e-004**	**0.0000**	**7.4931**

Civic Center Aquatics Complex - Building Construction

Sacramento County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Government (Civic Center)	75.00	1000sqft	1.72	75,000.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	3.5	**Precipitation Freq (Days)**	58
Climate Zone	6			**Operational Year**	2016
Utility Company	Sacramento Municipal Utility District				
CO2 Intensity (lb/MWhr)	590.31	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use -

Construction Phase - Building construction, paving, and painting assumed to occur simultaneously

Off-road Equipment -

Grading -

Construction Off-road Equipment Mitigation -

Table Name	Column Name	Default Value	New Value
tblConstructionPhase	NumDays	10.00	200.00
tblConstructionPhase	NumDays	10.00	200.00
tblConstructionPhase	PhaseEndDate	7/21/2016	10/15/2015
tblConstructionPhase	PhaseEndDate	7/21/2016	10/15/2015
tblConstructionPhase	PhaseStartDate	10/16/2015	1/9/2015
tblConstructionPhase	PhaseStartDate	10/16/2015	1/9/2015
tblProjectCharacteristics	OperationalYear	2014	2016

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2015	1.1715	4.0792	3.0718	4.4900e-003	0.0535	0.2658	0.3193	0.0182	0.2532	0.2714	0.0000	393.4384	393.4384	0.0862	0.0000	395.2491
Total	**1.1715**	**4.0792**	**3.0718**	**4.4900e-003**	**0.0535**	**0.2658**	**0.3193**	**0.0182**	**0.2532**	**0.2714**	**0.0000**	**393.4384**	**393.4384**	**0.0862**	**0.0000**	**395.2491**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2015	1.1709	4.0745	3.0687	4.4900e-003	0.0449	0.2655	0.3104	0.0138	0.2529	0.2667	0.0000	393.0318	393.0318	0.0861	0.0000	394.8405
Total	**1.1709**	**4.0745**	**3.0687**	**4.4900e-003**	**0.0449**	**0.2655**	**0.3104**	**0.0138**	**0.2529**	**0.2667**	**0.0000**	**393.0318**	**393.0318**	**0.0861**	**0.0000**	**394.8405**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	0.0555	0.1150	0.1029	0.0000	16.0591	0.1166	2.7906	24.1625	0.1145	1.7354	0.0000	0.1033	0.1033	0.1160	0.0000	0.1034

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Site Preparation	Site Preparation	1/1/2015	1/2/2015	5	2	
2	Grading	Grading	1/3/2015	1/8/2015	5	4	
3	Building Construction	Building Construction	1/9/2015	10/15/2015	5	200	
4	Paving	Paving	1/9/2015	10/15/2015	5	200	
5	Architectural Coating	Architectural Coating	1/9/2015	10/15/2015	5	200	

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Site Preparation	Graders	1	8.00	174	0.41
Site Preparation	Rubber Tired Dozers	1	7.00	255	0.40
Site Preparation	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Grading	Graders	1	6.00	174	0.41
Grading	Rubber Tired Dozers	1	6.00	255	0.40
Grading	Tractors/Loaders/Backhoes	1	7.00	97	0.37
Building Construction	Cranes	1	6.00	226	0.29
Building Construction	Forklifts	1	6.00	89	0.20
Building Construction	Generator Sets	1	8.00	84	0.74
Building Construction	Tractors/Loaders/Backhoes	1	6.00	97	0.37
Building Construction	Welders	3	8.00	46	0.45
Paving	Cement and Mortar Mixers	1	6.00	9	0.56

Paving	Pavers		1	6.00	125	0.42
Paving	Paving Equipment		1	8.00	130	0.36
Paving	Rollers		1	7.00	80	0.38
Paving	Tractors/Loaders/Backhoes		1	8.00	97	0.37
Architectural Coating	Air Compressors		1	6.00	78	0.48

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Site Preparation	3	8.00	0.00	0.00	10.00	6.50	20.00	LD_Mix	HDT_Mix	HHDT
Grading	3	8.00	0.00	0.00	10.00	6.50	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	7	24.00	12.00	0.00	10.00	6.50	20.00	LD_Mix	HDT_Mix	HHDT
Paving	5	13.00	0.00	0.00	10.00	6.50	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	5.00	0.00	0.00	10.00	6.50	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

Reduce Vehicle Speed on Unpaved Roads

3.2 Site Preparation - 2015

Unmitigated Construction On-Site

Acres of Grading: 1

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					5.8000e-003	0.0000	5.8000e-003	2.9500e-003	0.0000	2.9500e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	2.5400e-003	0.0269	0.0170	2.0000e-005		1.4700e-003	1.4700e-003		1.3500e-003	1.3500e-003	0.0000	1.6345	1.6345	4.9000e-004	0.0000	1.6448
Total	**2.5400e-003**	**0.0269**	**0.0170**	**2.0000e-005**	**5.8000e-003**	**1.4700e-003**	**7.2700e-003**	**2.9500e-003**	**1.3500e-003**	**4.3000e-003**	**0.0000**	**1.6345**	**1.6345**	**4.9000e-004**	**0.0000**	**1.6448**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.2000e-004	4.0000e-005	3.8000e-004	0.0000	6.0000e-005	0.0000	6.0000e-005	2.0000e-005	0.0000	2.0000e-005	0.0000	0.0544	0.0544	0.0000	0.0000	0.0545
Total	**1.2000e-004**	**4.0000e-005**	**3.8000e-004**	**0.0000**	**6.0000e-005**	**0.0000**	**6.0000e-005**	**2.0000e-005**	**0.0000**	**2.0000e-005**	**0.0000**	**0.0544**	**0.0544**	**0.0000**	**0.0000**	**0.0545**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					2.6100e-003	0.0000	2.6100e-003	1.3300e-003	0.0000	1.3300e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	2.5300e-003	0.0269	0.0170	2.0000e-005		1.4700e-003	1.4700e-003		1.3500e-003	1.3500e-003	0.0000	1.6326	1.6326	4.9000e-004	0.0000	1.6428
Total	**2.5300e-003**	**0.0269**	**0.0170**	**2.0000e-005**	**2.6100e-003**	**1.4700e-003**	**4.0800e-003**	**1.3300e-003**	**1.3500e-003**	**2.6800e-003**	**0.0000**	**1.6326**	**1.6326**	**4.9000e-004**	**0.0000**	**1.6428**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.2000e-004	4.0000e-005	3.8000e-004	0.0000	6.0000e-005	0.0000	6.0000e-005	2.0000e-005	0.0000	2.0000e-005	0.0000	0.0544	0.0544	0.0000	0.0000	0.0545
Total	**1.2000e-004**	**4.0000e-005**	**3.8000e-004**	**0.0000**	**6.0000e-005**	**0.0000**	**6.0000e-005**	**2.0000e-005**	**0.0000**	**2.0000e-005**	**0.0000**	**0.0544**	**0.0544**	**0.0000**	**0.0000**	**0.0545**

3.3 Grading - 2015

Unmitigated Construction On-Site

Acres of Grading: 1.5

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					9.8300e-003	0.0000	9.8300e-003	5.0500e-003	0.0000	5.0500e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	4.1300e-003	0.0439	0.0282	3.0000e-005		2.3900e-003	2.3900e-003		2.2000e-003	2.2000e-003	0.0000	2.6849	2.6849	8.0000e-004	0.0000	2.7017
Total	**4.1300e-003**	**0.0439**	**0.0282**	**3.0000e-005**	**9.8300e-003**	**2.3900e-003**	**0.0122**	**5.0500e-003**	**2.2000e-003**	**7.2500e-003**	**0.0000**	**2.6849**	**2.6849**	**8.0000e-004**	**0.0000**	**2.7017**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.5000e-004	7.0000e-005	7.5000e-004	0.0000	1.2000e-004	0.0000	1.2000e-004	3.0000e-005	0.0000	3.0000e-005	0.0000	0.1089	0.1089	1.0000e-005	0.0000	0.1090
Total	**2.5000e-004**	**7.0000e-005**	**7.5000e-004**	**0.0000**	**1.2000e-004**	**0.0000**	**1.2000e-004**	**3.0000e-005**	**0.0000**	**3.0000e-005**	**0.0000**	**0.1089**	**0.1089**	**1.0000e-005**	**0.0000**	**0.1090**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					4.4200e-003	0.0000	4.4200e-003	2.2700e-003	0.0000	2.2700e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	4.1300e-003	0.0438	0.0282	3.0000e-005		2.3900e-003	2.3900e-003		2.2000e-003	2.2000e-003	0.0000	2.6817	2.6817	8.0000e-004	0.0000	2.6985
Total	**4.1300e-003**	**0.0438**	**0.0282**	**3.0000e-005**	**4.4200e-003**	**2.3900e-003**	**6.8100e-003**	**2.2700e-003**	**2.2000e-003**	**4.4700e-003**	**0.0000**	**2.6817**	**2.6817**	**8.0000e-004**	**0.0000**	**2.6985**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.5000e-004	7.0000e-005	7.5000e-004	0.0000	1.2000e-004	0.0000	1.2000e-004	3.0000e-005	0.0000	3.0000e-005	0.0000	0.1089	0.1089	1.0000e-005	0.0000	0.1090
Total	**2.5000e-004**	**7.0000e-005**	**7.5000e-004**	**0.0000**	**1.2000e-004**	**0.0000**	**1.2000e-004**	**3.0000e-005**	**0.0000**	**3.0000e-005**	**0.0000**	**0.1089**	**0.1089**	**1.0000e-005**	**0.0000**	**0.1090**

3.4 Building Construction - 2015

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.3600	2.1564	1.5004	2.2000e-003		0.1485	0.1485		0.1434	0.1434	0.0000	186.4831	186.4831	0.0430	0.0000	187.3864
Total	**0.3600**	**2.1564**	**1.5004**	**2.2000e-003**		**0.1485**	**0.1485**		**0.1434**	**0.1434**	**0.0000**	**186.4831**	**186.4831**	**0.0430**	**0.0000**	**187.3864**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0372	0.1164	0.2206	2.5000e-004	6.8400e-003	1.9000e-003	8.7400e-003	1.9600e-003	1.7400e-003	3.7000e-003	0.0000	22.9482	22.9482	2.0000e-004	0.0000	22.9524
Worker	0.0370	0.0108	0.1128	2.1000e-004	0.0176	1.4000e-004	0.0178	4.6900e-003	1.3000e-004	4.8200e-003	0.0000	16.3293	16.3293	9.3000e-004	0.0000	16.3487
Total	**0.0742**	**0.1272**	**0.3334**	**4.6000e-004**	**0.0245**	**2.0400e-003**	**0.0265**	**6.6500e-003**	**1.8700e-003**	**8.5200e-003**	**0.0000**	**39.2775**	**39.2775**	**1.1300e-003**	**0.0000**	**39.3011**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.3596	2.1539	1.4986	2.1900e-003		0.1483	0.1483		0.1433	0.1433	0.0000	186.2613	186.2613	0.0430	0.0000	187.1635
Total	**0.3596**	**2.1539**	**1.4986**	**2.1900e-003**		**0.1483**	**0.1483**		**0.1433**	**0.1433**	**0.0000**	**186.2613**	**186.2613**	**0.0430**	**0.0000**	**187.1635**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0372	0.1164	0.2206	2.5000e-004	6.8400e-003	1.9000e-003	8.7400e-003	1.9600e-003	1.7400e-003	3.7000e-003	0.0000	22.9482	22.9482	2.0000e-004	0.0000	22.9524
Worker	0.0370	0.0108	0.1128	2.1000e-004	0.0176	1.4000e-004	0.0178	4.6900e-003	1.3000e-004	4.8200e-003	0.0000	16.3293	16.3293	9.3000e-004	0.0000	16.3487
Total	**0.0742**	**0.1272**	**0.3334**	**4.6000e-004**	**0.0245**	**2.0400e-003**	**0.0265**	**6.6500e-003**	**1.8700e-003**	**8.5200e-003**	**0.0000**	**39.2775**	**39.2775**	**1.1300e-003**	**0.0000**	**39.3011**

3.5 Paving - 2015

Unmitigated Construction On-Site

Acres of Paving: 0

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.1404	1.4596	0.9170	1.3300e-003		0.0892	0.0892		0.0822	0.0822	0.0000	125.4156	125.4156	0.0368	0.0000	126.1878
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.1404**	**1.4596**	**0.9170**	**1.3300e-003**		**0.0892**	**0.0892**		**0.0822**	**0.0822**	**0.0000**	**125.4156**	**125.4156**	**0.0368**	**0.0000**	**126.1878**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0201	5.8400e-003	0.0611	1.1000e-004	9.5500e-003	8.0000e-005	9.6200e-003	2.5400e-003	7.0000e-005	2.6100e-003	0.0000	8.8450	8.8450	5.0000e-004	0.0000	8.8555
Total	**0.0201**	**5.8400e-003**	**0.0611**	**1.1000e-004**	**9.5500e-003**	**8.0000e-005**	**9.6200e-003**	**2.5400e-003**	**7.0000e-005**	**2.6100e-003**	**0.0000**	**8.8450**	**8.8450**	**5.0000e-004**	**0.0000**	**8.8555**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.1402	1.4579	0.9159	1.3300e-003		0.0891	0.0891		0.0821	0.0821	0.0000	125.2664	125.2664	0.0367	0.0000	126.0377
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.1402**	**1.4579**	**0.9159**	**1.3300e-003**		**0.0891**	**0.0891**		**0.0821**	**0.0821**	**0.0000**	**125.2664**	**125.2664**	**0.0367**	**0.0000**	**126.0377**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0201	5.8400e-003	0.0611	1.1000e-004	9.5500e-003	8.0000e-005	9.6200e-003	2.5400e-003	7.0000e-005	2.6100e-003	0.0000	8.8450	8.8450	5.0000e-004	0.0000	8.8555
Total	**0.0201**	**5.8400e-003**	**0.0611**	**1.1000e-004**	**9.5500e-003**	**8.0000e-005**	**9.6200e-003**	**2.5400e-003**	**7.0000e-005**	**2.6100e-003**	**0.0000**	**8.8450**	**8.8450**	**5.0000e-004**	**0.0000**	**8.8555**

3.6 Architectural Coating - 2015

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	0.5214					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0407	0.2570	0.1902	3.0000e-004		0.0221	0.0221		0.0221	0.0221	0.0000	25.5325	25.5325	3.3200e-003	0.0000	25.6024
Total	**0.5621**	**0.2570**	**0.1902**	**3.0000e-004**		**0.0221**	**0.0221**		**0.0221**	**0.0221**	**0.0000**	**25.5325**	**25.5325**	**3.3200e-003**	**0.0000**	**25.6024**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	7.7100e-003	2.2500e-003	0.0235	4.0000e-005	3.6700e-003	3.0000e-005	3.7000e-003	9.8000e-004	3.0000e-005	1.0000e-003	0.0000	3.4019	3.4019	1.9000e-004	0.0000	3.4060
Total	**7.7100e-003**	**2.2500e-003**	**0.0235**	**4.0000e-005**	**3.6700e-003**	**3.0000e-005**	**3.7000e-003**	**9.8000e-004**	**3.0000e-005**	**1.0000e-003**	**0.0000**	**3.4019**	**3.4019**	**1.9000e-004**	**0.0000**	**3.4060**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	0.5214					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0406	0.2567	0.1900	3.0000e-004		0.0221	0.0221		0.0221	0.0221	0.0000	25.5022	25.5022	3.3200e-003	0.0000	25.5719
Total	**0.5621**	**0.2567**	**0.1900**	**3.0000e-004**		**0.0221**	**0.0221**		**0.0221**	**0.0221**	**0.0000**	**25.5022**	**25.5022**	**3.3200e-003**	**0.0000**	**25.5719**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	7.7100e-003	2.2500e-003	0.0235	4.0000e-005	3.6700e-003	3.0000e-005	3.7000e-003	9.8000e-004	3.0000e-005	1.0000e-003	0.0000	3.4019	3.4019	1.9000e-004	0.0000	3.4060
Total	**7.7100e-003**	**2.2500e-003**	**0.0235**	**4.0000e-005**	**3.6700e-003**	**3.0000e-005**	**3.7000e-003**	**9.8000e-004**	**3.0000e-005**	**1.0000e-003**	**0.0000**	**3.4019**	**3.4019**	**1.9000e-004**	**0.0000**	**3.4060**

Civic Center Aquatics Complex - Facility Features Construction

Sacramento County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Government (Civic Center)	0.00	1000sqft	30.00	1,306,800.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	3.5	**Precipitation Freq (Days)**	58
Climate Zone	6			**Operational Year**	2016
Utility Company	Sacramento Municipal Utility District				
CO2 Intensity (lb/MWhr)	590.31	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - Project site = 30 acres

Construction Phase - Project construction estimated to last 14 months

Off-road Equipment - Equipment list provided by Project applicant

Table Name	Column Name	Default Value	New Value
tblConstructionPhase	NumDays	440.00	110.00
tblLandUse	LandUseSquareFeet	0.00	1,306,800.00
tblLandUse	LotAcreage	0.00	30.00
tblOffRoadEquipment	LoadFactor	0.42	0.42
tblOffRoadEquipment	LoadFactor	0.38	0.38
tblOffRoadEquipment	LoadFactor	0.38	0.38
tblOffRoadEquipment	LoadFactor	0.41	0.41
tblOffRoadEquipment	LoadFactor	0.48	0.48
tblOffRoadEquipment	LoadFactor	0.38	0.38
tblOffRoadEquipment	OffRoadEquipmentType		Pavers
tblOffRoadEquipment	OffRoadEquipmentType		Dumpers/Tenders
tblOffRoadEquipment	OffRoadEquipmentType		Dumpers/Tenders
tblOffRoadEquipment	OffRoadEquipmentType		Off-Highway Trucks
tblOffRoadEquipment	OffRoadEquipmentType		Pumps
tblOffRoadEquipment	OffRoadEquipmentType		Excavators
tblOffRoadEquipment	OffRoadEquipmentType		Graders
tblOffRoadEquipment	OffRoadEquipmentType		Scrapers
tblOffRoadEquipment	OffRoadEquipmentType		Rollers
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	4.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblProjectCharacteristics	OperationalYear	2014	2016

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2015	1.2467	6.9928	6.3718	9.8100e-003	0.2360	0.3086	0.5446	0.0641	0.2858	0.3499	0.0000	884.0031	884.0031	0.1540	0.0000	887.2377
Total	**1.2467**	**6.9928**	**6.3718**	**9.8100e-003**	**0.2360**	**0.3086**	**0.5446**	**0.0641**	**0.2858**	**0.3499**	**0.0000**	**884.0031**	**884.0031**	**0.1540**	**0.0000**	**887.2377**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2015	1.2461	6.9859	6.3681	9.8100e-003	0.2360	0.3083	0.5442	0.0641	0.2854	0.3495	0.0000	883.4053	883.4053	0.1539	0.0000	886.6364
Total	**1.2461**	**6.9859**	**6.3681**	**9.8100e-003**	**0.2360**	**0.3083**	**0.5442**	**0.0641**	**0.2854**	**0.3495**	**0.0000**	**883.4053**	**883.4053**	**0.1539**	**0.0000**	**886.6364**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	0.0497	0.0977	0.0584	0.0000	0.0000	0.1102	0.0624	0.0000	0.1120	0.0886	0.0000	0.0676	0.0676	0.1104	0.0000	0.0678

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Building Construction	Building Construction	5/14/2015	10/14/2015	5	110	

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Building Construction	Pavers	1	8.00	125	0.42
Building Construction	Dumpers/Tenders	2	2.00	16	0.38
Building Construction	Dumpers/Tenders	1	8.00	16	0.38
Building Construction	Off-Highway Trucks	4	6.00	400	0.38
Building Construction	Cranes	1	7.00	226	0.29
Building Construction	Forklifts	1	8.00	89	0.20
Building Construction	Generator Sets	0	8.00	84	0.74
Building Construction	Pumps	1	8.00	84	0.74
Building Construction	Excavators	1	8.00	162	0.38
Building Construction	Graders	1	6.00	174	0.41
Building Construction	Scrapers	1	8.00	361	0.48
Building Construction	Tractors/Loaders/Backhoes	4	7.00	97	0.37
Building Construction	Rollers	1	8.00	80	0.38
Building Construction	Welders	0	8.00	46	0.45

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Building Construction	19	418.00	214.00	0.00	10.00	6.50	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

3.2 Building Construction - 2015

Unmitigated Construction On-Site

Acres of Grading: 0

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.5274	5.7478	3.1278	5.3200e-003		0.2886	0.2886		0.2674	0.2674	0.0000	502.4989	502.4989	0.1432	0.0000	505.5063
Total	**0.5274**	**5.7478**	**3.1278**	**5.3200e-003**		**0.2886**	**0.2886**		**0.2674**	**0.2674**	**0.0000**	**502.4989**	**502.4989**	**0.1432**	**0.0000**	**505.5063**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.3646	1.1418	2.1636	2.4700e-003	0.0671	0.0186	0.0858	0.0192	0.0171	0.0363	0.0000	225.0836	225.0836	1.9600e-003	0.0000	225.1247
Worker	0.3547	0.1032	1.0804	2.0200e-003	0.1689	1.3500e-003	0.1702	0.0449	1.2400e-003	0.0461	0.0000	156.4206	156.4206	8.8600e-003	0.0000	156.6067
Total	**0.7193**	**1.2450**	**3.2440**	**4.4900e-003**	**0.2360**	**0.0200**	**0.2560**	**0.0641**	**0.0183**	**0.0824**	**0.0000**	**381.5042**	**381.5042**	**0.0108**	**0.0000**	**381.7314**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.5268	5.7409	3.1241	5.3200e-003		0.2883	0.2883		0.2671	0.2671	0.0000	501.9012	501.9012	0.1430	0.0000	504.9050
Total	**0.5268**	**5.7409**	**3.1241**	**5.3200e-003**		**0.2883**	**0.2883**		**0.2671**	**0.2671**	**0.0000**	**501.9012**	**501.9012**	**0.1430**	**0.0000**	**504.9050**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.3646	1.1418	2.1636	2.4700e-003	0.0671	0.0186	0.0858	0.0192	0.0171	0.0363	0.0000	225.0836	225.0836	1.9600e-003	0.0000	225.1247
Worker	0.3547	0.1032	1.0804	2.0200e-003	0.1689	1.3500e-003	0.1702	0.0449	1.2400e-003	0.0461	0.0000	156.4206	156.4206	8.8600e-003	0.0000	156.6067
Total	**0.7193**	**1.2450**	**3.2440**	**4.4900e-003**	**0.2360**	**0.0200**	**0.2560**	**0.0641**	**0.0183**	**0.0824**	**0.0000**	**381.5042**	**381.5042**	**0.0108**	**0.0000**	**381.7314**

Civic Center Aquatics Complex - Asphalt Paving

Sacramento County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Government (Civic Center)	0.00	1000sqft	57.30	0.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	3.5	**Precipitation Freq (Days)**	58
Climate Zone	6			**Operational Year**	2016
Utility Company	Sacramento Municipal Utility District				
CO2 Intensity (lb/MWhr)	590.31	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - Project site + overflow parking lot = 57.3 acres

Off-road Equipment - Equipment list provided by Project applicant

Table Name	Column Name	Default Value	New Value
tblLandUse	LotAcreage	0.00	57.30
tblOffRoadEquipment	LoadFactor	0.37	0.37
tblOffRoadEquipment	OffRoadEquipmentType		Tractors/Loaders/Backhoes
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblProjectCharacteristics	OperationalYear	2014	2016

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2015	0.0825	0.7671	0.4830	6.9000e-004	3.5800e-003	0.0481	0.0517	9.5000e-004	0.0443	0.0452	0.0000	65.3790	65.3790	0.0187	0.0000	65.7720
Total	**0.0825**	**0.7671**	**0.4830**	**6.9000e-004**	**3.5800e-003**	**0.0481**	**0.0517**	**9.5000e-004**	**0.0443**	**0.0452**	**0.0000**	**65.3790**	**65.3790**	**0.0187**	**0.0000**	**65.7720**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2015	0.0824	0.7662	0.4825	6.9000e-004	3.5800e-003	0.0481	0.0516	9.5000e-004	0.0442	0.0452	0.0000	65.3052	65.3052	0.0187	0.0000	65.6978
Total	**0.0824**	**0.7662**	**0.4825**	**6.9000e-004**	**3.5800e-003**	**0.0481**	**0.0516**	**9.5000e-004**	**0.0442**	**0.0452**	**0.0000**	**65.3052**	**65.3052**	**0.0187**	**0.0000**	**65.6978**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**0.1092**	**0.1186**	**0.1139**	**0.0000**	**0.0000**	**0.1247**	**0.1161**	**0.0000**	**0.1129**	**0.1106**	**0.0000**	**0.1129**	**0.1129**	**0.1603**	**0.0000**	**0.1130**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Paving	Paving	2/6/2015	5/21/2015	5	75	

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Paving	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Paving	Pavers	2	8.00	125	0.42
Paving	Rollers	2	8.00	80	0.38
Paving	Paving Equipment	0	8.00	130	0.36

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Paving	5	13.00	0.00	0.00	10.00	6.50	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

3.2 Paving - 2015

Unmitigated Construction On-Site

Acres of Grading: 0

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0749	0.7649	0.4601	6.5000e-004		0.0481	0.0481		0.0442	0.0442	0.0000	62.0621	62.0621	0.0185	0.0000	62.4512
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0749**	**0.7649**	**0.4601**	**6.5000e-004**		**0.0481**	**0.0481**		**0.0442**	**0.0442**	**0.0000**	**62.0621**	**62.0621**	**0.0185**	**0.0000**	**62.4512**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	7.5200e-003	2.1900e-003	0.0229	4.0000e-005	3.5800e-003	3.0000e-005	3.6100e-003	9.5000e-004	3.0000e-005	9.8000e-004	0.0000	3.3169	3.3169	1.9000e-004	0.0000	3.3208
Total	**7.5200e-003**	**2.1900e-003**	**0.0229**	**4.0000e-005**	**3.5800e-003**	**3.0000e-005**	**3.6100e-003**	**9.5000e-004**	**3.0000e-005**	**9.8000e-004**	**0.0000**	**3.3169**	**3.3169**	**1.9000e-004**	**0.0000**	**3.3208**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0748	0.7640	0.4596	6.5000e-004		0.0480	0.0480		0.0442	0.0442	0.0000	61.9883	61.9883	0.0185	0.0000	62.3769
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0748**	**0.7640**	**0.4596**	**6.5000e-004**		**0.0480**	**0.0480**		**0.0442**	**0.0442**	**0.0000**	**61.9883**	**61.9883**	**0.0185**	**0.0000**	**62.3769**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	7.5200e-003	2.1900e-003	0.0229	4.0000e-005	3.5800e-003	3.0000e-005	3.6100e-003	9.5000e-004	3.0000e-005	9.8000e-004	0.0000	3.3169	3.3169	1.9000e-004	0.0000	3.3208
Total	**7.5200e-003**	**2.1900e-003**	**0.0229**	**4.0000e-005**	**3.5800e-003**	**3.0000e-005**	**3.6100e-003**	**9.5000e-004**	**3.0000e-005**	**9.8000e-004**	**0.0000**	**3.3169**	**3.3169**	**1.9000e-004**	**0.0000**	**3.3208**

Civic Center Aquatics Complex - Building Space Energy

Sacramento County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Government (Civic Center)	75.00	1000sqft	1.72	75,000.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	3.5	**Precipitation Freq (Days)**	58
Climate Zone	6			**Operational Year**	2016
Utility Company	Sacramento Municipal Utility District				
CO2 Intensity (lb/MWhr)	590.31	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use -

Construction Phase -

Off-road Equipment -

Grading -

Construction Off-road Equipment Mitigation -

Energy Mitigation -

Table Name	Column Name	Default Value	New Value
tblProjectCharacteristics	OperationalYear	2014	2016

2.0 Energy Detail

Historical Energy Use: N

2.1 Mitigation Measures Energy

Exceed Title 24

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000	0.0000	303.8006	303.8006	0.0149	3.0900e-003	305.0713
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	322.1154	322.1154	0.0158	3.2700e-003	323.4627
NaturalGas Mitigated	4.7700e-003	0.0433	0.0364	2.6000e-004		3.2900e-003	3.2900e-003		3.2900e-003	3.2900e-003	0.0000	47.1850	47.1850	9.0000e-004	8.7000e-004	47.4721
NaturalGas Unmitigated	5.5600e-003	0.0506	0.0425	3.0000e-004		3.8400e-003	3.8400e-003		3.8400e-003	3.8400e-003	0.0000	55.0314	55.0314	1.0500e-003	1.0100e-003	55.3663

2.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Government (Civic Center)	1.03125e+006	5.5600e-003	0.0506	0.0425	3.0000e-004		3.8400e-003	3.8400e-003		3.8400e-003	3.8400e-003	0.0000	55.0314	55.0314	1.0500e-003	1.0100e-003	55.3663
Total		**5.5600e-003**	**0.0506**	**0.0425**	**3.0000e-004**		**3.8400e-003**	**3.8400e-003**		**3.8400e-003**	**3.8400e-003**	**0.0000**	**55.0314**	**55.0314**	**1.0500e-003**	**1.0100e-003**	**55.3663**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Government (Civic Center)	884213	4.7700e-003	0.0433	0.0364	2.6000e-004		3.2900e-003	3.2900e-003		3.2900e-003	3.2900e-003	0.0000	47.1850	47.1850	9.0000e-004	8.7000e-004	47.4721
Total		**4.7700e-003**	**0.0433**	**0.0364**	**2.6000e-004**		**3.2900e-003**	**3.2900e-003**		**3.2900e-003**	**3.2900e-003**	**0.0000**	**47.1850**	**47.1850**	**9.0000e-004**	**8.7000e-004**	**47.4721**

2.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Government (Civic Center)	1.203e+006	322.1154	0.0158	3.2700e-003	323.4627
Total		**322.1154**	**0.0158**	**3.2700e-003**	**323.4627**

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Government (Civic Center)	1.1346e+006	303.8006	0.0149	3.0900e-003	305.0713
Total		**303.8006**	**0.0149**	**3.0900e-003**	**305.0713**

Civic Center Aquatics Complex - Pool Space Energy Use

Sacramento County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Recreational Swimming Pool	1.00	1000sqft	0.02	1,000.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	3.5	**Precipitation Freq (Days)**	58
Climate Zone	6			**Operational Year**	2016
Utility Company	Sacramento Municipal Utility District				
CO2 Intensity (lb/MWhr)	590.31	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use -

Energy Use - Pool energy use per Project applicant

Energy Mitigation -

Table Name	Column Name	Default Value	New Value
tblEnergyUse	NT24NG	0.00	10,179.56
tblEnergyUse	T24NG	0.00	10,179.56
tblProjectCharacteristics	OperationalYear	2014	2016

2.0 Energy Detail

Historical Energy Use: N

2.1 Mitigation Measures Energy

Exceed Title 24

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Mitigated	0.1016	0.9232	0.7754	5.5400e-003		0.0702	0.0702		0.0702	0.0702	0.0000	1,004.957 5	1,004.957 5	0.0193	0.0184	1,011.073 5
NaturalGas Unmitigated	0.1098	0.9980	0.8383	5.9900e-003		0.0759	0.0759		0.0759	0.0759	0.0000	1,086.440 5	1,086.440 5	0.0208	0.0199	1,093.052 4

2.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Recreational Swimming Pool	2.03591e+007	0.1098	0.9980	0.8383	5.9900e-003		0.0759	0.0759		0.0759	0.0759	0.0000	1,086.440 5	1,086.4405	0.0208	0.0199	1,093.0524
Total		**0.1098**	**0.9980**	**0.8383**	**5.9900e-003**		**0.0759**	**0.0759**		**0.0759**	**0.0759**	**0.0000**	**1,086.440 5**	**1,086.4405**	**0.0208**	**0.0199**	**1,093.0524**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Recreational Swimming Pool	1.88322e+007	0.1016	0.9232	0.7754	5.5400e-003		0.0702	0.0702		0.0702	0.0702	0.0000	1,004.9575	1,004.9575	0.0193	0.0184	1,011.0735
Total		**0.1016**	**0.9232**	**0.7754**	**5.5400e-003**		**0.0702**	**0.0702**		**0.0702**	**0.0702**	**0.0000**	**1,004.9575**	**1,004.9575**	**0.0193**	**0.0184**	**1,011.0735**

2.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Recreational Swimming Pool	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Recreational Swimming Pool	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

Civic Center Aquatics Complex - Water Use

Sacramento County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Government (Civic Center)	1.00	1000sqft	0.02	1,000.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	3.5	**Precipitation Freq (Days)**	58
Climate Zone	6			**Operational Year**	2016
Utility Company	Sacramento Municipal Utility District				
CO_2 Intensity (lb/MWhr)	590.31	**CH_4 Intensity (lb/MWhr)**	0.029	**N_2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use -

Water And Wastewater - Water use per Section 4.8

Water Mitigation -

Table Name	Column Name	Default Value	New Value
tblProjectCharacteristics	OperationalYear	2014	2016
tblWater	IndoorWaterUseRate	198,659.69	11,805,930.00
tblWater	OutdoorWaterUseRate	121,759.16	12,613,709.00

2.0 Water Detail

2.1 Mitigation Measures Water

Use Reclaimed Water

Use Water Efficient Irrigation System

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	26.6416	0.0155	9.3200e-003	29.8581
Unmitigated	31.7488	0.0157	9.3600e-003	34.9819

2.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Government (Civic Center)	11.8059 / 12.6137	31.7488	0.0157	9.3600e-003	34.9819
Total		**31.7488**	**0.0157**	**9.3600e-003**	**34.9819**

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Government (Civic Center)	11.8059 / 7.16409	26.6416	0.0155	9.3200e-003	29.8581
Total		**26.6416**	**0.0155**	**9.3200e-003**	**29.8581**

Civic Center Aquatics Complex - Solid Waste

Sacramento County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Government (Civic Center)	1.00	1000sqft	0.02	1,000.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	3.5	**Precipitation Freq (Days)**	58
Climate Zone	6			**Operational Year**	2016
Utility Company	Sacramento Municipal Utility District				
CO_2 Intensity (lb/MWhr)	590.31	**CH_4 Intensity (lb/MWhr)**	0.029	**N_2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use -

Solid Waste - Solid waste generation per Section 4.8

Table Name	Column Name	Default Value	New Value
tblProjectCharacteristics	OperationalYear	2014	2016
tblSolidWaste	SolidWasteGenerationRate	5.70	535.00

2.0 Waste Detail

2.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	108.6002	6.4181	0.0000	243.3800
Unmitigated	108.6002	6.4181	0.0000	243.3800

2.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Government (Civic Center)	535	108.6002	6.4181	0.0000	243.3800
Total		**108.6002**	**6.4181**	**0.0000**	**243.3800**

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Government (Civic Center)	535	108.6002	6.4181	0.0000	243.3800
Total		**108.6002**	**6.4181**	**0.0000**	**243.3800**

Civic Center Aquatics Complex - Project Traffic

Sacramento County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Government (Civic Center)	1.00	1000sqft	0.02	1,000.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	3.5	**Precipitation Freq (Days)**	58
Climate Zone	6			**Operational Year**	2016
Utility Company	Sacramento Municipal Utility District				
CO_2 Intensity (lb/MWhr)	590.31	**CH_4 Intensity (lb/MWhr)**	0.029	**N_2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use -

Vehicle Trips - Trip generation per Traffic Impact Report

Table Name	Column Name	Default Value	New Value
tblProjectCharacteristics	OperationalYear	2014	2016
tblVehicleTrips	ST_TR	0.00	4,782.00
tblVehicleTrips	SU_TR	0.00	4,782.00
tblVehicleTrips	WD_TR	27.92	2,808.00

2.0 Operational Detail - Mobile

2.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	4.8841	4.0190	19.7024	0.0343	2.3657	0.0518	2.4175	0.6337	0.0476	0.6813	0.0000	2,692.045 7	2,692.045 7	0.1238	0.0000	2,694.646 1
Unmitigated	4.8841	4.0190	19.7024	0.0343	2.3657	0.0518	2.4175	0.6337	0.0476	0.6813	0.0000	2,692.045 7	2,692.045 7	0.1238	0.0000	2,694.646 1

2.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Government (Civic Center)	2,808.00	4,782.00	4782.00	6,356,286	6,356,286
Total	2,808.00	4,782.00	4,782.00	6,356,286	6,356,286

2.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Government (Civic Center)	10.00	5.00	6.50	75.00	20.00	5.00	50	34	16

2.4 Fleet Mix

LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
0.504516	0.068219	0.178179	0.147873	0.044976	0.006346	0.020386	0.015946	0.002304	0.002308	0.006193	0.000574	0.002181

Civic Center Aquatics Complex - Area Source

Sacramento County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Government (Civic Center)	75.00	1000sqft	1.72	75,000.00	0
Parking Lot	2,225.00	Space	20.02	890,000.00	0
Recreational Swimming Pool	30.60	1000sqft	0.70	30,600.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	3.5	**Precipitation Freq (Days)**	58
Climate Zone	6			**Operational Year**	2016
Utility Company	Sacramento Municipal Utility District				
CO_2 Intensity (lb/MWhr)	590.31	**CH_4 Intensity (lb/MWhr)**	0.029	**N_2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use -

Table Name	Column Name	Default Value	New Value
tblProjectCharacteristics	OperationalYear	2014	2016

2.0 Area Detail

2.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	3.9833	2.9000e-004	0.0305	0.0000		1.1000e-004	1.1000e-004		1.1000e-004	1.1000e-004	0.0000	0.0578	0.0578	1.6000e-004	0.0000	0.0613
Unmitigated	3.9833	2.9000e-004	0.0305	0.0000		1.1000e-004	1.1000e-004		1.1000e-004	1.1000e-004	0.0000	0.0578	0.0578	1.6000e-004	0.0000	0.0613

2.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.0920					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	3.8883					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	2.9700e-003	2.9000e-004	0.0305	0.0000		1.1000e-004	1.1000e-004		1.1000e-004	1.1000e-004	0.0000	0.0578	0.0578	1.6000e-004	0.0000	0.0613
Total	**3.9833**	**2.9000e-004**	**0.0305**	**0.0000**		**1.1000e-004**	**1.1000e-004**		**1.1000e-004**	**1.1000e-004**	**0.0000**	**0.0578**	**0.0578**	**1.6000e-004**	**0.0000**	**0.0613**

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.0920					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	3.8883					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	2.9700e-003	2.9000e-004	0.0305	0.0000		1.1000e-004	1.1000e-004		1.1000e-004	1.1000e-004	0.0000	0.0578	0.0578	1.6000e-004	0.0000	0.0613
Total	**3.9833**	**2.9000e-004**	**0.0305**	**0.0000**		**1.1000e-004**	**1.1000e-004**		**1.1000e-004**	**1.1000e-004**	**0.0000**	**0.0578**	**0.0578**	**1.6000e-004**	**0.0000**	**0.0613**

APPENDIX H – PHASE I ENVIRONMENTAL SITE ASSESSMENT

DRAFT PHASE I
ENVIRONMENTAL SITE ASSESSMENT
Civic Center Park (Aquatic Center)
Property Acquisition
Elk Grove, California

Prepared for
City of Elk Grove

April 2013

Prepared by
Blackburn Consulting
2491 Boatman Ave
West Sacramento, CA 95691

DRAFT Phase I Environmental Site Assessment
Civic Center Park (Aquatic Center) Property Acquisition
Elk Grove, California

TABLE OF CONTENTS

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Geotechnical • Construction Services • Forensics

BCI File No. 2101.X050
April 17, 2013

Mr. Gary Otremba
City of Elk Grove
8401 Laguna Palms Way
Elk Grove, CA 95758

Subject: **DRAFT PHASE I ENVIRONMENTAL SITE ASSESSMENT**
Civic Center Park (Aquatic Center) Property Acquisition
Elk Grove, California

Dear Mr. Otremba,

Blackburn Consulting (BCI) prepared this Draft Phase I Environmental Site Assessment for the Civic Center Park (Aquatic Center) Property Acquisition project. The purpose of this assessment is to identify recognized soil and groundwater contamination and hazardous material conditions that may significantly impact property acquisition. This report specifically addresses eight parcels (APN 132-1990-007, -009, -010, -011, -012, -014, -015 and -017) and was prepared in accordance with our proposal dated March 8, 2013.

As always, BCI appreciates the opportunity to be part of your team. Please call if you have questions or require additional information.

Sincerely,

BLACKBURN CONSULTING

Laura Long
Environmental Engineer

Jeffrey S. Patton, PE
Principal Engineer

EXECUTIVE SUMMARY

Blackburn Consulting (BCI) completed this Environmental Site Assessment (ESA) Phase I to identify recognized environmental conditions[1] (RECs) that may be present within and/or adjacent to the subject acquisition parcels. This report specifically addresses eight contiguous parcels (APN 132-1990-007, -009, -010, -011, -012, -014, -015 and -017) located in Elk Grove, California. We prepared this report in general conformance with the American Society of Testing and Materials (ASTM) Standard E1527-13, *"Standard Practice for Environmental Site Assessments Phase I Environmental Site Assessment Process."*

This ESA concludes that there are potential recognized environmental conditions (RECs) at the site.

Potential Hazardous Material/Environmental Conditions located at the Acquisition Parcels

APN 132-1990-014 - Asbestos Containing Materials/Lead Based Paint and Unspecified Hazardous Material Conditions

- The three houses at this parcel were built circa 1980. Construction materials used prior to 1980 may contain asbestos and/or lead containing paint. Because demolition is anticipated as part of this project, a properly certified inspector should survey the structures for lead based paints (LBP) and asbestos containing material (ACM).

- In addition to asbestos and lead containing building materials, the three abandoned homes may have associated leach fields, septic tanks, and buried heating oil tanks.

APN 132-1990-015 - Historic Home Site and Orchard

- A historic home site and several associated buildings were identified at this parcel. All of the buildings are now removed. A concrete water tank is the only remaining structure. Potential issues associated with the identified land use include leach fields, septic tanks, buried heating oil tanks, and pesticide mixing and/or storage (old barn site).

- This parcel was first identified as an active nut orchard on the 1971 Historic Aerial Photograph. By 2005, a portion of the orchard had been cleared in preparation for the development of Lotz Parkway. Persistent pesticides such as DDT and lead arsenate were commonly used prior to 1972. We recommend a limited shallow soil investigation to screen for persistent pesticides at this parcel.

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[1] BCI uses the term Recognized Environmental Condition (REC) in general compliance with ASTM E1527-13, which defines the meaning as *"The presence or likely presence of any hazardous substances or petroleum products in, on, or at a property (1) due to any release to the environment, (2) under conditions indicative of a release to the environment or (3) under conditions that pose a material threat of a future release to the environment. The term is not intended to include de minimus conditions that generally do not present a threat to human health or the environment and generally would not be the subject of an enforcement action if brought to the attention of the appropriate regulatory agencies. Conditions determined to be de minimus are not recognized environmental conditions."*

APN 132-1990-007, APN 132-1990-009, APN 132-1990-014, and APN 132-1990-017 - Historic Agricultural Land

- These parcels have been used historically for agricultural purposes. On April 4, 2013 BCI contacted Ms. Debbie Thompson with the Sacramento County Agricultural Commissioner's office to discuss agricultural land use in the area. Ms. Thompson indicated that the area had been heavily farmed since the 1930's with rice, strawberries, seasonal row crops, hay crop and irrigated pastureland. Prior to the 1930's, Ms. Thompson believed the area was developed as nut orchards but could not confirm this because records were not kept for that time period. Persistent pesticides such as DDT and lead arsenate were commonly used prior to 1972. We recommend a limited shallow soil investigation to screen for persistent pesticides at these parcels.

Potential Hazardous Material Conditions located Adjacent to the Acquisition Property

Our research found no recorded REC's on the adjacent parcels.

1. INTRODUCTION

In accordance with our proposal dated March 8, 2013, Blackburn Consulting (BCI) prepared this Phase I Environmental Site Assessment (ESA) for the City of Elk Grove's proposed purchase of the following eight contiguous parcels:

APN 132-1990-007
APN 132-1990-009
APN 132-1990-010
APN 132-1990-011
APN 132-1990-012
APN 132-1990-014
APN 132-1990-015
APN 132-1990-017

The parcels will be acquired as part of the City of Elk Grove's Civic Center Park (Aquatic Center) Project located in Elk Grove, California. The purpose of this ESA is to identify recognized environmental conditions[2] (RECs) and potential RECs that may affect the proposed property acquisition. We prepared this report in general conformance with the American Society of Testing and Materials (ASTM) Standard E1527-13, *Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process.*

To conduct this ESA, BCI:

- Conducted a site visit to observe current land use and potential indications of contamination at the proposed acquisition parcels, and view publicly accessible portions of the adjacent properties;
- Contacted the City of Elk Grove to conduct owner/operator interviews;
- Contacted the Sacramento County Agricultural Commissioner's office;
- Reviewed historical aerial photographic and topographic maps and City Directory coverage of the site and surrounding properties to identify past and present land use for indications of potential sources of contamination;
- Performed federal, state, and county records review for indications of the use, misuse, or storage of hazardous materials at or adjacent to the acquisition parcels. This commercial records review was provided by Environmental Data Resources, Inc. (EDR) of Southport, Connecticut; and
- Reviewed the general site geology, ground water, and soil conditions through published maps and literature.

[2] BCI uses the term Recognized Environmental Condition (REC) in general compliance with ASTM E1527-13, which defines the meaning as *"The presence or likely presence of any hazardous substances or petroleum products in, on, or at a property (1) due to any release to the environment, (2) under conditions indicative of a release to the environment or (3) under conditions that pose a material threat of a future release to the environment. The term is not intended to include de minimus conditions that generally do not present a threat to human health or the environment and generally would not be the subject of an enforcement action if brought to the attention of the appropriate regulatory agencies. Conditions determined to be de minimus are not recognized environmental conditions."*

2. PROJECT DESCRIPTION AND LOCATION

The project includes acquisition of eight parcels (APN 132-1990-007, -009, -010, -011, -012, 014, -015 and -017). Total area of the eight parcels is approximately 51 acres and the shape is generally rectangular. The project area is located immediately south of Civic Center Drive, east of Big Horn Boulevard, north of Lotz Parkway, and west of undeveloped land. The site is approximately 1,860 feet long (north to south) and 1,350 feet wide (west to east). Figure 1 is a Vicinity Map and Figure 2 is a Site Plan of the proposed acquisition properties including associated Assessor Parcel Numbers (APNs).

2.1 Current Land Use

Parcel APN 132-1990-007: The north (Civic Center Drive) and west (Big Horn Boulevard) edges are landscaped with grass and pedestrian sidewalks. The remaining portion of the parcel is undeveloped. The ground surface is covered by grasses, low shrubs and dirt.

Parcel APN 132-1990-009: This parcel is primarily undeveloped with the exception of the northern edge (along Civic Center Drive) which is landscaped with grass and a pedestrian sidewalk. The parcel is irregular in shape and is bordered by historic Johnson Road to the west, wetlands to the south and undeveloped land to the east. Adjacent to the northeast corner is a water treatment facility. The ground surface of the entire parcel is covered with grasses, low shrubs and dirt.

Parcel APN 132-1990-010: This parcel is undeveloped and is bordered by wetlands to the north and a dirt road to the south. A barbed wire fence is present along the south border. The ground surface is covered by thick grass, dense shrubs and trees.

Parcels APN 132-1990-011 and -012: These parcels are undeveloped and delineated as wetlands. An orange marking fence is visible along portions of the perimeter. Several ponds were present. The ground surface is covered with grasses, dense shrubs and trees.

Parcel APN 132-1990-014: This parcel is developed with three houses. The properties are abandoned, the houses boarded up and the yards are unkempt and overgrown. A small shed/chicken coop was located behind one house at the southeast corner of the parcel. Debris and trash piles are present throughout the parcel.

Parcel APN 132-1990-015: This parcel is currently undeveloped. It is bordered by a dirt road to the north, and Lotz Parkway to the south. An old orchard is located on the east portion of the property. A historic home and barn have been demolished and the debris cleared from the site. The remaining structure is a concrete water tank/tower located near the former residence. Minor debris relict from building demolition remains at the ground surface.

Parcel APN 132-1990-017: This parcel is undeveloped except for a local utility station which includes a paved driveway and parking area and small utility building.

Regionally, the area surrounding the eight acquisition parcels includes Big Horn Boulevard/residential housing to the west, Civic Center Drive to the north, undeveloped land to the east, and Lotz Parkway/Consumes Oak High School to the south.

2.2 Topography and Drainage

The topography within and surrounding the project area is generally flat. The site elevation is approximately 32 to 42 feet above mean sea level (msl) based on the USGS Target Property Map 38121-D3 Elk Grove, California, 1979 (EDR Report, Appendix D). Drainage for the area is generally towards the wetland area (parcels 132-1990-011 and -012) and discharges to the west via culvert under Big Horn Boulevard.

2.3 General Geologic Conditions

The parcels are in the southern Sacramento Valley. Physiographically, the area is along the eastern edge of the Great Valley Geomorphic Province. This province includes the Sacramento and San Joaquin Valleys, which are bounded by the Sierra Nevada on the east and the Coast Ranges on the west. The Sacramento Valley is a structural trough that represents the northern third of the Great Valley.

The relatively flat surface of the Sacramento Valley is underlain by alluvial, lacustrine, and marine sedimentary deposits that have accumulated as the structural trough formed while the adjacent mountain ranges were rising. The thickness of the sediments varies from a thin veneer along the valley margins to thousands of feet at the axis of the trough. The main axis of the trough is oriented north-south along the valley's main drainage axis.

Based on site reconnaissance/mapping and published geologic maps the subject area is immediately underlain by Pleistocene age (greater than approximately 600,000 years old) alluvial sediments of the Riverbank Formation. Soil mapping[3] show the site soil consists of San Joaquin silt loam and clay loam.

2.4 Surface Water, Groundwater and Wells

Elk Grove is considered part of the Central Sacramento Valley Groundwater Basin. BCI reviewed ground water level data made available by the California Department of Water Resources (DWR) website (http://wwww.cd.water.ca.gov) and available ground water elevation maps (DWR, 2008). These records indicate that regional ground water in the property vicinity is approximately 40-60 feet below ground surface (bgs). Groundwater flow is generally to the south and west.

Parcels APN 132-1990-011 and APN 132-1990-012 are comprised of wetlands identified on the National Wetland Inventory. Water is present year round with seasonal increases/decreases. The wetland area drains to the west via a culvert under Big Horn Boulevard.

[3] Soil Survey Staff, Natural Resources Conservation Service, United States Department of Agriculture. Web Soil Survey. Available online at http://websoilsurvey.nrcs.usda.gov/.

There are eight Federal USGS wells, six State Database wells, and one State Oil/Gas well located within a one mile radius of the acquisition sites. A majority of Elk Grove's drinking water comes from ground water with additional supplies from local surface water.

There is a water well identified on the west side of Johnston Road at APN 132-1990-014 (1968 Topographic Map). This is consistent with our observations (i.e. water storage tank) in the rear yard of the same parcel (Photo 29 of this report). Given the past agricultural and domestic use of the site additional wells may be present.

2.5 Historic Land Use

2.5.1 Aerial Photograph Review

Aerial photos from 1937, 1947, 1952, 1961, 1971, 1981, 1993, 1998, 2005, 2006, 2009 and 2010 as listed below:

1937 Photo by Laval, Scale 1"=555'
1947 Photo by USGS, Scale 1"=655'
1952 Photo by Pacific Air, Scale 1'=555'
1961 Photo by Cartwright, Scale 1"=555'
1971 Photo by Cartwright, Scale 1"=333'
1981 Photo by Cartwright, Scale 1"=333'
1993 Photo by USGS, Scale 1"=666'
1998 Photo by EDR, Scale 1"=500'
2005 Photo by EDR, Scale 1"=500'
2006 Photo by EDR, Scale 1"=500'
2009 Photo by EDR, Scale 1"=500'
2010 Photo by EDR, Scale 1"=500'

Historical aerial photography was reviewed to identify conditions that may indicate potential hazardous materials issues within or adjacent to the acquisition parcels. Aerial photographs are provided in Appendix A. The following summary highlights these findings.

Parcel APN 132-1990-007: In 1937 this parcel is divided and appears to be part of two larger parcels. The area is developed for agriculture as early as 1937 and appears to have been farmed continually until 1981. In 1993 the site is fallow but by 1998 the fields appear to be actively farmed again. In 2006, the delineations visible on the aerial photo appear consistent with the current parcel boundaries; Big Horn Boulevard delineates the west boundary, and Civic Center Drive delineates the north boundary. A gravel area that appears to be construction staging is present in the northwest corner.

Parcel APN 132-1990-009: In 1937 the parcel appears to have large areas of water in the southern portion, but is reduced to a stream in 1947. In 1952 the parcel appears to be undeveloped land or pastureland. By 1961 the parcel appears under cultivation until 2006, when the parcel is no longer cultivated.

Parcel APN 132-1990-010: In 1937 the parcel is undeveloped. The southeast corner is covered by a large area of water and a dirt road delineates the southern border of the parcel. In 1947 the large area of water is not visible but a stream exists to the north. From 1952 to present day the parcel is undeveloped and is covered by vegetation and a row of trees planted along the dirt road.

Parcels APN 132-1990-011 and APN 132-1990-012: In 1937 the parcels are covered in irregular shaped bodies of water, however, in 1947 the bodies of water are no longer visible and a stream cuts across the parcels in an east-west direction. In 1952 more streams and larger bodies of water are visible. The stream/water extends only the width of the parcel not onto the adjacent parcels. In 1961 it appears that several man made ponds are present, however in 1981 the landscape is natural again. The parcel becomes more densely wooded from 1981 to the present day.

Parcel APN 132-1990-014: In 1937 a dirt road is present delineating the west side of the parcel. The parcel is undeveloped until 1961. Two houses are visible in 1961. In 1971 a third house is visible as well as driveways and several smaller structures. There are no significant changes except the surrounding trees becoming larger.

Parcel APN 132-1990-015: In 1937 the parcel is delineated by dirt roads to the north and west. There are several small structures in the middle of the parcel. The 1947 photo is blurry. In 1952 there is a large structure (barn) on the west side and a grouping of buildings within some large trees on the east side. The 1961 photo shows additional buildings, but the trees are cleared. There are no significant changes until 1971 when an orchard appears to be present throughout the site. In 2005 portions of the orchard and several small structures are cleared; the remaining orchard, barn, house and water tank/tower remain. The 2006, 2009 and 2010 aerial photographs show no significant changes.

Parcel APN 132-1990-017: In 1937, based on delineations on the aerial photography, this parcel appears to be part of a larger parcel. The parcel is under cultivation as early as 1937 and appears to have been farmed continually until 1998. In 2006 a paved Big Horn Boulevard delineates the west boundary of the parcel. In 2010 a paved driveway, parking area and small utility station are visible on the north side of the parcel.

2.5.2 Topographic Map Review

Topographic maps reviewed include 30-minute quad maps from 1894, 7 ½ -minute quad maps from 1909, 1953, 1968, 1975, and 1980; and a 15 minute quad map from 1947. Copies of topographic maps are provided in Appendix B. This summary includes the noted changes within and adjacent to the subject parcels as recorded on the maps:

1894: The subject parcel boundaries are not defined.

1909: Unpaved Johnston Road and Laguna Springs Drive are present.

1947: Two structures are present on APN 132-1990-015. The unpaved road on the north property boundary of APN 132-1990-015 is present.

1953: The unpaved road north of APN 132-1990-015 is extended eastward.

1968: A well and three structures are present on APN 132-1990-014. Wetlands are identified on APN 132-1990-011 and -012.

1975 and 1980: No significant changes.

2.5.3 Historical Sanborn® Map Review

Sanborn Maps do not exist for the subject parcels or the surrounding area.

3. RECORDS REVIEW

3.1 County, State and Federal Records Review

Environmental Data Resources, Inc. (EDR) provided a "Radius Map with GeoCheck" for the subject parcels. We include a copy of the EDR Report's Executive Summary in Appendix C. The remainder of the report is included on a CD, also in Appendix D. The search includes a review of county, state, and federal databases for sites located within a 1-mile radius from the approximate outline of the subject parcels. The EDR report includes a complete listing of the databases searched. Sites with adequate address information are plotted on EDR's site plan "EDR Radius Map with Geocheck". EDR lists sites with inadequate address information as "orphan sites" and does not provide mapped locations. BCI reviewed the complete list of 14 "orphan sites" identified by EDR and determined that none of these sites appear to be located within or adjacent to the subject parcels.

3.2 Summary of Records Search

To generate this summary, we reviewed the EDR database records search for all sites listed within the searched area. The EDR records review did not identify sites with RECs or potential RECs at or immediately adjacent to the acquisition parcels. The EDR database does not list any potential hazardous waste issues, which may restrict the use of these parcels.

3.3 Historical City Directory Review

A historical City of Elk Grove Directory was reviewed to look for evidence of hazardous materials conditions at or near the subject parcels. The City Directory review did not identify any conditions that are not already identified in other sections of this report.

3.4 Title Documents Review

BCI was not provided title documents for this assessment.

3.5 Sacramento County Agricultural Commissioner's Office Interview

BCI interviewed Ms. Debbie Thompson with the Sacramento County Agricultural Commissioner's office to discuss agricultural land use in the area. Ms. Thompson indicated that the project area had been heavily farmed since the 1930's with rice, strawberries, seasonal row crops, hay crop and irrigated pastureland. Prior to the 1930's, Ms. Thompson believed the area was developed as nut orchards but could not confirm this because records were not kept for that time period.

4. RECONNAISSANCE AND OWNER/OPERATOR INFORMATION

BCI conducted a site reconnaissance on March 27, 2013. Observations were made from within and adjacent to the subject parcels. Photos from our site visit are included in Appendix D. Our observations generally support the land use descriptions and background data above with the following additions:

- APN 132-1990-014: Three abandoned houses are located on this parcel. Two were boarded up and locked and access was not available. One house was open and it appeared that mold was prominent in the kitchen area and likely throughout the house. These houses may include lead and asbestos containing building materials, septic systems and/or fuel oil tanks.
- APN 132-1990-015: Portions of an orchard were observed on the eastern portion of the parcel. The barn that appeared in the 2010 aerial photo is removed.

The City of Elk Grove did not provide owner/operator information or contacts for the subject parcels; consequently, no property owner/tenant interviews were performed.

5. FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

This Environmental Site Assessment's objective was to:

- Determine whether there may be hazardous materials at or near the proposed acquisition parcels at concentrations likely to warrant mitigation pursuant to regulations;
- Identify recognized environmental conditions (RECs) and/or potential RECs at the proposed acquisition parcels which could affect property acquisition;
- Identify potential site contamination issues.

The assessment identified the following RECs and/or potential RECs.

5.1 Known or Potential RECs at the Acquisition Parcels

APN 132-1990-014 - Asbestos Containing Materials/Lead Based Paint and Unspecified Hazardous Material Conditions

- The three houses at this parcel were built circa 1980. Construction materials used prior to 1980 may contain asbestos and/or lead containing paint.

  Recommendation: Because demolition is anticipated as part of this project, prior to demolition a properly certified inspector should survey the structures for lead based paints (LBP) and asbestos containing material (ACM).

- Existing site development includes three residences and one shed which can be an indication of potential contamination sources such as leach fields, septic tanks, and buried heating oil tanks.

APN 132-1990-015 - Historic Home Site and Orchard

- A historic home site and several associated buildings were identified at this parcel. All of the structures have been removed during the past few years. A water tank is the only remaining structure. Common issues associated with the identified land use include leach fields, septic tanks, and buried heating oil tanks.

- This parcel was first identified as an active orchard on the 1971 Historic Aerial Photograph. By 2005, a portion of the orchard had been cleared in preparation for the development of Lotz Parkway. Persistent pesticides such as DDT and lead arsenate were commonly used in orchards prior to 1972.

  Recommendation: We recommend a limited shallow soil investigation to screen for persistent pesticides at this parcel.

APN 132-1990-007, 132-1990-009, 132-1990-014, and 132-1990-017 - Historic Agricultural Land

- These parcels have been used historically for agricultural purposes. On April 4, 2013 BCI contacted Ms. Debbie Thompson with the Sacramento County Agricultural Commissioner's office to discuss agricultural land use in the area. Ms. Thompson indicated that these parcels have been heavily farmed since the 1930's with rice, strawberries, seasonal row crops, hay crop and irrigated pastureland. Prior to the 1930's, Ms. Thompson believes the general area including the project parcels were developed as nut orchards, but could not confirm this because records were not kept for that time period. Persistent pesticides such as DDT and lead arsenate were commonly used prior to 1972.

  Recommendation: We recommend a limited shallow soil investigation to screen for residual evidence of persistent pesticides.

5.2 Known or Potential RECs located Adjacent to the Subject Parcels

Our research found no recorded REC's on the adjacent parcels.

6. LIMITATIONS

The accompanying report summarizes the findings and opinions of Blackburn Consulting (BCI), with regard to the potential for hazardous materials to be present on the properties at concentrations likely to warrant mitigation under current statutes and guidelines. Our findings and opinions are based on information obtained on given dates or provided by specified individuals, through records review, site review, and related activities. Our information is only as good as the information provided to us. Conditions can change after we have made our observations. We cannot warrant or guarantee that hazardous materials do not exist at the described site. To further reduce your risk, invasive exploration may be necessary.

This report was prepared for the specific use of our client and applies only to the subject area. We are not responsible for interpretations by others of data presented in this report. This report does not represent a legal opinion. No warranty is expressed or implied. We base our conclusions in this report on judgment and experience. We performed this work in accordance with generally accepted standards of practice existing in northern California at the time of the assessment.

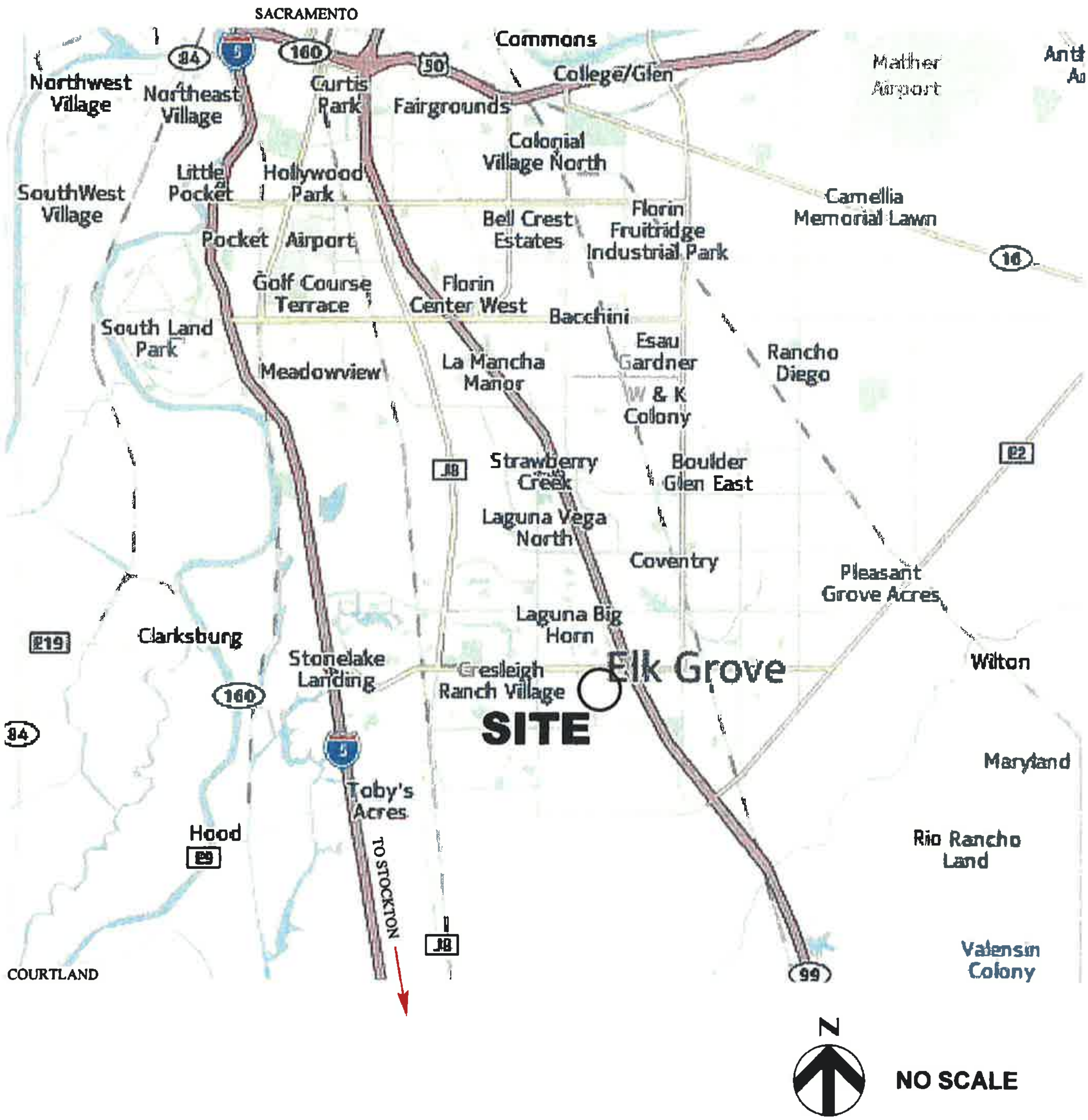
The scope of our investigation did not include determining the presence of radon, lead-based paint, or asbestos-containing materials. Identifying endangered species, geologic hazards, or archeological sites are also beyond the scope of this report.

The governmental records portion of this report is derived from public records and is updated on a continual basis. For this reason, we do not advise you to use this information to base a decision after 90 days of the issue date of this report. Also, conditions at the site can and will change over time. Please contact BCI to revise this report to reflect new information.

FIGURES

Figure 1 – Vicinity Map

Figure 2 – Site Plan



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www.blackburnconsulting.com

VICINITY MAP

Elk Grove Civic Center Park (Aquatic Center)
Property Acquisition
Elk Grove, California

File No. 2101.X 050

April 2013

Figure 1

4/2/2013 2101.X 050 Fig 1 Elk Grove Civic Center Park.dwg

N

NO SCALE

4/2/2013 2101.X 050 Fig 2 Elk Grove Civic Center Park.dwg

blackburn consulting

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SITE PLAN

Elk Grove Civic Center Park (Aquatic Center)
Property Acquisition
Elk Grove, California

File No. 2101.X 050

April 2013

Figure 2

APPENDIX A

Aerial Photographs

Civic Center Park Aquatic Center
Big Horn Boulevard/Lotz Parkway
Elk Grove, CA 95757

Inquiry Number: 3554080.5
March 26, 2013

The EDR Aerial Photo Decade Package

EDR® Environmental Data Resources Inc

440 Wheelers Farms Road
Milford, CT 06461
800.352.0050
www.edrnet.com

EDR Aerial Photo Decade Package

Environmental Data Resources, Inc. (EDR) Aerial Photo Decade Package is a screening tool designed to assist environmental professionals in evaluating potential liability on a target property resulting from past activities. EDR's professional researchers provide digitally reproduced historical aerial photographs, and when available, provide one photo per decade.

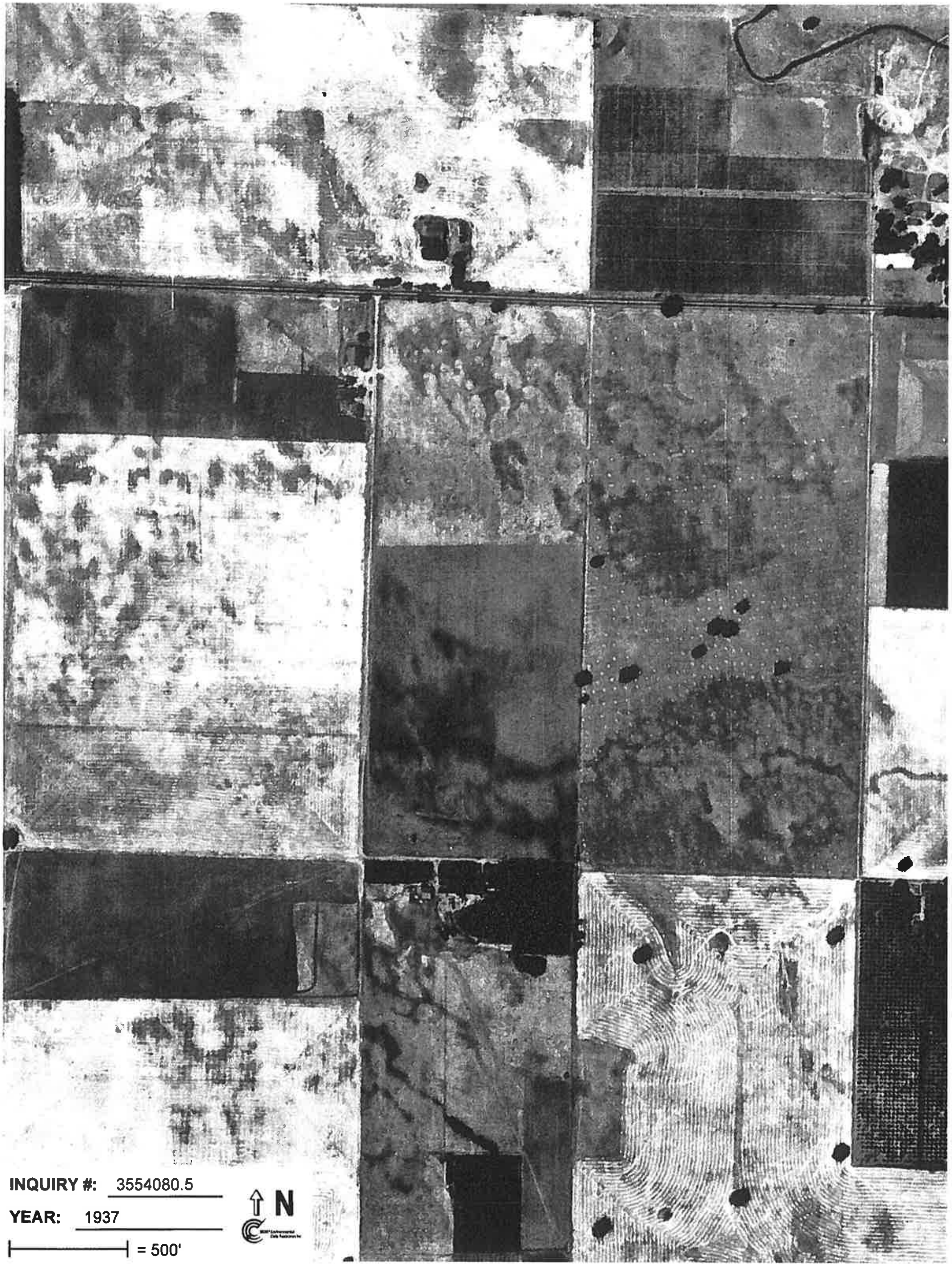
When delivered electronically by EDR, the aerial photo images included with this report are for ONE TIME USE ONLY. Further reproduction of these aerial photo images is prohibited without permission from EDR. For more information contact your EDR Account Executive.

Thank you for your business.
Please contact EDR at 1-800-352-0050
with any questions or comments.

Date EDR Searched Historical Sources:
Aerial Photography March 26, 2013

Target Property:
Big Horn Boulevard/Lotz Parkway
Elk Grove, CA 95757

Year	***Scale***	***Details***	***Source***
1937	Aerial Photograph. Scale: 1"=500'	Flight Year: 1937	Laval
1947	Aerial Photograph. Scale: 1"=500'	Flight Year: 1947	USGS
1952	Aerial Photograph. Scale: 1"=500'	Flight Year: 1952	PacificAir
1961	Aerial Photograph. Scale: 1"=500'	Flight Year: 1961	Cartwright
1971	Aerial Photograph. Scale: 1"=500'	Flight Year: 1971	Cartwright
1981	Aerial Photograph. Scale: 1"=500'	Flight Year: 1981	Cartwright
1993	Aerial Photograph. Scale: 1"=500'	Flight Year: 1993	USGS
1998	Aerial Photograph. Scale: 1"=500'	/DOQQ - acquisition dates: 1998	EDR
2005	Aerial Photograph. Scale: 1"=500'	Flight Year: 2005	EDR
2006	Aerial Photograph. Scale: 1"=500'	Flight Year: 2006	EDR
2009	Aerial Photograph. Scale: 1"=500'	Flight Year: 2009	EDR
2010	Aerial Photograph. Scale: 1"=500'	Flight Year: 2010	EDR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YEAR: 1937
= 500'
N

INQUIRY #: 3554080.5
YEAR: 1947
= 500'
N


INQUIRY #: 3554080.5
YEAR: 1952
N
= 500'

INQUIRY #: 3554080.5

YEAR: 1961

= 500'

N


INQUIRY #: 3554080.5
YEAR: 1971
= 500'
N


INQUIRY #: 3554080.5
YEAR: 1981
N
= 500'


INQUIRY #: 3554080.5
YEAR: 1993
= 500'
N


INQUIRY #: 3554080.5
YEAR: 1998
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YEAR: 2006
= 500'
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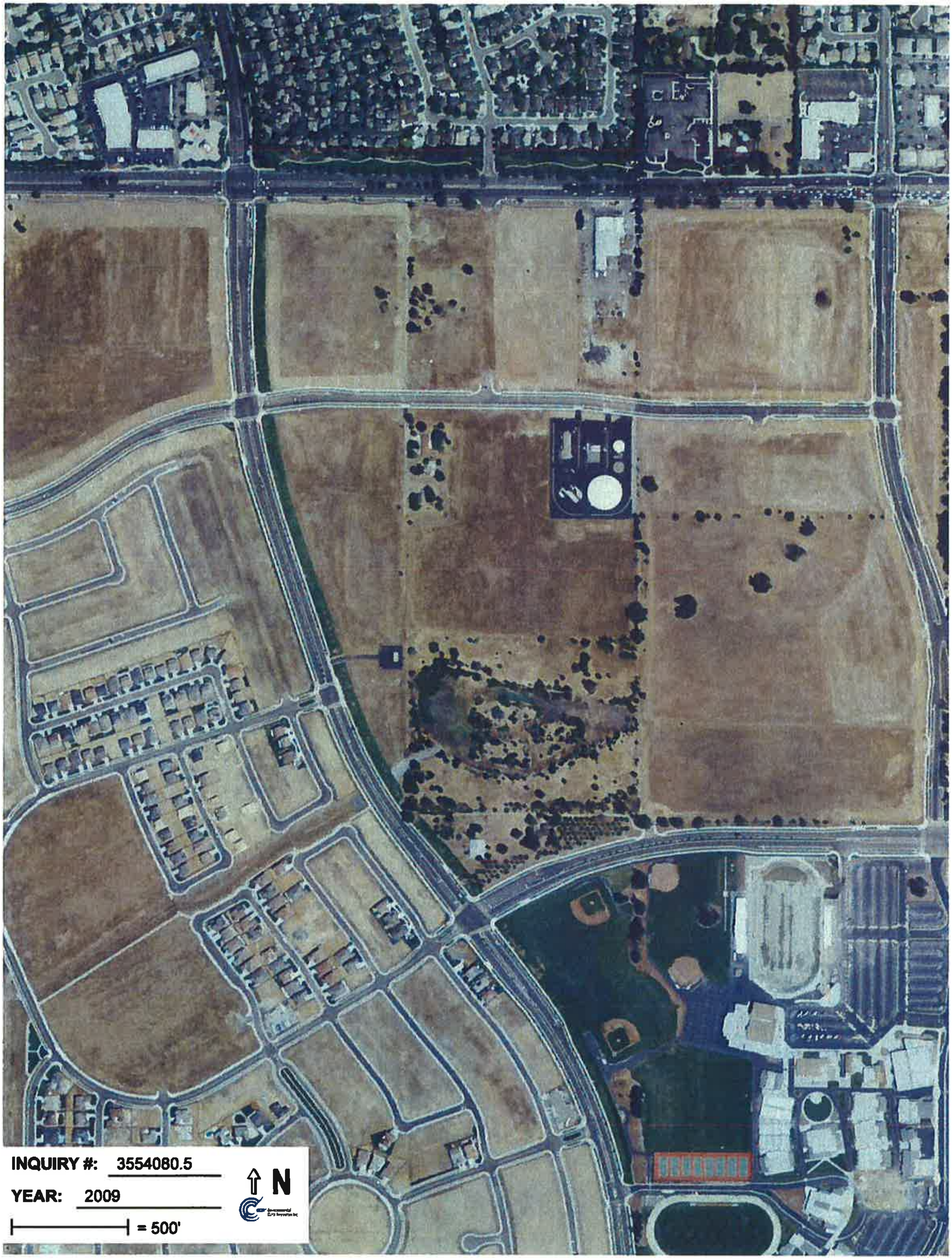
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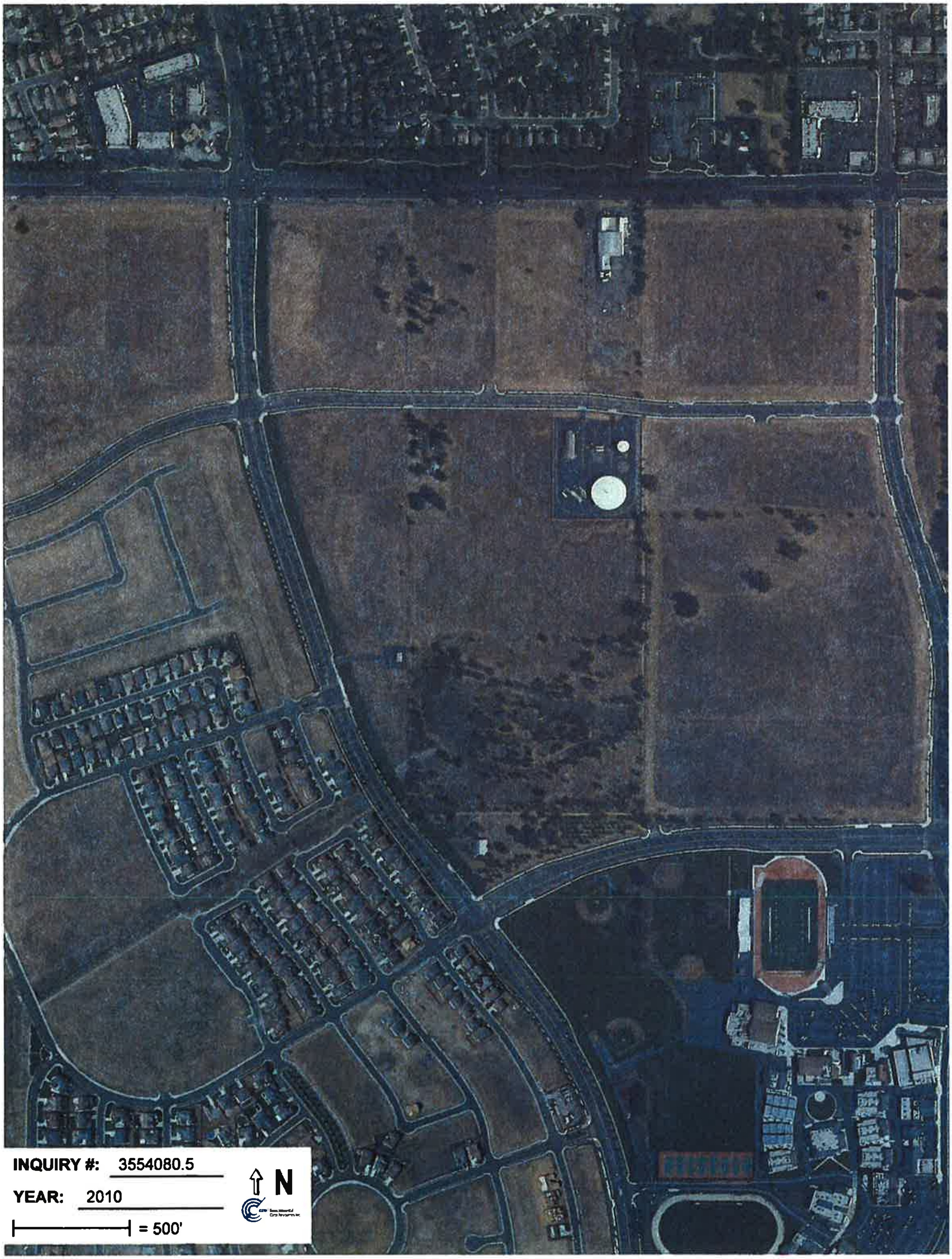
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YEAR: 2010
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APPENDIX B

Topographic Maps

Civic Center Park Aquatic Center
Big Horn Boulevard/Lotz Parkway
Elk Grove, CA 95757

Inquiry Number: 3554080.4
March 21, 2013

EDR Historical Topographic Map Report

EDR® Environmental Data Resources Inc

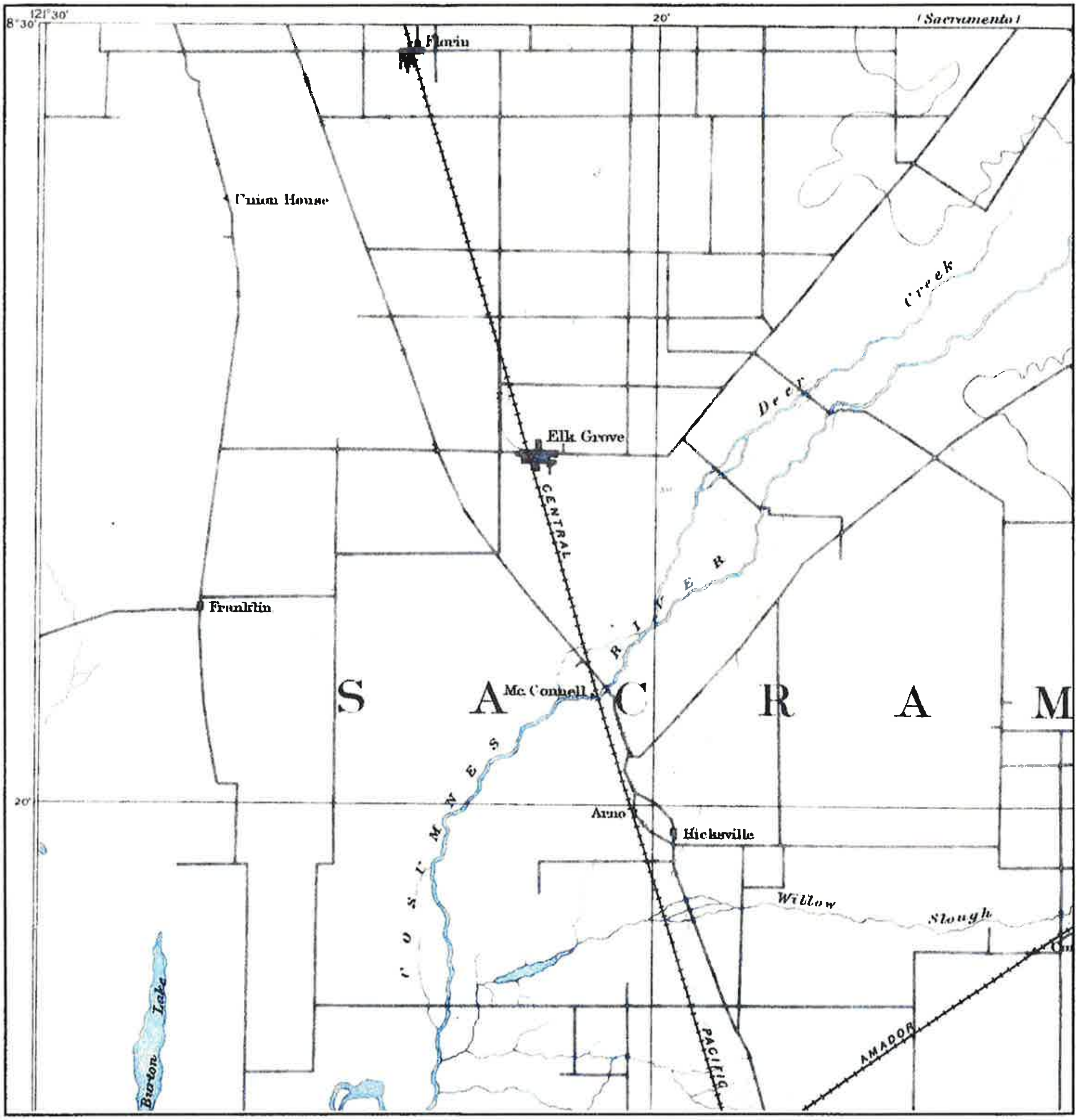
440 Wheelers Farms Road
Milford, CT 06461
800.352.0050
www.edrnet.com

EDR Historical Topographic Map Report

Environmental Data Resources, Inc.s (EDR) Historical Topographic Map Report is designed to assist professionals in evaluating potential liability on a target property resulting from past activities. EDRs Historical Topographic Map Report includes a search of a collection of public and private color historical topographic maps, dating back to the early 1900s.

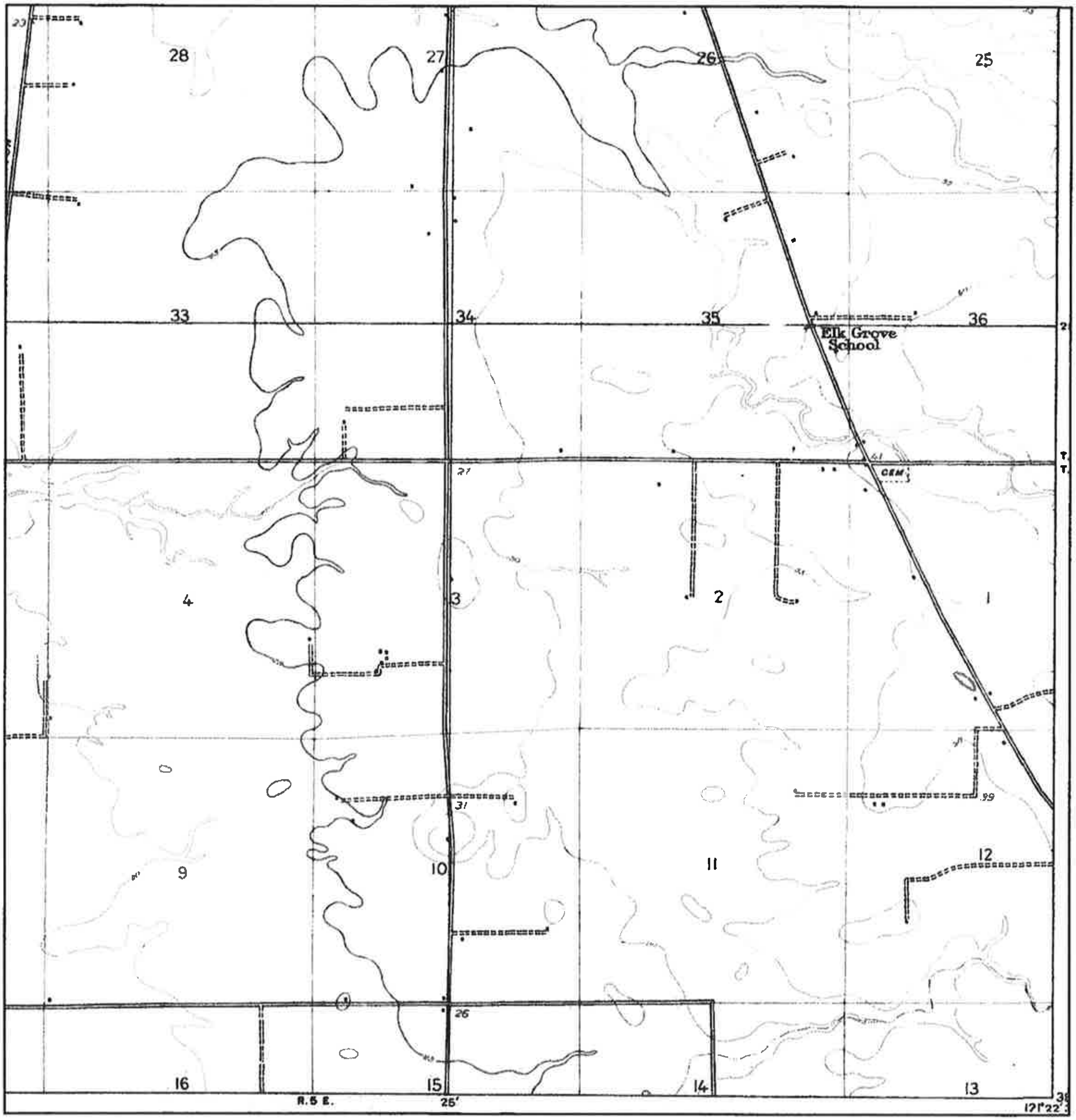
Thank you for your business.
Please contact EDR at 1-800-352-0050
with any questions or comments.

Historical Topographic Map



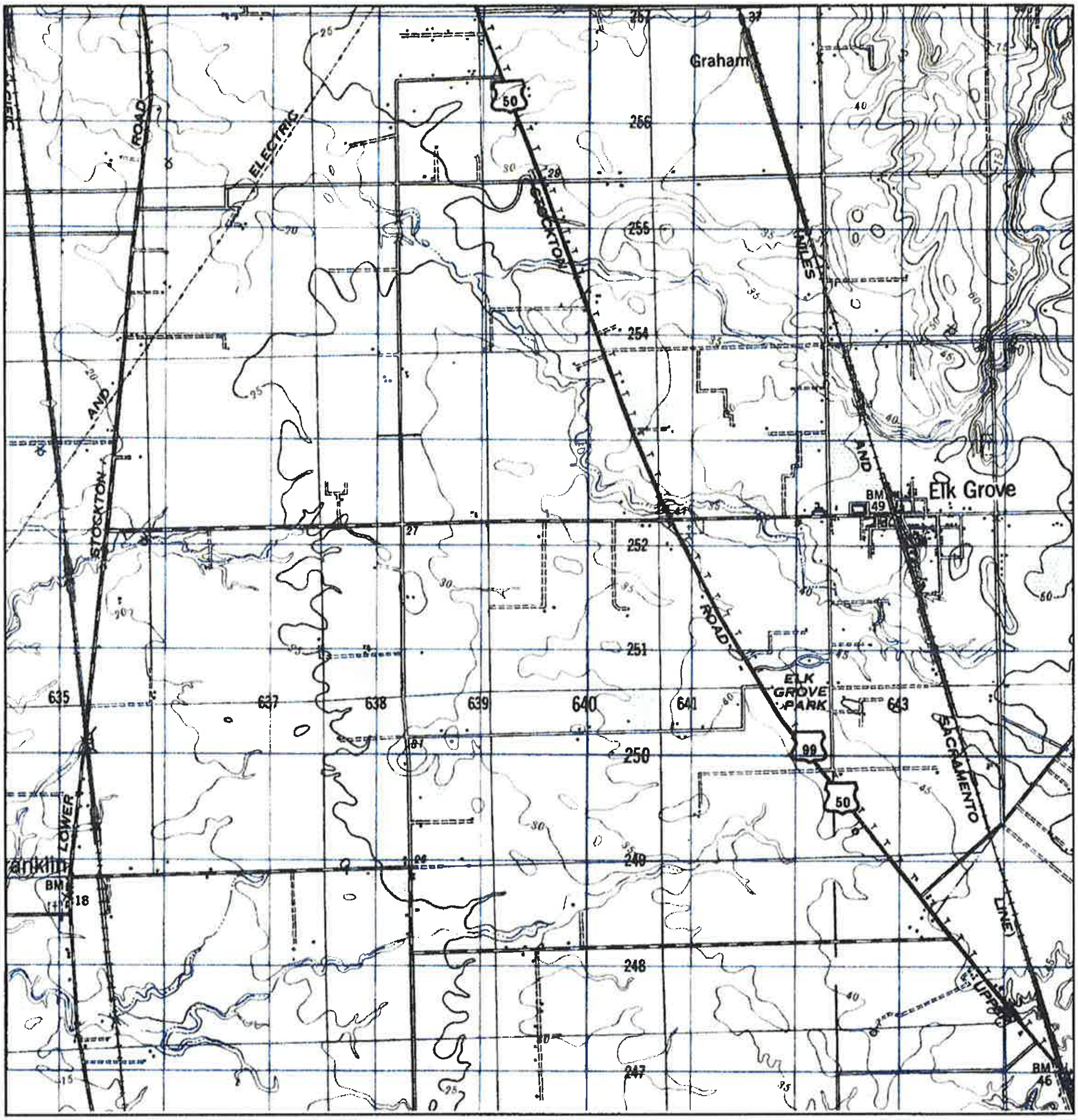
N ↑	TARGET QUAD NAME: LODI MAP YEAR: 1894 SERIES: 30 SCALE: 1:125000	SITE NAME: Civic Center Park Aquatic Center ADDRESS: Big Horn Boulevard/Lotz Parkway Elk Grove, CA 95757 LAT/LONG: 38.404 / -121.4005	CLIENT: Blackburn Consulting CONTACT: Laura Long INQUIRY#: 3554080.4 RESEARCH DATE: 03/21/2013

Historical Topographic Map



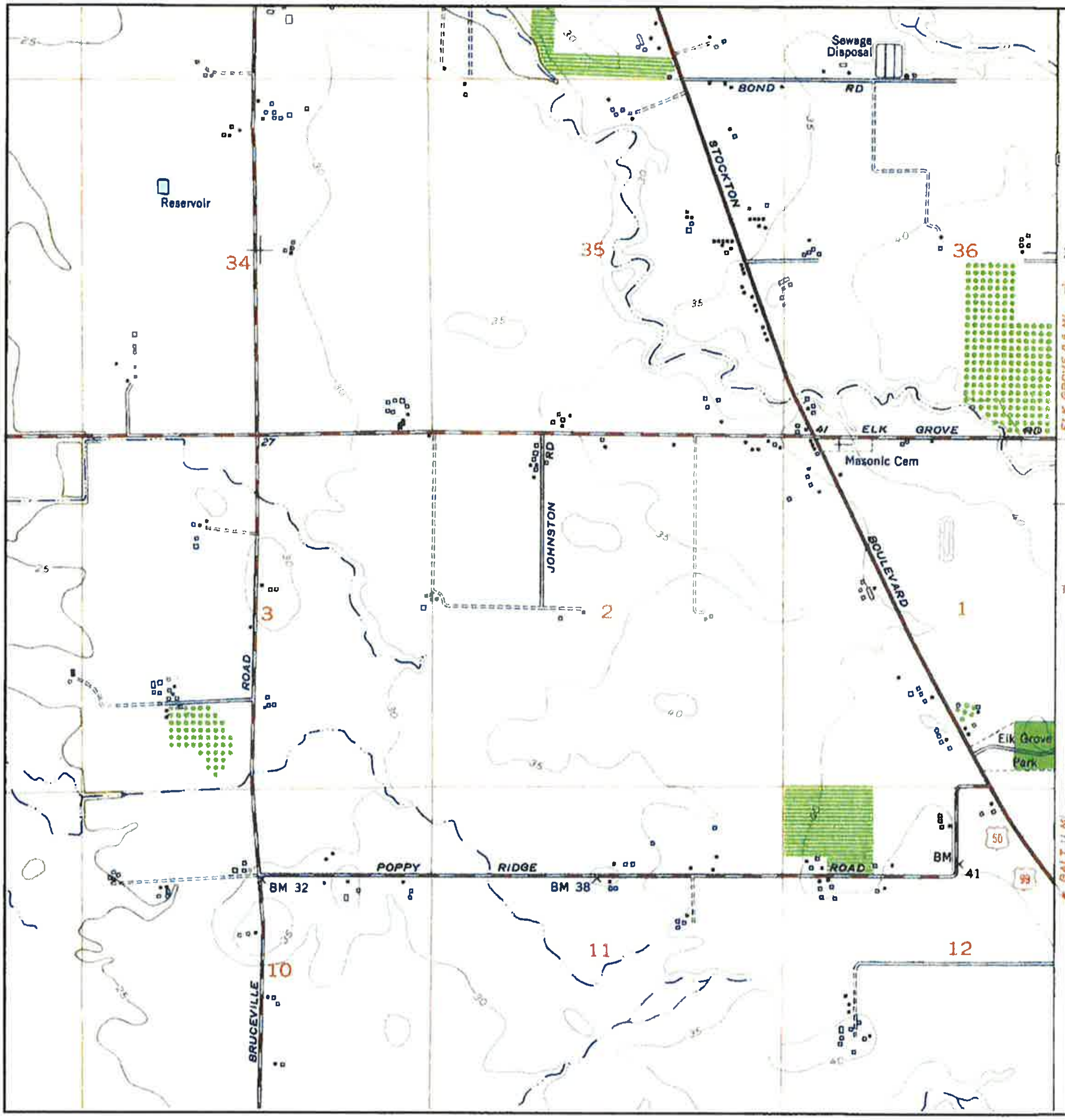
N ↑	TARGET QUAD NAME: FLORIN MAP YEAR: 1909 SERIES: 7.5 SCALE: 1:31680	SITE NAME: Civic Center Park Aquatic Center ADDRESS: Big Horn Boulevard/Lotz Parkway Elk Grove, CA 95757 LAT/LONG: 38.404 / -121.4005	CLIENT: Blackburn Consulting CONTACT: Laura Long INQUIRY#: 3554080.4 RESEARCH DATE: 03/21/2013

Historical Topographic Map



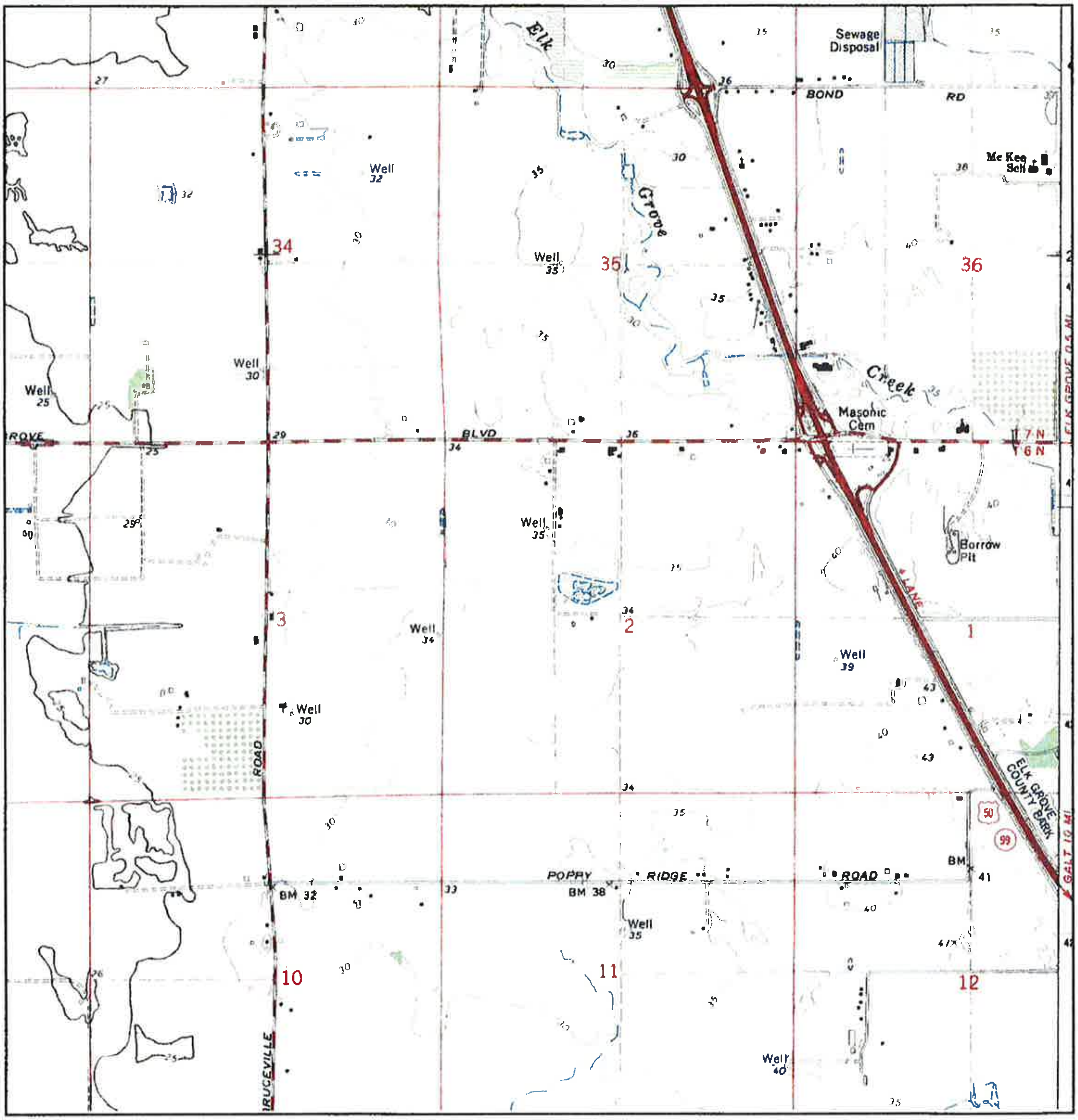
N	TARGET QUAD		SITE NAME:	Civic Center Park Aquatic Center	CLIENT:	Blackburn Consulting
	NAME:	GALT			CONTACT:	Laura Long
	MAP YEAR:	1947	ADDRESS:	Big Horn Boulevard/Lotz Parkway	INQUIRY#:	3554080.4
					RESEARCH DATE:	03/21/2013
	SERIES:	15		Elk Grove, CA 95757		
	SCALE:	1:50000	LAT/LONG:	38.404 / -121.4005		

Historical Topographic Map



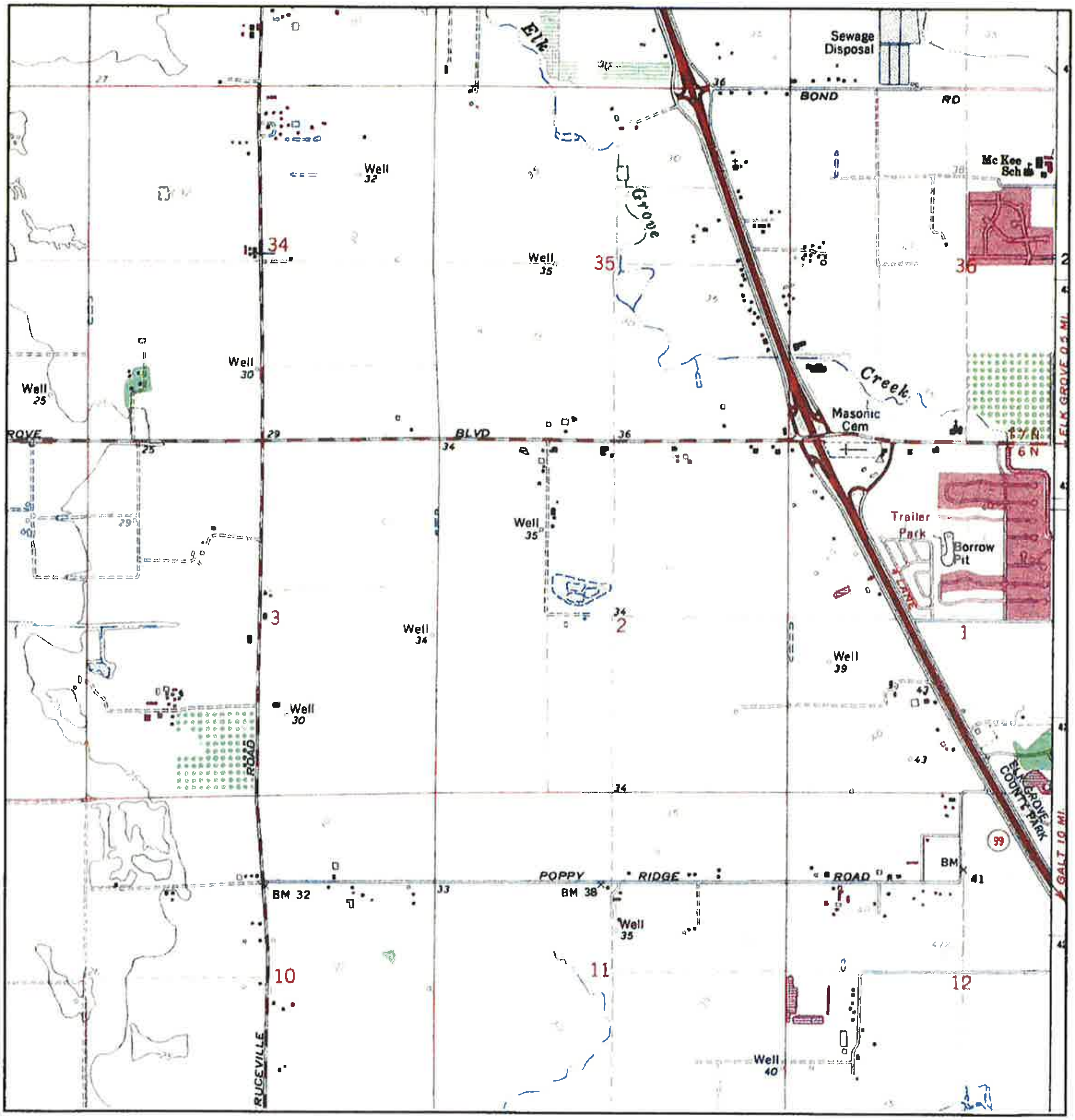
TARGET QUAD NAME: FLORIN MAP YEAR: 1953 SERIES: 7.5 SCALE: 1:24000	SITE NAME: Civic Center Park Aquatic Center ADDRESS: Big Horn Boulevard/Lotz Parkway Elk Grove, CA 95757 LAT/LONG: 38.404 / -121.4005	CLIENT: Blackburn Consulting CONTACT: Laura Long INQUIRY#: 3554080.4 RESEARCH DATE: 03/21/2013

Historical Topographic Map



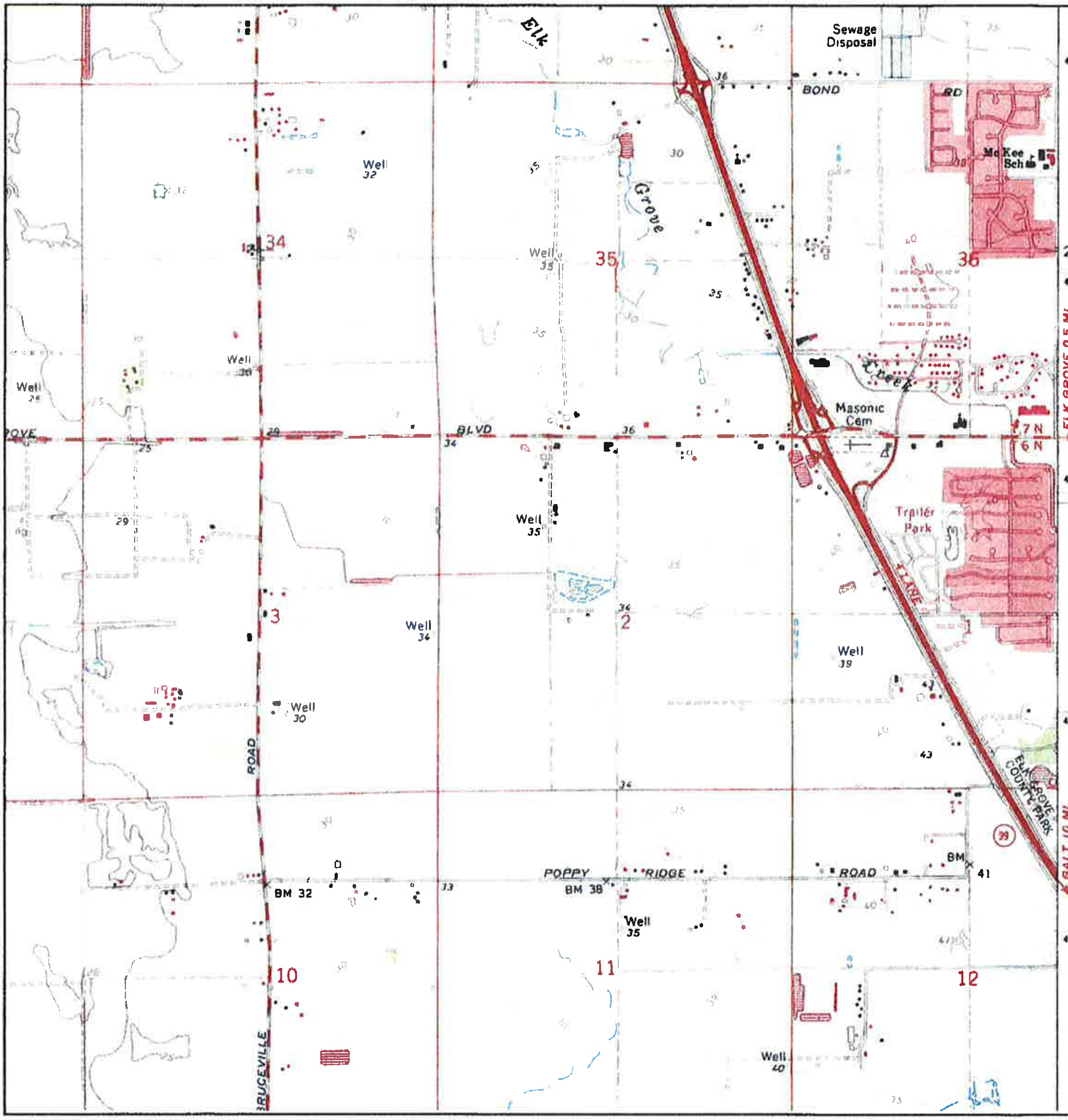
N ↑	TARGET QUAD NAME: FLORIN MAP YEAR: 1968 SERIES: 7.5 SCALE: 1:24000	SITE NAME: Civic Center Park Aquatic Center ADDRESS: Big Horn Boulevard/Lotz Parkway Elk Grove, CA 95757 LAT/LONG: 38.404 / -121.4005	CLIENT: Blackburn Consulting CONTACT: Laura Long INQUIRY#: 3554080.4 RESEARCH DATE: 03/21/2013

Historical Topographic Map



N ↑	TARGET QUAD NAME: FLORIN MAP YEAR: 1975 PHOTOREVISED FROM :1968 SERIES: 7.5 SCALE: 1:24000	SITE NAME: Civic Center Park Aquatic Center ADDRESS: Big Horn Boulevard/Lotz Parkway Elk Grove, CA 95757 LAT/LONG: 38.404 / -121.4005	CLIENT: Blackburn Consulting CONTACT: Laura Long INQUIRY#: 3554080.4 RESEARCH DATE: 03/21/2013

Historical Topographic Map



N ↑	TARGET QUAD NAME: FLORIN MAP YEAR: 1980 PHOTOREVISED FROM :1968 SERIES: 7.5 SCALE: 1:24000	SITE NAME: Civic Center Park Aquatic Center ADDRESS: Big Horn Boulevard/Lotz Parkway Elk Grove, CA 95757 LAT/LONG: 38.404 / -121.4005	CLIENT: Blackburn Consulting CONTACT: Laura Long INQUIRY#: 3554080.4 RESEARCH DATE: 03/21/2013

APPENDIX C

EDR Report – Executive Summary

(Entire Report in CD Format)

Civic Center Park Aquatic Center
Big Horn Boulevard/Lotz Parkway
Elk Grove, CA 95757

Inquiry Number: 3554080.2s
March 21, 2013

The EDR Radius Map™ Report with GeoCheck®

EDR® Environmental Data Resources Inc

440 Wheelers Farms Road
Milford, CT 06461
Toll Free 800 352 0050
www edrnet com

FORM-STD-TXV

TABLE OF CONTENTS

SECTION **PAGE**

GEOCHECK ADDENDUM

Thank you for your business.
Please contact EDR at 1-800-352-0050
with any questions or comments.

EXECUTIVE SUMMARY

A search of available environmental records was conducted by Environmental Data Resources, Inc (EDR). The report was designed to assist parties seeking to meet the search requirements of EPA's Standards and Practices for All Appropriate Inquiries (40 CFR Part 312), the ASTM Standard Practice for Environmental Site Assessments (E 1527-05) or custom requirements developed for the evaluation of environmental risk associated with a parcel of real estate.

TARGET PROPERTY INFORMATION

ADDRESS

BIG HORN BOULEVARD/LOTZ PARKWAY
ELK GROVE, CA 95757

COORDINATES

Latitude (North):	38.4040000 - 38° 24' 14.40"
Longitude (West):	121.4005000 - 121° 24' 1.80"
Universal Tranverse Mercator:	Zone 10
UTM X (Meters):	639665.6
UTM Y (Meters):	4251646.0
Elevation:	37 ft. above sea level

USGS TOPOGRAPHIC MAP ASSOCIATED WITH TARGET PROPERTY

Target Property Map:	38121-D4 FLORIN, CA
Most Recent Revision:	1980

AERIAL PHOTOGRAPHY IN THIS REPORT

Photo Year:	2010
Source:	USDA

TARGET PROPERTY SEARCH RESULTS

The target property was not listed in any of the databases searched by EDR.

DATABASES WITH NO MAPPED SITES

No mapped sites were found in EDR's search of available ("reasonably ascertainable ") government records either on the target property or within the search radius around the target property for the following databases:

STANDARD ENVIRONMENTAL RECORDS

Federal NPL site list

NPL________________________ National Priority List

EXECUTIVE SUMMARY

Proposed NPL................ Proposed National Priority List Sites
NPL LIENS................... Federal Superfund Liens

Federal Delisted NPL site list

Delisted NPL................ National Priority List Deletions

Federal CERCLIS list

CERCLIS..................... Comprehensive Environmental Response, Compensation, and Liability Information System
FEDERAL FACILITY............ Federal Facility Site Information listing

Federal CERCLIS NFRAP site List

CERC-NFRAP.................. CERCLIS No Further Remedial Action Planned

Federal RCRA CORRACTS facilities list

CORRACTS.................... Corrective Action Report

Federal RCRA non-CORRACTS TSD facilities list

RCRA-TSDF................... RCRA - Treatment, Storage and Disposal

Federal RCRA generators list

RCRA-LQG.................... RCRA - Large Quantity Generators
RCRA-CESQG.................. RCRA - Conditionally Exempt Small Quantity Generator

Federal institutional controls / engineering controls registries

US ENG CONTROLS............. Engineering Controls Sites List
US INST CONTROL............. Sites with Institutional Controls
LUCIS....................... Land Use Control Information System

Federal ERNS list

ERNS........................ Emergency Response Notification System

State- and tribal - equivalent NPL

RESPONSE.................... State Response Sites

State and tribal landfill and/or solid waste disposal site lists

SWF/LF...................... Solid Waste Information System

State and tribal leaking storage tank lists

INDIAN LUST................. Leaking Underground Storage Tanks on Indian Land

State and tribal registered storage tank lists

AST......................... Aboveground Petroleum Storage Tank Facilities
INDIAN UST.................. Underground Storage Tanks on Indian Land

EXECUTIVE SUMMARY

FEMA UST________________ Underground Storage Tank Listing

State and tribal voluntary cleanup sites

VCP________________________ Voluntary Cleanup Program Properties
INDIAN VCP_______________ Voluntary Cleanup Priority Listing

ADDITIONAL ENVIRONMENTAL RECORDS

Local Brownfield lists

US BROWNFIELDS__________ A Listing of Brownfields Sites

Local Lists of Landfill / Solid Waste Disposal Sites

ODI________________________ Open Dump Inventory
DEBRIS REGION 9__________ Torres Martinez Reservation Illegal Dump Site Locations
WMUDS/SWAT______________ Waste Management Unit Database
SWRCY____________________ Recycler Database
HAULERS__________________ Registered Waste Tire Haulers Listing
INDIAN ODI________________ Report on the Status of Open Dumps on Indian Lands

Local Lists of Hazardous waste / Contaminated Sites

US CDL____________________ Clandestine Drug Labs
HIST Cal-Sites______________ Historical Calsites Database
SCH_______________________ School Property Evaluation Program
Toxic Pits___________________ Toxic Pits Cleanup Act Sites
CDL________________________ Clandestine Drug Labs
US HIST CDL_______________ National Clandestine Laboratory Register

Local Land Records

LIENS 2____________________ CERCLA Lien Information
LIENS______________________ Environmental Liens Listing
DEED_______________________ Deed Restriction Listing

Records of Emergency Release Reports

HMIRS_____________________ Hazardous Materials Information Reporting System
CHMIRS____________________ California Hazardous Material Incident Report System
LDS________________________ Land Disposal Sites Listing
MCS________________________ Military Cleanup Sites Listing

Other Ascertainable Records

RCRA NonGen / NLR________ RCRA - Non Generators
DOT OPS___________________ Incident and Accident Data
DOD________________________ Department of Defense Sites
FUDS_______________________ Formerly Used Defense Sites
CONSENT__________________ Superfund (CERCLA) Consent Decrees
ROD________________________ Records Of Decision
UMTRA_____________________ Uranium Mill Tailings Sites
US MINES__________________ Mines Master Index File

TRIS	Toxic Chemical Release Inventory System
TSCA	Toxic Substances Control Act
FTTS	FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)
HIST FTTS	FIFRA/TSCA Tracking System Administrative Case Listing
SSTS	Section 7 Tracking Systems
ICIS	Integrated Compliance Information System
PADS	PCB Activity Database System
MLTS	Material Licensing Tracking System
RADINFO	Radiation Information Database
FINDS	Facility Index System/Facility Registry System
RAATS	RCRA Administrative Action Tracking System
RMP	Risk Management Plans
CA BOND EXP. PLAN	Bond Expenditure Plan
UIC	UIC Listing
NPDES	NPDES Permits Listing
Cortese	"Cortese" Hazardous Waste & Substances Sites List
CUPA Listings	CUPA Resources List
Notify 65	Proposition 65 Records
WIP	Well Investigation Program Case List
ENF	Enforcement Action Listing
HAZNET	Facility and Manifest Data
EMI	Emissions Inventory Data
INDIAN RESERV	Indian Reservations
SCRD DRYCLEANERS	State Coalition for Remediation of Drycleaners Listing
MWMP	Medical Waste Management Program Listing
COAL ASH DOE	Steam-Electric Plant Operation Data
COAL ASH EPA	Coal Combustion Residues Surface Impoundments List
HWT	Registered Hazardous Waste Transporter Database
HWP	EnviroStor Permitted Facilities Listing
Financial Assurance	Financial Assurance Information Listing
2020 COR ACTION	2020 Corrective Action Program List
US AIRS	Aerometric Information Retrieval System Facility Subsystem
PRP	Potentially Responsible Parties
WDS	Waste Discharge System
EPA WATCH LIST	EPA WATCH LIST
US FIN ASSUR	Financial Assurance Information
PCB TRANSFORMER	PCB Transformer Registration Database
PROC	Certified Processors Database

EDR HIGH RISK HISTORICAL RECORDS

EDR Exclusive Records

EDR MGP	EDR Proprietary Manufactured Gas Plants

SURROUNDING SITES: SEARCH RESULTS

Surrounding sites were identified in the following databases.

Elevations have been determined from the USGS Digital Elevation Model and should be evaluated on a relative (not an absolute) basis. Relative elevation information between sites of close proximity should be field verified. Sites with an elevation equal to or higher than the target property have been differentiated below from sites with an elevation lower than the target property.
Page numbers and map identification numbers refer to the EDR Radius Map report where detailed data on individual sites can be reviewed.

Sites listed in ***bold italics*** are in multiple databases.

Unmappable (orphan) sites are not considered in the foregoing analysis.

EXECUTIVE SUMMARY

STANDARD ENVIRONMENTAL RECORDS

Federal RCRA generators list

RCRA-SQG: RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Small quantity generators (SQGs) generate between 100 kg and 1,000 kg of hazardous waste per month.

A review of the RCRA-SQG list, as provided by EDR, and dated 02/12/2013 has revealed that there is 1 RCRA-SQG site within approximately 0.25 miles of the target property.

Lower Elevation	Address	Direction / Distance	Map ID	Page
CHEVRON STATION NO 207218	*8169 ELK GROVE BLVD*	*NNW 1/8 - 1/4 (0.191 mi.)*	*A4*	*11*

State- and tribal - equivalent CERCLIS

ENVIROSTOR: The Department of Toxic Substances Control's (DTSC's) Site Mitigation and Brownfields Reuse Program's (SMBRP's) EnviroStor database identifes sites that have known contamination or sites for which there may be reasons to investigate further. The database includes the following site types: Federal Superfund sites (National Priorities List (NPL)); State Response, including Military Facilities and State Superfund; Voluntary Cleanup; and School sites. EnviroStor provides similar information to the information that was available in CalSites, and provides additional site information, including, but not limited to, identification of formerly-contaminated properties that have been released for reuse, properties where environmental deed restrictions have been recorded to prevent inappropriate land uses, and risk characterization information that is used to assess potential impacts to public health and the environment at contaminated sites.

A review of the ENVIROSTOR list, as provided by EDR, and dated 12/05/2012 has revealed that there is 1 ENVIROSTOR site within approximately 1 mile of the target property.

Equal/Higher Elevation	Address	Direction / Distance	Map ID	Page
ELK GROVE Status: Inactive - Needs Evaluation	*9660 STOCKTON BLVD*	*ENE 1/2 - 1 (0.743 mi.)*	*16*	*23*

State and tribal leaking storage tank lists

LUST: The Leaking Underground Storage Tank Incident Reports contain an inventory of reported leaking underground storage tank incidents. The data come from the State Water Resources Control Board Leaking Underground Storage Tank Information System.

A review of the LUST list, as provided by EDR, and dated 01/30/2013 has revealed that there is 1 LUST site within approximately 0.5 miles of the target property.

Equal/Higher Elevation	Address	Direction / Distance	Map ID	Page
BAKER WELLS & PUMPS Status: Completed - Case Closed	*8460 ELK GROVE BL*	*NE 1/4 - 1/2 (0.427 mi.)*	*C14*	*19*

SLIC: SLIC Region comes from the California Regional Water Quality Control Board.

A review of the SLIC list, as provided by EDR, and dated 01/30/2013 has revealed that there is 1 SLIC site within approximately 0.5 miles of the target property.

Equal/Higher Elevation	Address	Direction / Distance	Map ID	Page
LAGUNA 99 CLEANERS Facility Status: Completed - Case Closed	*8451 ELK GROVE BLVD*	*NE 1/4 - 1/2 (0.457 mi.)*	*C15*	*21*

Sacramento Co. CS: List of sites where unauthorized releases of potentially hazardous materials have occurred.

A review of the Sacramento Co. CS list, as provided by EDR, and dated 11/29/2012 has revealed that there are 3 Sacramento Co. CS sites within approximately 0.5 miles of the target property.

Equal/Higher Elevation	Address	Direction / Distance	Map ID	Page
BAKER WELLS & PUMPS Date Closed: 01/09/1992	*8460 ELK GROVE BL*	*NE 1/4 - 1/2 (0.427 mi.)*	*C14*	*19*
LAGUNA 99 CLEANERS	*8451 ELK GROVE BLVD*	*NE 1/4 - 1/2 (0.457 mi.)*	*C15*	*21*

Lower Elevation	Address	Direction / Distance	Map ID	Page
FLOYD PEDERSON VENTURES	7927 ELK GROVE BLVD	NW 1/4 - 1/2 (0.350 mi.)	13	19

State and tribal registered storage tank lists

UST: The Underground Storage Tank database contains registered USTs. USTs are regulated under Subtitle I of the Resource Conservation and Recovery Act (RCRA). The data come from the State Water Resources Control Board's Hazardous Substance Storage Container Database.

A review of the UST list, as provided by EDR, and dated 12/17/2012 has revealed that there is 1 UST site within approximately 0.25 miles of the target property.

Lower Elevation	Address	Direction / Distance	Map ID	Page
CHEVRON #207218	8169 ELK GROVE BLVD	NNW 1/8 - 1/4 (0.191 mi.)	A6	15

ADDITIONAL ENVIRONMENTAL RECORDS

Local Lists of Registered Storage Tanks

CA FID UST: The Facility Inventory Database contains active and inactive underground storage tank locations. The source is the State Water Resource Control Board.

A review of the CA FID UST list, as provided by EDR, and dated 10/31/1994 has revealed that there are 2 CA FID UST sites within approximately 0.25 miles of the target property.

Equal/Higher Elevation	Address	Direction / Distance	Map ID	Page
685 CENTRAL OFFICE	*8224 ELK GROVE BLVD*	*NNW 1/8 - 1/4 (0.176 mi.)*	*2*	*10*
SHERWOOD ALLEN RANCH	*8300 ELK GROVE BLVD*	*NNE 1/8 - 1/4 (0.200 mi.)*	*B7*	*15*

EXECUTIVE SUMMARY

HIST UST: Historical UST Registered Database.

A review of the HIST UST list, as provided by EDR, and dated 10/15/1990 has revealed that there is 1 HIST UST site within approximately 0.25 miles of the target property.

Equal/Higher Elevation	Address	Direction / Distance	Map ID	Page
SHERWOOD ALLEN RANCH	8300 ELK GROVE BLVD	NNE 1/8 - 1/4 (0.200 mi.)	B8	16

SWEEPS UST: Statewide Environmental Evaluation and Planning System. This underground storage tank listing was updated and maintained by a company contacted by the SWRCB in the early 1990's. The listing is no longer updated or maintained. The local agency is the contact for more information on a site on the SWEEPS list.

A review of the SWEEPS UST list, as provided by EDR, and dated 06/01/1994 has revealed that there are 2 SWEEPS UST sites within approximately 0.25 miles of the target property.

Equal/Higher Elevation	Address	Direction / Distance	Map ID	Page
685 CENTRAL OFFICE	***8224 ELK GROVE BLVD***	***NNW 1/8 - 1/4 (0.176 mi.)***	***2***	***10***
SHERWOOD ALLEN RANCH	***8300 ELK GROVE BLVD***	***NNE 1/8 - 1/4 (0.200 mi.)***	***B7***	***15***

Other Ascertainable Records

HIST CORTESE: The sites for the list are designated by the State Water Resource Control Board [LUST], the Integrated Waste Board [SWF/LS], and the Department of Toxic Substances Control [CALSITES]. This listing is no longer updated by the state agency.

A review of the HIST CORTESE list, as provided by EDR, and dated 04/01/2001 has revealed that there is 1 HIST CORTESE site within approximately 0.5 miles of the target property.

Equal/Higher Elevation	Address	Direction / Distance	Map ID	Page
BAKER WELLS & PUMPS	***8460 ELK GROVE BL***	***NE 1/4 - 1/2 (0.427 mi.)***	***C14***	***19***

DRYCLEANERS: A list of drycleaner related facilities that have EPA ID numbers. These are facilities with certain SIC codes: power laundries, family and commercial; garment pressing and cleaners' agents; linen supply; coin-operated laundries and cleaning; drycleaning plants except rugs; carpet and upholster cleaning; industrial launderers; laundry and garment services.

A review of the DRYCLEANERS list, as provided by EDR, and dated 12/11/2012 has revealed that there is 1 DRYCLEANERS site within approximately 0.25 miles of the target property.

Equal/Higher Elevation	Address	Direction / Distance	Map ID	Page
K'S CLEANERS	***8145 ELK GROVE BLVD STE***	***NW 1/8 - 1/4 (0.207 mi.)***	***A10***	***17***

Sacramento Co. ML: Sacramento County Master List. Any business that has hazardous materials on site - hazardous materials storage sites, underground storage tanks, waste generators.

A review of the Sacramento Co. ML list, as provided by EDR, and dated 11/02/2012 has revealed that there are 6 Sacramento Co. ML sites within approximately 0.25 miles of the target property.

Equal/Higher Elevation	Address	Direction / Distance	Map ID	Page
THS PRODUCTS INC	*8280 ELK GROVE*	*N 1/8 - 1/4 (0.138 mi.)*	*1*	*8*
K'S CLEANERS	*8145 ELK GROVE BLVD STE*	*NW 1/8 - 1/4 (0.207 mi.)*	*A10*	*17*
FAA QSL-RMLR	ELK GROVE BL	NW 1/8 - 1/4 (0.207 mi.)	A11	18
RAI - ELK GROVE	8139 ELK GROVE BLVD STE	NW 1/8 - 1/4 (0.211 mi.)	12	18

Lower Elevation	Address	Direction / Distance	Map ID	Page
MSA: BIG HORN SOUTH WELL (W50)	ELK GROVE BL/BIG HORN B	NW 1/8 - 1/4 (0.183 mi.)	A3	10
CHEVRON STATION NO 207218	*8169 ELK GROVE BLVD*	*NNW 1/8 - 1/4 (0.191 mi.)*	*A4*	*11*

EDR HIGH RISK HISTORICAL RECORDS

EDR Exclusive Records

EDR US Hist Auto Stat: EDR has searched selected national collections of business directories and has collected listings of potential gas station/filling station/service station sites that were available to EDR researchers. EDR's review was limited to those categories of sources that might, in EDR's opinion, include gas station/filling station/service station establishments. The categories reviewed included, but were not limited to gas, gas station, gasoline station, filling station, auto, automobile repair, auto service station, service station, etc. This database falls within a category of information EDR classifies as "High Risk Historical Records", or HRHR. EDR's HRHR effort presents unique and sometimes proprietary data about past sites and operations that typically create environmental concerns, but may not show up in current government records searches.

A review of the EDR US Hist Auto Stat list, as provided by EDR, has revealed that there is 1 EDR US Hist Auto Stat site within approximately 0.25 miles of the target property.

Lower Elevation	Address	Direction / Distance	Map ID	Page
Not reported	8169 ELK GROVE BLVD	NNW 1/8 - 1/4 (0.191 mi.)	A5	14

EDR US Hist Cleaners: EDR has searched selected national collections of business directories and has collected listings of potential dry cleaner sites that were available to EDR researchers. EDR's review was limited to those categories of sources that might, in EDR's opinion, include dry cleaning establishments. The categories reviewed included, but were not limited to dry cleaners, cleaners, laundry, laundromat, cleaning/laundry, wash & dry etc. This database falls within a category of information EDR classifies as "High Risk Historical Records", or HRHR. EDR's HRHR effort presents unique and sometimes proprietary data about past sites and operations that typically create environmental concerns, but may not show up in current government records searches.

A review of the EDR US Hist Cleaners list, as provided by EDR, has revealed that there is 1 EDR US Hist Cleaners site within approximately 0.25 miles of the target property.

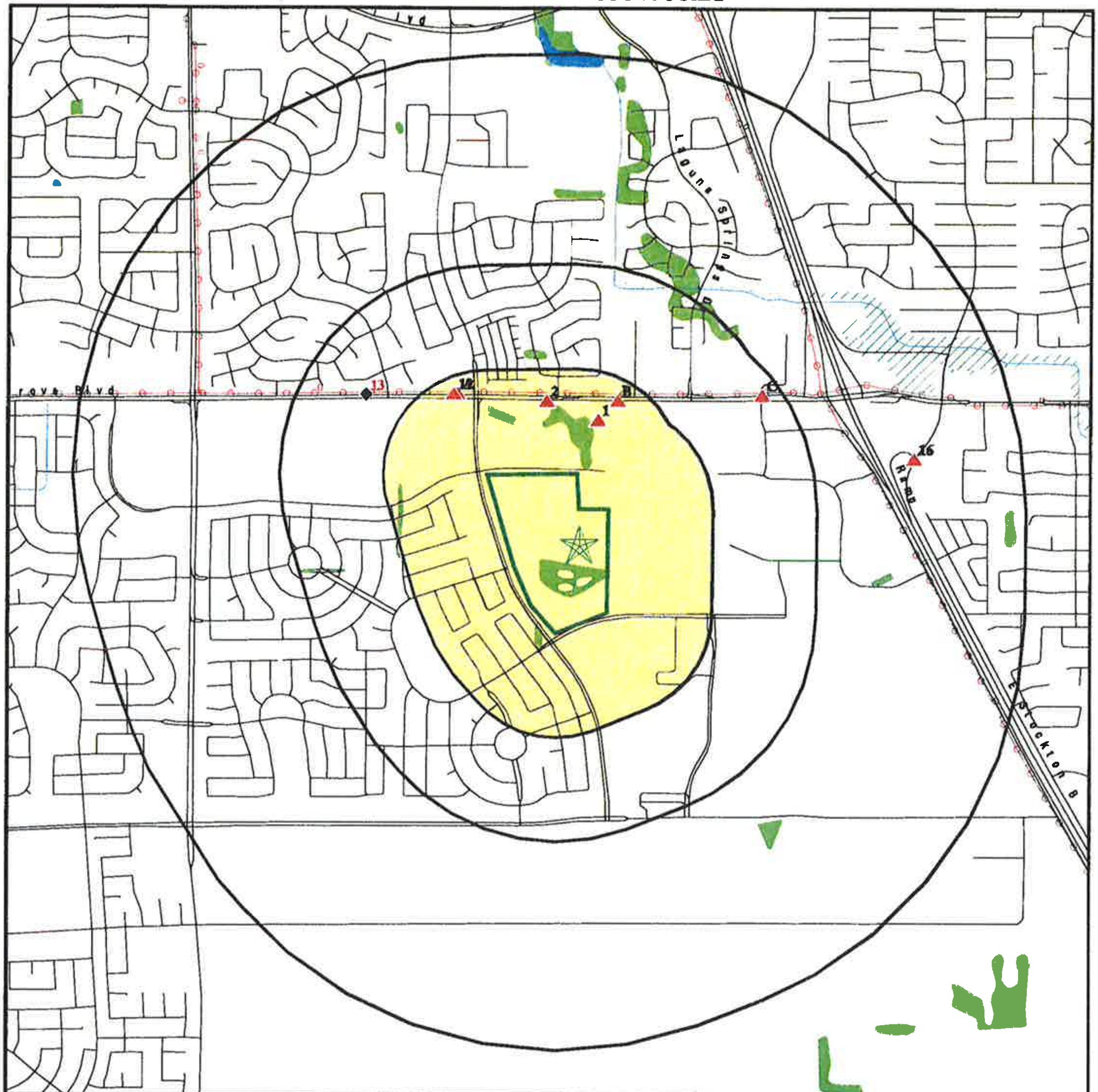
Equal/Higher Elevation	Address	Direction / Distance	Map ID	Page
Not reported	8145 ELK GROVE BLVD	NW 1/8 - 1/4 (0.207 mi.)	A9	16

EXECUTIVE SUMMARY

Due to poor or inadequate address information, the following sites were not mapped. Count: 14 records.

Site Name	Database(s)
G56 RIO COSUMNES CORRECTIONAL CENT	RMP
LAGUNA SPRINGS MEDICAL OFFICE PARK	NPDES
CRC ELK GROVE CENTER	NPDES
BARTHOLOMEW SPORTS PARK	NPDES
LAGUNA SPRINGS CORPORATE CENTER PH	NPDES
BUSCHER PARK	NPDES
FALES PARK	NPDES
CROOKED CREEK INDUSTRIAL PARK FRON	NPDES
UNIV PARK	NPDES
G56 RIO COSUMNES CORRECTIONAL CENT	FINDS
ASHURST WELL SITE (W46)	Sacramento Co. ML
COSUMNES COMMUNITY SVCS DISTRICT	Sacramento Co. ML
MSA: BIG HORN NORTH WELL (W52)	Sacramento Co. ML
MSA: BIG HORN WTP (WT07)	Sacramento Co. ML

OVERVIEW MAP - 3554080.2s



Target Property
Sites at elevations higher than or equal to the target property
Sites at elevations lower than the target property
Manufactured Gas Plants
National Priority List Sites
Dept. Defense Sites

0 1/4 1/2 1 Miles

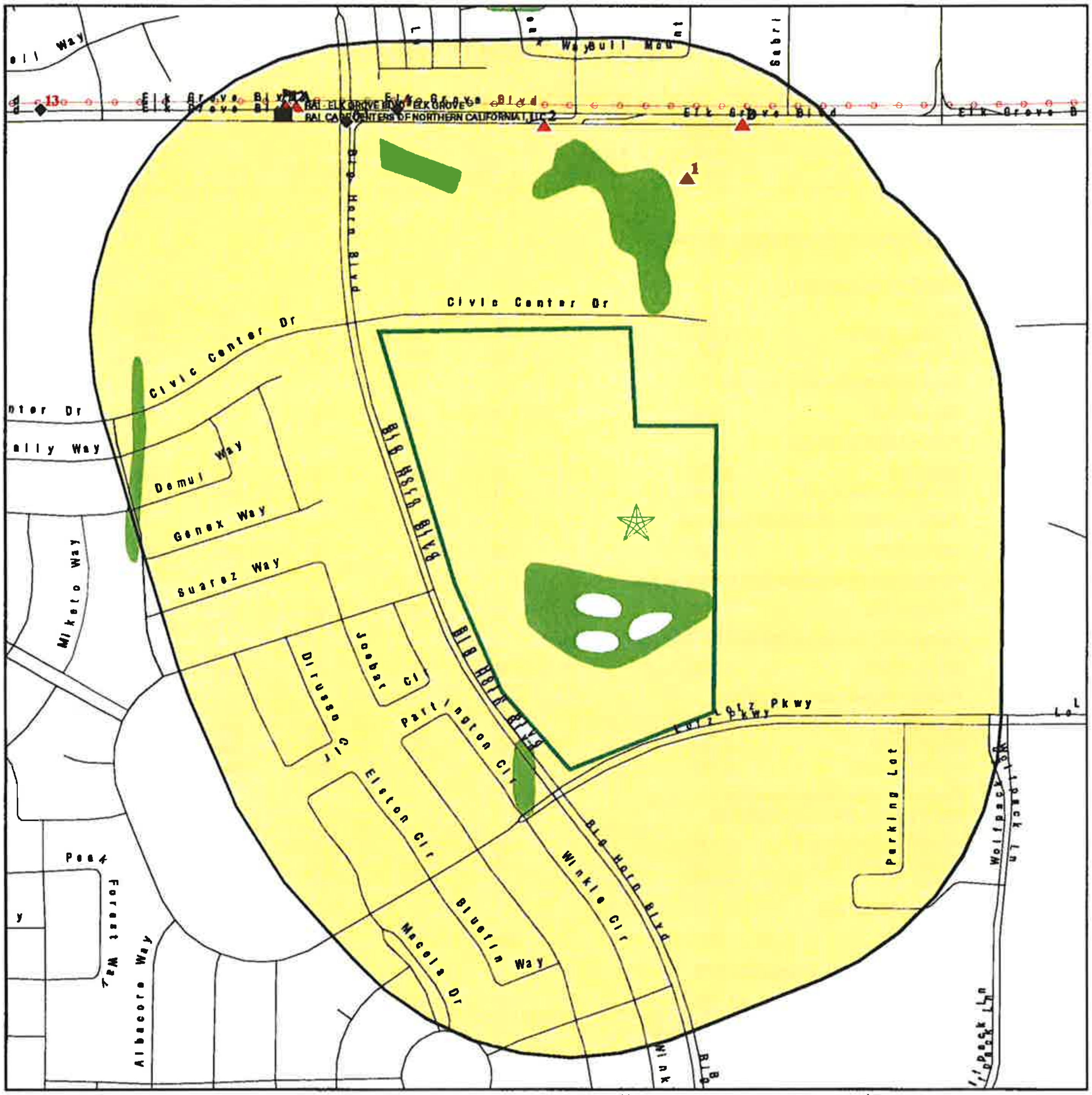
Indian Reservations BIA
Power transmission lines
Oil & Gas pipelines from USGS
100-year flood zone
500-year flood zone
National Wetland Inventory

Areas of Concern

This report includes Interactive Map Layers to display and/or hide map information. The legend includes only those icons for the default map view.

SITE NAME:	Civic Center Park Aquatic Center	CLIENT:	Blackburn Consulting
ADDRESS:	Big Horn Boulevard/Lotz Parkway	CONTACT:	Laura Long
	Elk Grove CA 95757	INQUIRY #:	3554080.2s
LAT/LONG:	38.404 / 121.4005	DATE:	March 21, 2013 3:49 pm

DETAIL MAP - 3554080.2s



Target Property

Sites at elevations higher than or equal to the target property

Sites at elevations lower than the target property

Manufactured Gas Plants

Sensitive Receptors

National Priority List Sites

Dept. Defense Sites

0 1/16 1/8 1/4 Miles

Indian Reservations BIA

Power transmission lines

Oil & Gas pipelines from USGS

100-year flood zone

500-year flood zone

National Wetland Inventory

Areas of Concern

This report includes Interactive Map Layers to display and/or hide map information. The legend includes only those icons for the default map view.

SITE NAME: Civic Center Park Aquatic Center	CLIENT: Blackburn Consulting
ADDRESS: Big Horn Boulevard/Lotz Parkway Elk Grove CA 95757	CONTACT: Laura Long
	INQUIRY #: 3554080.2s
LAT/LONG: 38.404 / 121.4005	DATE: March 21, 2013 3:51 pm

MAP FINDINGS SUMMARY

Database	Search Distance (Miles)	Target Property	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
STANDARD ENVIRONMENTAL RECORDS								
Federal NPL site list								
NPL	1.000		0	0	0	0	NR	0
Proposed NPL	1.000		0	0	0	0	NR	0
NPL LIENS	TP		NR	NR	NR	NR	NR	0
Federal Delisted NPL site list								
Delisted NPL	1.000		0	0	0	0	NR	0
Federal CERCLIS list								
CERCLIS	0.500		0	0	0	NR	NR	0
FEDERAL FACILITY	0.500		0	0	0	NR	NR	0
Federal CERCLIS NFRAP site List								
CERC-NFRAP	0.500		0	0	0	NR	NR	0
Federal RCRA CORRACTS facilities list								
CORRACTS	1.000		0	0	0	0	NR	0
Federal RCRA non-CORRACTS TSD facilities list								
RCRA-TSDF	0.500		0	0	0	NR	NR	0
Federal RCRA generators list								
RCRA-LQG	0.250		0	0	NR	NR	NR	0
RCRA-SQG	0.250		0	1	NR	NR	NR	1
RCRA-CESQG	0.250		0	0	NR	NR	NR	0
Federal institutional controls / engineering controls registries								
US ENG CONTROLS	0.500		0	0	0	NR	NR	0
US INST CONTROL	0.500		0	0	0	NR	NR	0
LUCIS	0.500		0	0	0	NR	NR	0
Federal ERNS list								
ERNS	TP		NR	NR	NR	NR	NR	0
State- and tribal - equivalent NPL								
RESPONSE	1.000		0	0	0	0	NR	0
State- and tribal - equivalent CERCLIS								
ENVIROSTOR	1.000		0	0	0	1	NR	1
State and tribal landfill and/or solid waste disposal site lists								
SWF/LF	0.500		0	0	0	NR	NR	0
State and tribal leaking storage tank lists								
LUST	0.500		0	0	1	NR	NR	1

MAP FINDINGS SUMMARY

Database	Search Distance (Miles)	Target Property	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
SLIC	0.500		0	0	1	NR	NR	1
Sacramento Co. CS	0.500		0	0	3	NR	NR	3
INDIAN LUST	0.500		0	0	0	NR	NR	0
State and tribal registered storage tank lists								
UST	0.250		0	1	NR	NR	NR	1
AST	0.250		0	0	NR	NR	NR	0
INDIAN UST	0.250		0	0	NR	NR	NR	0
FEMA UST	0.250		0	0	NR	NR	NR	0
State and tribal voluntary cleanup sites								
VCP	0.500		0	0	0	NR	NR	0
INDIAN VCP	0.500		0	0	0	NR	NR	0
ADDITIONAL ENVIRONMENTAL RECORDS								
Local Brownfield lists								
US BROWNFIELDS	0.500		0	0	0	NR	NR	0
Local Lists of Landfill / Solid Waste Disposal Sites								
ODI	0.500		0	0	0	NR	NR	0
DEBRIS REGION 9	0.500		0	0	0	NR	NR	0
WMUDS/SWAT	0.500		0	0	0	NR	NR	0
SWRCY	0.500		0	0	0	NR	NR	0
HAULERS	TP		NR	NR	NR	NR	NR	0
INDIAN ODI	0.500		0	0	0	NR	NR	0
Local Lists of Hazardous waste / Contaminated Sites								
US CDL	TP		NR	NR	NR	NR	NR	0
HIST Cal-Sites	1.000		0	0	0	0	NR	0
SCH	0.250		0	0	NR	NR	NR	0
Toxic Pits	1.000		0	0	0	0	NR	0
CDL	TP		NR	NR	NR	NR	NR	0
US HIST CDL	TP		NR	NR	NR	NR	NR	0
Local Lists of Registered Storage Tanks								
CA FID UST	0.250		0	2	NR	NR	NR	2
HIST UST	0.250		0	1	NR	NR	NR	1
SWEEPS UST	0.250		0	2	NR	NR	NR	2
Local Land Records								
LIENS 2	TP		NR	NR	NR	NR	NR	0
LIENS	TP		NR	NR	NR	NR	NR	0
DEED	0.500		0	0	0	NR	NR	0
Records of Emergency Release Reports								
HMIRS	TP		NR	NR	NR	NR	NR	0
CHMIRS	TP		NR	NR	NR	NR	NR	0

MAP FINDINGS SUMMARY

Database	Search Distance (Miles)	Target Property	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
LDS	TP		NR	NR	NR	NR	NR	0
MCS	TP		NR	NR	NR	NR	NR	0
Other Ascertainable Records								
RCRA NonGen / NLR	0.250		0	0	NR	NR	NR	0
DOT OPS	TP		NR	NR	NR	NR	NR	0
DOD	1.000		0	0	0	0	NR	0
FUDS	1.000		0	0	0	0	NR	0
CONSENT	1.000		0	0	0	0	NR	0
ROD	1.000		0	0	0	0	NR	0
UMTRA	0.500		0	0	0	NR	NR	0
US MINES	0.250		0	0	NR	NR	NR	0
TRIS	TP		NR	NR	NR	NR	NR	0
TSCA	TP		NR	NR	NR	NR	NR	0
FTTS	TP		NR	NR	NR	NR	NR	0
HIST FTTS	TP		NR	NR	NR	NR	NR	0
SSTS	TP		NR	NR	NR	NR	NR	0
ICIS	TP		NR	NR	NR	NR	NR	0
PADS	TP		NR	NR	NR	NR	NR	0
MLTS	TP		NR	NR	NR	NR	NR	0
RADINFO	TP		NR	NR	NR	NR	NR	0
FINDS	TP		NR	NR	NR	NR	NR	0
RAATS	TP		NR	NR	NR	NR	NR	0
RMP	TP		NR	NR	NR	NR	NR	0
CA BOND EXP. PLAN	1.000		0	0	0	0	NR	0
UIC	TP		NR	NR	NR	NR	NR	0
NPDES	TP		NR	NR	NR	NR	NR	0
Cortese	0.500		0	0	0	NR	NR	0
HIST CORTESE	0.500		0	0	1	NR	NR	1
CUPA Listings	0.250		0	0	NR	NR	NR	0
Notify 65	1.000		0	0	0	0	NR	0
DRYCLEANERS	0.250		0	1	NR	NR	NR	1
WIP	0.250		0	0	NR	NR	NR	0
ENF	TP		NR	NR	NR	NR	NR	0
Sacramento Co. ML	0.250		0	6	NR	NR	NR	6
HAZNET	TP		NR	NR	NR	NR	NR	0
EMI	TP		NR	NR	NR	NR	NR	0
INDIAN RESERV	1.000		0	0	0	0	NR	0
SCRD DRYCLEANERS	0.500		0	0	0	NR	NR	0
MWMP	0.250		0	0	NR	NR	NR	0
COAL ASH DOE	TP		NR	NR	NR	NR	NR	0
COAL ASH EPA	0.500		0	0	0	NR	NR	0
HWT	0.250		0	0	NR	NR	NR	0
HWP	1.000		0	0	0	0	NR	0
Financial Assurance	TP		NR	NR	NR	NR	NR	0
2020 COR ACTION	0.250		0	0	NR	NR	NR	0
US AIRS	TP		NR	NR	NR	NR	NR	0
PRP	TP		NR	NR	NR	NR	NR	0
WDS	TP		NR	NR	NR	NR	NR	0
EPA WATCH LIST	TP		NR	NR	NR	NR	NR	0
US FIN ASSUR	TP		NR	NR	NR	NR	NR	0

MAP FINDINGS SUMMARY

Database	Search Distance (Miles)	Target Property	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
PCB TRANSFORMER	TP		NR	NR	NR	NR	NR	0
PROC	0.500		0	0	0	NR	NR	0
EDR HIGH RISK HISTORICAL RECORDS								
EDR Exclusive Records								
EDR MGP	1.000		0	0	0	0	NR	0
EDR US Hist Auto Stat	0.250		0	1	NR	NR	NR	1
EDR US Hist Cleaners	0.250		0	1	NR	NR	NR	1

NOTES:

TP = Target Property

NR = Not Requested at this Search Distance

Sites may be listed in more than one database

APPENDIX D

Site Photographs


Photo 1 – APN -015 adjacent parcels to east


Photo 2 – APN -015


Photo 3 – APN -015 dirt road north side of parcel


Photo 4 – APN -015 water tower


Photo 5 – APN -015 looking west


Photo 6 – APN -015 old home site


Photo 7 – APN-015 PVC pipe at northwest corner


Photo 8 – APN-015 water tower


Photo 9 – APN -011, -012 wetland delineation


Photo 10 – APN -011, drainage creek


Photo 11 – APN-011 wetland delineation


Photo 12 – APN -011 culvert under Big Horn Boulevard


Photo 13 – APN -012


Photo 14 – APN-012


Photo 15 – APN -011


Photo 16 – APN-012


Photo 17 APN-009


Photo 18 – APN-009

Photo 19 – APN-017

Photo 20 – APN-017

Photo 21 – APN – 014 south house

Photo 22 – APN – 014 shed behind south house

Photo 23 – APN – 014 shed and water tank at south house

Photo 24 – APN – 014 middle house


Photo 25 – APN – 014 middle house front


Photo 26 – APN-014 rear of middle house


Photo 27 – APN-014 front of middle house


Photo 28 – APN-014 side of north house

Text here


Photo 29 – APN-014 rear of south house


Photo 30 – APN-014 rear of north house


Photo 31 – APN-014 rear of north house


Photo 32 – APN-014 trash pile behind north house

Appendix I – Noise Assessment

EXISTING WEEKDAY

Intersection	NBU	NBL	NBT	NBR	SBU	SBL	SBT	SBR	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR
6. Elk Grove Boulevard / Big Horn Boulevard	1	77	92	188	1	182	255	199	64	135	1235	78	7	275	1574	197
7. Elk Grove Boulevard / Laguna Springs Drive	2	69	70	132	0	138	66	142	10	95	1398	27	3	109	1726	72
15. Big Horn Boulevard / Civic Center Drive	0	12	278	7	2	3	478	126	0	66	45	15	0	4	41	12
16. Laguna Springs Drive / Civic Center Drive	0	20	208	0	0	0	166	38	0	65	0	12	0	0	0	0
17. Big Horn Boulevard / Denali Circle	0	6	252	0	0	0	440	57	0	45	0	4	0	0	0	0
18. Big Horn Boulevard / Lotz Parkway	0	12	166	62	0	88	303	53	0	44	18	2	2	60	23	48
19. Laguna Springs Drive / Lotz Parkway	0	29	87	6	2	3	57	54	17	69	9	6	0	6	15	16

	PKHR VOL	ROAD SEGMENT AVERAGE PKHR VOLUMES	AVG ADT SEG. VOL.
ELK GROVE BLVD, WEST OF BIG HORN BLVD	3284	ELK GROVE BLVD, WEST OF BIG HORN BLVD	32,840
ELK GROVE BLVD, EAST OF BIG HORN BLVD	3658	ELK GROVE BLVD, BIG HORN BLVD TO LAGUNA SPRINGS DR	35,605
ELK GROVE BLVD, WEST OF LAGUNA SPRINGS DR	3463		
ELK GROVE BLVD, EAST OF LAGUNA SPRINGS DR	3578	ELK GROVE BLVD, EAST OF LAGUNA SPRINGS DR	35,780
LAGUNA SPRINGS DR, NORTH OF ELK GROVE BLVD	583	LAGUNA SPRINGS DR, NORTH OF ELK GROVE BLVD	5,830
LAGUNA SPRINGS DR, SOUTH OF ELK GROVE BLVD	475	LAGUNA SPRINGS DR, ELK GROVE BLVD TO CIVIC CENTER DR	4,495
LAGUNA SPRINGS DR, NORTH OF CIVIC CENTER DR	424		
LAGUNA SPRINGS DR, SOUTH OF CIVIC CENTER DR	406	LAGUNA SPRINGS DR, CIVIC CENTER DR TO LOTZ PARKWAY	3,470
LAGUNA SPRINGS DR, NORTH OF LOTZ PARKWAY	288		
LAGUNA SPRINGS DR, SOUTH OF LOTZ PARKWAY	191	LAGUNA SPRINGS DR, SOUTH OF LOTZ PARKWAY	1,910
LOTZ PARKWAY, EAST OF BIG HORN	301	LOTZ PARKWAY, BIG HORN BLVD TO LAGUNA SPRINGS DR	2,500
LOTZ PARKWAY, WEST OF LAGUNA SPRINGS DR	199		
LOTZ PARKWAY, EAST OF LAGUNA SPRINGS DR	55	LOTZ PARKWAY, EAST OF LAGUNA SPRINGS DR	550
BIG HORN BLVD, SOUTH OF ELK GROVE BLVD	966	BIG HORN BLVD, ELK GROVE BLVD TO CIVIC CENTER DR	9,655
BIG HORN BLVD, NORTH OF CIVIC CENTER DR	965		
BIG HORN BLVD, SOUTH OF CIVIC CENTER DR	794	BIG HORN BLVD, CIVIC CENTER DR TO DENALI CIRCLE	3,970
BIG HORN BLVD, SOUTH OF LOTZ PARKWAY	605	BIG HORN BLVD, SOUTH OF LOTZ PARKWAY	6,050
CIVIC CENTER, WEST OF BIG HORN BLVD	305	CIVIC CENTER, WEST OF BIG HORN BLVD	3,050
CIVIC CENTER, EAST OF BIG HORN BLVD	112	CIVIC CENTER, BIG HORN BLVD TO LAGUNA SPRINGS DR	124
CIVIC CENTER, WEST OF LAGUNA SPRINGS DR	135		

EXISTING SATURDAY

Intersection	NBU	NBL	NBT	NBR	SBU	SBL	SBT	SBR	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR
6. Elk Grove Boulevard / Big Horn Boulevard	1	50	158	235	7	161	118	118	79	187	1210	34	15	154	933	127
7. Elk Grove Boulevard / Laguna Springs Drive	0	6	27	89	0	64	19	60	10	74	1529	16	8	40	1181	87
15. Big Horn Boulevard / Civic Center Drive	0	2	337	11	0	2	228	77	0	105	50	2	0	1	15	3
16. Laguna Springs Drive / Civic Center Drive	0	10	73	0	1	0	64	20	0	59	0	11	0	0	0	0
17. Big Horn Boulevard / Denali Circle	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18. Big Horn Boulevard / Lotz Parkway	0	6	232	56	0	53	144	23	0	49	10	8	5	30	8	13
19. Laguna Springs Drive / Lotz Parkway	0	7	20	1	0	3	22	35	8	51	12	5	0	2	9	2

	PKHR VOL	ROAD SEGMENT AVERAGE PKHR VOLUMES	AVG ADT SEG. VOL.
ELK GROVE BLVD, WEST OF BIG HORN BLVD	2577	ELK GROVE BLVD, WEST OF BIG HORN BLVD	25,770
ELK GROVE BLVD, EAST OF BIG HORN BLVD	2835	ELK GROVE BLVD, BIG HORN BLVD TO LAGUNA SPRINGS DR	28,575
ELK GROVE BLVD, WEST OF LAGUNA SPRINGS DR	2880		
ELK GROVE BLVD, EAST OF LAGUNA SPRINGS DR	2998	ELK GROVE BLVD, EAST OF LAGUNA SPRINGS DR	29,980
LAGUNA SPRINGS DR, NORTH OF ELK GROVE BLVD	331	LAGUNA SPRINGS DR, NORTH OF ELK GROVE BLVD	3,310
LAGUNA SPRINGS DR, SOUTH OF ELK GROVE BLVD	197	LAGUNA SPRINGS DR, ELK GROVE BLVD TO CIVIC CENTER DR	1,830
LAGUNA SPRINGS DR, NORTH OF CIVIC CENTER DR	169		
LAGUNA SPRINGS DR, SOUTH OF CIVIC CENTER DR	158	LAGUNA SPRINGS DR, CIVIC CENTER DR TO LOTZ PARKWAY	1,455
LAGUNA SPRINGS DR, NORTH OF LOTZ PARKWAY	133		
LAGUNA SPRINGS DR, SOUTH OF LOTZ PARKWAY	57	LAGUNA SPRINGS DR, SOUTH OF LOTZ PARKWAY	570
LOTZ PARKWAY, EAST OF BIG HORN	175	LOTZ PARKWAY, BIG HORN BLVD TO LAGUNA SPRINGS DR	1,510
LOTZ PARKWAY, WEST OF LAGUNA SPRINGS DR	127		
LOTZ PARKWAY, EAST OF LAGUNA SPRINGS DR	29	LOTZ PARKWAY, EAST OF LAGUNA SPRINGS DR	290
BIG HORN BLVD, SOUTH OF ELK GROVE BLVD	750	BIG HORN BLVD, ELK GROVE BLVD TO CIVIC CENTER DR	7,510
BIG HORN BLVD, NORTH OF CIVIC CENTER DR	752		
BIG HORN BLVD, SOUTH OF CIVIC CENTER DR	581	BIG HORN BLVD, CIVIC CENTER DR TO DENALI CIRCLE	2,905
BIG HORN BLVD, SOUTH OF LOTZ PARKWAY	476	BIG HORN BLVD, SOUTH OF LOTZ PARKWAY	4,760
CIVIC CENTER, WEST OF BIG HORN BLVD	251	CIVIC CENTER, WEST OF BIG HORN BLVD	2,510
CIVIC CENTER, EAST OF BIG HORN BLVD	82	CIVIC CENTER, BIG HORN BLVD TO LAGUNA SPRINGS DR	91
CIVIC CENTER, WEST OF LAGUNA SPRINGS DR	100		

EXISTING PLUS PROJECT - WEEKDAY

Intersection	NBU	NBL	NBT	NBR	SBU	SBL	SBT	SBR	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR
6. Elk Grove Boulevard / Big Horn Boulevard	1	116	108	237	1	182	210	199	64	135	1220	96	7	256	1574	197
7. Elk Grove Boulevard / Laguna Springs Drive	2	69	75	165	0	138	71	142	10	95	1447	27	3	140	1771	72
15. Big Horn Boulevard / Civic Center Drive	0	12	381	7	2	3	574	126	0	66	68	15	0	4	66	12
16. Laguna Springs Drive / Civic Center Drive	0	20	220	0	0	0	177	62	0	91	0	12	0	0	0	0
17. Big Horn Boulevard / Denali Circle	0	6	252	18	0	96	440	57	0	45	2	4	0	19	2	103
18. Big Horn Boulevard / Lotz Parkway	0	12	172	62	0	100	310	53	0	44	18	2	2	60	23	59
19. Laguna Springs Drive / Lotz Parkway	0	29	87	6	2	3	57	65	17	81	9	6	0	6	15	16

	PKHR VOL
ELK GROVE BLVD, WEST OF BIG HORN BLVD	3308
ELK GROVE BLVD, EAST OF BIG HORN BLVD	3673
ELK GROVE BLVD, WEST OF LAGUNA SPRINGS DR	3557
ELK GROVE BLVD, EAST OF LAGUNA SPRINGS DR	3736
LAGUNA SPRINGS DR, NORTH OF ELK GROVE BLVD	593
LAGUNA SPRINGS DR, SOUTH OF ELK GROVE BLVD	549
LAGUNA SPRINGS DR, NORTH OF CIVIC CENTER DR	471
LAGUNA SPRINGS DR, SOUTH OF CIVIC CENTER DR	429
LAGUNA SPRINGS DR, NORTH OF LOTZ PARKWAY	311
LAGUNA SPRINGS DR, SOUTH OF LOTZ PARKWAY	191
LOTZ PARKWAY, EAST OF BIG HORN	324
LOTZ PARKWAY, WEST OF LAGUNA SPRINGS DR	222
LOTZ PARKWAY, EAST OF LAGUNA SPRINGS DR	55
BIG HORN BLVD, SOUTH OF ELK GROVE BLVD	1024
BIG HORN BLVD, NORTH OF CIVIC CENTER DR	1164
BIG HORN BLVD, SOUTH OF CIVIC CENTER DR	993
BIG HORN BLVD, SOUTH OF LOTZ PARKWAY	618
CIVIC CENTER, WEST OF BIG HORN BLVD	353
CIVIC CENTER, EAST OF BIG HORN BLVD	160
CIVIC CENTER, WEST OF LAGUNA SPRINGS DR	185

ROAD SEGMENT AVERAGE PKHR VOLUMES	AVG ADT SEG. VOL.
ELK GROVE BLVD, WEST OF BIG HORN BLVD	33,080
ELK GROVE BLVD, BIG HORN BLVD TO LAGUNA SPRINGS DR	36,150
ELK GROVE BLVD, EAST OF LAGUNA SPRINGS DR	37,360
LAGUNA SPRINGS DR, NORTH OF ELK GROVE BLVD	5,930
LAGUNA SPRINGS DR, ELK GROVE BLVD TO CIVIC CENTER DR	5,100
LAGUNA SPRINGS DR, CIVIC CENTER DR TO LOTZ PARKWAY	3,700
LAGUNA SPRINGS DR, SOUTH OF LOTZ PARKWAY	1,910
LOTZ PARKWAY, BIG HORN BLVD TO LAGUNA SPRINGS DR	2,730
LOTZ PARKWAY, EAST OF LAGUNA SPRINGS DR	550
BIG HORN BLVD, ELK GROVE BLVD TO CIVIC CENTER DR	10,940
BIG HORN BLVD, CIVIC CENTER DR TO DENALI CIRCLE	4,965
BIG HORN BLVD, SOUTH OF LOTZ PARKWAY	6,180
CIVIC CENTER, WEST OF BIG HORN BLVD	3,530
CIVIC CENTER, BIG HORN BLVD TO LAGUNA SPRINGS DR	173

EXISTING PLUS PROJECT - SATURDAY

Intersection	NBU	NBL	NBT	NBR	SBU	SBL	SBT	SBR	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR
6. Elk Grove Boulevard / Big Horn Boulevard	1	92	175	289	7	161	157	118	79	187	1210	128	15	274	933	127
7. Elk Grove Boulevard / Laguna Springs Drive	0	6	33	126	0	64	32	60	10	74	1583	16	8	122	1301	87
15. Big Horn Boulevard / Civic Center Drive	0	2	451	11	0	2	481	77	0	105	110	2	0	1	42	3
16. Laguna Springs Drive / Civic Center Drive	0	10	87	0	1	0	94	84	0	88	0	11	0	0	0	0
17. Big Horn Boulevard / Denali Circle	0	5	289	47	0	253	208	23	0	61	4	12	0	21	2	114
18. Big Horn Boulevard / Lotz Parkway	0	6	249	56	0	67	152	23	0	49	10	8	5	30	8	43
19. Laguna Springs Drive / Lotz Parkway	0	7	20	1	0	3	22	65	8	65	12	5	0	2	9	2

	PKHR VOL	ROAD SEGMENT AVERAGE PKHR VOLUMES	AVG ADT SEG. VOL.
ELK GROVE BLVD, WEST OF BIG HORN BLVD	2619	ELK GROVE BLVD, WEST OF BIG HORN BLVD	26,190
ELK GROVE BLVD, EAST OF BIG HORN BLVD	3009	ELK GROVE BLVD, BIG HORN BLVD TO LAGUNA SPRINGS DR	30,315
ELK GROVE BLVD, WEST OF LAGUNA SPRINGS DR	3054		
ELK GROVE BLVD, EAST OF LAGUNA SPRINGS DR	3291	ELK GROVE BLVD, EAST OF LAGUNA SPRINGS DR	32,910
LAGUNA SPRINGS DR, NORTH OF ELK GROVE BLVD	350	LAGUNA SPRINGS DR, NORTH OF ELK GROVE BLVD	3,500
LAGUNA SPRINGS DR, SOUTH OF ELK GROVE BLVD	335	LAGUNA SPRINGS DR, ELK GROVE BLVD TO CIVIC CENTER DR	3,060
LAGUNA SPRINGS DR, NORTH OF CIVIC CENTER DR	277		
LAGUNA SPRINGS DR, SOUTH OF CIVIC CENTER DR	202	LAGUNA SPRINGS DR, CIVIC CENTER DR TO LOTZ PARKWAY	1,895
LAGUNA SPRINGS DR, NORTH OF LOTZ PARKWAY	177		
LAGUNA SPRINGS DR, SOUTH OF LOTZ PARKWAY	57	LAGUNA SPRINGS DR, SOUTH OF LOTZ PARKWAY	570
LOTZ PARKWAY, EAST OF BIG HORN	219	LOTZ PARKWAY, BIG HORN BLVD TO LAGUNA SPRINGS DR	1,950
LOTZ PARKWAY, WEST OF LAGUNA SPRINGS DR	171		
LOTZ PARKWAY, EAST OF LAGUNA SPRINGS DR	29	LOTZ PARKWAY, EAST OF LAGUNA SPRINGS DR	290
BIG HORN BLVD, SOUTH OF ELK GROVE BLVD	1116	BIG HORN BLVD, ELK GROVE BLVD TO CIVIC CENTER DR	11,175
BIG HORN BLVD, NORTH OF CIVIC CENTER DR	1119		
BIG HORN BLVD, SOUTH OF CIVIC CENTER DR	948	BIG HORN BLVD, CIVIC CENTER DR TO DENALI CIRCLE	4,740
BIG HORN BLVD, SOUTH OF LOTZ PARKWAY	501	BIG HORN BLVD, SOUTH OF LOTZ PARKWAY	5,010
CIVIC CENTER, WEST OF BIG HORN BLVD	338	CIVIC CENTER, WEST OF BIG HORN BLVD	3,380
CIVIC CENTER, EAST OF BIG HORN BLVD	169	CIVIC CENTER, BIG HORN BLVD TO LAGUNA SPRINGS DR	181
CIVIC CENTER, WEST OF LAGUNA SPRINGS DR	193		

CUMULATIVE PLUS PROJECT - WEEKDAY

Intersection	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
6. Elk Grove Boulevard / Big Horn Boulevard	605	1129	326	190	1208	280	160	1290	392	422	1580	200
7. Elk Grove Boulevard / Laguna Springs Drive	230	355	1192	140	235	160	100	1446	190	849	1772	80
15. Big Horn Boulevard / Civic Center Drive	70	1739	40	110	1733	420	180	131	120	60	103	260
16. Laguna Springs Drive / Civic Center Drive	260	1362	0	0	1051	63	165	0	150	0	0	0
17. Big Horn Boulevard / Denali Circle	110	1710	34	83	1740	90	50	2	20	37	2	89
18. Big Horn Boulevard / Lotz Parkway	20	1146	310	599	1088	110	80	70	10	350	150	628
19. Laguna Springs Drive / Lotz Parkway	40	150	30	600	140	181	82	757	10	10	796	750

	INT	PKHR VOL	ROAD SEGMENT AVERAGE PKHR VOLUMES	AVG ADT SEG. VOL.
ELK GROVE BLVD, WEST OF BIG HORN BLVD	6	4307	ELK GROVE BLVD, WEST OF BIG HORN BLVD	43,070
ELK GROVE BLVD, EAST OF BIG HORN BLVD	6	4008	ELK GROVE BLVD, BIG HORN BLVD TO LAGUNA SPRINGS DR	39,530
ELK GROVE BLVD, WEST OF LAGUNA SPRINGS DR	7	3898		
ELK GROVE BLVD, EAST OF LAGUNA SPRINGS DR	7	5479	ELK GROVE BLVD, EAST OF LAGUNA SPRINGS DR	54,790
LAGUNA SPRINGS DR, NORTH OF ELK GROVE BLVD	7	1070	LAGUNA SPRINGS DR, NORTH OF ELK GROVE BLVD	10,700
LAGUNA SPRINGS DR, SOUTH OF ELK GROVE BLVD	7	3051	LAGUNA SPRINGS DR, ELK GROVE BLVD TO CIVIC CENTER DR	28,460
LAGUNA SPRINGS DR, NORTH OF CIVIC CENTER DR	15	2641		
LAGUNA SPRINGS DR, SOUTH OF CIVIC CENTER DR	15	2823	LAGUNA SPRINGS DR, CIVIC CENTER DR TO LOTZ PARKWAY	23,630
LAGUNA SPRINGS DR, NORTH OF LOTZ PARKWAY	19	1903		
LAGUNA SPRINGS DR, SOUTH OF LOTZ PARKWAY	19	380	LAGUNA SPRINGS DR, SOUTH OF LOTZ PARKWAY	3,800
LOTZ PARKWAY, EAST OF BIG HORN	18	2107	LOTZ PARKWAY, BIG HORN BLVD TO LAGUNA SPRINGS DR	19,865
LOTZ PARKWAY, WEST OF LAGUNA SPRINGS DR	19	1866		
LOTZ PARKWAY, EAST OF LAGUNA SPRINGS DR	19	2943	LOTZ PARKWAY, EAST OF LAGUNA SPRINGS DR	29,430
BIG HORN BLVD, SOUTH OF ELK GROVE BLVD	6	4082	BIG HORN BLVD, ELK GROVE BLVD TO CIVIC CENTER DR	42,620
BIG HORN BLVD, NORTH OF CIVIC CENTER DR	15	4442		
BIG HORN BLVD, SOUTH OF CIVIC CENTER DR	15	3762	BIG HORN BLVD, CIVIC CENTER DR TO DENALI CIRCLE	18,810
BIG HORN BLVD, SOUTH OF LOTZ PARKWAY	18	2924	BIG HORN BLVD, SOUTH OF LOTZ PARKWAY	29,240
CIVIC CENTER, WEST OF BIG HORN BLVD	15	1024	CIVIC CENTER, WEST OF BIG HORN BLVD	10,240
CIVIC CENTER, EAST OF BIG HORN BLVD	15	704	CIVIC CENTER, BIG HORN BLVD TO LAGUNA SPRINGS DR	671
CIVIC CENTER, WEST OF LAGUNA SPRINGS DR	16	638		

CUMULATIVE PLUS PROJECT - SATURDAY

Intersection	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
6. Elk Grove Boulevard / Big Horn Boulevard	409	1940	400	170	751	170	220	1280	296	392	930	130
7. Elk Grove Boulevard / Laguna Springs Drive	20	146	815	60	83	70	80	1580	110	377	1292	100
15. Big Horn Boulevard / Civic Center Drive	10	2098	60	70	1009	260	290	176	20	20	55	70
16. Laguna Springs Drive / Civic Center Drive	130	484	0	0	440	80	157	0	140	0	0	0
17. Big Horn Boulevard / Denali Circle	90	1970	90	219	820	40	70	4	60	41	2	98
18. Big Horn Boulevard / Lotz Parkway	10	1623	280	371	529	50	90	40	40	180	50	207
19. Laguna Springs Drive / Lotz Parkway	10	30	10	600	50	140	64	1008	10	0	487	100

	PKHR VOL
ELK GROVE BLVD, WEST OF BIG HORN BLVD	3305
ELK GROVE BLVD, EAST OF BIG HORN BLVD	3302
ELK GROVE BLVD, WEST OF LAGUNA SPRINGS DR	3152
ELK GROVE BLVD, EAST OF LAGUNA SPRINGS DR	4224
LAGUNA SPRINGS DR, NORTH OF ELK GROVE BLVD	539
LAGUNA SPRINGS DR, SOUTH OF ELK GROVE BLVD	1551
LAGUNA SPRINGS DR, NORTH OF CIVIC CENTER DR	1161
LAGUNA SPRINGS DR, SOUTH OF CIVIC CENTER DR	1194
LAGUNA SPRINGS DR, NORTH OF LOTZ PARKWAY	984
LAGUNA SPRINGS DR, SOUTH OF LOTZ PARKWAY	110
LOTZ PARKWAY, EAST OF BIG HORN	1128
LOTZ PARKWAY, WEST OF LAGUNA SPRINGS DR	1719
LOTZ PARKWAY, EAST OF LAGUNA SPRINGS DR	2205
BIG HORN BLVD, SOUTH OF ELK GROVE BLVD	4188
BIG HORN BLVD, NORTH OF CIVIC CENTER DR	3797
BIG HORN BLVD, SOUTH OF CIVIC CENTER DR	3217
BIG HORN BLVD, SOUTH OF LOTZ PARKWAY	2662
CIVIC CENTER, WEST OF BIG HORN BLVD	811
CIVIC CENTER, EAST OF BIG HORN BLVD	451
CIVIC CENTER, WEST OF LAGUNA SPRINGS DR	507

ROAD SEGMENT AVERAGE PKHR VOLUMES	AVG ADT SEG. VOL.
ELK GROVE BLVD, WEST OF BIG HORN BLVD	33,050
ELK GROVE BLVD, BIG HORN BLVD TO LAGUNA SPRINGS DR	32,270
ELK GROVE BLVD, EAST OF LAGUNA SPRINGS DR	42,240
LAGUNA SPRINGS DR, NORTH OF ELK GROVE BLVD	5,390
LAGUNA SPRINGS DR, ELK GROVE BLVD TO CIVIC CENTER DR	13,560
LAGUNA SPRINGS DR, CIVIC CENTER DR TO LOTZ PARKWAY	10,890
LAGUNA SPRINGS DR, SOUTH OF LOTZ PARKWAY	1,100
LOTZ PARKWAY, BIG HORN BLVD TO LAGUNA SPRINGS DR	14,235
LOTZ PARKWAY, EAST OF LAGUNA SPRINGS DR	22,050
BIG HORN BLVD, ELK GROVE BLVD TO CIVIC CENTER DR	39,925
BIG HORN BLVD, CIVIC CENTER DR TO DENALI CIRCLE	16,085
BIG HORN BLVD, SOUTH OF LOTZ PARKWAY	26,620
CIVIC CENTER, WEST OF BIG HORN BLVD	8,110
CIVIC CENTER, BIG HORN BLVD TO LAGUNA SPRINGS DR	479

SUMMARY OF PREDICTED TRAFFIC NOISE LEVELS

EXISTING-WEEKDAY	CNEL @ 50' NTLCL	DISTANCE TO NOISE CONTOURS (FEET) 70	65	60
ELK GROVE BLVD, WEST OF BIG HORN BLVD	70.44	108	307	960
ELK GROVE BLVD, BIG HORN BLVD TO LAGUNA SPRINGS DR	70.8	115	333	1041
ELK GROVE BLVD, EAST OF LAGUNA SPRINGS DR	70.82	116	334	1046
LAGUNA SPRINGS DR, NORTH OF ELK GROVE BLVD	59.82	0	0	77
LAGUNA SPRINGS DR, ELK GROVE BLVD TO CIVIC CENTER DR	58.69	0	0	63
LAGUNA SPRINGS DR, CIVIC CENTER DR TO LOTZ PARKWAY	57.57	0	0	137
LAGUNA SPRINGS DR, SOUTH OF LOTZ PARKWAY	54.98	0	0	0
LOTZ PARKWAY, BIG HORN BLVD TO LAGUNA SPRINGS DR	55.92	0	0	0
LOTZ PARKWAY, EAST OF LAGUNA SPRINGS DR	49.34	0	0	0
BIG HORN BLVD, ELK GROVE BLVD TO CIVIC CENTER DR	64.67	0	75	220
BIG HORN BLVD, SOUTH OF CIVIC CENTER DR	63.82	0	64	181
BIG HORN BLVD, SOUTH OF LOTZ PARKWAY	60.53	0	0	76
CIVIC CENTER, WEST OF BIG HORN BLVD	57.55	0	0	0
CIVIC CENTER, BIG HORN BLVD TO LAGUNA SPRINGS DR	43.64	0	0	0

EXISTING-SATURDAY	CNEL @ 50' NTLCL	DISTANCE TO NOISE CONTOURS (FEET) 70	65	60
ELK GROVE BLVD, WEST OF BIG HORN BLVD	69.39	90	243	754
ELK GROVE BLVD, BIG HORN BLVD TO LAGUNA SPRINGS DR	69.84	97	269	836
ELK GROVE BLVD, EAST OF LAGUNA SPRINGS DR	70.05	101	281	877
LAGUNA SPRINGS DR, NORTH OF ELK GROVE BLVD	57.37	0	0	0
LAGUNA SPRINGS DR, ELK GROVE BLVD TO CIVIC CENTER DR	54.79	0	0	0
LAGUNA SPRINGS DR, CIVIC CENTER DR TO LOTZ PARKWAY	53.8	0	0	0
LAGUNA SPRINGS DR, SOUTH OF LOTZ PARKWAY	49.73	0	0	0
LOTZ PARKWAY, BIG HORN BLVD TO LAGUNA SPRINGS DR	53.73	0	0	0
LOTZ PARKWAY, EAST OF LAGUNA SPRINGS DR	46.56	0	0	0
BIG HORN BLVD, ELK GROVE BLVD TO CIVIC CENTER DR	63.58	0	61	172
BIG HORN BLVD, SOUTH OF CIVIC CENTER DR	59.46	0	0	72
BIG HORN BLVD, SOUTH OF LOTZ PARKWAY	59.48	0	0	61
CIVIC CENTER, WEST OF BIG HORN BLVD	56.71	0	0	0
CIVIC CENTER, BIG HORN BLVD TO LAGUNA SPRINGS DR	42.3	0	0	0

EXISTING PLUS PROJECT-WEEKDAY	CNEL @ 50' NTLCL	DISTANCE TO NOISE CONTOURS (FEET) 70	65	60
ELK GROVE BLVD, WEST OF BIG HORN BLVD	70.48	109	310	967
ELK GROVE BLVD, BIG HORN BLVD TO LAGUNA SPRINGS DR	70.86	117	338	1057
ELK GROVE BLVD, EAST OF LAGUNA SPRINGS DR	71	120	349	1092
LAGUNA SPRINGS DR, NORTH OF ELK GROVE BLVD	59.9	0	0	78
LAGUNA SPRINGS DR, ELK GROVE BLVD TO CIVIC CENTER DR	59.24	0	0	69
LAGUNA SPRINGS DR, CIVIC CENTER DR TO LOTZ PARKWAY	57.85	0	0	0
LAGUNA SPRINGS DR, SOUTH OF LOTZ PARKWAY	54.98	0	0	0
LOTZ PARKWAY, BIG HORN BLVD TO LAGUNA SPRINGS DR	56.3	0	0	0
LOTZ PARKWAY, EAST OF LAGUNA SPRINGS DR	49.34	0	0	0
BIG HORN BLVD, ELK GROVE BLVD TO CIVIC CENTER DR	65.22	0	84	248
BIG HORN BLVD, SOUTH OF CIVIC CENTER DR	64.8	0	77	226
BIG HORN BLVD, SOUTH OF LOTZ PARKWAY	60.62	0	0	78
CIVIC CENTER, WEST OF BIG HORN BLVD	58.19	0	0	0
CIVIC CENTER, BIG HORN BLVD TO LAGUNA SPRINGS DR	45.09	0	0	0

EXISTING PLUS PROJECT-SATURDAY	CNEL @ 50' NTLCL	DISTANCE TO NOISE CONTOURS (FEET) 70	65	60
ELK GROVE BLVD, WEST OF BIG HORN BLVD	69.46	91	247	766
ELK GROVE BLVD, BIG HORN BLVD TO LAGUNA SPRINGS DR	70.1	102	284	887
ELK GROVE BLVD, EAST OF LAGUNA SPRINGS DR	70.45	108	308	962
LAGUNA SPRINGS DR, NORTH OF ELK GROVE BLVD	57.61	0	0	0
LAGUNA SPRINGS DR, ELK GROVE BLVD TO CIVIC CENTER DR	57.02	0	0	0
LAGUNA SPRINGS DR, CIVIC CENTER DR TO LOTZ PARKWAY	54.94	0	0	0
LAGUNA SPRINGS DR, SOUTH OF LOTZ PARKWAY	49.73	0	0	0
LOTZ PARKWAY, BIG HORN BLVD TO LAGUNA SPRINGS DR	54.84	0	0	0
LOTZ PARKWAY, EAST OF LAGUNA SPRINGS DR	46.56	0	0	0
BIG HORN BLVD, ELK GROVE BLVD TO CIVIC CENTER DR	65.31	0	85	254
BIG HORN BLVD, SOUTH OF CIVIC CENTER DR	64.59	0	74	216
BIG HORN BLVD, SOUTH OF LOTZ PARKWAY	59.71	0	0	64
CIVIC CENTER, WEST OF BIG HORN BLVD	58	0	0	0
CIVIC CENTER, BIG HORN BLVD TO LAGUNA SPRINGS DR	45.29	0	0	0

CUMULATIVE PLUS PROJECT-WEEKDAY	CNEL @ 50' NTLCL	DISTANCE TO NOISE CONTOURS (FEET) 70	65	60
ELK GROVE BLVD, WEST OF BIG HORN BLVD	71.62	135	401	1259
ELK GROVE BLVD, BIG HORN BLVD TO LAGUNA SPRINGS DR	71.25	126	369	1155
ELK GROVE BLVD, EAST OF LAGUNA SPRINGS DR	72.67	168	508	1601
LAGUNA SPRINGS DR, NORTH OF ELK GROVE BLVD	62.46	0	0	134
LAGUNA SPRINGS DR, ELK GROVE BLVD TO CIVIC CENTER DR	66.71	0	114	349
LAGUNA SPRINGS DR, CIVIC CENTER DR TO LOTZ PARKWAY	65.9	0	96	290
LAGUNA SPRINGS DR, SOUTH OF LOTZ PARKWAY	57.96	0	0	0
LOTZ PARKWAY, BIG HORN BLVD TO LAGUNA SPRINGS DR	64.92	0	85	245
LOTZ PARKWAY, EAST OF LAGUNA SPRINGS DR	66.63	0	119	361
BIG HORN BLVD, ELK GROVE BLVD TO CIVIC CENTER DR	71.12	101	305	960
BIG HORN BLVD, SOUTH OF CIVIC CENTER DR	70.58	90	270	848
BIG HORN BLVD, SOUTH OF LOTZ PARKWAY	67.37	0	115	258
CIVIC CENTER, WEST OF BIG HORN BLVD	62.81	0	0	127
CIVIC CENTER, BIG HORN BLVD TO LAGUNA SPRINGS DR	50.98	0	0	0

CUMULATIVE PLUS PROJECT-SATURDAY	CNEL @ 50' NTLCL	DISTANCE TO NOISE CONTOURS (FEET) 70	65	60
ELK GROVE BLVD, WEST OF BIG HORN BLVD	70.47	109	309	966
ELK GROVE BLVD, BIG HORN BLVD TO LAGUNA SPRINGS DR	70.37	107	302	944
ELK GROVE BLVD, EAST OF LAGUNA SPRINGS DR	71.54	133	393	1235
LAGUNA SPRINGS DR, NORTH OF ELK GROVE BLVD	59.48	0	0	72
LAGUNA SPRINGS DR, ELK GROVE BLVD TO CIVIC CENTER DR	63.49	0	60	168
LAGUNA SPRINGS DR, CIVIC CENTER DR TO LOTZ PARKWAY	62.54	0	0	136
LAGUNA SPRINGS DR, SOUTH OF LOTZ PARKWAY	52.58	0	0	0
LOTZ PARKWAY, BIG HORN BLVD TO LAGUNA SPRINGS DR	63.47	0	66	177
LOTZ PARKWAY, EAST OF LAGUNA SPRINGS DR	65.37	0	92	271
BIG HORN BLVD, ELK GROVE BLVD TO CIVIC CENTER DR	70.84	95	286	900
BIG HORN BLVD, SOUTH OF CIVIC CENTER DR	69.9	78	231	725
BIG HORN BLVD, SOUTH OF LOTZ PARKWAY	66.96	0	105	326
CIVIC CENTER, WEST OF BIG HORN BLVD	61.8	0	0	101
CIVIC CENTER, BIG HORN BLVD TO LAGUNA SPRINGS DR	49.51	0	0	0

MODEL CALIBRATION	MODELED	MEASURED	DIFFERENCE	ACCEPTABLE
LAGUNA SPRINGS DR, CIVIC CENTER DR TO LOTZ PARKWAY	57	56.8	0.2	YES
LOTZ PARKWAY, BIG HORN BLVD TO LAGUNA SPRINGS DR	55.8	55.7	0.1	YES
BIG HORN BLVD, SOUTH OF CIVIC CENTER DR	63.8	63.4	0.4	YES
CIVIC CENTER, BIG HORN BLVD TO LAGUNA SPRINGS DR	51.3	51.2	0.1	YES

Assumes pk-hr noise levels are roughly equivalent to CNEL levels. LDA/t=97%, MDT=2.02%, HDT=0.98%.

SUMMARY OF PREDICTED TRAFFIC NOISE LEVELS

	PREDICTED TRAFFIC NOISE LEVELS AT 50 FEET FROM NEAR-TRAVEL LANE CENTERLINE							
	Existing		Existing Plus Project		Project Increase		Cumulative Plus Project	
ROADWAY SEGMENT	Weekday	Saturday	Weekday	Saturday	Weekday	Saturday	Weekday	Saturday
ELK GROVE BLVD, WEST OF BIG HORN BLVD	70.44	69.39	70.48	69.46	0.04	0.07	71.62	70.47
ELK GROVE BLVD, BIG HORN BLVD TO LAGUNA SPRINGS DR	70.80	69.84	70.86	70.10	0.06	0.26	71.25	70.37
ELK GROVE BLVD, EAST OF LAGUNA SPRINGS DR	70.82	70.05	71.00	70.45	0.18	0.40	72.67	71.54
LAGUNA SPRINGS DR, NORTH OF ELK GROVE BLVD	59.82	57.37	59.90	57.61	0.08	0.24	62.46	59.48
LAGUNA SPRINGS DR, ELK GROVE BLVD TO CIVIC CENTER DR	58.69	54.79	59.24	57.02	0.55	2.23	66.71	63.49
LAGUNA SPRINGS DR, CIVIC CENTER DR TO LOTZ PARKWAY	57.57	53.80	57.85	54.94	0.28	1.14	65.90	62.54
LAGUNA SPRINGS DR, SOUTH OF LOTZ PARKWAY	54.98	49.73	54.98	49.73	0.00	0.00	57.96	52.58
LOTZ PARKWAY, BIG HORN BLVD TO LAGUNA SPRINGS DR	55.92	53.73	56.30	54.84	0.38	1.11	64.92	63.47
LOTZ PARKWAY, EAST OF LAGUNA SPRINGS DR	49.34	46.56	49.34	46.56	0.00	0.00	66.63	65.37
BIG HORN BLVD, ELK GROVE BLVD TO CIVIC CENTER DR	64.67	63.58	65.22	65.31	0.55	1.73	71.12	70.84
BIG HORN BLVD, SOUTH OF CIVIC CENTER DR	63.82	59.46	64.80	64.59	0.98	5.13	70.58	69.90
BIG HORN BLVD, SOUTH OF LOTZ PARKWAY	60.53	59.48	60.62	59.71	0.09	0.23	67.37	66.96
CIVIC CENTER, WEST OF BIG HORN BLVD	57.55	56.71	58.19	58.00	0.64	1.29	62.81	61.80
CIVIC CENTER, BIG HORN BLVD TO LAGUNA SPRINGS DR	43.64	42.30	45.09	45.29	1.45	2.99	50.98	49.51

SOUNDPLAN (v3.0) MODEL CALIBRATION

Representative Measurement Location	Noise Source	Measured Noise Levels (dBA)		Modeled Noise Levels (dBA)		Difference		Acceptable
		L_{eq}	L_{max}	L_{eq}	L_{max}	L_{eq}	L_{max}	
Ventura Ranch KOA, 7400 Pine Grove Rd., Santa Paula, CA[(1)]	Zipline	69.3	72.4			-0.4	0	YES
				68.9	72.4	0	0	YES
	Zipline Tower Platform	73.2	75.1	72.6	74.7	-0.6	-0.4	YES
Raging Waters, 111 Lakeside Road, San Dimas, CA[(2)]	Water slides. Amplified public address speaker at upper platform	73.3	82.4	73.3	81.7	0	-0.7	YES
	Water slides. Exit Pool.	71.2	87.3	71.6	86.6	0.4	-0.7	YES
	Wave Pool	80.1	82.3	79.9	81.7	-0.2	-0.6	YES
	Wave Pool mechanical bldg. vent	83.4	84.9	82.9	84.6	-0.5	-0.3	YES
	Laxy River	65.1	71.3	65.3	71.7	0.2	0.4	YES
	Water Lagoon/Play Areas	72.9	75.6	73.1	75.9	0.2	0.3	YES
Clovis Olympic Swim Complex,. Clovis West High School, 1070 E. Teague, Fresno, CA[(3)]	Pool Mechanical Equipment Area	67.3	68.3	66.9	68.4	-0.4	0.1	YES
	Competition Swim Meet	57.8	71.3	57.5	71.6	-0.3	0.3	YES

Notes:

1. *Noise measurements were conducted on May 17, 2014. Primary sources included individuals talking/yelling, cable/wheel noise. Does not include the use of amplified sound/public address systems.*

2. *Noise measurements were conducted on May 18, 2014. Primary sources included individuals talking/yelling, background amplified music, and public address systems.*

3. *Noise measurements were conducted on May 3, 2014. IMX-Extreme Long Course Meet. Primary sources included individuals talking/yelling, whistles, buzzers, and amplified public address system.*

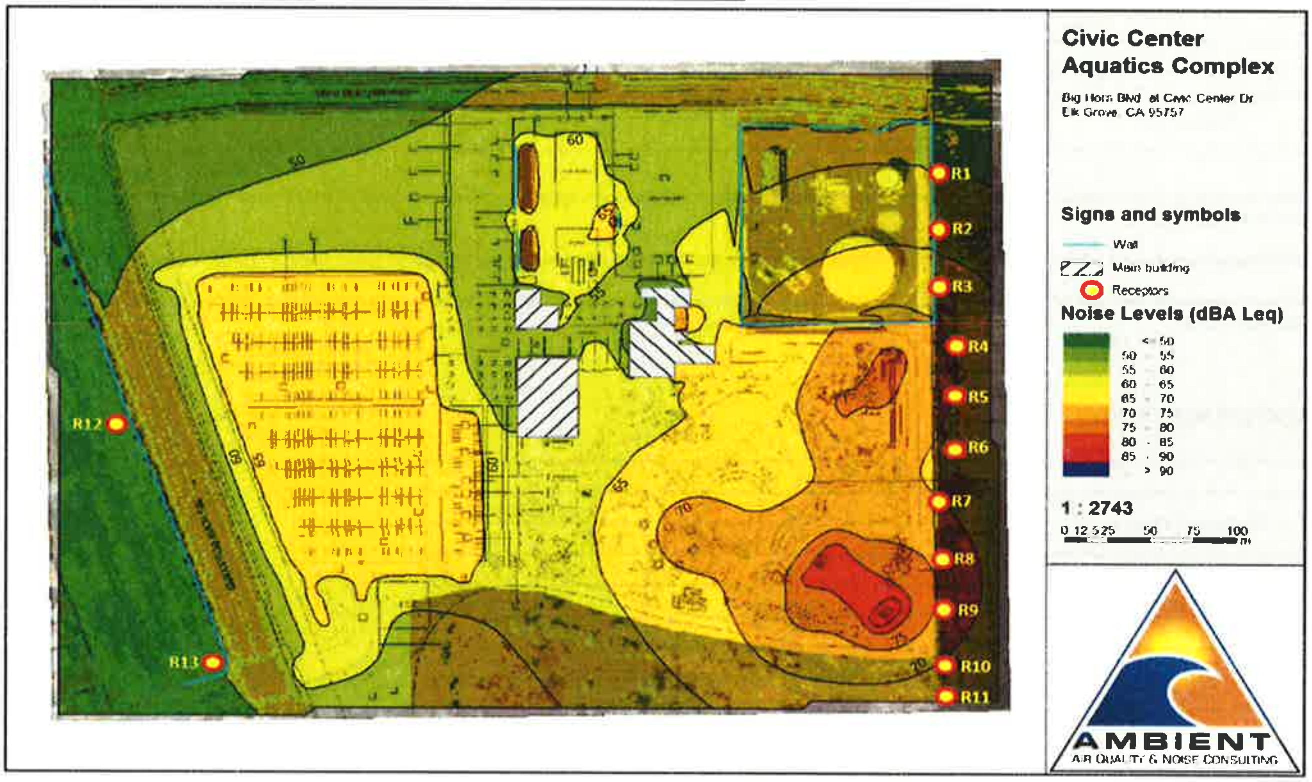
PARKING LOT NOISE LEVELS

Existing Conditions				
Parking Entrance	Weekday		Saturday	
	IN	OUT	IN	OUT
Civic Center Drive	47	51	124	56
Big Horn Boulevard	115	124	305	137
Total	162	175	429	193
	337		622	
dBA Leq	58		60	
Cumulative Conditions				
Parking Entrance	**Weekday**		**Saturday**	
	IN	**OUT**	**IN**	**OUT**
Civic Center Drive	44	48	116	52
Big Horn Boulevard	118	128	313	141
Total	162	176	429	193
	338		622	
dBA Leq	58		60	
MODELED:			60.1	
DIFFERENCE:			0.1	
ACCEPTABLE:			YES	

NON-TRANSPORTATION NOISE LEVELS

LEQ WITHOUT MITIGATION

	EXTERIOR		INTERIOR	
	1ST FL	2ND FL	1ST FL	2ND FL
1-Eastern Property Line	59.9	60.3	34.9	35.3
2-Eastern Property Line	63.7	63.9	38.7	38.9
3-Eastern Property Line	67.2	67.2	42.2	42.2
4-Eastern Property Line	70.5	70.5	45.5	45.5
5-Eastern Property Line	70.4	70.5	45.4	45.5
6-Eastern Property Line	69.2	69.3	44.2	44.3
7-Eastern Property Line	70.4	70.6	45.4	45.6
8-Eastern Property Line	72.9	73.2	47.9	48.2
9-Eastern Property Line	72.6	73.1	47.6	48.1
10-Eastern Property Line	68.9	69.3	43.9	44.3
11- Eastern Property Line	67.2	67.5	42.2	42.5
12- West of Big Horn Boulevard	52	54.6	27	29.6
13- West of Big Horn Boulevard	52.4	54.8	27.4	29.8



Parking lot noise levels represent Saturday pk-hr conditions. All locations are approximate. Based on site plan dated May 14, 2014.

NON-TRANSPORTATION NOISE LEVELS

LEQ WITH MITIGATION & 8-FT BARRIER

	EXTERIOR		INTERIOR	
	1ST FL	2ND FL	1ST FL	2ND FL
1-Eastern Property Line	59.2	59.6	34.2	34.6
2-Eastern Property Line	63.1	63.3	38.1	38.3
3-Eastern Property Line	65.4	65.8	40.4	40.8
4-Eastern Property Line	61	63.8	36	38.8
5-Eastern Property Line	61.9	65.3	36.9	40.3
6-Eastern Property Line	66.8	67.4	41.8	42.4
7-Eastern Property Line	69.8	70.2	44.8	45.2
8-Eastern Property Line	64.3	67.9	39.3	42.9
9-Eastern Property Line	66.5	70.7	41.5	45.7
10-Eastern Property Line	68.1	69	43.1	44
11- Eastern Property Line	66.5	67.1	41.5	42.1
12- West of Big Horn Boulevard	51.7	54.5	26.7	29.5
13- West of Big Horn Boulevard	52	54.5	27	29.5

Parking lot noise levels represent Saturday pk-hr conditions. All locations are approximate. Based on site plan dated May 14, 2014.

NON-TRANSPORTATION NOISE LEVELS

LEQ WITH MITIGATION & 10-FT BARRIER

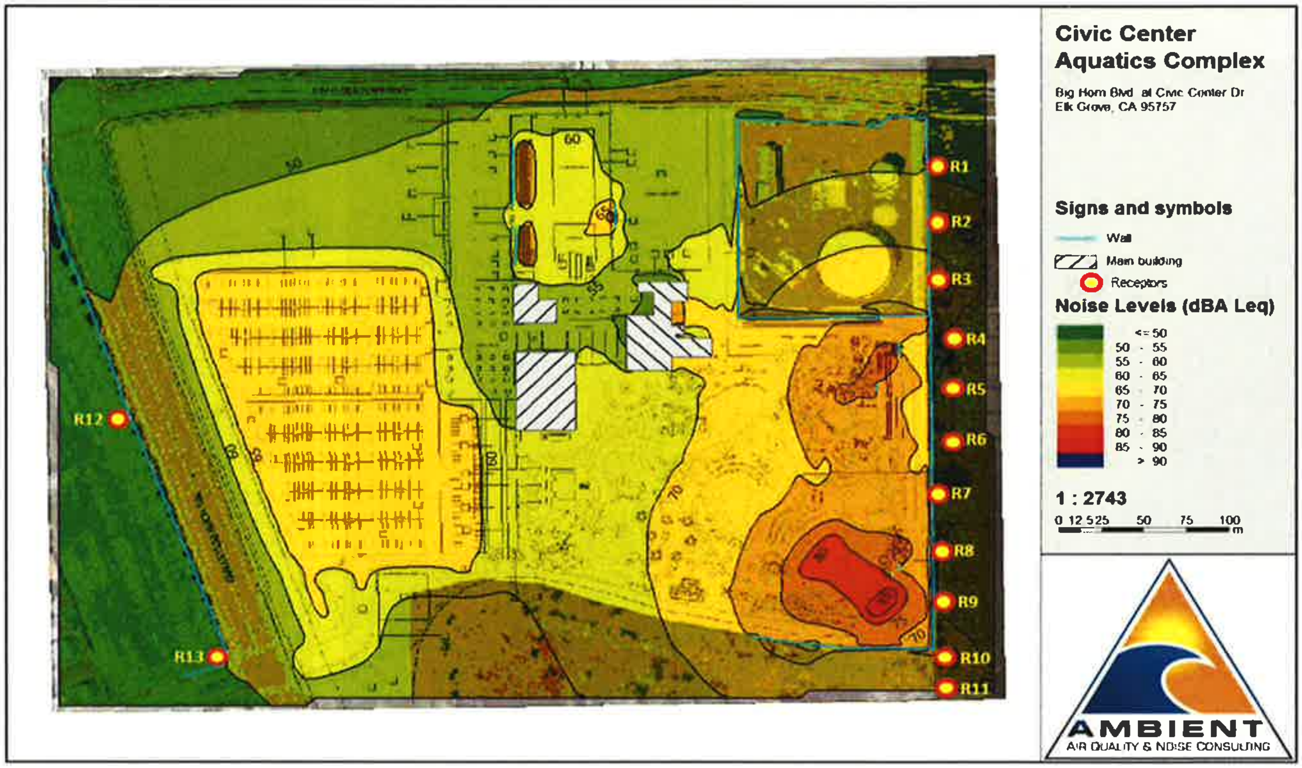
	EXTERIOR		INTERIOR	
	1ST FL	2ND FL	1ST FL	2ND FL
1-Eastern Property Line	59.2	59.6	34.2	34.6
2-Eastern Property Line	63.1	63.4	38.1	38.4
3-Eastern Property Line	65.4	65.8	40.4	40.8
4-Eastern Property Line	60.7	63.8	35.7	38.8
5-Eastern Property Line	61.5	65.3	36.5	40.3
6-Eastern Property Line	66.6	67.4	41.6	42.4
7-Eastern Property Line	69.5	70.2	44.5	45.2
8-Eastern Property Line	63	67.8	38	42.8
9-Eastern Property Line	64.5	70.7	39.5	45.7
10-Eastern Property Line	67.7	66.9	42.7	41.9
11- Eastern Property Line	66.3	66.8	41.3	41.8
12- West of Big Horn Boulevard	51.7	54.5	26.7	29.5
13- West of Big Horn Boulevard	52	54.5	27	29.5

Parking lot noise levels represent Saturday pk-hr conditions. All locations are approximate. Based on site plan dated May 14, 2014.

NON-TRANSPORTATION NOISE LEVELS

LEQ WITH MITIGATION & 12-FT BARRIER

	EXTERIOR		INTERIOR	
	1ST FL	2ND FL	1ST FL	2ND FL
1-Eastern Property Line	59.2	59.6	34.2	34.6
2-Eastern Property Line	63.1	63.4	38.1	38.4
3-Eastern Property Line	65.4	65.8	40.4	40.8
4-Eastern Property Line	60.4	63.8	35.4	38.8
5-Eastern Property Line	61.1	65.3	36.1	40.3
6-Eastern Property Line	66.4	67.3	41.4	42.3
7-Eastern Property Line	69.3	70.2	44.3	45.2
8-Eastern Property Line	62.9	67.2	37.9	42.2
9-Eastern Property Line	62.9	70	37.9	45
10-Eastern Property Line	67.5	68.6	42.5	43.6
11- Eastern Property Line	66.1	66.7	41.1	41.7
12- West of Big Horn Boulevard	51.7	54.5	26.7	29.5
13- West of Big Horn Boulevard	52	54.5	27	29.5

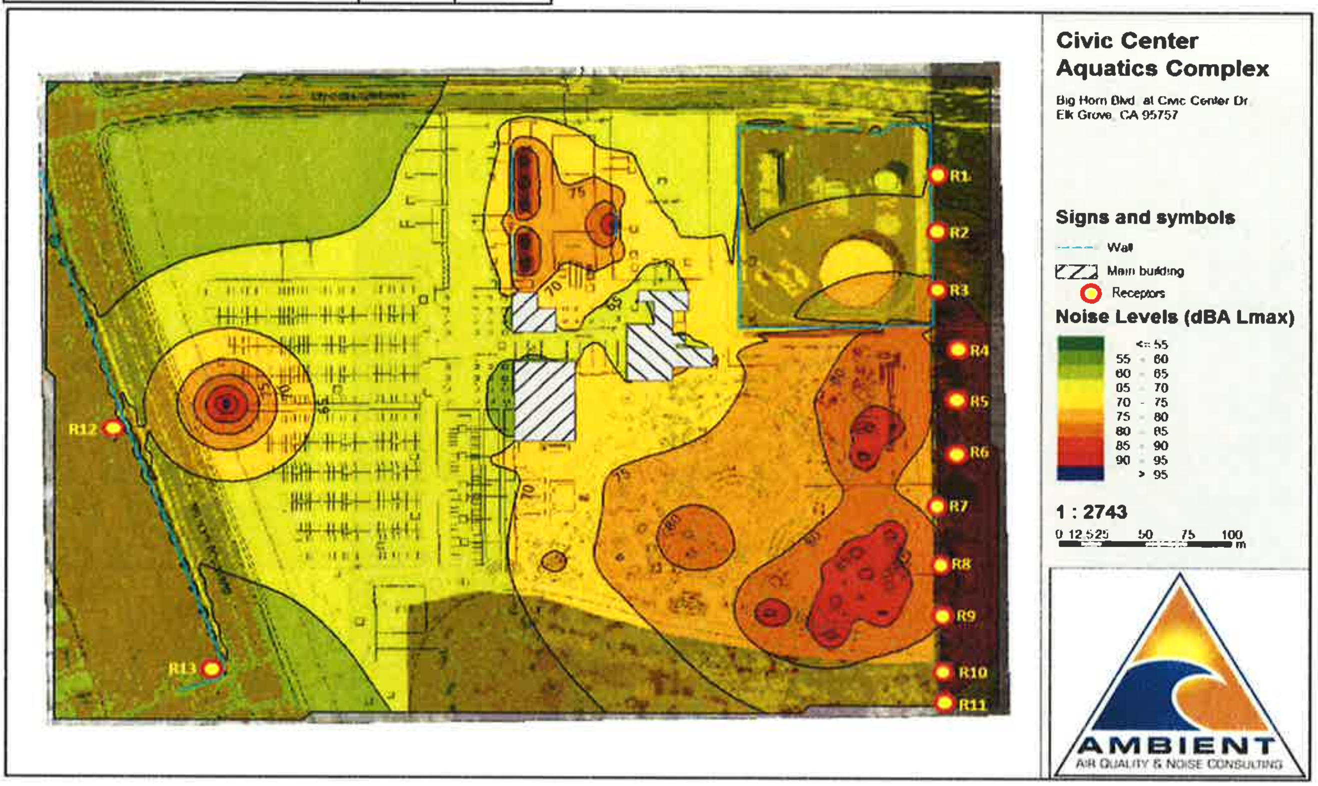


Parking lot noise levels represent Saturday pk-hr conditions. All locations are approximate. Based on site plan dated May 14, 2014.

NON-TRANSPORTATION NOISE LEVELS

LMAX WITHOUT MITIGATION

	EXTERIOR	
	1ST FL	2ND FL
1-Eastern Property Line	68.4	68.9
2-Eastern Property Line	72	72.2
3-Eastern Property Line	75.5	75.6
4-Eastern Property Line	78.7	78.8
5-Eastern Property Line	78.8	79.1
6-Eastern Property Line	77.9	78.2
7-Eastern Property Line	78.9	79.3
8-Eastern Property Line	80.8	81.1
9-Eastern Property Line	79.6	79.6
10-Eastern Property Line	76.3	76.5
11- Eastern Property Line	74.8	75
12- West of Big Horn Boulevard	64.6	68.5
13- West of Big Horn Boulevard	61.8	63.4

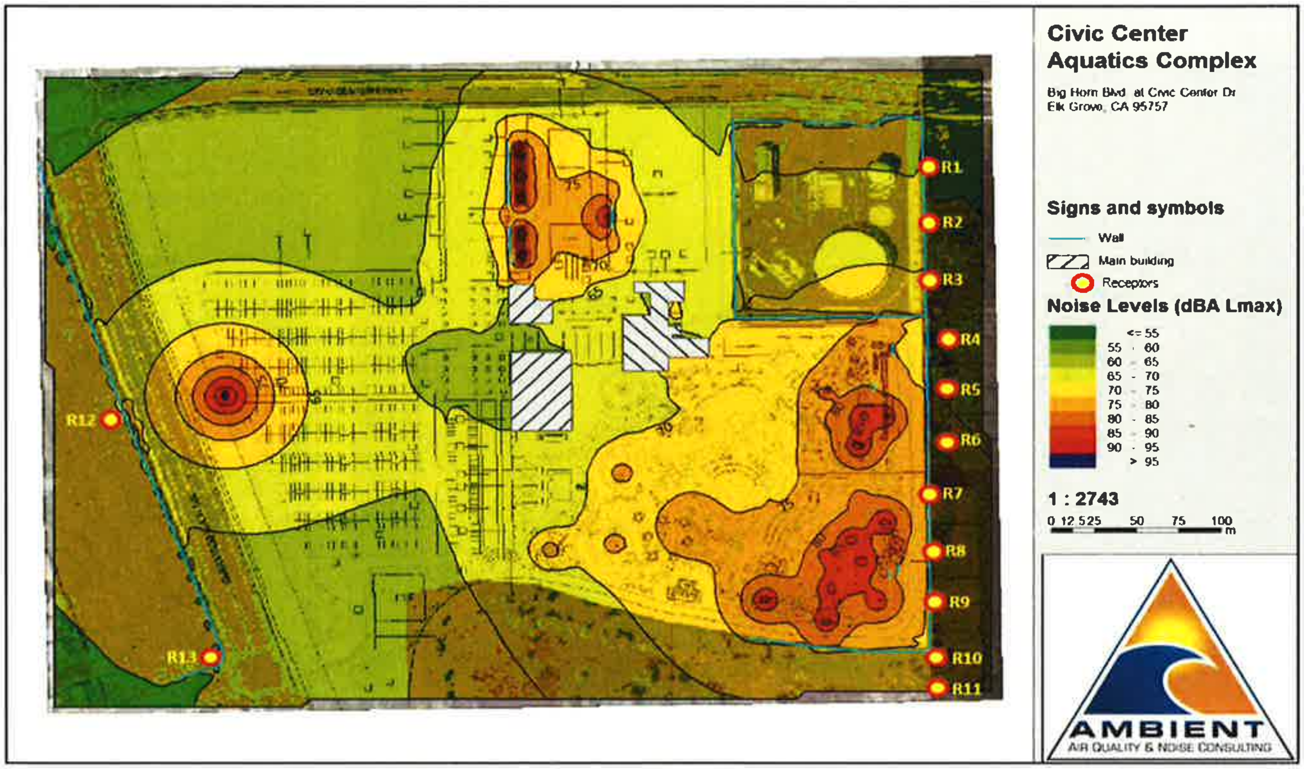


Parking lot noise levels represent Saturday pk-hr conditions. All locations are approximate. Based on site plan dated May 14, 2014.

NON-TRANSPORTATION NOISE LEVELS

LMAX WITH MITIGATION & 8-FT BARRIER

	EXTERIOR	
	1ST FL	2ND FL
1-Eastern Property Line	63.7	64.4
2-Eastern Property Line	66.6	67.1
3-Eastern Property Line	69.3	69.9
4-Eastern Property Line	67.9	69.7
5-Eastern Property Line	69.6	72.6
6-Eastern Property Line	72.2	74.4
7-Eastern Property Line	74.1	75.9
8-Eastern Property Line	73.9	75.6
9-Eastern Property Line	72.9	74.4
10-Eastern Property Line	71.6	72.5
11- Eastern Property Line	70.3	70.8
12- West of Big Horn Boulevard	64	68.2
13- West of Big Horn Boulevard	60.2	61.7

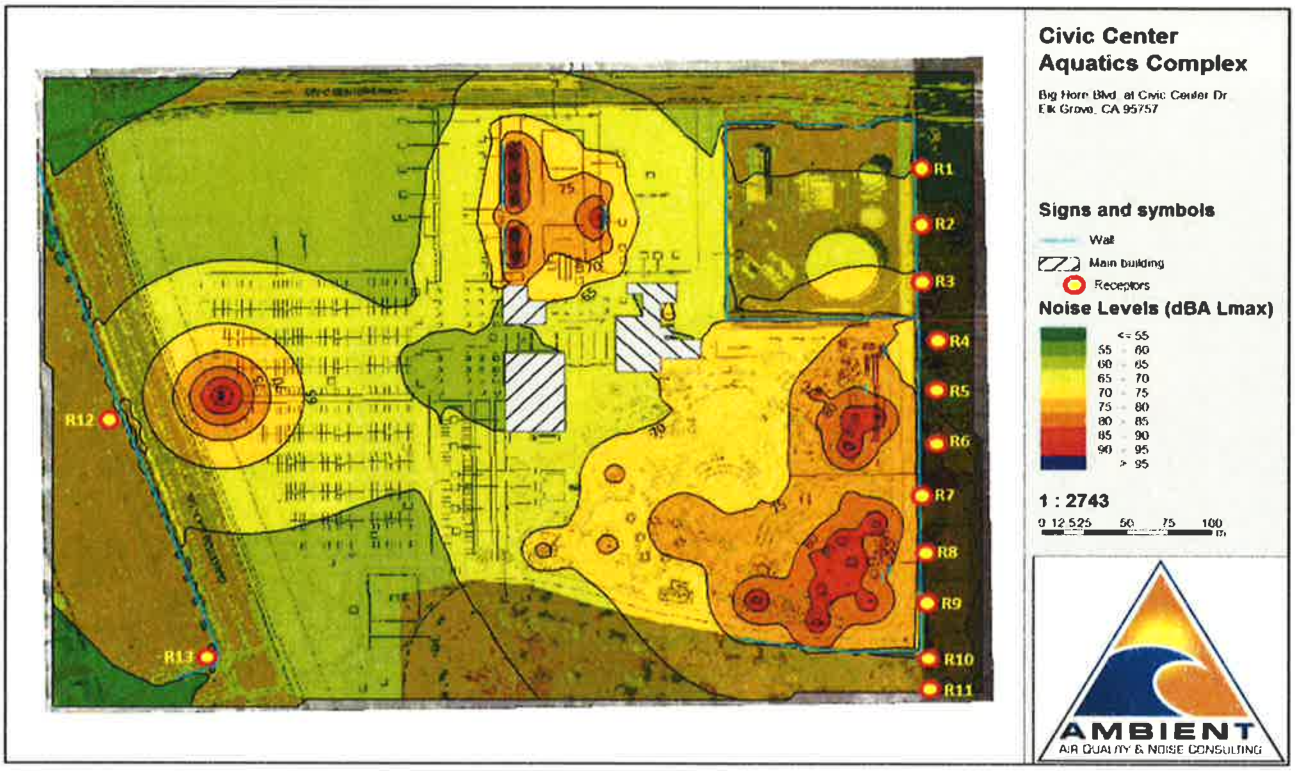


Parking lot noise levels represent Saturday pk-hr conditions. All locations are approximate. Based on site plan dated May 14, 2014.

NON-TRANSPORTATION NOISE LEVELS

LMAX WITH MITIGATION & 10-FT BARRIER

	EXTERIOR	
	1ST FL	2ND FL
1-Eastern Property Line	63.7	64.4
2-Eastern Property Line	66.6	67.1
3-Eastern Property Line	69.3	69.9
4-Eastern Property Line	67	69.7
5-Eastern Property Line	68.4	72.2
6-Eastern Property Line	71.2	74.1
7-Eastern Property Line	73.2	75.9
8-Eastern Property Line	73.2	75.6
9-Eastern Property Line	71.9	74.4
10-Eastern Property Line	71.2	72.4
11- Eastern Property Line	70	70.6
12- West of Big Horn Boulevard	64.6	68.5
13- West of Big Horn Boulevard	61.8	63.4

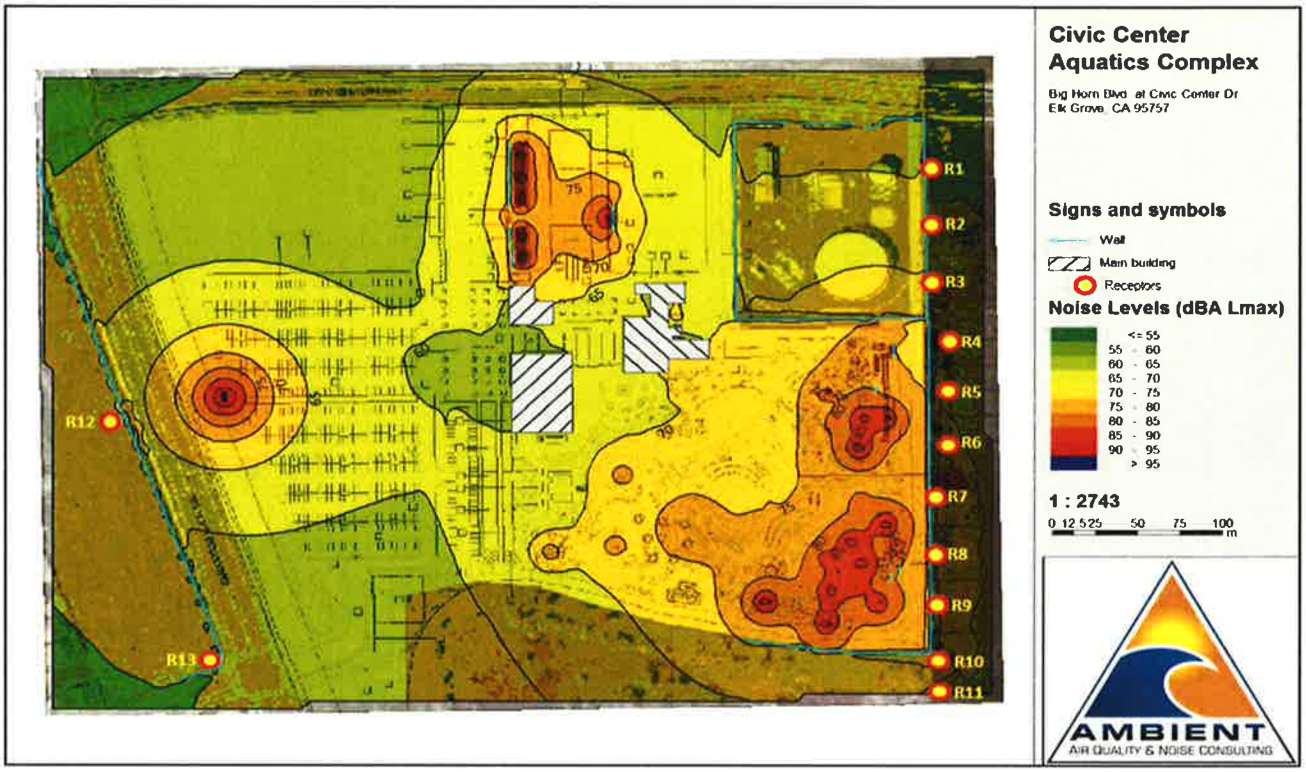


Parking lot noise levels represent Saturday pk-hr conditions. All locations are approximate. Based on site plan dated May 14, 2014.

NON-TRANSPORTATION NOISE LEVELS

LMAX WITH MITIGATION & 12-FT BARRIER

	EXTERIOR	
	1ST FL	2ND FL
1-Eastern Property Line	63.7	64.4
2-Eastern Property Line	66.6	67.1
3-Eastern Property Line	69.3	69.9
4-Eastern Property Line	66.1	69.2
5-Eastern Property Line	67.2	71.4
6-Eastern Property Line	70.4	73.4
7-Eastern Property Line	72.5	75
8-Eastern Property Line	72.6	74.9
9-Eastern Property Line	71.3	73.9
10-Eastern Property Line	70.7	72.1
11- Eastern Property Line	69.6	70.5
12- West of Big Horn Boulevard	64.6	68.5
13- West of Big Horn Boulevard	61.8	63.4



Parking lot noise levels represent Saturday pk-hr conditions. All locations are approximate. Based on site plan dated May 14, 2014.

APPENDIX J – TRAFFIC IMPACT ASSESSMENT

Draft Transportation Impact Analysis

Civic Center Aquatics Complex

May 2014

RS14-3227

FEHR & PEERS

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Appendices

1. INTRODUCTION

This study addresses the potential transportation impacts associated with implementation of the Civic Center Aquatics Complex. The project is generally located west of State Route 99 (SR 99) and south of Elk Grove Boulevard in the Laguna Ridge Specific Plan area. Figure 1 shows the project location, which is south of Civic Center Drive and east of Big Horn Boulevard. The project proposes the following access and circulation features:

- Full access driveway at the Big Horn Boulevard/Denali Circle Intersection, which is traffic signal controlled.
- Right-in/right-out driveway on Big Horn Boulevard about 330 feet south of Civic Center Drive.
- Pedestrian connections between the project site and Civic Center Drive and Big Horn Boulevard.
- An 8-foot decomposed granite trail extending from Civic Center Drive along the east boundary of the project south towards Lotz Parkway.
- A 20-foot paved service road bordering the east and south boundary of the project from Civic Center Drive to the Denali Circle driveway.
- Three emergency vehicle access locations, two serving the water park/adventure park and one serving the competition pool area.

The proposed project could have an effect on transportation. This impact analysis examines the transportation system serving the project under existing and cumulative conditions for the following scenarios:

- Existing Conditions
- Existing Plus Project Conditions
- Cumulative Conditions

Figure 1: Project Location

STUDY AREA

The study area was selected based on the expected travel characteristics of the project (i.e., project location), as well as the nearby transportation facilities' susceptibility to project impacts. The study area is shown on Figure 2. The following 21 intersections and 17 freeway facilities were selected for analysis:

STUDY INTERSECTIONS

1. Elk Grove Boulevard/I-5 SB Ramps
2. Elk Grove Boulevard/I-5 NB Ramps
3. Elk Grove Boulevard/Franklin Boulevard
4. Elk Grove Boulevard/Bruceville Road
5. Elk Grove Boulevard/Wymark Drive
6. Elk Grove Boulevard/Big Horn Boulevard
7. Elk Grove Boulevard/Laguna Springs Drive
8. Elk Grove Boulevard/Auto Center Drive
9. Elk Grove Boulevard/SR 99 SB Ramps
10. Elk Grove Boulevard/SR 99 NB On-Ramp
11. Elk Grove Boulevard/East Stockton Boulevard
12. East Stockton Boulevard/SR 99 NB Off-Ramp
13. Civic Center Drive/Bruceville Road
14. Civic Center Drive/Wymark Drive
15. Civic Center Drive/Big Horn Boulevard
16. Civic Center Drive/Laguna Springs Drive
17. Lotz Parkway/Big Horn Boulevard
18. Lotz Parkway/Laguna Springs Drive
19. Whitelock Parkway/Bruceville Road
20. Whitelock Parkway/Big Horn Boulevard
21. Denali Circle/Big Horn Boulevard

STUDY FREEWAY FACILITIES

1. NB SR 99 South of Elk Grove Boulevard
2. NB SR 99 Elk Grove Boulevard Off-Ramp
3. NB SR 99 Elk Grove Boulevard Loop On-Ramp
4. NB SR 99 Elk Grove Boulevard Slip On-Ramp
5. NB SR 99 North of Elk Grove Boulevard
6. SB SR 99 North of Elk Grove Boulevard
7. SB SR 99 Elk Grove Boulevard Off-Ramp
8. SB SR 99 Elk Grove Boulevard Slip On-Ramp
9. SB SR 99 South of Elk Grove Boulevard
10. NB I-5 South of Elk Grove Boulevard
11. NB I-5 Elk Grove Boulevard Off-Ramp
12. NB I-5 Elk Grove Boulevard Slip On-Ramp
13. NB I-5 North of Elk Grove Boulevard
14. SB I-5 North of Elk Grove Boulevard
15. SB I-5 Elk Grove Boulevard Off-Ramp
16. SB I-5 Elk Grove Boulevard Loop On-Ramp
17. SB I-5 South of Elk Grove Boulevard

DATA COLLECTION

To provide a baseline for the transportation analysis, traffic counts were collected at the existing study intersections in May 2014 and April 2013. The intersection turning movement counts were conducted during the PM (4:00 to 6:00) peak period (mid-week) and between 9:00 AM and 11:00 AM on Saturday. During the counts, weather conditions were generally dry, no unusual traffic patterns were observed, and the Elk Grove Unified School District was in full session. Pedestrians were also counted at each of the study intersections.

Each intersection's peak hour within the peak period was used for the analysis. For most study intersections, the counts indicate that the mid-week PM peak hour begins at 4:45 or 5:00 PM.

In addition to the intersection counts, the following additional data sources were used in the analysis of study facilities:

- Freeway traffic count data provided by Caltrans and available through the Caltrans Performance Measurement System (PeMS)
- Traffic signal timings provided by the City of Elk Grove

ANALYSIS METHODOLOGY

Analysis methods for roadways are described below.

INTERSECTIONS

All intersections were analyzed using procedures and methodologies contained in the Highway Capacity Manual (HCM), Transportation Research Board, 2000. These methodologies were applied using Synchro, a traffic operations analysis software package. HCM 2010 was not used for intersection operations analysis due to software errors that prevent the accurate analysis of some shared turn lane configurations present in the study area. Use of HCM 2000 methods for study intersections was approved by City of Elk Grove staff.

The HCM methodologies determine a level of service (LOS) for each study intersection. Level of service is a qualitative measure of traffic operating conditions whereby a letter grade, from A to F, is assigned. These grades represent the perspective of drivers and are an indication of the comfort and convenience associated with driving. In general, LOS A represents free-flow conditions with no congestion, and LOS F represents severe congestion and delay under stop-and-go conditions. Table 1 presents the intersection LOS thresholds for signal and stop controlled intersections.

TABLE 1: INTERSECTION LEVEL OF SERVICE THRESHOLDS		
Level of Service	**Average Control Delay (Seconds/Vehicle)** [1]	
	Signal Control	**Stop Control**
A	≤ 10.0	≤ 10.0
B	10.1 – 20.0	10.1 – 15.0
C	20.1 – 35.0	15.1 – 25.0
D	35.1 – 55.0	25.1 – 35.0
E	55.1 – 80.0	35.1 – 50.0
F	> 80.0	> 50.0

Notes: [1]Control delay includes initial deceleration delay, queue move-up time, stopped delay, and acceleration delay.
Source: Highway Capacity Manual, Transportation Research Board, 2000.

Detailed Assumptions and Methodologies

- Per HCM procedures, the level of service (LOS) for the study intersections was based on the average control delay for all vehicles.
- For the Existing and Existing Plus Project scenarios, peak hour factors (PHF) for study intersections were calculated based upon the April 2013 counts. Under Cumulative No Project and Cumulative Plus Project conditions, PHFs for study intersections were set at the existing PHF, or 0.92, whichever was higher.
- Intersection peak hour heavy vehicle[1] percentages were set at two percent based on data obtained during the April 2013 counts.
- Freeway mainline truck percentages were set at six percent with ramp percentages set at three percent.

[1] As defined by the *Highway Capacity Manual*, a heavy vehicle is any "vehicle with more than four wheels touching the pavement during normal operation."

FREEWAY FACILITIES

Per Caltrans standards, the freeway ramps and mainline were analyzed using procedures from the Highway Capacity Manual, 2010. This procedure determines the LOS based on the computed density, which is expressed in passenger cars per lane, per mile. Table 2 displays the density ranges associated with each LOS category for basic segments and ramp merge/diverge movements. Consistent with the methodology described in the *Highway Design Manual* (Caltrans, last updated July 1, 2008), the Leisch Method was used to analyze weaving areas.

TABLE 2: FREEWAY LEVEL OF SERVICE DEFINITIONS

Level of Service	Density (Passenger Cars per Mile per Lane) [1]	
	Basic Segments	Ramp Merge/Diverge
A	< 11	< 10
B	> 11 to 18	> 10 to 20
C	> 18 to 26	> 20 to 28
D	> 26 to 35	> 28 to 35
E	> 35 to 45	> 35
F	> 45 or any v/c ratio > 1.00[1]	Demand exceeds capacity[2]

Notes: [1] V/C ratio = demand flow rate divided by the capacity of a given segment.
[2] Occurs when freeway demand exceeds upstream (diverge) or downstream (merge) freeway segment capacity, or if off-ramp demand exceeds off-ramp capacity.
Source: Exhibits 10-7 and13-2 of 2010 HCM

As outlined below, SR 99 from just south of Elk Grove Boulevard through the city includes one high occupancy vehicle (HOV) lane and two general purpose lanes in each direction. Therefore, to account for HOV lane utilization, the freeway segment analysis is based on the traffic volume in the general purpose lanes, by removing vehicles using the HOV lanes from the analysis, based on measured HOV volumes documented in Caltrans' *District 3 High Occupancy Vehicle Lanes Status Report, Sacramento Metropolitan Area* (July 2011).

TRAVEL DEMAND FORECASTING

A modified version of SACOG's MTP/SCS travel demand forecasting (TDF) model was used to develop traffic volumes for the study facilities. The base year model is generally representative of

2008 conditions and the future year model has a 2035 forecast year. The TDF model was used to develop traffic volume forecasts cumulative conditions without the proposed project. The TDF model was modified to reflect build out development levels in the City of Elk Grove, including build out of the Laguna Ridge Specific Plan, Southeast Policy Area, Sterling Meadows, the Elk Grove Promenade, and Lent Ranch Marketplace. Year 2035 levels of development are assumed outside the City of Elk Grove. All forecasts are adjusted using a growth increment method (i.e., the difference method) that adds the growth in forecasted travel demand to existing traffic counts. The base year TDF model transportation network (in the study area) was modified to account of changes to the network that have occurred between 2008 and 2014 (i.e., when the traffic counts were collected). The 2035 transportation network is consistent with programmed improvements listed in the Final MTP/SCS project list. Forecasts for Saturday conditions were developed by factoring weekday PM peak hour forecasts based on existing weekday and Saturday traffic counts. Factors were applied by intersection, considering total volume using intersection and individual turn movements.

ANALYSIS EVALUATION CRITERIA

Consistent with the City of Elk Grove's *Traffic Impact Analysis Guidelines* (July 2000), the following evaluation criteria were used to determine the significance of project impacts:

INTERSECTIONS

An impact to a roadway segment is considered significant, and mitigation measures must be identified when:

- The traffic generated by the project degrades the LOS from an acceptable LOS D or better (without the project) to an unacceptable LOS E or LOS F (with the project)
- The level of service (without project) is unacceptable and project generated traffic increases the average vehicle delay by more than five seconds

FREEWAY FACILITIES

An impact is considered significant on freeway facilities if the project causes the facility to change from acceptable to unacceptable LOS.

For facilities, which are or will be (in the cumulative condition), operating at unacceptable LOS without the project, an impact is considered significant if the project:

- Increases the V/C ratio on a freeway mainline segment or freeway ramp junction by 0.05
- Increase the number of peak hour vehicles on a freeway mainline segment or freeway ramp junction ramp junction by more than five percent

According to the Guide for the Preparation of Traffic Impact Studies (Caltrans, June 2001), Caltrans strives to maintain a target LOS at the transition between LOS C and LOS D on State highway facilities; therefore, LOS D was selected as the minimum standard for all study freeway facilities.

BICYCLE/PEDESTRIAN/TRANSIT FACILITIES

An impact is considered significant if implementation of the project will disrupt or interfere with existing or planned bicycle, pedestrian, or transit facilities.

REPORT ORGANIZATION

The remainder of this report consists of the following chapters:

- Chapter 2 – Existing Conditions
- Chapter 3 – Existing Plus Project Conditions
- Chapter 4 – Cumulative Conditions

2. EXISTING CONDITIONS

This chapter describes the physical and operational characteristics of the transportation system within the study area.

EXISTING TRANSPORTATION SYSTEM

The City of Elk Grove is generally located in south Sacramento County about 15 miles south of the City of Sacramento. Regional freeway access to Elk Grove is provided by State Route 99 (SR 99) and Interstate 5 (I-5). Grant Line Road provides access to regional destination north and south of Elk Grove like the City of Rancho Cordova, City of Folsom, and community of El Dorado Hills. Elk Grove is generally served by a network of arterial-level roadways on a one-mile grid with interchanges on SR 99. I-5 has two interchanges that provide direct access to the city. Key study roadways are described below.

ROADWAY SYSTEM

- **Elk Grove Boulevard** is an east-west road extending from I-5 to Grant Line Road. Elk Grove Boulevard is six lanes from I-5 to East Stockton Boulevard, four lanes to Elk Grove-Florin Road, and two lanes to Grant Line Road. Elk Grove Boulevard is constructed to its general plan designation between I-5 and Waterman Road. Elk Grove Boulevard is designated in the general plan as a four-lane arterial east of Waterman Road.
- **Civic Center Drive** is a two-lane (with center turn lane) commercial street extending from Bruceville Road to Laguna Springs Drive. Civic Center is constructed to its general plan designation.
- **Lotz Parkway** is a four-lane arterial street extending from Big Horn Boulevard to just east of Laguna Springs Drive. Lotz Parkway is constructed to its general plan designation. Lotz Parkway will continue east and south and connect to and extend south of Whitelock Parkway.
- **Whitelock Parkway** is an east-west road extending from West Stockton Boulevard to Bruceville Road. Whitelock Parkway is improved with four travel lanes between Bruceville Road and Big Horn Boulevard. East of Big Horn Boulevard, Whitelock Parkway is two lanes. Whitelock Parkway is planned as a four-lane arterial with a partial access interchange at SR 99 that will serve travel to/from the west only.

- **Bruceville Road** is a north-south road extending from Valley Hi Drive near the Kaiser–Permanente complex in unincorporated Sacramento County to south of Kammerer Road. Bruceville Road is four lanes between Sheldon Road and Laguna Boulevard, six lanes between Laguna Boulevard and Elk Grove Boulevard, four lanes between Elk Grove Boulevard and Whitelock Parkway, and two lanes south of Whitelock Parkway. Bruceville Road is designated as a six-lane arterial in the general plan.
- **Big Horn Boulevard** is a four-lane arterial street extending from Franklin Boulevard to Whitelock Parkway. Big Horn Boulevard is constructed to its general plan designation.
- **Laguna Springs Drive** is a four-lane arterial street extending from Laguna Boulevard to Lotz Parkway. Lotz Parkway is constructed to its general plan designation.
- **State Route 99 (SR 99)** is a north-south freeway that provides a connection between all of the major cities in the Central Valley, from Sacramento and Stockton in the north to the cities of Modesto, Merced, Fresno, and Bakersfield in the south. Access to SR 99 is provided through interchanges at Grant Line Road, Elk Grove Boulevard, Laguna Boulevard/Bond Road, and Sheldon Road. This section of SR 99 has two mainline travel lanes and one high occupancy vehicle (HOV) lane in either direction with a posted speed limit of 65 mph.
- **Interstate 5 (I-5)** is a north-south freeway that traverses California and is a major national freeway that connects between Mexico and Canada. Near the Elk Grove Boulevard interchange, I-5 is a four-lane freeway.

BICYCLE AND PEDESTRIAN FACILITIES

Bicycle and pedestrian trips account for approximately 2.8 percent of all work trips and 4.9 percent of all non-work trips made by residents and employees in suburban areas. This estimate is from the *Pre-Census Travel Behavior Report Analysis of the 2000 SACOG Household Travel Survey* (Sacramento Area Council of Governments, 2001).

The majority of the bike paths in the city limits are Class II lanes, which are located on existing streets or highways and are striped for one-way bicycle travel. Below are descriptions of bicycle paths and their classifications.

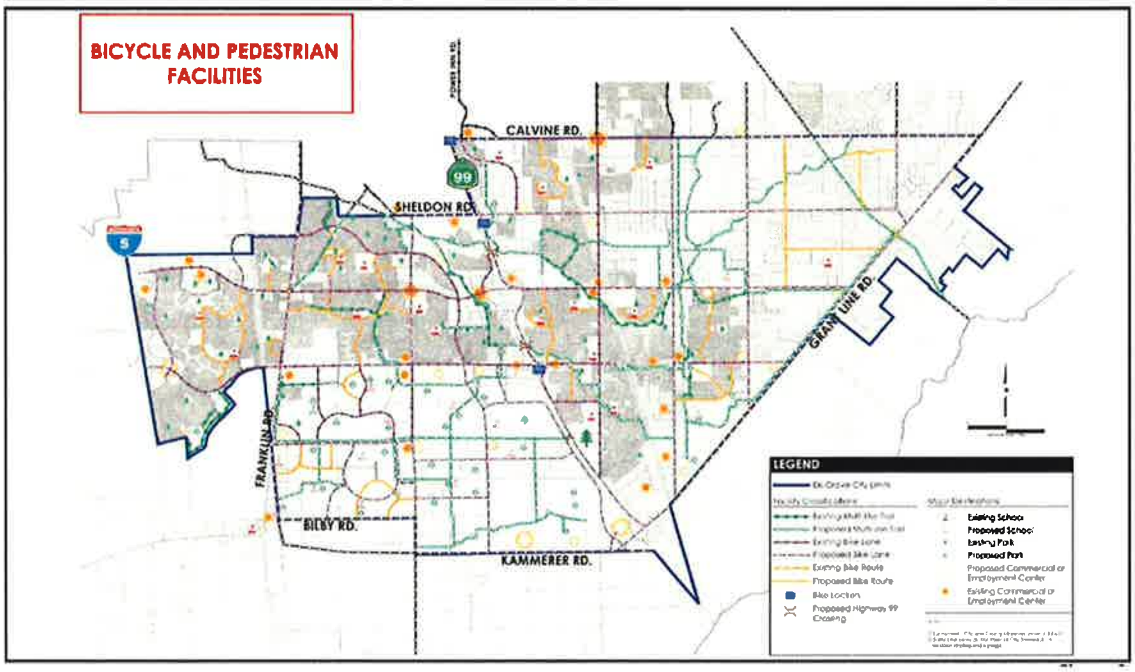
Class I Bike Paths provide a completely separated right-of-way for the exclusive use of bicycles and pedestrian with cross-flow minimized.

Class II Bike Lanes are striped lanes for one-way bike travel on a street or highway.

Class III Bike Routes provide for shared use with pedestrians or motor vehicle traffic.

The City adopted the City of Elk Grove Bicycle and Pedestrian Master Plan (BPMP) in July 2004. The BPMP identifies existing facilities opportunities, constraints, and destination points for bicycle users and pedestrians in the City of Elk Grove. Existing and proposed bicycle and pedestrian facilities documented in the BPMP are shown in the following graphic (Figure 2 of the BPMP).

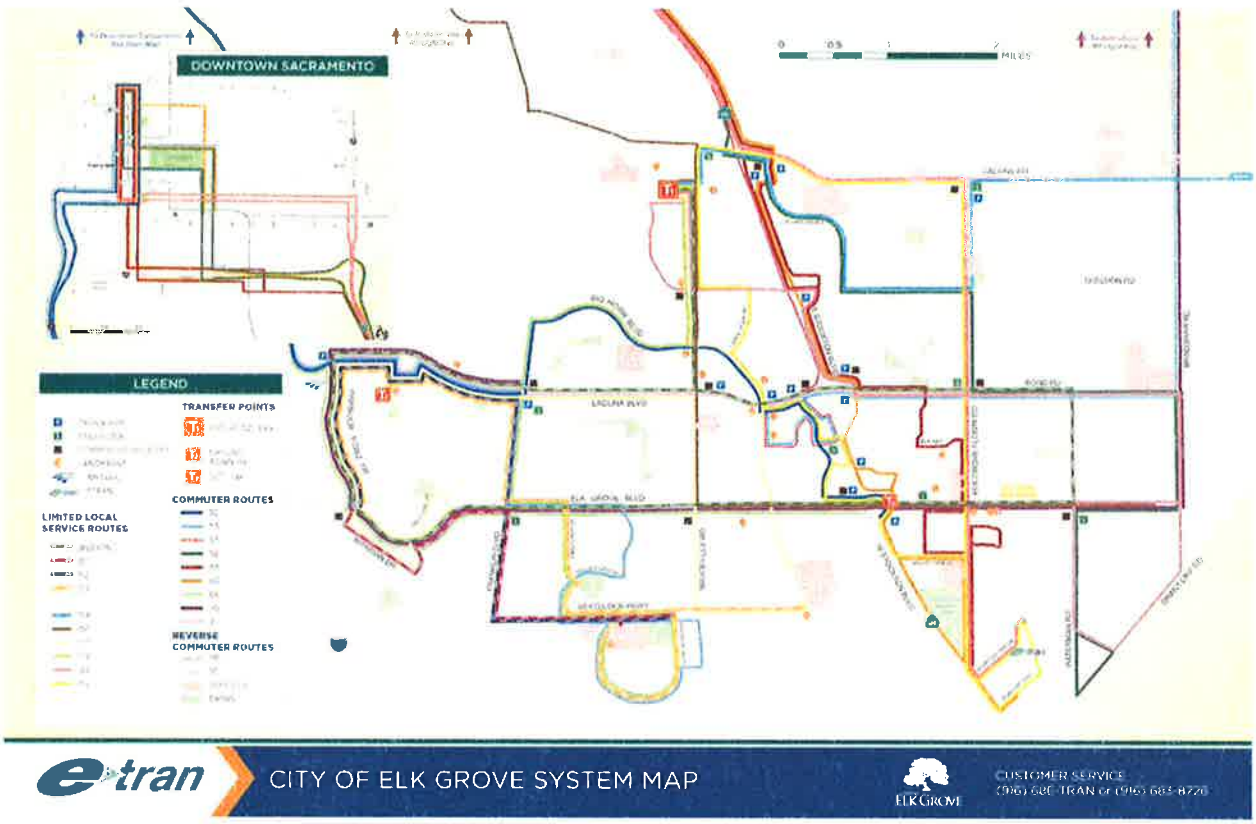
Figure 2: Bicycle and Pedestrian Facilities



TRANSIT FACILITIES

The City of Elk Grove is served by its own transit system, e-Tran, including e-Tran neighborhood shuttle service (ez-tran), limited local transit service, and commuter routes. Local transit service is provided on weekdays (six routes) and weekends (three routes). e-Tran provides nine commuter routes that operate mid-week, including two reverse commuter routes. The current e-Trans system map is shown below.

Figure 3: Elk Grove Transit System Map



TRAFFIC OPERATIONS ANALYSIS

This section describes the operations of the study intersections and freeway facilities under existing conditions.

INTERSECTION OPERATIONS

Appendix A includes existing weekday PM and Saturday peak hour intersection turning movement volumes, lane configurations, and traffic controls present at each of the study intersections. Table 3 summarizes the existing peak hour intersection operations (refer to separate Appendix A for detailed calculations). As shown, most study intersections currently operate acceptably at LOS D or better during both peak hours, except for the Elk Grove Boulevard/I-5 SB Ramps intersection. The controlled eastbound and westbound movements at the intersection operate at LOS F due to uncontrolled southbound left-turn movement from SB I-5, continuing east to Elk Grove. However, the west leg of the intersection is undeveloped and the volumes for turn movements to/from the west are low.

During field observations, significant vehicle queuing was observed during the PM peak hour near the SR 99/Elk Grove Boulevard interchange. The Synchro intersection operations documented in Table 3 are based on the number of vehicles that served during the peak conditions and do not include the operational effects of these closely spaced intersections. Therefore, conditions experienced by motorists may be worse than reported on Elk Grove Boulevard between Big Horn Boulevard and SR 99.

TABLE 3: PEAK HOUR INTERSECTION LEVEL OF SERVICE – EXISTING CONDITIONS

Intersection	Traffic Control	Weekday PM		Saturday	
		Delay	LOS	Delay	LOS
1. Elk Grove Blvd / I-5 SB Ramps	Side-Street Stop	**>50**	**F**	30	D
2. Elk Grove Blvd / I-5 NB Ramps	Side-Street Stop	29	D	11	B
3. Elk Grove Blvd / Franklin Blvd	Signal	37	D	35	C
4. Elk Grove Blvd / Bruceville Rd	Signal	37	D	39	D

TABLE 3: PEAK HOUR INTERSECTION LEVEL OF SERVICE – EXISTING CONDITIONS					
Intersection	**Traffic Control**	**Weekday PM**		**Saturday**	
		Delay	**LOS**	**Delay**	**LOS**
5. Elk Grove Blvd / Wymark Drive	Signal	13	B	14	B
6. Elk Grove Blvd / Big Horn Blvd	Signal	25	C	29	C
7. Elk Grove Blvd / Laguna Springs Dr	Signal	22	C	14	B
8. Elk Grove Blvd / Auto Center Dr	Signal	25	C	28	C
9. Elk Grove Blvd / SR 99 SB Ramps	Signal	36	D	34	C
10. Elk Grove Blvd / SR 99 NB On-Ramp	Signal	13	B	15	B
11. Elk Grove Blvd / East Stockton Blvd	Signal	39	D	35	C
12. East Stockton Blvd / SR 99 NB Off-Ramp	Side-Street Stop	22	C	15	B
13. Civic Center Dr / Bruceville Road	Signal	26	C	19	B
14. Civic Center Dr / Wymark Drive	All-way Stop	8	A	8	A
15. Civic Center Dr / Big Horn Blvd	Signal	16	B	14	B
16. Civic Center Dr / Laguna Springs Dr	Signal	20	C	15	B
17. Lotz Parkway / Big Horn Blvd	Signal	18	B	18	B
18. Lotz Parkway / Laguna Springs Dr	Signal	36	D	23	C
19. Whitelock Pkwy / Bruceville Rd	Signal	26	C	26	C
20. Whitelock Pkwy / Big Horn Blvd	Signal	16	B	16	B
21. Denali Circle / Big Horn Blvd	Signal	5	A	6	A

Notes: [1]During field observations, significant vehicle queuing was observed during the PM peak hour near the SR 99/Elk Grove Boulevard interchange. The Synchro intersection operations are based on the number of vehicles that are served during the PM peak hour and does not include the operational effects of these closely spaced intersections. Therefore, conditions experienced by motorists may be worse than expected

Bold text indicates LOS worse than established threshold. *Italic and underlined text* identifies a potential impact.

Source: Fehr & Peers, 2014.

FREEWAY FACILITY OPERATIONS

Table 4 summarizes the existing weekday PM and Saturday peak hour freeway operations on SR 99 and I-5 (refer to separate Appendix A for detailed calculations). As shown, most of the freeway facilities operate acceptably at LOS D or better during both peak hours, except for the SB I-5 Elk Grove Boulevard Off-ramp diverge, which operates at the LOS D/E threshold during the weekday PM peak hour.

However, peak period operations on SR 99 may be worse than reported due to reoccurring bottlenecks. As documented in the *California Department of Transportation Mobility Performance Report, 2009,* several bottleneck locations exist on SR 99 that meter traffic northbound in the morning and southbound in the evening. These bottlenecks cause congested conditions (i.e., vehicle speed of 35 miles per hour or less) and vehicle queuing on northbound SR 99 during the AM peak period. Similarly, bottlenecks on southbound SR 99 in the evening meter traffic on SR 99 through Elk Grove.

TABLE 4: FREEWAY ANALYSIS – EXISTING CONDITIONS

Freeway Facility	Type	Weekday PM Peak Hour		Saturday Peak Hour	
		Density	LOS	Density	LOS
1. NB SR 99 South of Elk Grove Boulevard	Basic Segment	12.5	B	11.5	B
2. NB SR 99 Elk Grove Boulevard Off-Ramp	Diverge	16.5	B	16.1	B
3. NB SR 99 Elk Grove Boulevard Loop On-Ramp	Merge	Cumulative Conditions Only			
4. NB SR 99 Elk Grove Boulevard Slip On-Ramp	Merge	19.5	B	19.3	B
5. NB SR 99 North of Elk Grove Boulevard	Basic Segment	17.8	B	17.6	B
6. SB SR 99 North of Elk Grove Boulevard	Basic Segment	20.3	C	16.5	B
7. SB SR 99 Elk Grove Boulevard Off-Ramp	Diverge	13.7	B	10.5	B

TABLE 4: FREEWAY ANALYSIS – EXISTING CONDITIONS

Freeway Facility	Type	Weekday PM Peak Hour		Saturday Peak Hour	
		Density	LOS	Density	LOS
8. SB SR 99 Elk Grove Boulevard Slip On-Ramp	Merge	22.2	C	19.2	B
9. SB SR 99 South of Elk Grove Boulevard	Basic Segment	18.6	C	14.8	B
10. NB I-5 South of Elk Grove Boulevard	Basic Segment	17.1	B	13.7	B
11. NB I-5 Elk Grove Boulevard Off-Ramp	Diverge	20.5	C	17.5	B
12. NB I-5 Elk Grove Boulevard Slip On-Ramp	Merge	19.1	B	18.0	B
13. NB I-5 North of Elk Grove Boulevard	Basic Segment	19.9	C	18.0	C
14. SB I-5 North of Elk Grove Boulevard	Basic Segment	32.4	D	15.1	B
15. SB I-5 Elk Grove Boulevard Off-Ramp	Diverge	**35.1**	**E**	20.9	C
16. SB I-5 Elk Grove Boulevard Loop On-Ramp	Merge	18.9	B	14.2	B
17. SB I-5 South of Elk Grove Boulevard	Basic Segment	17.9	B	12.4	B

Bold text indicates LOS worse than established threshold. *Italic and underlined text* identifies a potential impact.
Source: Fehr & Peers, 2014.

3. PROPOSED PROJECT

This chapter discusses the proposed project, including site access and operation characteristics.

PROJECT DESCRIPTION

The Civic Center Aquatics Complex is proposed to be located at the southwest corner of the Civic Center Drive/Big Horn boulevard intersection in the Laguna Ridge Specific Plan area. Figure 4 shows the proposed project.

PROJECT DESCRIPTION

The project includes the construction of an aquatic center (i.e., competition/training facility), a waterpark/adventure park (i.e., commercial recreational facility), parking, and support facilities. The total site area is approximately 30-acres.

The aquatic center will consist of an Olympic-sized swimming pool (approximately 50 meters by 25 yards, 2 meter depth) and a warm-up pool with a 10-meter diving tower (approximately 20 meters by 25 yards, 17-foot depth). Support facilities include the following:

- Shaded seating for 1,000+ spectators
- Water system
- Concessions
- Hot tub for 12 to 20 athletes
- Locker rooms
- Meeting room
- Office and storage space
- Temporary enclosure area

The competitive facilities are anticipated to be home to multiple Elk Grove high schools and a variety of regional club teams for practices and meets. It is also intended for large scale competitive tournaments drawing people from outside the region.

The waterpark will include attractions like a lazy river, wave pool, water slides, children's aquatic play area, family activity pool, spray grounds, geysers, private cabanas, entertainment stage, and group pavilion. The adventure park will include attractions like a ropes course, zip lines, sky trail, climbing walls, various challenge/team building activities, arcade, and party rooms. The adventure park facilities will be integrated with the waterpark.

PARKING

As shown on Figure 4, the project site includes 724 parking spaces adjacent to the planned facilities and an additional 1,500 parking spaces north of Civic Center.

OPERATIONAL CHARACTERISTICS

As outlined below, the three components of the project will have different operating hours with peak operation in the summer (i.e., June through August) and July representing the peak month. The waterpark will operate for 120 days between May and October. The following summarizes peak operating hours for each component of the project during the summer:

- The aquatic center will be open from 7:00 AM to 9:00 PM
- The adventure park will be open from 10:00 AM to 10:00 PM
- The waterpark will be open from 10:00 AM to 9:00 PM. School events are scheduled for the first week in June (10:00 AM to 4:00 PM). Operating hours are reduced to 10:00 AM to 6:00 PM in mid-August.

Average weekday attendance for the project in July is estimated at 3,230[2], with maximum attendance occurring on a Saturday in July with 5,500 attendees[3].

MARKET AREA

The project will attract about 60 percent of its attendees from outside the City of Elk Grove, with 20 percent of these attendees traveling 60 minutes or more to the project[4].

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[2] Project demand average attendance estimates developed by Hotel & Leisure Advisors.
[3] Maximum attendance developed by Kirk Van Cleave, P3 INTERNATIONAL.
[4] Market demand developed by Hotel & Leisure Advisors.

Figure 4: Proposed Project

TRIP GENERATION

Table 5 summarizes weekday and Saturday trip generation for the proposed project. As outlined above, average weekday project attendance is estimated at 3,230, with maximum attendance estimated a 5,500 and occurring on a Saturday in July. Due to the unique composition of project uses, trip generation from comparable sites was not available. Therefore, the trip generation presented in Table 5 was developed using the estimated attendance levels for average weekday conditions and the maximum attendance scenario, operational characteristics, and available trip generation characteristics for comparable land used documented in Trip Generation, 9th Edition (Institute of Transportation Engineers). The following outlines the steps used to develop the project trip generation presented in Table 5.

- Project Attendance – Identified weekday and maximum attendance scenarios
- Auto Occupancy – Calculated expected auto occupancy using project auto occupancy based on the ratio of total visitors (adults and youth under the age of 13) to adult chaperones developed by Hotel & Leisure Advisors (for estimating project demand) assuming all adult chaperones drive.
- Daily Vehicle Trips – Calculated daily vehicle trips by dividing project attendance by auto occupancy and multiplied by two to account for vehicles entering/existing the project.
- Peak Hour Trips – Calculated peak hour vehicle trips by multiplying daily vehicle trips by the peak-to-daily factor and directional distribution from Trip Generation, 9th Edition (Institute of Transportation Engineers) for Water Slide Park (Land Use: 414), for weekday and Saturday scenarios.

As shown in Table 5, the project is projected to generate about 2,810 vehicle trips during an average weekday and 4,780 vehicle trips during a maximum attendance day. On an average weekday, the project would generate about 340 trips during the PM peak hour (i.e., peak hour of adjacent street traffic). During maximum attendance, the project would generate about 620 trips.

TABLE 5: TRIP GENERATION – CIVIC CENTER AQUATICS COMPLEX							
Scenario[1]	**Daily Attendance**[2] **[Persons]**	**Auto Occupancy**[3] **[Persons/Vehicle]**	**Vehicles**	**Trips**			
				Daily[4]	**Peak Hour**[5,6] **(Weekday=PM, Saturday=Generator)**		
					Total	**In**	**Out**
Weekday	3,230	2.3	1,404	2,808	337	162	175
Saturday	5,500	2.3	2,391	4,782	622	429	193

Notes: [1]Hours of operation – Waterpark/Adventure Park -10:00 AM to 10:00 PM Monday through Sunday. Analysis scenarios include mid-week (Tuesday, Wednesday, or Thursday) PM peak hour conditions and a peak hour on Saturday. Aquatic Complex – 7:00 AM to 9:00 PM.

[2]Attendance estimate based on usage levels developed by Hotel & Leisure Advisors

[3]Auto occupancy based on the ratio of total visitors (adults and youth under the age of 13) to adult chaperones developed by Hotel & Leisure Advisors (for estimating project demand) assuming all adult chaperones drive.

[4]Daily vehicle trips developed by multiplying total vehicles by two to account for vehicles entering and exiting the project.

[5]Total peak hour trips based on the peak-to-daily factor and directional distribution from *Trip Generation, 9th Edition* (Institute of Transportation Engineers) for Water Slide Park (Land Use: 414), for weekday and Saturday scenarios.

[6]Weekday peak hour trip generation represents the peak hour of adjacent street traffic. Saturday peak hour is the peak hour of the generator (i.e., the highest hour of trip generation for the proposed project).

Source: Fehr & Peers, 2014

4. EXISTING PLUS PROJECT CONDITIONS

This chapter discusses the conditions of the transportation system under Existing Plus Project conditions.

TRAFFIC OPERATIONS ANALYSIS

The operations of the study intersections and freeway facilities are presented below. This scenario assumes build out of the project added to existing development levels and traffic volumes at the time study area traffic counts were collected. Under this analysis scenario, the project is assumed to develop immediately.

The analysis presented below assumes transportation improvements needed to support the project, including site access improvements, parking facilities, bicycle, and pedestrian connections are constructed. This includes construction of the east (i.e., fourth) leg of the Denali Circle/Big Horn Boulevard intersection, which includes turn lane modifications and signal system modifications.

INTERSECTION OPERATIONS

Appendix B includes existing AM and PM weekday peak hour intersection turning movement volumes, lane configurations, and traffic controls present at each of the study intersections. The traffic volume forecasts in Appendix B were developed by adding the project traffic from Table 5 through the study intersections using the trip distribution shown on Figure 5.

Table 6 summarizes the intersection operations under existing conditions with the addition of the proposed project (refer to separate Appendix B for detailed calculations). As shown, most study intersections currently operate acceptably at LOS D or better during both peak hours, except for the Elk Grove Boulevard/I-5 SB Ramps intersection. The controlled eastbound and westbound movements at the intersection operate at LOS F due to uncontrolled southbound left-turn movement from SB I-5, continuing east to Elk Grove. The project would add traffic to the uncontrolled on- and off-ramp movements at this intersection.

As noted under existing conditions, during field observations, significant vehicle queuing was observed during the PM peak hour near the SR 99/Elk Grove Boulevard intersection. The Synchro intersection operations documented in Table 6 represent isolated intersection operation and are based on the number of vehicles served during the peak hour conditions. The analysis does not account for the operational effects of these closely spaced intersections, like vehicle queuing extending between intersections. Therefore, conditions experienced by motorists may be worse than reported at the intersections on Elk Grove Boulevard near the SR 99 interchange.

Figure 5: Project Trip Distribution – Existing Conditions

TABLE 6: PEAK HOUR INTERSECTION LEVEL OF SERVICE – EXISTING PLUS PROJECT CONDITIONS

Intersection	Traffic Control	Weekday PM		Saturday		Weekday PM		Saturday	
		Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
		Existing Conditions				***Existing Plus Project Conditions***			
1. Elk Grove Blvd / I-5 SB Ramps	Side-Street Stop	**>50**	**F**	30	D	***>50***	***F***	35	D
2. Elk Grove Blvd / I-5 NB Ramps	Side-Street Stop	29	D	11	B	31	D	11	B
3. Elk Grove Blvd / Franklin Blvd	Signal	37	D	35	C	38	D	35	C
4. Elk Grove Blvd / Bruceville Rd	Signal	37	D	39	D	37	D	39	D
5. Elk Grove Blvd / Wymark Drive	Signal	13	B	14	B	13	B	15	B
6. Elk Grove Blvd / Big Horn Blvd	Signal	25	C	29	C	27	C	32	C
7. Elk Grove Blvd / Laguna Springs Dr	Signal	22	C	14	B	23	C	18	B
8. Elk Grove Blvd / Auto Center Dr	Signal	25	C	28	C	26	C	29	C
9. Elk Grove Blvd / SR 99 SB Ramps	Signal	36	D	34	C	41	D	49	D
10. Elk Grove Blvd / SR 99 NB On-Ramp	Signal	13	B	15	B	13	B	16	B
11. Elk Grove Blvd / East Stockton Blvd	Signal	39	D	35	C	39	D	35	D
12. East Stockton Blvd / SR 99 NB Off-Ramp	Side-Street Stop	22	C	15	B	23	C	16	C
13. Civic Center Dr / Bruceville Rd	Signal	26	C	19	B	28	C	21	C
14. Civic Center Dr / Wymark Dr	All-way Stop	8	A	8	A	8	A	8	A
15. Civic Center Dr / Big Horn Blvd	Signal	16	B	14	B	19	B	17	B

TABLE 6: PEAK HOUR INTERSECTION LEVEL OF SERVICE – EXISTING PLUS PROJECT CONDITIONS

Intersection	Traffic Control	Weekday PM		Saturday		Weekday PM		Saturday	
		Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
16. Civic Center Dr / Laguna Springs Dr	Signal	20	C	15	B	18	B	15	B
17. Lotz Pkwy / Big Horn Blvd	Signal	18	B	18	B	19	B	18	B
18. Lotz Pkwy / Laguna Springs Dr	Signal	36	D	23	C	35	D	21	C
19. Whitelock Pkwy / Bruceville Rd	Signal	26	C	26	C	27	C	26	C
20. Whitelock Pkwy / Big Horn Blvd	Signal	16	B	16	B	16	B	16	B
21. Denali Circle / Big Horn Blvd	Signal	5	A	6	A	18	B	28	C

Notes: [1]During field observations, significant vehicle queuing was observed during the PM peak hour near the SR 99/Elk Grove Boulevard interchange. The Synchro intersection operations are based on the number of vehicles that are served during the PM peak hour and does not include the operational effects of these closely spaced intersections. Therefore, conditions experienced by motorists may be worse than expected

Bold text indicates LOS worse than established threshold. *Italic and underlined text* identifies a potential impact.

Source: Fehr & Peers, 2014.

The addition of project trips would result in the following potential impacts:

Impact 1 – Elk Grove Boulevard/I-5 SB Ramps Intersection

This intersection has side-street stop control. The controlled eastbound and westbound movements at the intersection operate at LOS F due to the much higher volume uncontrolled southbound off-ramp left-turn movement from I-5. The project would add traffic to the uncontrolled on-ramp movements at the intersection, which would increase delay for the controlled eastbound and westbound movements at the intersection. However, based on the intersection traffic control, lane configurations, and volumes using the intersection the traffic analysis software cannot report delay for the controlled movements, so we must conservatively find that this is a potentially significant impact.

Mitigation 1

The west leg of the intersection provides access to the Stone Lake National Wildlife Refuge and is and will remain undeveloped, so the volumes for turn movements to/from the west are low. A review of the latest three-year collision records from the Statewide Integrated Traffic Records System (SWITRS) database revealed no reported collision at or near the intersection. Although the project would add traffic to the uncontrolled on- and off-ramp movements at this intersection, no mitigation are recommended based on the following factors:

- The west leg of the intersection is and will remain undeveloped.
- Volumes are low on the controlled movements and will remain low without development.
- There were no reported collisions at the intersection indicating need for modified intersection traffic control.
- Traffic volumes on the controlled movements would not warrant installation of traffic signal control.

Therefore, this impact would remain significant and unavoidable.

Impact 2 – Elk Grove Boulevard Corridor (Near SR 99/Elk Grove Boulevard Interchange)

Implementation of the project would add traffic to the Elk Grove Boulevard Corridor near the SR 99 interchange, which was observed to have vehicle queues that extended through adjacent intersections at times during the peak periods. This is a potentially significant impact.

Mitigation 2

There is limited right-of-way for physical (i.e., capacity) improvements along the Elk Grove Boulevard corridor. The corridor is largely constructed to its general plan designation as a six-lane arterial. However, the City is nearing construction of the SR 99/Elk Grove Boulevard interchange Northbound Loop On-Ramp, which is the final phase of the interchange project. In addition, the SR 99/Whitelock Parkway interchange that is planned between Elk Grove Boulevard and Grant Line Road, would provide an alternative to Elk Grove Boulevard and Big Horn Boulevard for trips with an origin and destination west of SR 99 in the Laguna Ridge Specific Plan. Elk Grove Boulevard, between Bruceville Road and East Stockton Boulevard, is identified in the General Plan Background Report as operating worse than LOS D during the PM peak hour. Consistent with Policy CI-14, the City recognizes that level of service D may not be achieved on these roadway segments.

Implementation of the improvements outlined above and routine traffic signal coordination in response to planned growth and changing travel patterns would improve operations and provide an alternative to the Elk Grove corridor for some travel. However, these improvements would not improve intersection spacing. Consequently, Elk Grove Boulevard is still expected to experience congested conditions due to poor vehicle progression through the corridor. Therefore, this impact would remain significant and unavoidable.

FREEWAY FACILITY OPERATIONS

Table 7 summarizes the existing AM and PM peak hour freeway operations on SR 99 and I-5 (refer to separate Appendix B for detailed calculations). As shown, most of the study freeway facilities would operate acceptably at LOS D or better during both peak hours, except for the SB I-5 Elk Grove Boulevard Off-ramp diverge, which operates at the LOS D/E threshold during the weekday PM peak hour. The project would add traffic to the SB I-5 Elk Grove Boulevard Off-ramp diverge. The addition of project traffic would result in the following potential impacts.

Impact 3 – SB I-5 Elk Grove Boulevard Off-ramp Diverge

Implementation of the project would add traffic to the SB I-5 Elk Grove Boulevard Off-ramp diverge, which would operate unacceptably at LOS E under existing conditions. The addition of project traffic would result in an increase in density of the diverge influence area at the SB off-ramp from 35.1 to 35.3, corresponding to an increase in the volume-to-capacity ratio of the diverge from 0.85 to 0.86 (i.e., a volume-to-capacity increase of 0.01). Based on the City of Elk Grove analysis evaluation criteria, this is a less than significant impact.

Mitigation 3

No mitigation required.

Impact 4 – SR 99 Freeway Operations

Peak period operations on SR 99 may be worse than reported due to reoccurring bottlenecks. As documented in the *California Department of Transportation Mobility Performance Report, 2009,* several bottleneck locations exist on SR 99 that meter traffic northbound in the morning and southbound in the evening. These bottlenecks cause congested conditions (i.e., vehicle speed of 35 miles per hour or less) and vehicle queuing on northbound SR 99 during the AM peak period. Similarly, bottlenecks on southbound SR 99 in the evening meter traffic on SR 99 through Elk Grove. This is a potentially significant impact.

Mitigation 4

General Policy CI-2 relates to coordination and participation with the City of Sacramento, Sacramento County, and Caltrans on roadway improvements that are shared by the jurisdictions in order to improve operations, including joint transportation planning efforts, roadway construction, and funding. Consistent with Policy CI-2, the City should continue to work with Caltrans and other affected agencies to address operational conditions on SR 99, which may include the extension of HOV lanes from their current terminus just south of Elk Grove Boulevard to south of Grant Line Road, which would ensure additional capacity on SR 99 through the City. However, this improvement would not address the impact of existing bottleneck locations that cause reoccurring congestion on SR 99. This commitment to improving operation on SR 99 in the City is also demonstrated with

Policy CI-11, related to implementing improvements to I-5 and SR 99, and Policy CI-12, related to the Capital SouthEast Connector project. However, since SR 99 is under the jurisdiction of Caltrans, these facilities are outside the City's jurisdiction to implements improvements that would mitigate these impacts. Therefore, these impacts would be significant and unavoidable.

TABLE 7: FREEWAY ANALYSIS – EXISTING PLUS PROJECT CONDITIONS

Intersection	Traffic Control	Existing Conditions				Existing Plus Project Conditions			
		Weekday PM Peak Hour		Saturday Peak Hour		Weekday PM Peak Hour		Saturday Peak Hour	
		Density	LOS	Density	LOS	Density	LOS	Density	LOS
1. NB SR 99 South of Elk Grove Boulevard	Basic Segment	12.5	B	11.5	B	12.6	B	11.8	B
2. NB SR 99 Elk Grove Boulevard Off-Ramp	Diverge	16.5	B	16.1	B	16.6	B	16.4	B
3. NB SR 99 Elk Grove Boulevard Loop On-Ramp	Merge	Cumulative Conditions Only							
4. NB SR 99 Elk Grove Boulevard Slip On-Ramp	Merge	19.5	B	19.3	B	19.9	B	19.7	B
5. NB SR 99 North of Elk Grove Boulevard	Basic Segment	17.8	B	17.6	B	18.0	C	17.9	B
6. SB SR 99 North of Elk Grove Boulevard	Basic Segment	20.3	C	16.5	B	20.5	C	17.1	B
7. SB SR 99 Elk Grove Boulevard Off-Ramp	Diverge	13.7	B	10.5	B	13.9	B	11.3	B
8. SB SR 99 Elk Grove Boulevard Slip On-Ramp	Merge	22.2	C	19.2	B	22.3	C	19.3	B
9. SB SR 99 South of Elk Grove Boulevard	Basic Segment	18.6	C	14.8	B	18.7	C	14.9	B
10. NB I-5 South of Elk Grove Boulevard	Basic Segment	17.1	B	13.7	B	17.1	B	13.9	B
11. NB I-5 Elk Grove Boulevard Off-Ramp	Diverge	20.5	C	17.5	B	20.6	C	17.7	B
12. NB I-5 Elk Grove Boulevard Slip On-Ramp	Merge	19.1	B	18.0	B	19.3	B	18.2	B
13. NB I-5 North of Elk Grove Boulevard	Basic Segment	19.9	C	18.0	C	20.0	C	18.2	C
14. SB I-5 North of Elk Grove Boulevard	Basic Segment	32.4	D	15.1	B	32.7	D	15.4	B
15. SB I-5 Elk Grove Boulevard Off-Ramp	Diverge	**35.1**	**E**	20.9	C	***35.3***	***E***	21.3	C

TABLE 7: FREEWAY ANALYSIS – EXISTING PLUS PROJECT CONDITIONS

Intersection	Traffic Control	Existing Conditions				Existing Plus Project Conditions			
		Weekday PM Peak Hour		Saturday Peak Hour		Weekday PM Peak Hour		Saturday Peak Hour	
		Density	LOS	Density	LOS	Density	LOS	Density	LOS
16. SB I-5 Elk Grove Boulevard Loop On-Ramp	Merge	18.9	B	14.2	B	19.0	B	14.3	B
17. SB I-5 South of Elk Grove Boulevard	Basic Segment	17.9	B	12.4	B	18.0	B	12.5	B

Bold text indicates LOS worse than established threshold. *Italic and underlined text* identifies a potential impact.

Source: Fehr & Peers, 2014.

BICYCLE AND PEDESTRIAN FACILITIES

The proposed project would integrate with existing bicycle and pedestrian facilities and will implement planned bicycle and pedestrian facilities in the Laguna Ridge Specific Plan, like the decomposed granite trail along the east boundary of the project. Implementation of the proposed project would not disrupt or interfere with existing bicycle or pedestrian facilities, and would not disrupt or interfere with the implementation of any planned bicycle or pedestrian facilities.

TRANSIT FACILITIES

Implementation of the proposed project would not disrupt or interfere with existing or planned transit operations or facilities.

5. CUMULATIVE CONDITIONS

This chapter discusses the conditions of the transportation system under cumulative conditions with the proposed project.

TRAFFIC OPERATIONS ANALYSIS

The operations of the study intersections and freeway facilities are presented below. The analysis presented below assumes transportation improvements within the project area and the following transportation improvements identified with reasonably foreseeable funding consistent with the region's Final Metropolitan Transportation Plan/Sustainable Communities Strategy Project List. Key transportation projects from the MTP/SCS in the project area follow:

- Bruceville Road – Widen from two to four lanes between Whitelock Parkway and Kammerer Road
- Grant Line Road (SouthEast Connector Segment) – Widen from two to four lanes between East Stockton Boulevard and Calvine Road
- Kammerer Road Extension (SouthEast Connector Segment) – Construct new four-lane Kammerer Road from Bruceville Road to I-5 at Hood Franklin Road
- Kammerer Road (SouthEast Connector Segment) – Widen from two to four then four to six lanes from west of SR 99 (unimproved portion) to Bruceville Road
- Willard Parkway – Extend Willard Parkway from current terminus to the new Kammerer Road extension as a four-lane roadway with a follow on project to complete widening of Willard Parkway to six lanes

INTERSECTION OPERATIONS

Appendix C includes existing AM and PM weekday peak hour intersection turning movement volumes, lane configurations, and traffic controls present at each of the study intersections under cumulative conditions. The traffic volume forecasts in Appendix C were developed by adding the project traffic from Table 5 through the study intersections using the trip distribution shown on Figure 6.

Figure 6: Project Trip Distribution – Cumulative Conditions

Table 8 summarizes the peak hour intersection operations at the study intersections (refer to separate Appendix C for detailed calculations) under cumulative conditions. The following intersections will operate unacceptably (LOS E or F) during at least one peak hour without the addition of project traffic:

- Elk Grove Boulevard/I-5 SB Ramps – LOS F during the weekday PM peak hour
- Elk Grove Boulevard/Bruceville Road – LOS E during the weekday PM peak hour
- Elk Grove Boulevard/Big Horn Boulevard – LOS E during the weekday PM peak hour and LOS F on Saturday
- Elk Grove Boulevard/Laguna Springs Drive – LOS E during the weekday PM peak hour
- Elk Grove Boulevard/SR 99 Southbound Ramps – LOS E during the weekday PM and Saturday peak hours
- Elk Grove Boulevard/East Stockton Boulevard – LOS E during the weekday PM peak hour
- Civic Center Drive/Big Horn Boulevard – LOS F during the weekday PM peak hour and LOS F on Saturday

As noted under existing conditions, significant vehicle queuing was observed during field observations during the PM peak hour near the SR 99/Elk Grove Boulevard intersection. The Synchro intersection operations documented in Table 8 are based on the number of vehicles served during the PM peak hour, plus traffic added by the proposed project. The analysis does not account for the operational effects of these closely spaced intersections. Therefore, conditions experienced by motorists may be worse than reported at the intersections on Elk Grove Boulevard between Big Horn Boulevard and SR 99.

TABLE 8: PEAK HOUR INTERSECTION LEVEL OF SERVICE – CUMULATIVE PLUS PROJECT CONDITIONS

Intersection	Traffic Control	Weekday PM		Saturday		Weekday PM		Saturday	
		Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
		Cumulative Conditions				*Cumulative Plus Project Conditions*			
1. Elk Grove Blvd / I-5 SB Ramps	Side-Street Stop	***>50***	***F***	29	D	***>50***	***F***	34	D
2. Elk Grove Blvd / I-5 NB Ramps	Side-Street Stop	32	D	11	B	34	D	11	B
3. Elk Grove Blvd / Franklin Blvd	Signal	48	D	45	D	49	D	45	D
4. Elk Grove Blvd / Bruceville Rd	Signal	***57***	***E***	49	D	***58***	***E***	49	D
5. Elk Grove Blvd / Wymark Drive	Signal	19	B	15	B	18	B	14	B
6. Elk Grove Blvd / Big Horn Blvd	Signal	***78***	***E***	***89***	***F***	***83***	***F***	***100***	***F***
7. Elk Grove Blvd / Laguna Springs Dr	Signal	***57***	***E***	26	C	***65***	***E***	28	C
8. Elk Grove Blvd / Auto Center Dr	Signal	34	C	51	D	37	D	54	D
9. Elk Grove Blvd / SR 99 SB Ramps	Signal	***78***	***E***	***59***	***E***	***88***	***F***	***77***	***E***
10. Elk Grove Blvd / SR 99 NB On-Ramp	Signal	-	-	-	-	-	-	-	-
11. Elk Grove Blvd / East Stockton Blvd	Signal	***67***	***E***	27	C	***72***	***E***	27	C
12. East Stockton Blvd / SR 99 NB Off-Ramp	Signal	50	D	35	D	53	D	36	D
13. Civic Center Dr / Bruceville Rd	Signal	32	C	21	C	32	C	22	C
14. Civic Center Dr / Wymark Dr	Signal	43	D	34	D	44	D	36	D
15. Civic Center Dr / Big Horn Blvd	Signal	***91***	***F***	***77***	***E***	***104***	***F***	***96***	***F***
16. Civic Center Dr / Laguna Springs Dr	Signal	22	C	17	B	24	C	18	B

TABLE 8: PEAK HOUR INTERSECTION LEVEL OF SERVICE – CUMULATIVE PLUS PROJECT CONDITIONS

Intersection	Traffic Control	Weekday PM		Saturday		Weekday PM		Saturday	
		Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
17. Lotz Pkwy / Big Horn Blvd	Signal	44	D	43	D	45	D	46	D
18. Lotz Pkwy / Laguna Springs Dr	Signal	34	C	23	C	36	D	24	C
19. Whitelock Pkwy / Bruceville Rd	Signal	30	C	30	C	31	C	30	C
20. Whitelock Pkwy / Big Horn Blvd	Signal	27	C	32	C	27	C	34	C
21. Denali Circle / Big Horn Blvd	Signal	10	B	11	B	27	C	53	D

Notes: [1]During field observations, significant vehicle queuing was observed during the PM peak hour near the SR 99/Elk Grove Boulevard interchange. The Synchro intersection operations are based on the number of vehicles that are served during the PM peak hour and does not include the operational effects of these closely spaced intersections. Therefore, conditions experienced by motorists may be worse than expected

Bold text indicates LOS worse than established threshold. ***Italic and underlined text*** identifies a potential impact.

Source: Fehr & Peers, 2014.

The addition of the project would add traffic to the intersections identified above as operating unacceptably under cumulative conditions without the project, resulting in the following potential impacts.

<u>Impact 5 – Elk Grove Boulevard/I-5 SB Ramps Intersection</u>

This intersection has side-street stop control. The controlled eastbound and westbound movements at the intersection operate at LOS F due to the much higher volume uncontrolled southbound off-ramp left-turn movement from I-5. The project would add traffic to the uncontrolled on-ramp movements at the intersection, which would increase delay for the controlled eastbound and westbound movements at the intersection. However, based on the intersection traffic control, lane configurations, and volumes using the intersection the traffic analysis software cannot report delay for the controlled movements, so we must conservatively find that this is a potentially significant impact.

<u>Mitigation 5</u>

The west leg of the intersection provides access to the Stone Lake National Wildlife Refuge and is and will remain undeveloped, so the volumes for turn movements to/from the west are low. A review of the latest three-year collision records from the Statewide Integrated Traffic Records System (SWITRS) database revealed no reported collision at or near the intersection. Although the project would add traffic to the uncontrolled on- and off-ramp movements at this intersection, no mitigation are recommended based on the following factors:

- The west leg of the intersection is and will remain undeveloped.
- Volumes are low on the controlled movements and will remain low without development.
- There were no reported collisions at the intersection indicating need for modified intersection traffic control.
- Traffic volumes on the controlled movements would not warrant installation of traffic signal control.

Therefore, this impact would remain significant and unavoidable.

Impact 6 – Elk Grove Boulevard/Bruceville Road

The addition of project traffic would worsen weekday PM peak hour operations at this intersection. However, the volume increase would only increase control delay by one second. Based on City of Elk Grove significance criteria, this is a less than significant impact, since the addition of project traffic would not increase control delay by more than five seconds.

Mitigation 6

No mitigation required.

Impact 7 – Elk Grove Boulevard (Near SR 99/Elk Grove Boulevard Interchange)

Intersections 6, 7, 9

The addition of project traffic would worsen unacceptable operations at near the SR 99/Elk Grove Boulevard interchange. This is a potentially significant impact.

Mitigation 7

Under cumulative conditions, the intersection operations were conducted assuming modified traffic signal timings, consistent with the City's ongoing traffic signal coordination and maintenance in response to traffic growth.

There is limited right-of-way for physical (i.e., capacity) improvements along the Elk Grove Boulevard corridor. The corridor is largely constructed to its general plan designation as a six-lane arterial. However, the City is nearing construction of the SR 99/Elk Grove Boulevard interchange Northbound Loop On-Ramp, which is the final phase of the interchange project. In addition, the planned SR 99/Whitelock Parkway that is planned between Elk Grove Boulevard and Grant Line Road would provide an alternative to Elk Grove Boulevard and Grant Line Road for trips with an origin/destination west of SR 99 in the Laguna Ridge Specific Plan. Implementation of the SR 99/Northbound Loop On-Ramp and the planned SR 99/Whitelock Parkway interchange would reduce delay at most of the study intersections identified below, except for the Elk Grove Boulevard/Big Horn Boulevard intersection. The effect of these improvements diminishes as one travels west of Elk Grove Boulevard. With these improvement, volume would increase on the westbound left-turn lane (a critical turn movement), increasing average intersection delay.

Implementation of Northbound Loop On-Ramp and Whitelock Parkway Interchange		
Intersection	**Weekday PM[1]**	
	Before	**After**
Elk Grove Boulevard/Big Horn Boulevard	F (83)	F (94)
Elk Grove Boulevard/Laguna Springs Drive	E (65)	D (48)
Elk Grove Boulevard/Auto Center Drive	D (37)	C (29)
Elk Grove Boulevard/SR 99 Southbound Ramps	F (88)	E (57)
Elk Grove Boulevard/East Stockton Boulevard	E (72)	D (45)
East Stockton Boulevard/SR 99 Ramps	D (53)	D (42)
Civic Center Drive/Big Horn Boulevard	F (104)	E (68)
Denali Circle/Big Horn Boulevard	C (27)	C (27)
Lotz Parkway/Big Horn Boulevard	D (45)	D (40)
Whitelock Parkway/Big Horn Boulevard	C (27)	C (27)

Notes: [1]Level of Service (Delay)

Elk Grove Boulevard between Bruceville Road and East Stockton Boulevard is identified in the General Plan Background Report as operating worse than LOS D during the PM peak hour. Consistent with Policy CI-14, the City recognizes that level of service D may not be achieved on these roadway segments.

Implementation of the improvements outlined above would reduce delay along the Elk Grove Boulevard and Kammerer Road corridors, including operations near the SR 99/Elk Grove Boulevard interchange, which experiences congested conditions due to closely spaced intersection that are characterized by long vehicle queues. However, implementation of these improvements would not result in acceptable LOS D or better operations. Therefore, this impact would remain significant and unavoidable.

Impact 8 – Elk Grove Boulevard/Laguna Springs Drive

The addition of project traffic would worsen weekday PM peak hour operations at this intersection. The volume increase would increase control delay by more than five seconds. Based on City of Elk Grove significance criteria, this is a potentially significant impact.

Mitigation 8

Providing right-turn overlap phasing for the northbound right-turn movement would improve operations to acceptable LOS D conditions during the weekday PM peak hour. Right-turn overlap phasing would require prohibiting westbound u-turn movements at the intersection. With this improvement, this impact would be less than significant. Also refer to Mitigation 7, which relates to operation at this intersection.

Impact 9 – Elk Grove Boulevard/East Stockton Boulevard

The addition of project traffic would worsen weekday PM peak hour operations at this intersection. However, the volume increase would only increase control delay by five seconds. Based on City of Elk Grove significance criteria, this is a less than significant impact, since the addition of project traffic would not increase control delay by more than five seconds.

Mitigation 9

No mitigation required

Impact 10 – Civic Center/Big Horn Boulevard

The addition of project traffic would worsen weekday PM and Saturday peak hour operations at this intersection. The volume increase would increase control delay by more than five seconds. Based on City of Elk Grove significance criteria, this is a potentially significant impact.

Mitigation 10

There is limited right-of-way for physical (i.e., capacity) improvements along Big Horn Boulevard, which is constructed to its general plan designation as a four-lane arterial. However, the planned SR 99/Whitelock Parkway to be located between Elk Grove Boulevard and Grant Line Road would provide an alternative to Elk Grove Boulevard and Grant Line Road for trips with an origin/destination west of SR 99 in the Laguna Ridge Specific Plan. Implementation of the planned SR 99/Whitelock Parkway interchange would reduce delay at this intersection as identified below.

Implementation of the Whitelock Parkway Interchange		
Intersection	Weekday PM[1]	
	Before	After
Civic Center Drive/Big Horn Boulevard	F (104)	E (68)

Notes: [1]Level of Service (Delay)

However, implementation of these improvements would not result in acceptable LOS D or better operations. Therefore, this impact would remain significant and unavoidable.

FREEWAY FACILITY OPERATIONS

Table 9 summarizes the cumulative AM and PM peak hour freeway operations on SR 99 and I-5 (refer to separate Appendix C for detailed calculations). As shown, most of the study freeway facilities would operate acceptably at LOS D or better during both peak hours with the addition of project traffic, except for the SB I-5 mainline (north of Elk Grove Boulevard) and the SB I-5 Elk Grove Boulevard Off-ramp diverge area.

TABLE 9: FREEWAY ANALYSIS – CUMULATIVE PLUS PROJECT CONDITIONS

Freeway Facility	Type	Weekday PM Peak Hour		Saturday Peak Hour	
		Density	LOS	Density	LOS
1. NB SR 99 South of Elk Grove Boulevard	Basic Segment	19.1	C	17.7	B
2. NB SR 99 Elk Grove Boulevard Off-Ramp	Diverge	23.7	C	23.1	C
3. NB SR 99 Elk Grove Boulevard Loop On-Ramp	Merge	32.9	D	30.3	D
4. NB SR 99 Elk Grove Boulevard Slip On-Ramp	Merge	27.6	C	23.8	C
5. NB SR 99 North of Elk Grove Boulevard	Basic Segment	29.5	D	24.8	C
6. SB SR 99 North of Elk Grove Boulevard	Basic Segment	24.2	C	19.7	C

TABLE 9: FREEWAY ANALYSIS – CUMULATIVE PLUS PROJECT CONDITIONS					
Freeway Facility	**Type**	**Weekday PM Peak Hour**		**Saturday Peak Hour**	
		Density	**LOS**	**Density**	**LOS**
7. SB SR 99 Elk Grove Boulevard Off-Ramp	Diverge	17.5	B	13.8	B
8. SB SR 99 Elk Grove Boulevard Slip On-Ramp	Merge	25.8	C	21.7	C
9. SB SR 99 South of Elk Grove Boulevard	Basic Segment	22.7	C	17.5	B
10. NB I-5 South of Elk Grove Boulevard	Basic Segment	22.4	C	18.4	C
11. NB I-5 Elk Grove Boulevard Off-Ramp	Diverge	26.4	C	22.5	C
12. NB I-5 Elk Grove Boulevard Slip On-Ramp	Merge	26.2	C	24.6	C
13. NB I-5 North of Elk Grove Boulevard	Basic Segment	28.5	D	26.1	D
14. SB I-5 North of Elk Grove Boulevard	Basic Segment	*-*	***F***	20.9	C
15. SB I-5 Elk Grove Boulevard Off-Ramp	Diverge	*-*	***F***	26.2	C
16. SB I-5 Elk Grove Boulevard Loop On-Ramp	Merge	27.0	C	19.2	B
17. SB I-5 South of Elk Grove Boulevard	Basic Segment	27.6	D	18.0	C

Bold text indicates LOS worse than established threshold. *Italic and underlined text* identifies a potential impact.
Source: Fehr & Peers, 2014.

Impact 11 – SB I-5 Mainline and Off-ramp Diverge to Elk Grove Boulevard

Implementation of the project would add traffic to the SB I-5 mainline and off-ramp diverge, which would operate unacceptably at LOS F under cumulative conditions. The addition of project traffic would increase the density of the I-5 mainline (north of Elk Grove Boulevard) and the I-5 SB off-ramp diverge influence area to Elk Grove Boulevard. This is a potentially significant impact.

Mitigation 11

Poor operation of the SB I-5 mainline (north of Elk Grove Boulevard) and the SB I-5 off-ramp diverge influence area to Elk Grove Boulevard is due to capacity constraints on SB I-5. Extending the third southbound lane on I-5 from its current terminus just south Laguna Boulevard to just south of Elk Grove Boulevard, would improve operations of these facilities to LOS D or better. Since this impact occurs under cumulative conditions, a fair share contribution to these improvements, based on the project's share of traffic using the facility under cumulative conditions, would mitigate this impact. However, since I-5 is under the jurisdiction of Caltrans, these facilities are outside the City's jurisdiction to implements improvements that would mitigate these impacts. Therefore, these impacts would be significant and unavoidable.

Impact 12 – SR 99 Freeway Operations

Peak period operations on SR 99 may be worse than reported due to reoccurring bottlenecks. As documented in the *California Department of Transportation Mobility Performance Report, 2009,* several bottleneck locations exist on SR 99 that meter traffic northbound in the morning and southbound in the evening. These bottlenecks cause congested conditions (i.e., vehicle speed of 35 miles per hour or less) and vehicle queuing on northbound SR 99 during the AM peak period. Similarly, bottlenecks on southbound SR 99 in the evening meter traffic on SR 99 through Elk Grove. This is a potentially significant impact.

Mitigation 12

General Policy CI-2 relates to coordination and participation with the City of Sacramento, Sacramento County, and Caltrans on roadway improvements that are shared by the jurisdictions in order to improve operations, including joint transportation planning efforts, roadway construction, and funding. Consistent with Policy CI-2, the City should continue to work with Caltrans and other affected agencies to address operational conditions on SR 99, which may include the extension of HOV lanes from their current terminus just south of Elk Grove Boulevard to south of Grant Line Road, which would ensure additional capacity on SR 99 through the City. However, this improvement would not address the impact of existing bottleneck locations that cause reoccurring congestion on SR 99. This commitment to improving operation on SR 99 in the City is also demonstrated with Policy CI-11, related to implementing improvements to I-5 and SR 99, and Policy CI-12, related to the

Capital SouthEast Connector project. However, since SR 99 is under the jurisdiction of Caltrans, these facilities are outside the City's jurisdiction to implements improvements that would mitigate these impacts. Therefore, these impacts would be significant and unavoidable.

BICYCLE AND PEDESTRIAN FACILITIES

The proposed project would integrate with existing bicycle and pedestrian facilities and will implement planned bicycle and pedestrian facilities in the Laguna Ridge Specific Plan, like the decomposed granite trail along the east boundary of the project. Implementation of the proposed project would not disrupt or interfere with existing bicycle or pedestrian facilities, and would not disrupt or interfere with the implementation of any planned bicycle or pedestrian facilities.

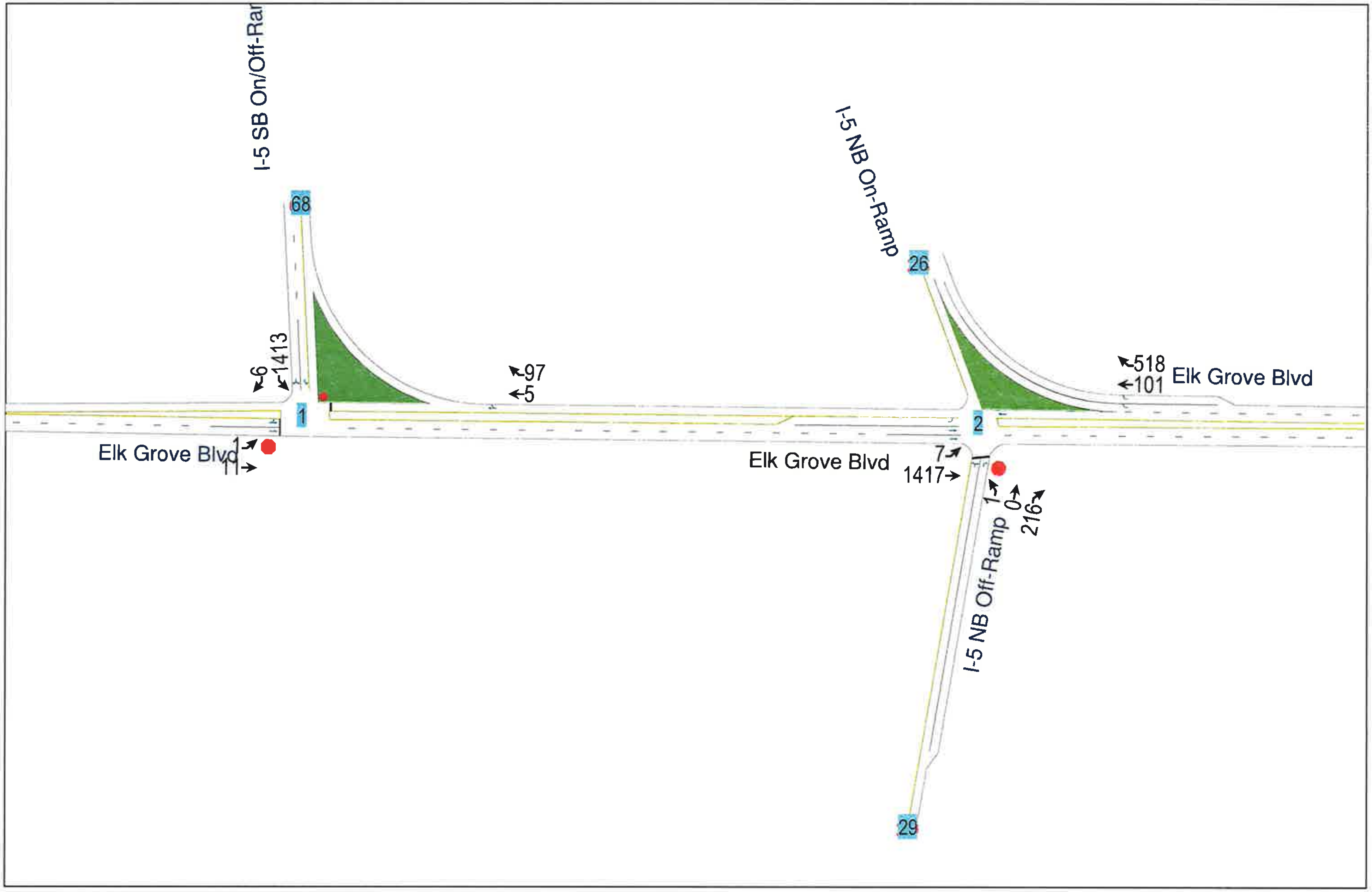
TRANSIT FACILITIES

Implementation of the proposed project would not disrupt or interfere with existing or planned transit operations or facilities.

APPENDIX A: EXISTING CONDITIONS

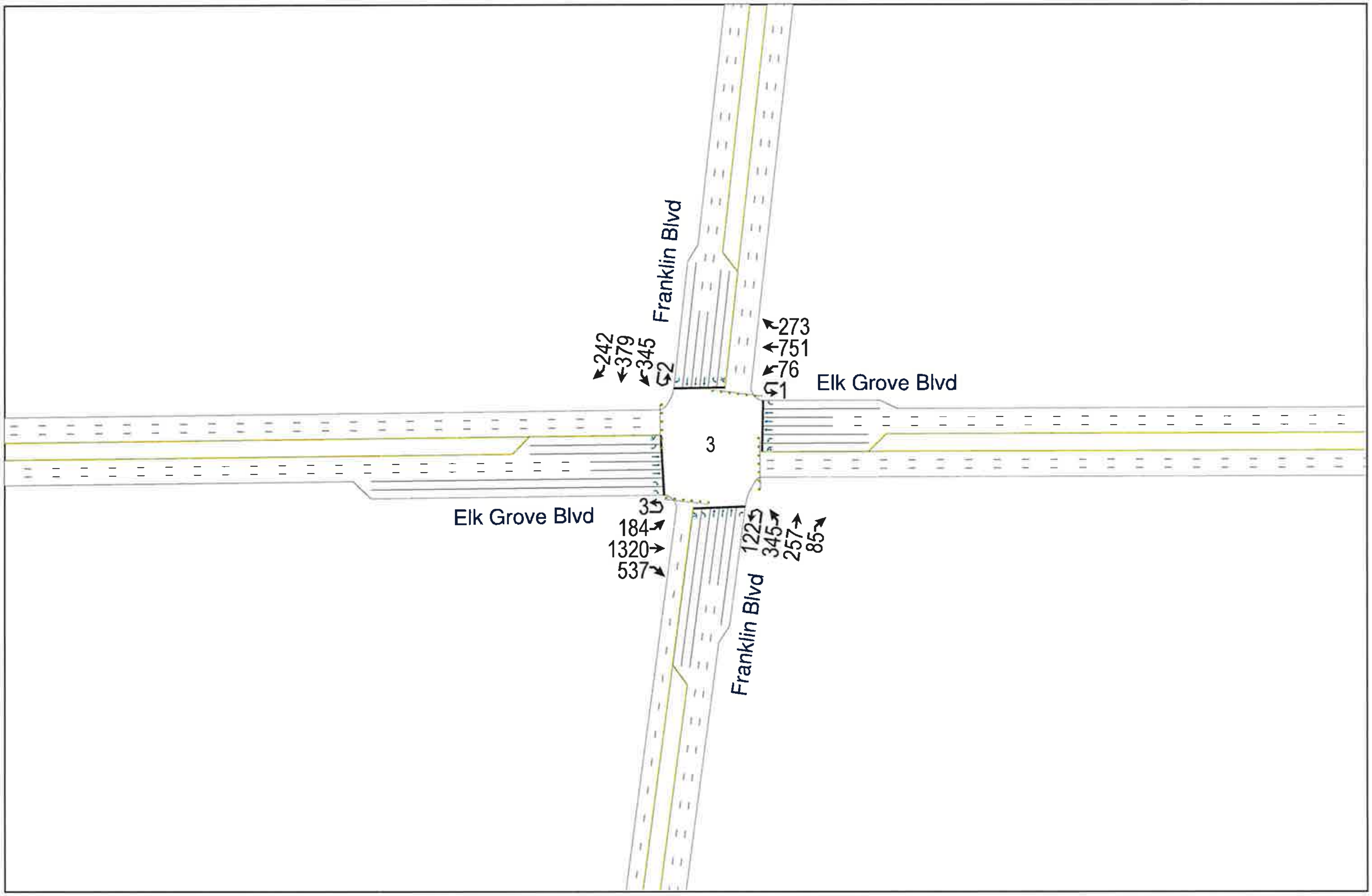
Elk Grove Civic Center Aquatics Complex

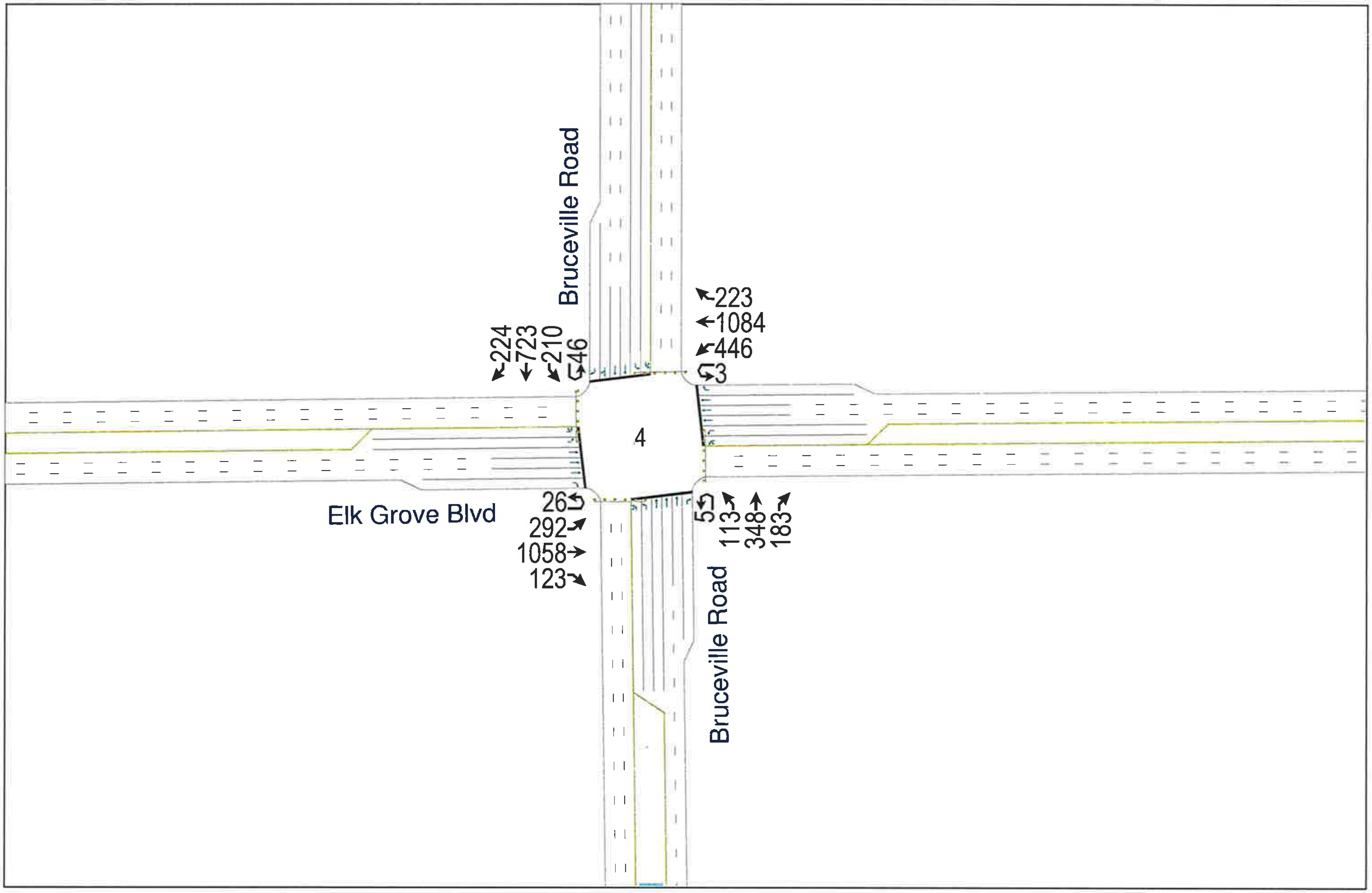
Existing Weekday Conditions
PM Peak Hour



Elk Grove Civic Center Aquatics Complex

Existing Weekday Conditions
PM Peak Hour

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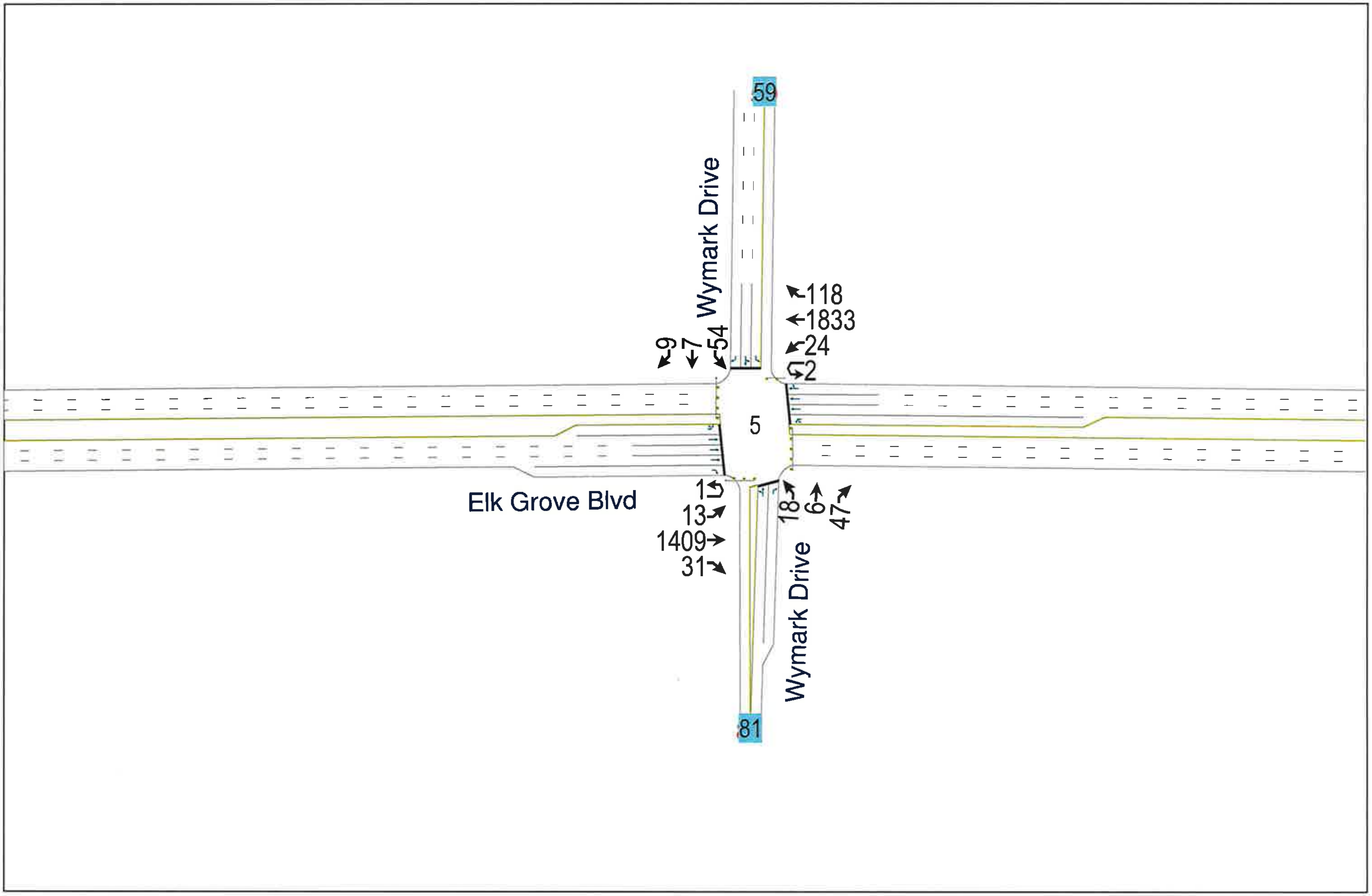
224
723
210
46
223
1084
446
3
4
Elk Grove Blvd
26
292
1058
123
5
113
348
183
Bruceville Road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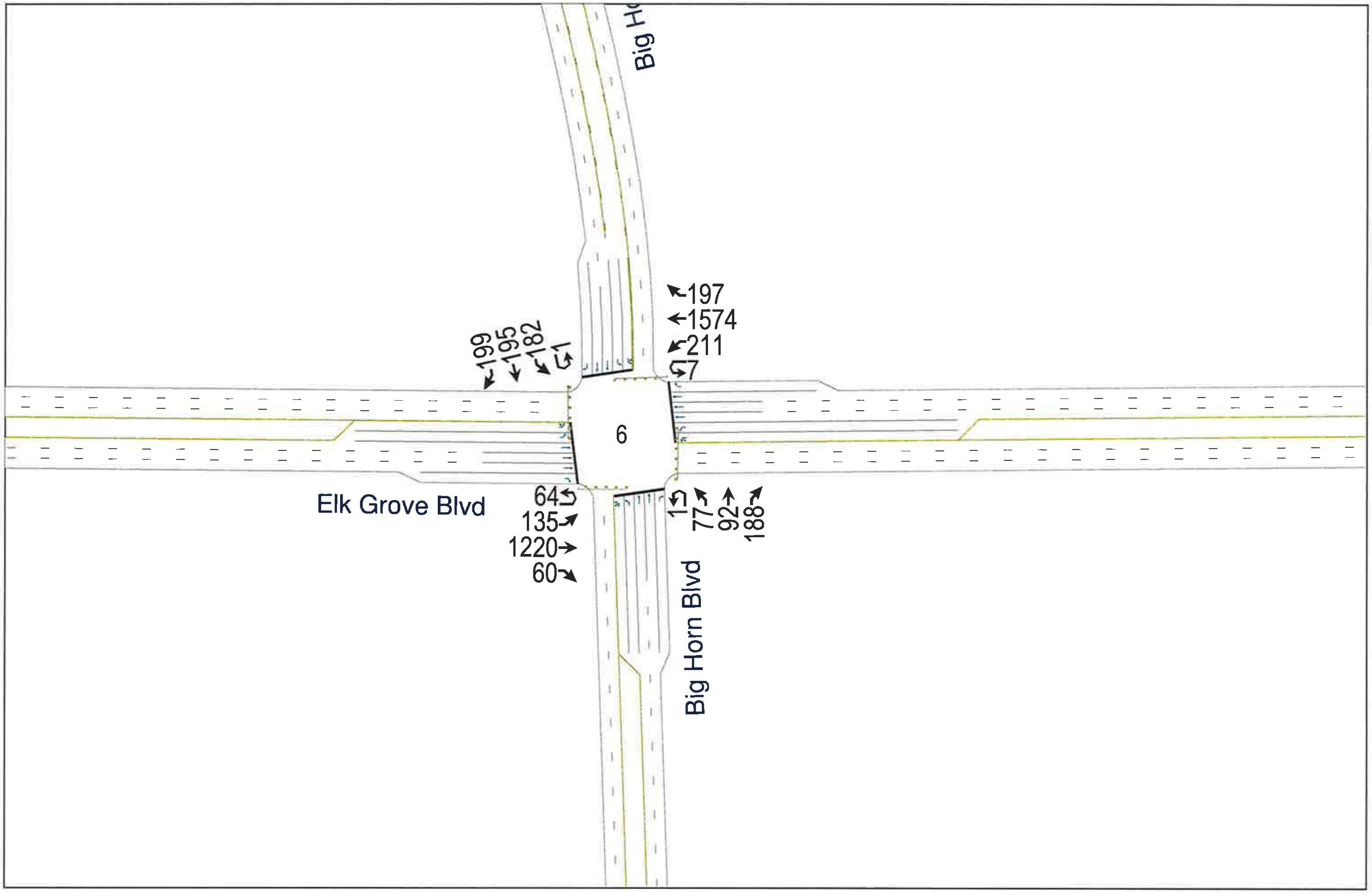
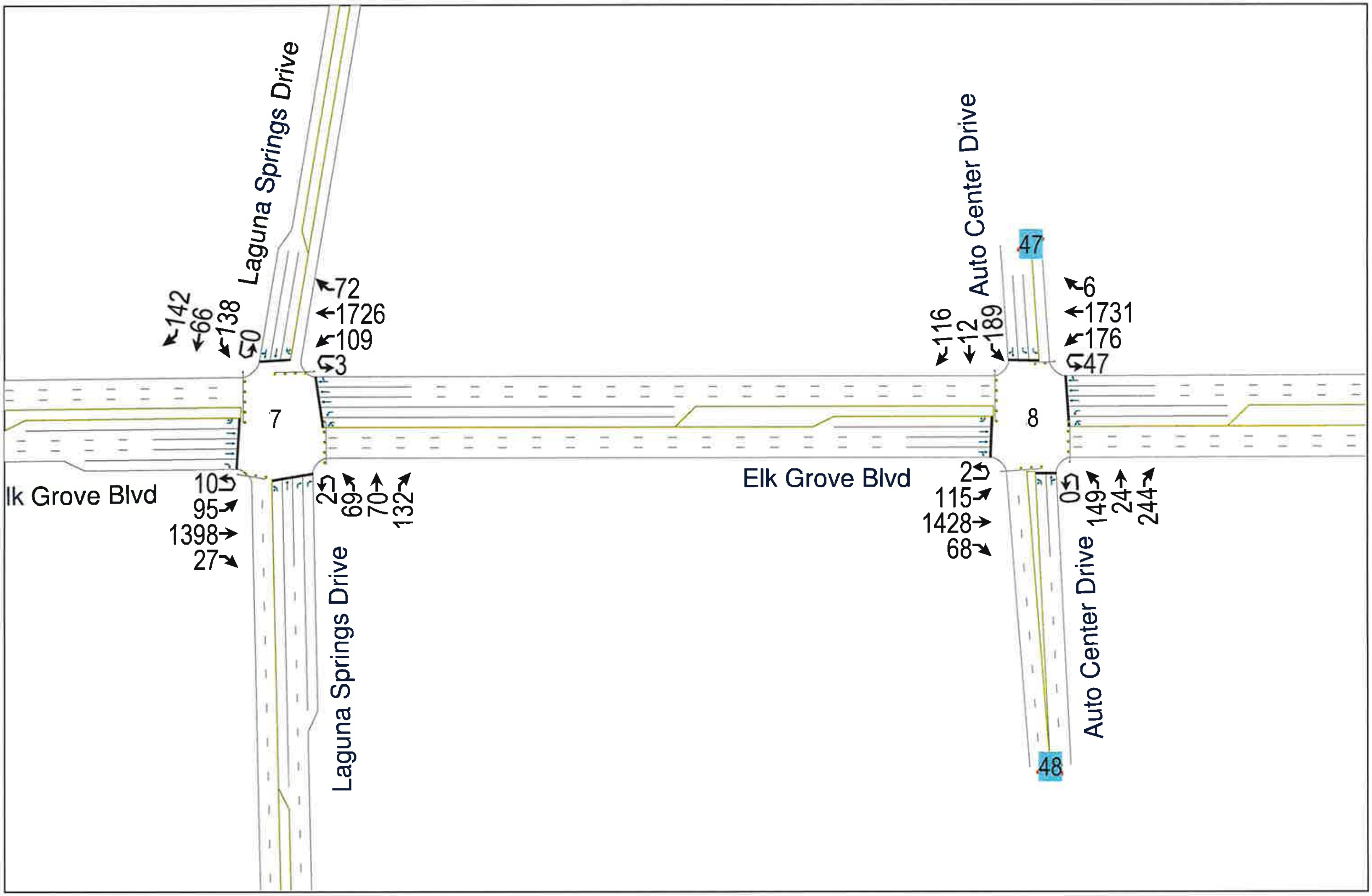
Wymark Drive
9
7
54
118
1833
24
2
5
Elk Grove Blvd
1
13
1409
31
18
6
47
Wymark Drive
81

Elk Grove Civic Center Aquatics Complex

Existing Weekday Conditions
PM Peak Hour

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142
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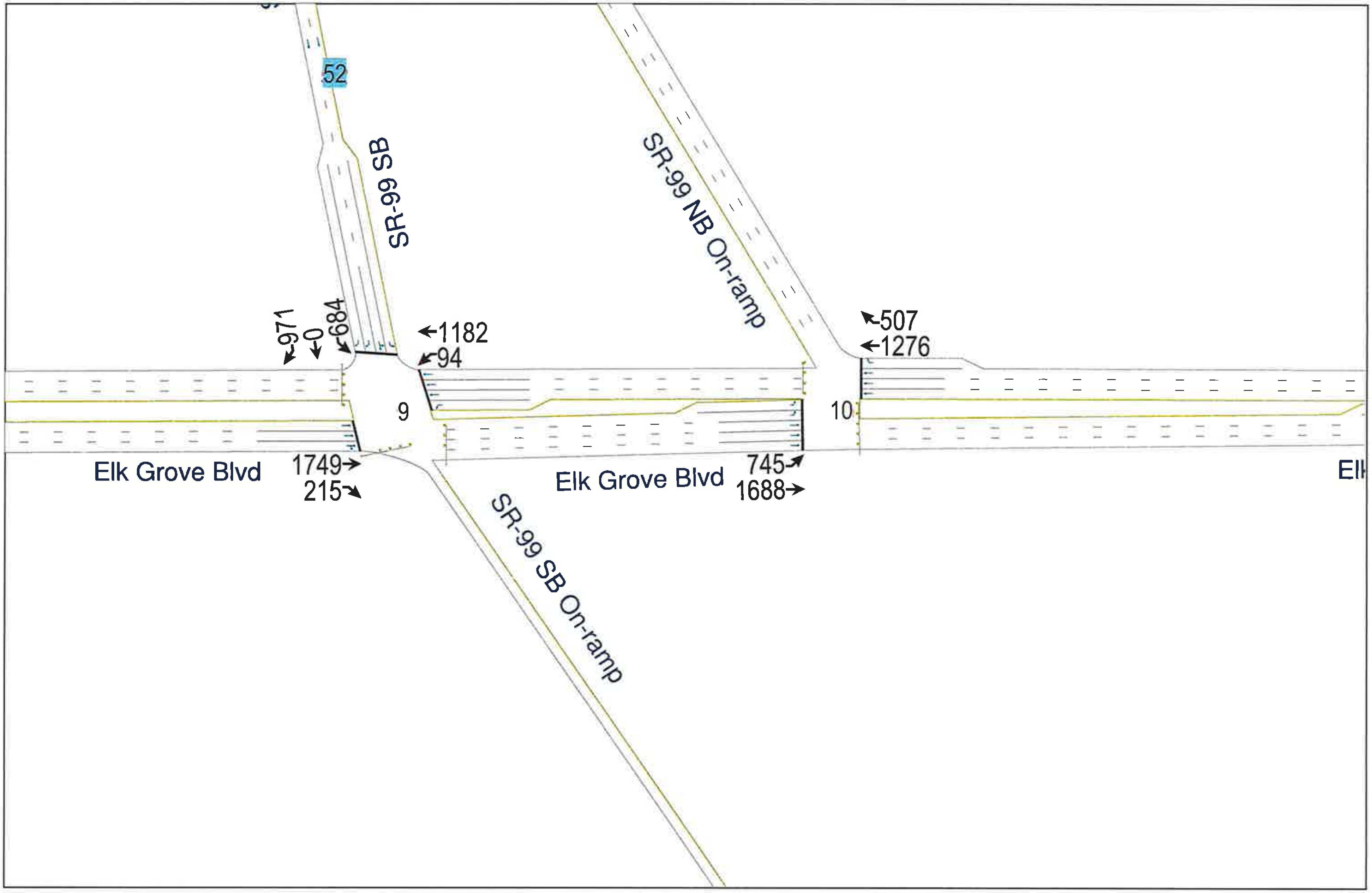
138
0
72
1726
109
3
7
Elk Grove Blvd
10
95
1398
27
2
69
70
132
Laguna Springs Drive
Auto Center Drive
47
116
12
189
6
1731
176
47
8
Elk Grove Blvd
2
115
1428
68
0
149
24
244
Auto Center Drive
48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SR-99 SB
SR-99 NB On-ramp
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0
684
1182
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10
Elk Grove Blvd
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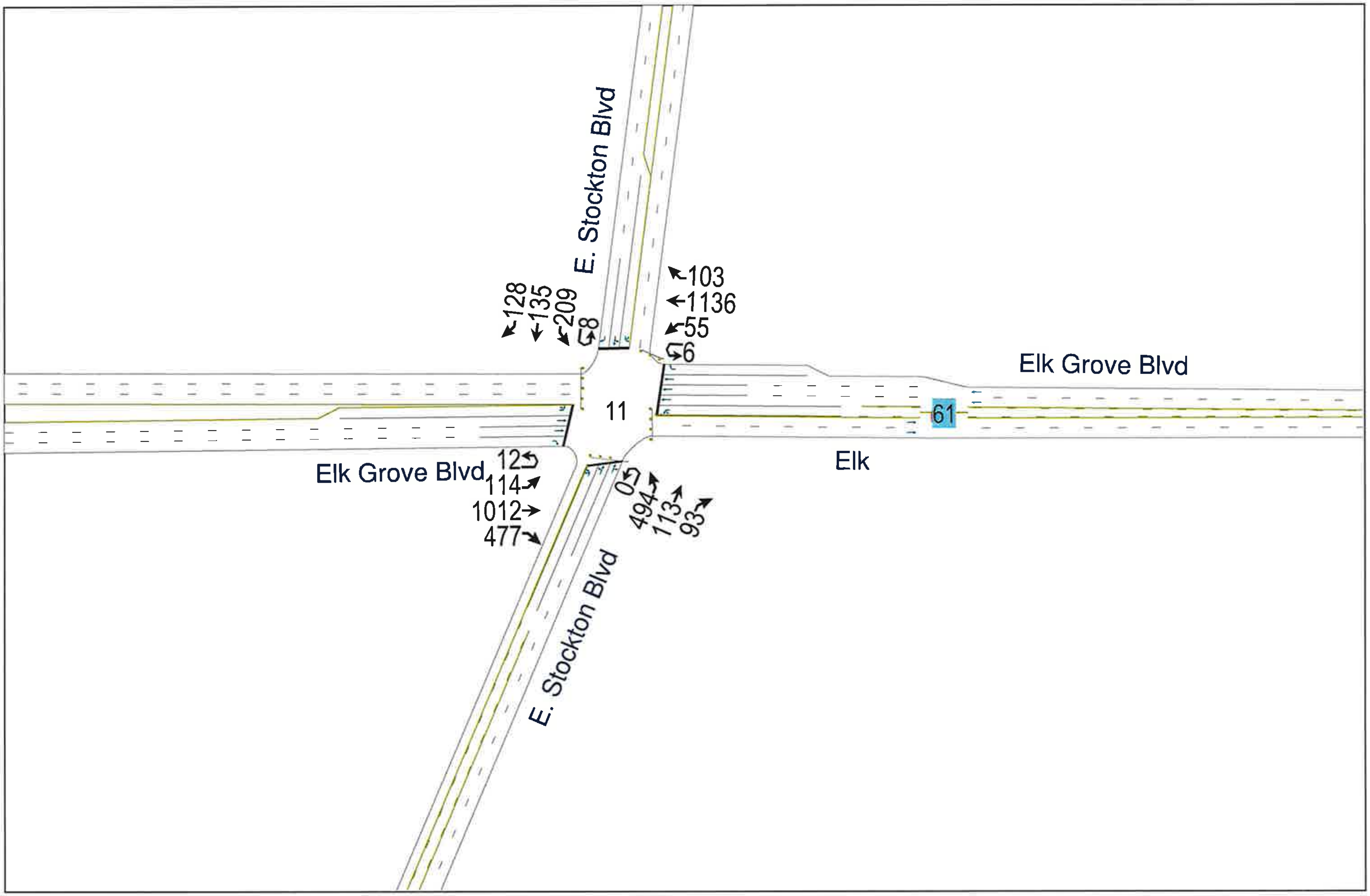
215
Elk Grove Blvd
745
1688
SR-99 SB On-ramp
Elk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128
135
209
8
103
1136
55
6
Elk Grove Blvd
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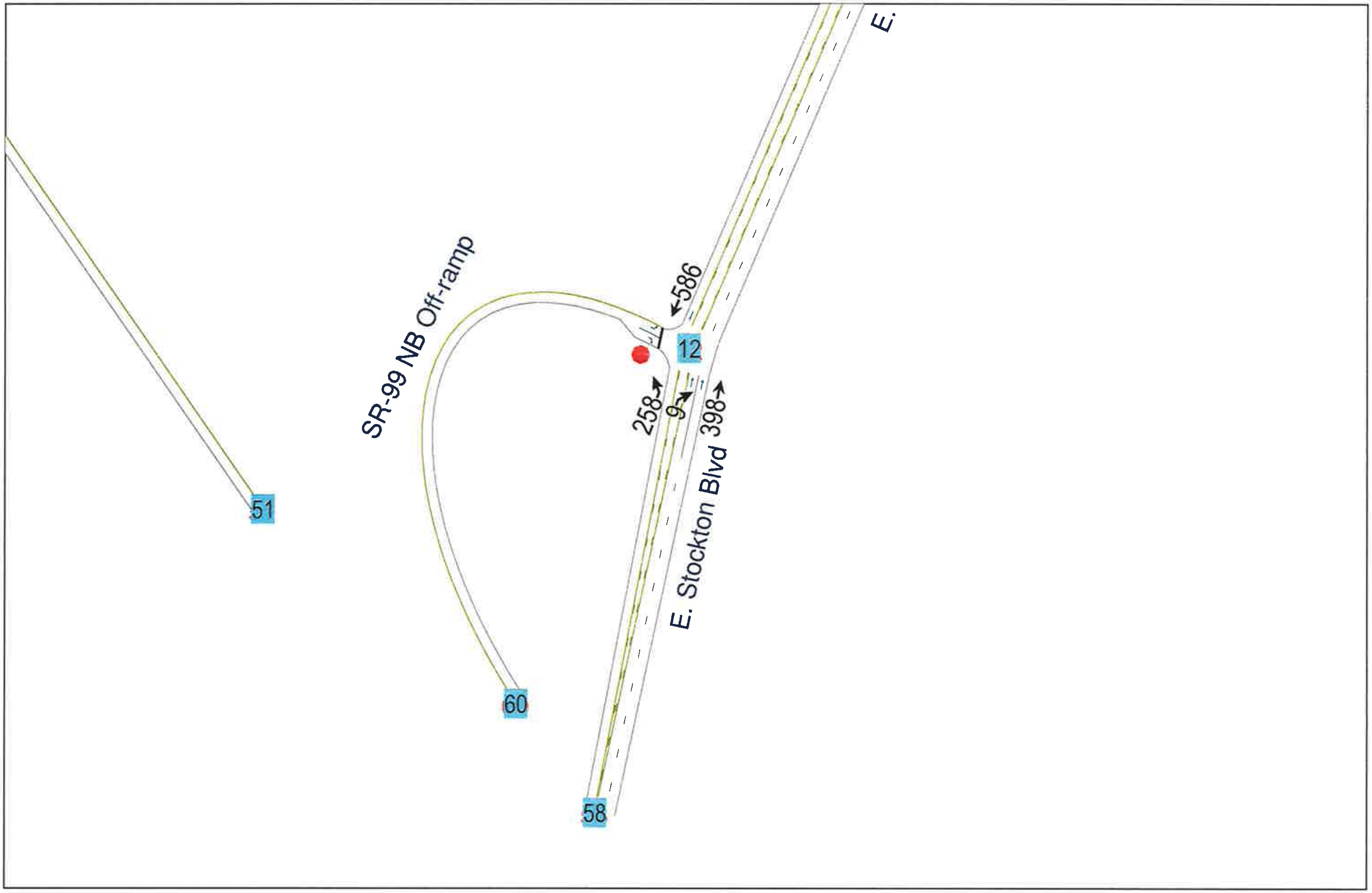
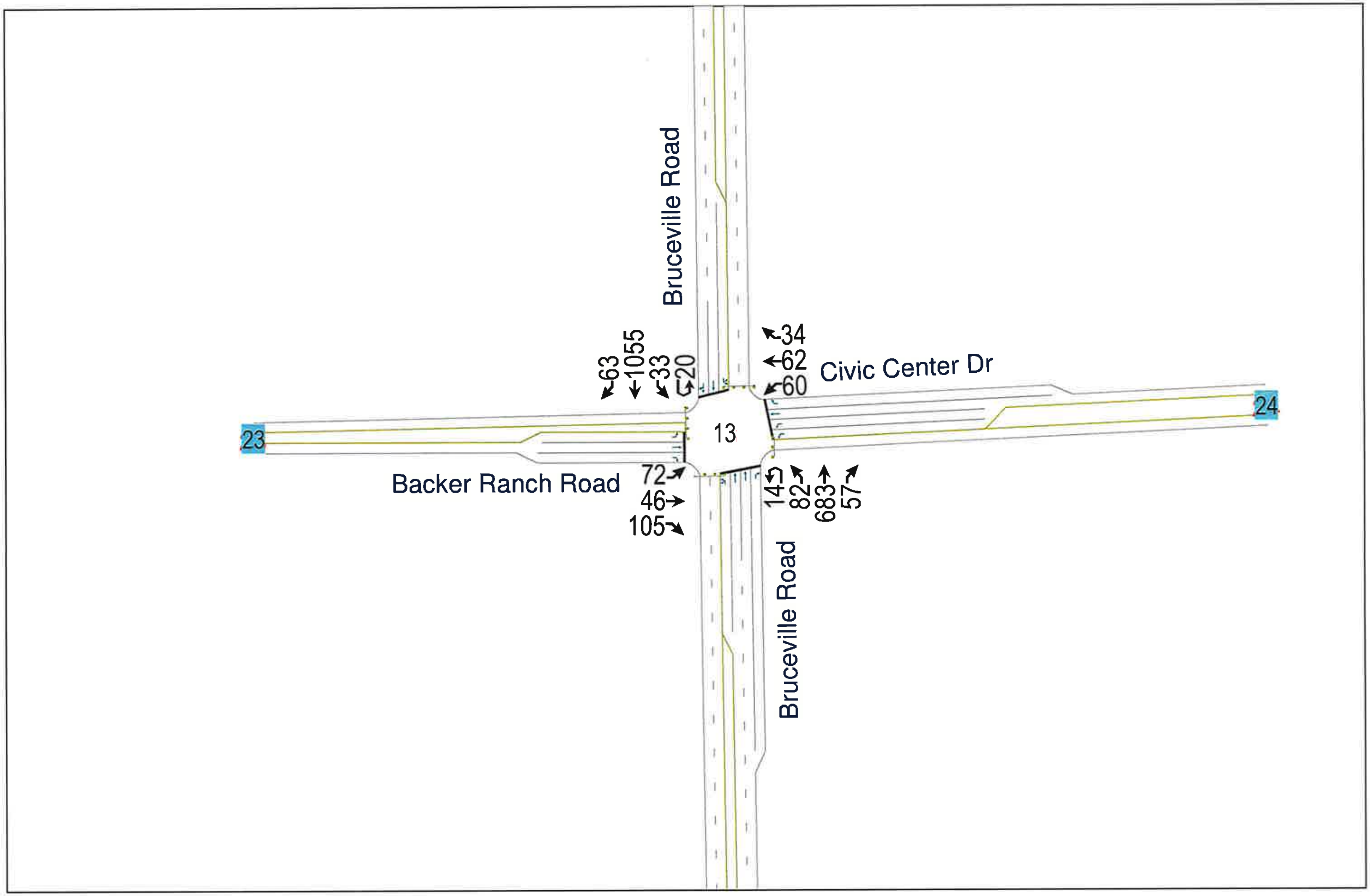
61
Elk Grove Blvd
12
114
1012
477
0
494
113
93
Elk
E. Stockton Blvd


E.
SR-99 NB Off-ramp
586
12
258
9
398
E. Stockton Blvd
51
60
58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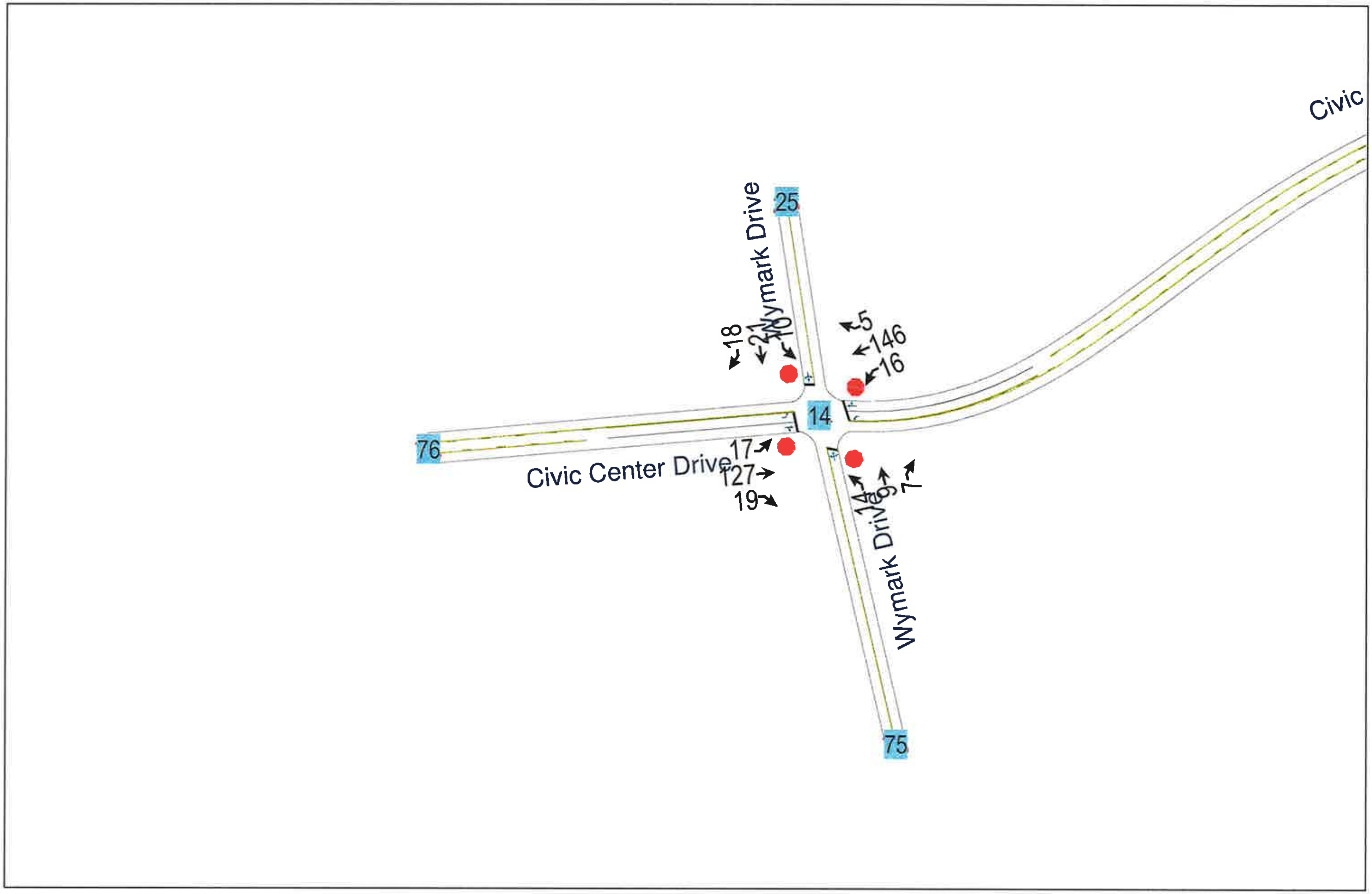
1055
33
20
34
62
60
Civic Center Dr
23
13
24
Backer Ranch Road
72
46
105
14
82
683
57
Bruceville Road


Civic
Wymark Drive
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18
21
10
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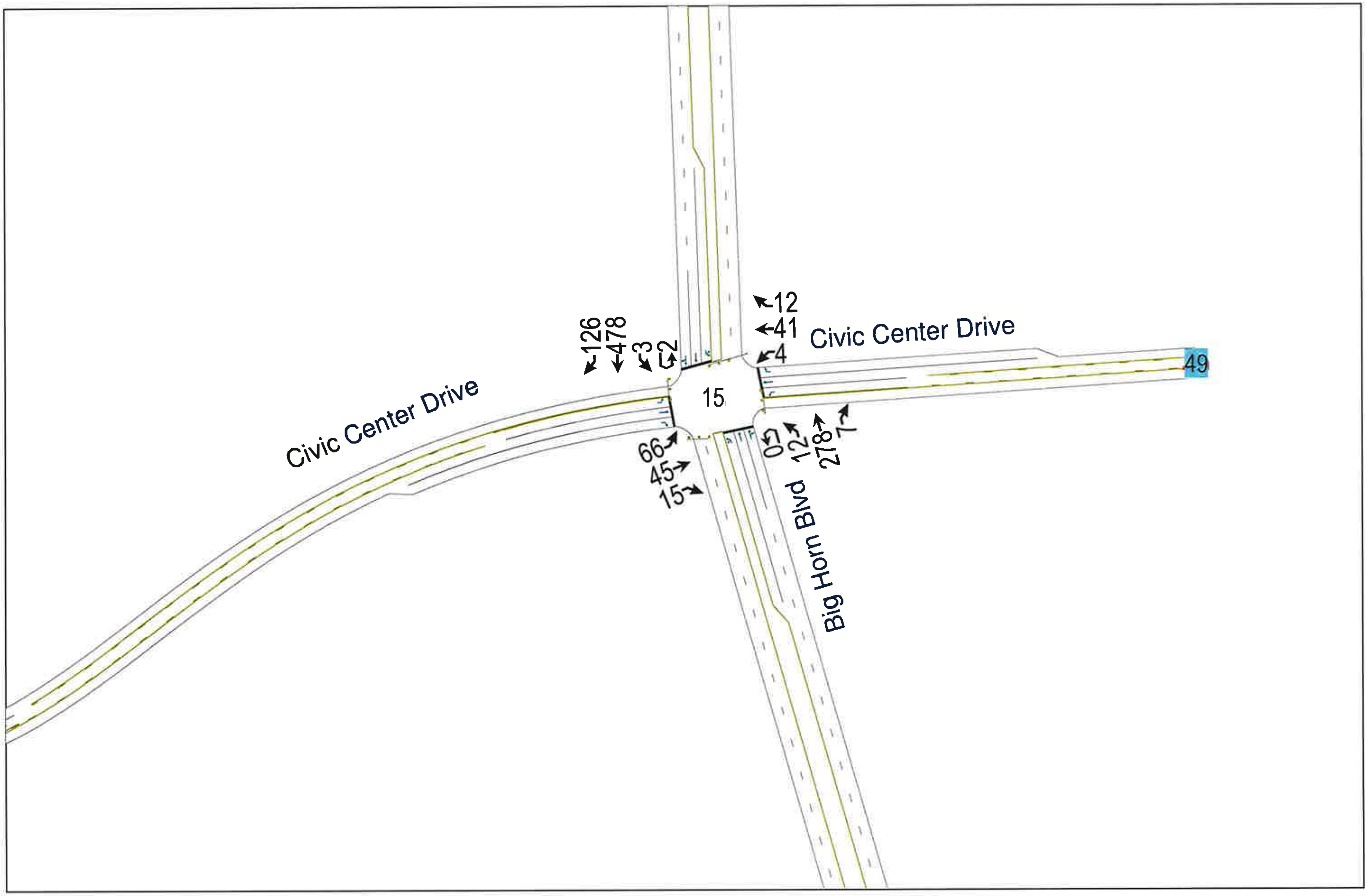
146
16
14
76
17
Civic Center Drive
127
19
14
9
7
Wymark Drive
75


Civic Center Drive
Civic Center Drive
Big Horn Blvd
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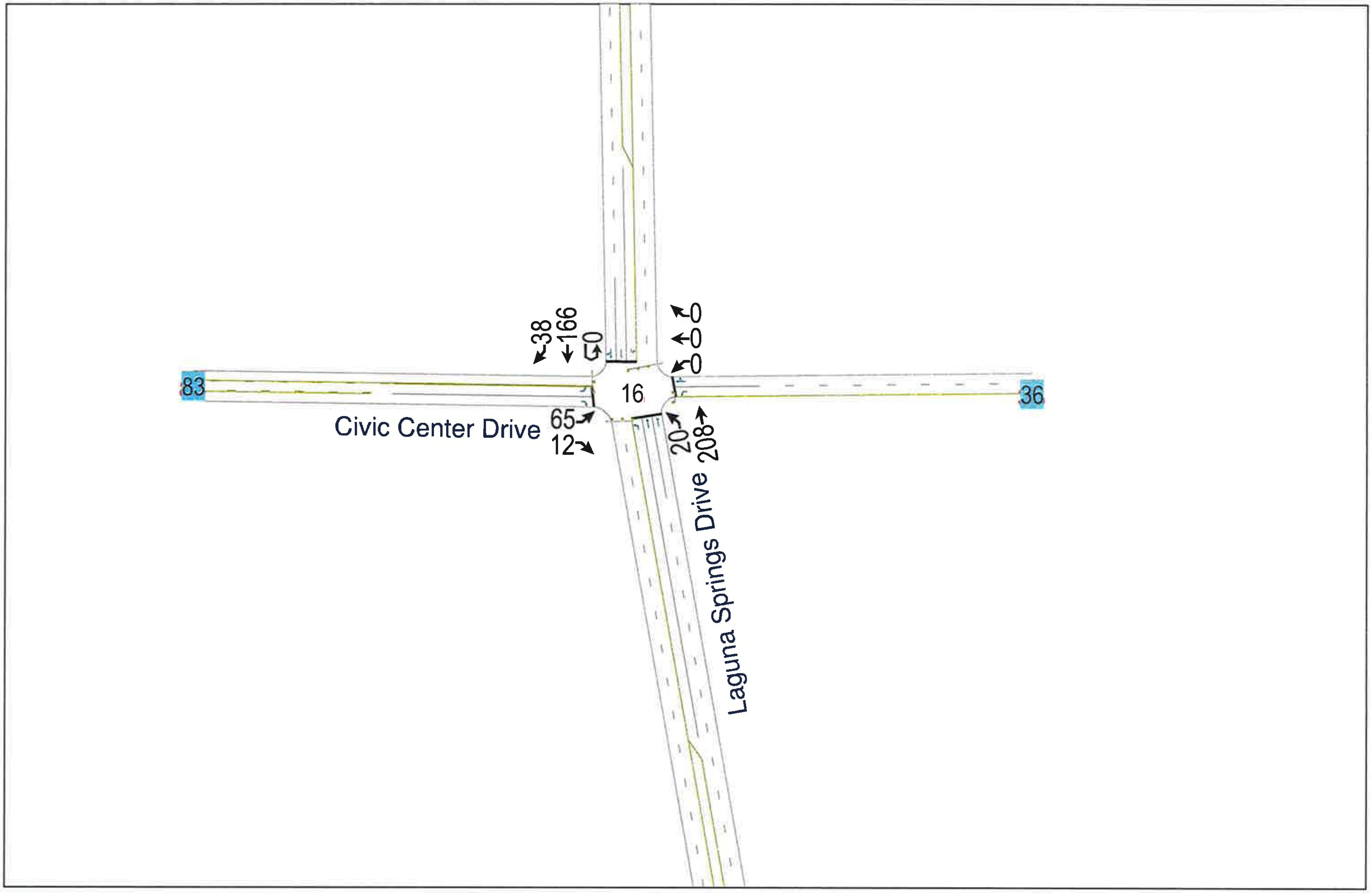
49
126
478
3
2
12
41
4
66
45
15
0
12
278
7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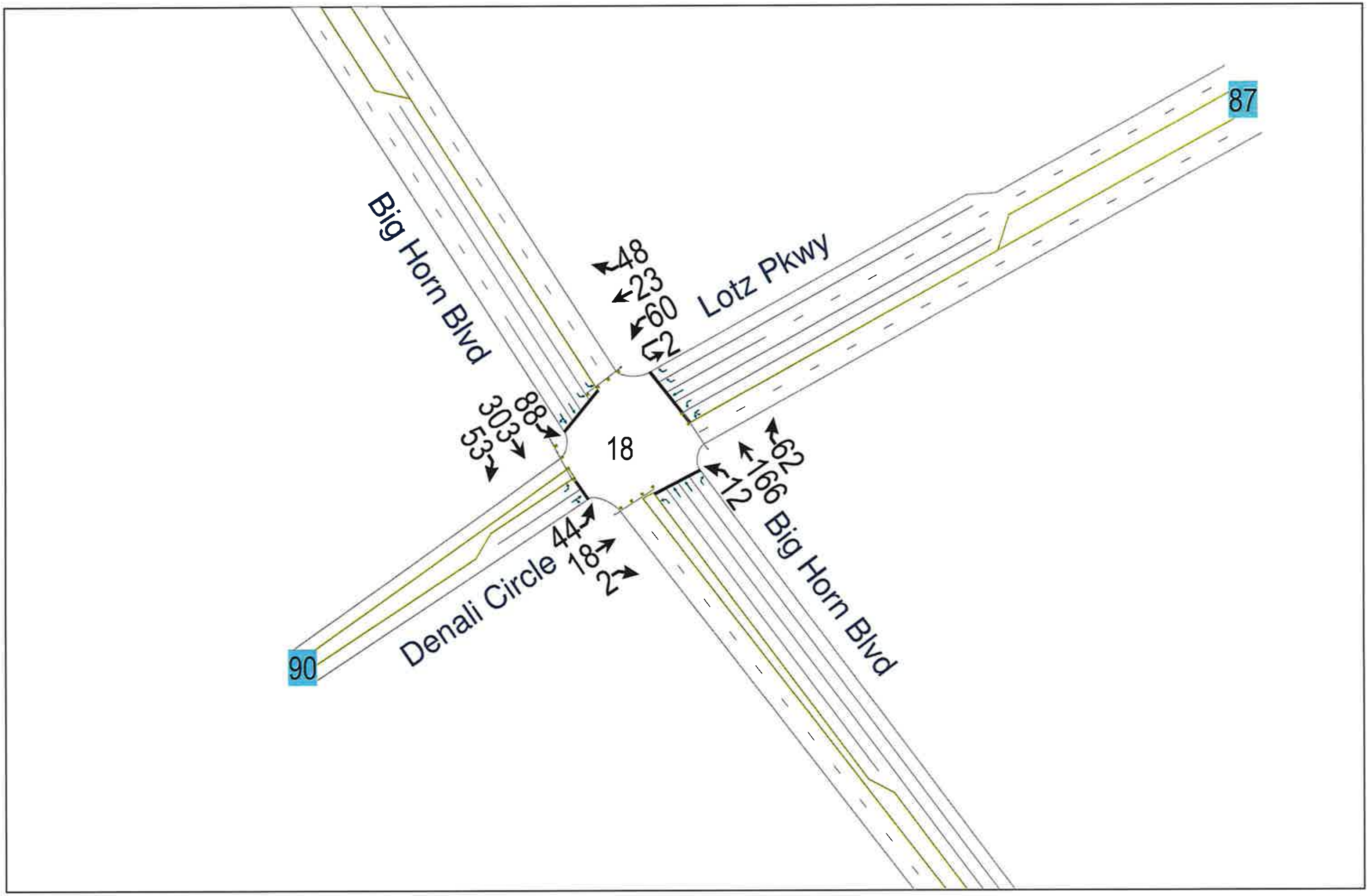
38
166
0
0
0
0
16
36
65
12
20
208
Civic Center Drive
Laguna Springs Drive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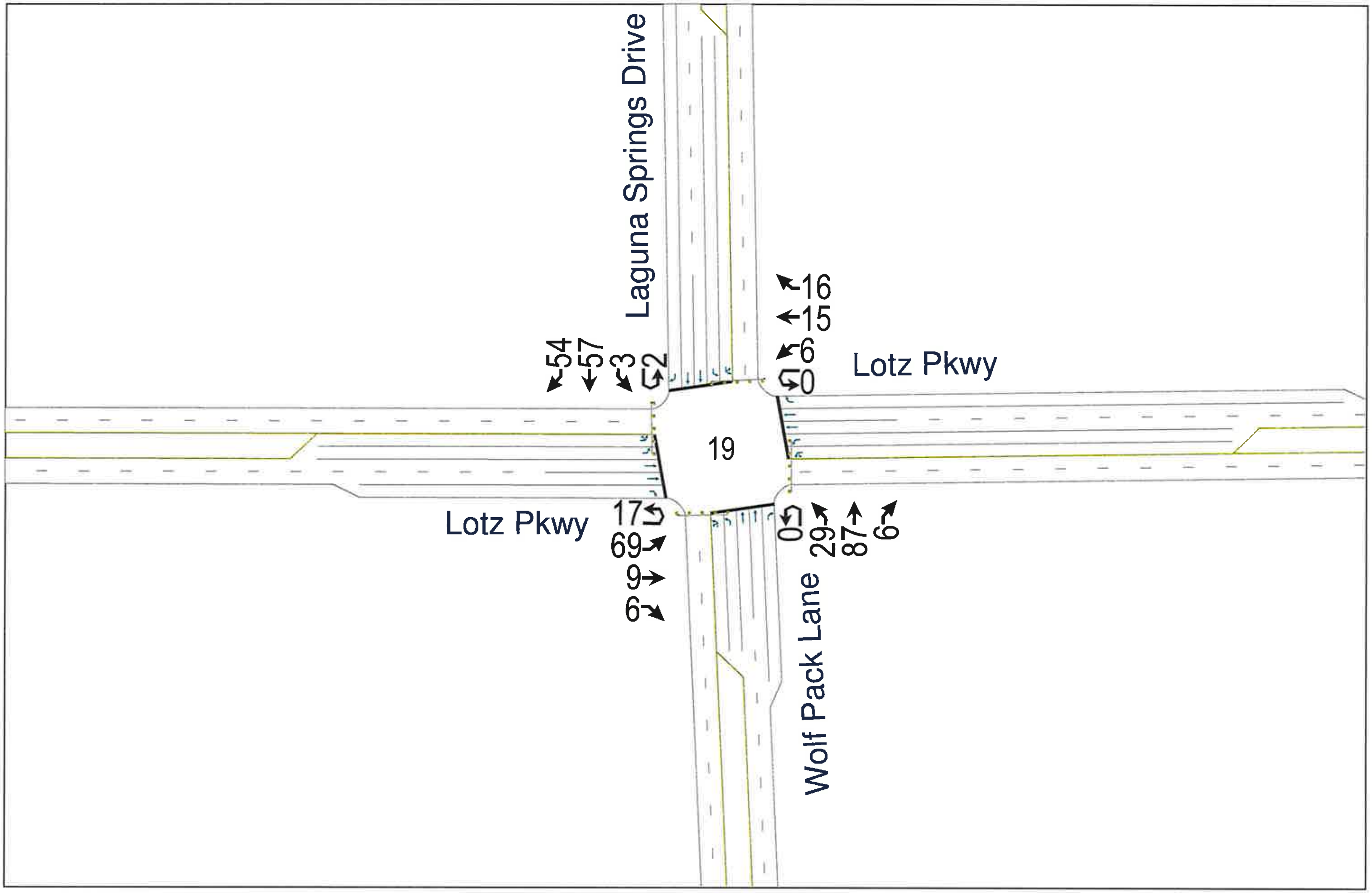
Big Horn Blvd
48
23
60
2
Lotz Pkwy
88
303
53
18
62
166
12
44
18
2
Denali Circle
Big Horn Blvd
90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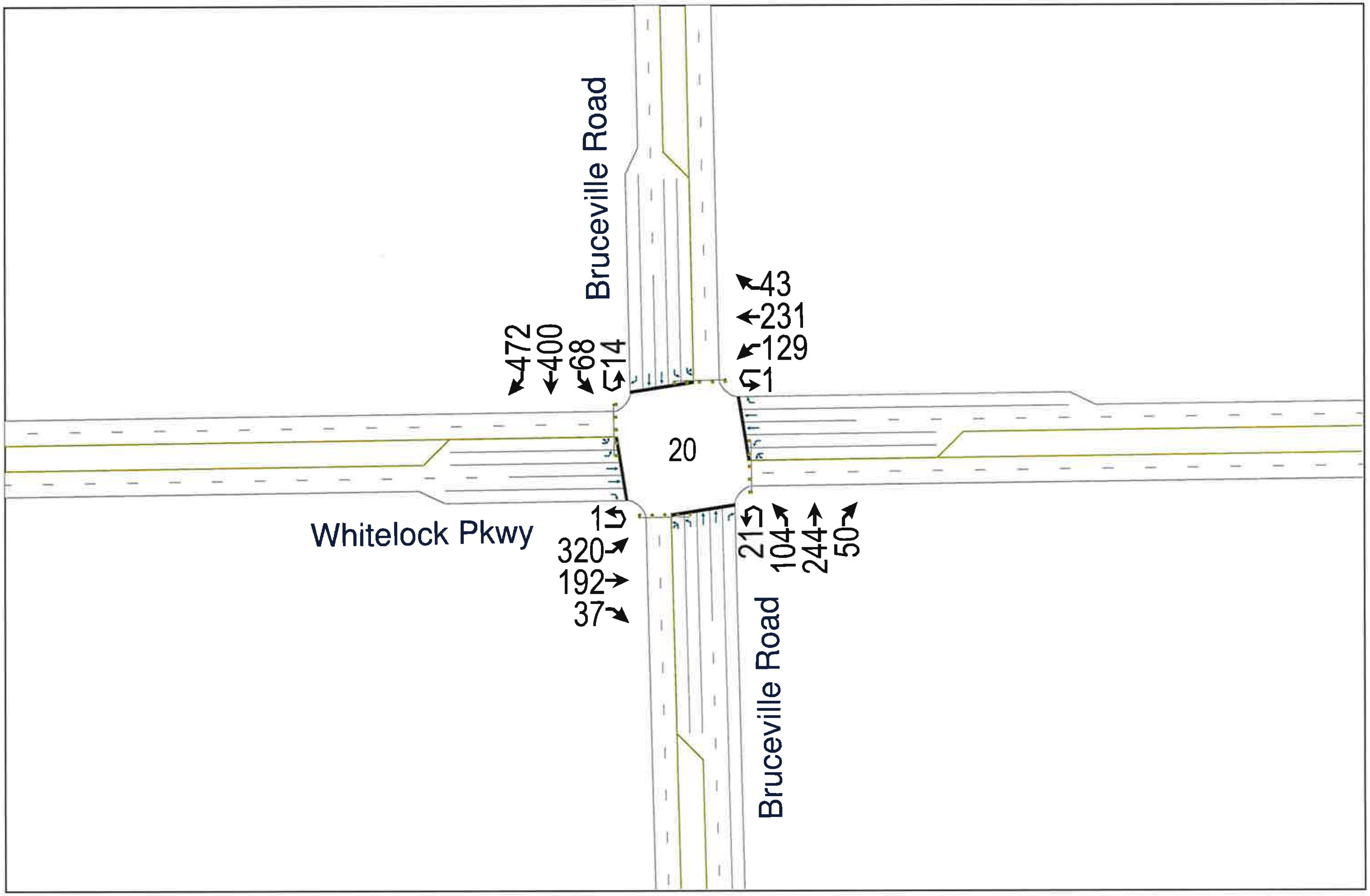
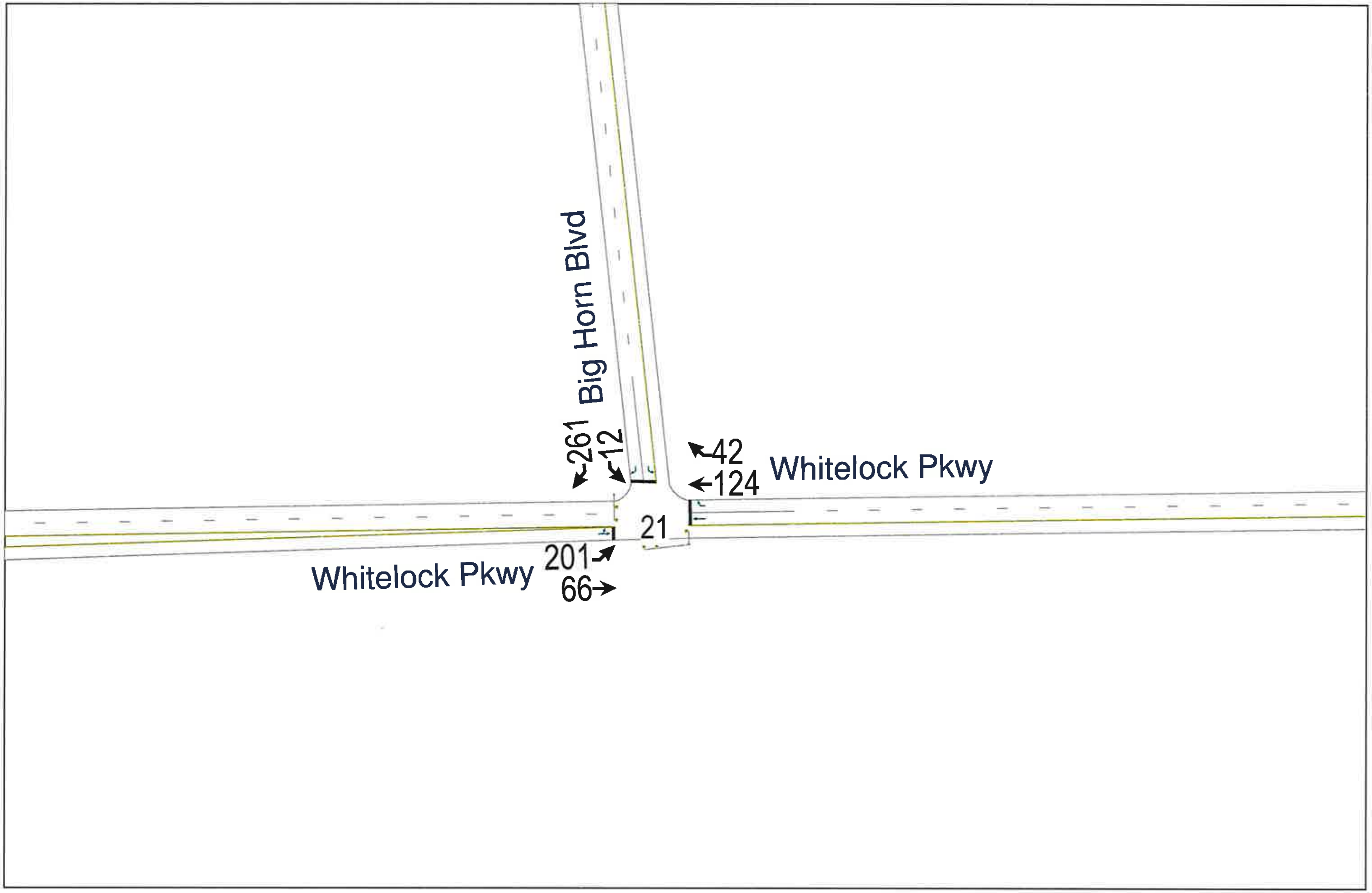
54
57
3
2
16
15
6
0
Lotz Pkwy
19
Lotz Pkwy
17
69
9
6
0
29
87
6
Wolf Pack Lane

Elk Grove Civic Center Aquatics Complex

Existing Weekday Conditions
PM Peak Hour

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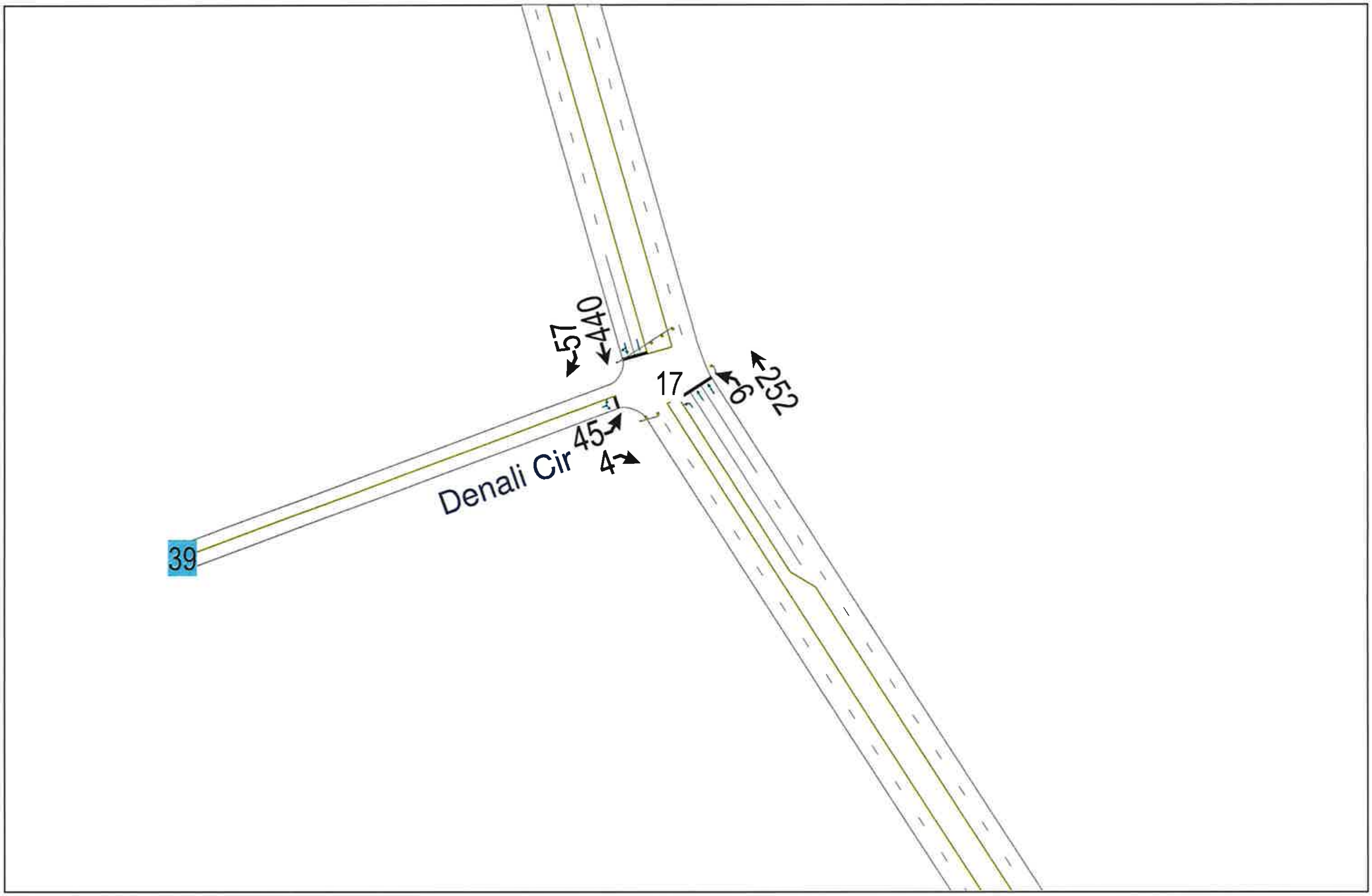
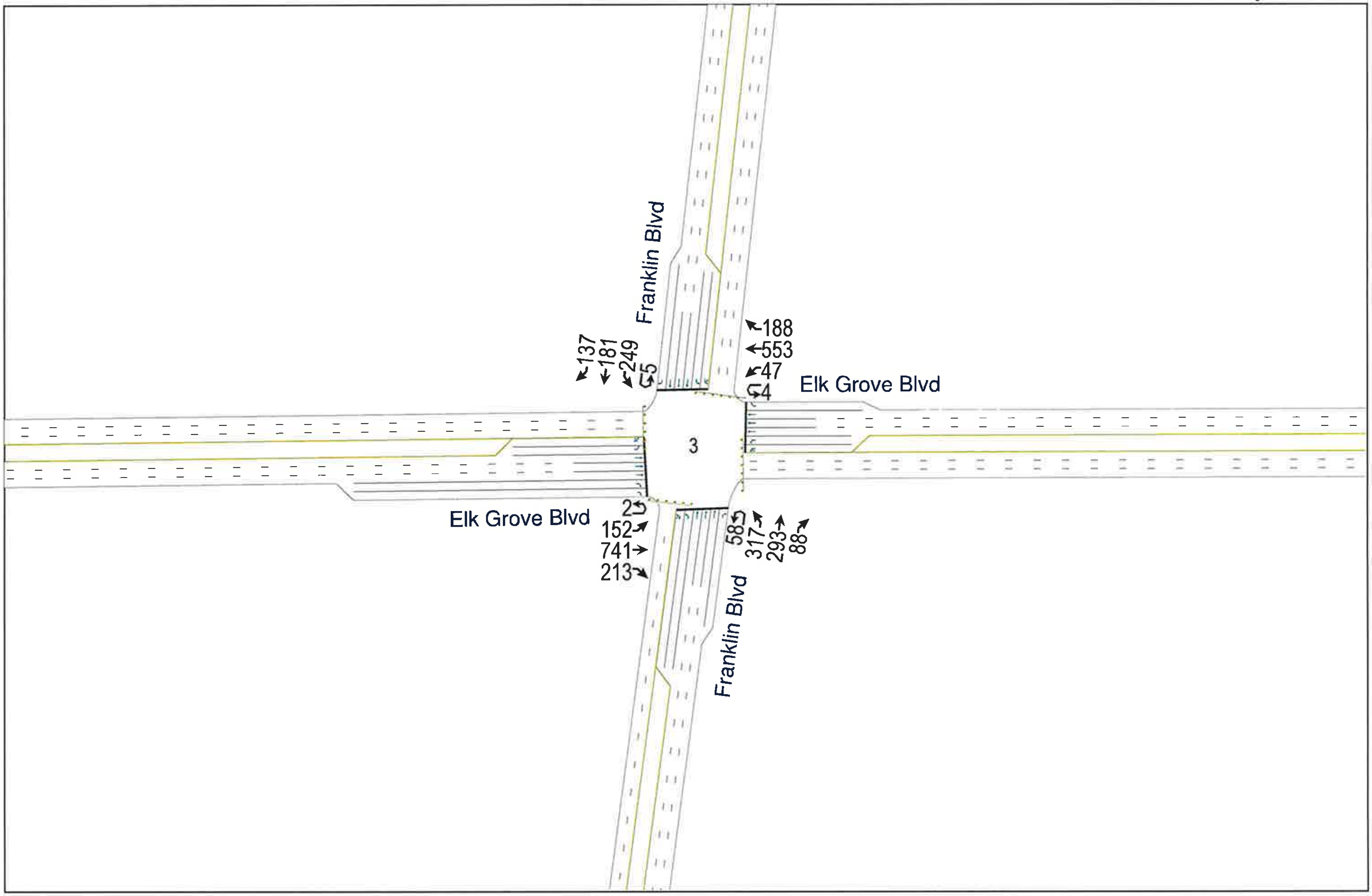
12
42
124
Whitelock Pkwy
21
201
66
Whitelock Pkwy


57
440
17
6
252
45
4
Denali Cir
39

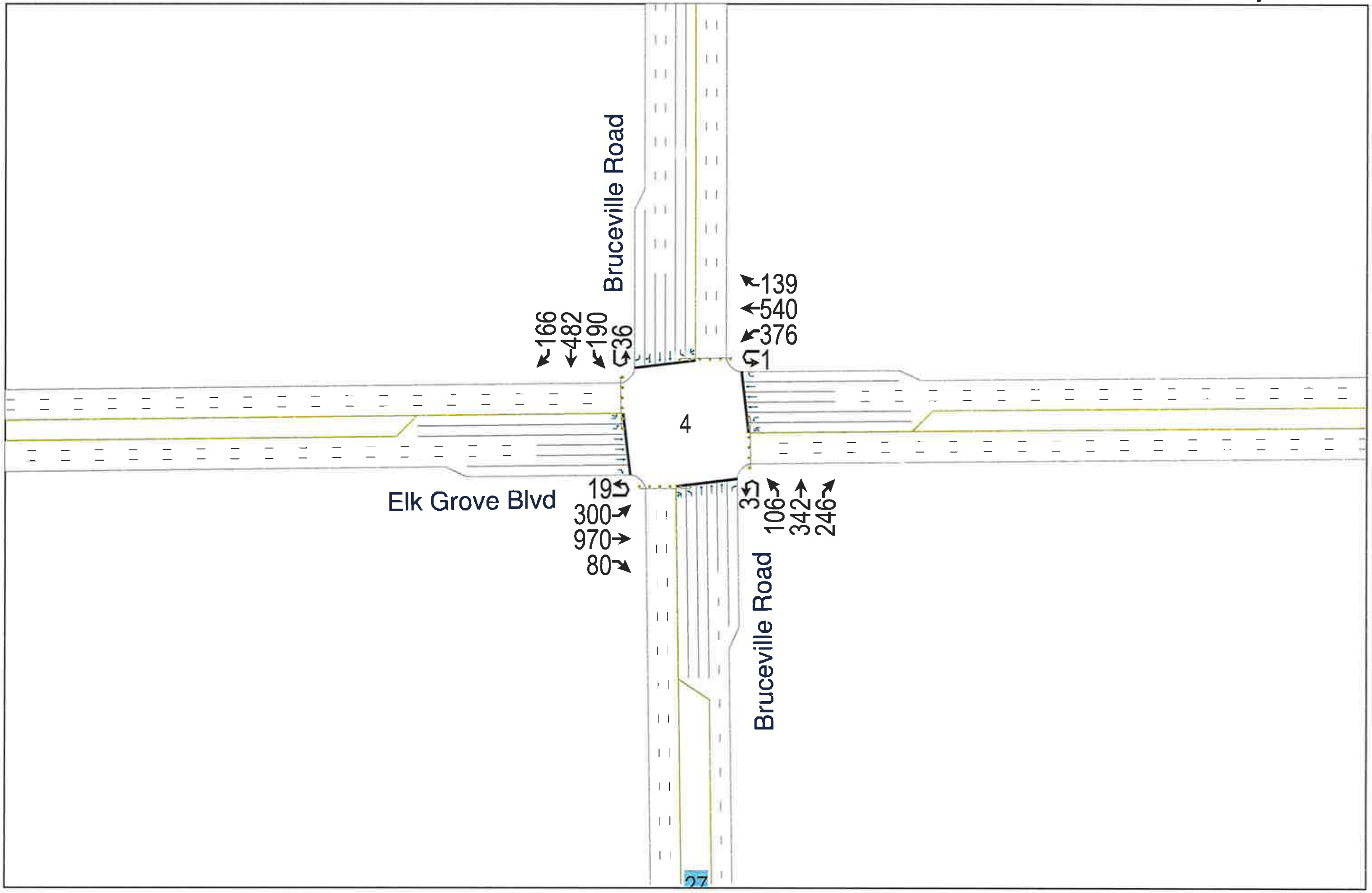
Elk Grove Civic Center Aquatics Complex

Existing Saturday Conditions
Saturday Peak Hour


Franklin Blvd
137
181
249
5
188
553
47
4
Elk Grove Blvd
3
2
152
741
213
Elk Grove Blvd
58
317
293
88
Franklin Blvd

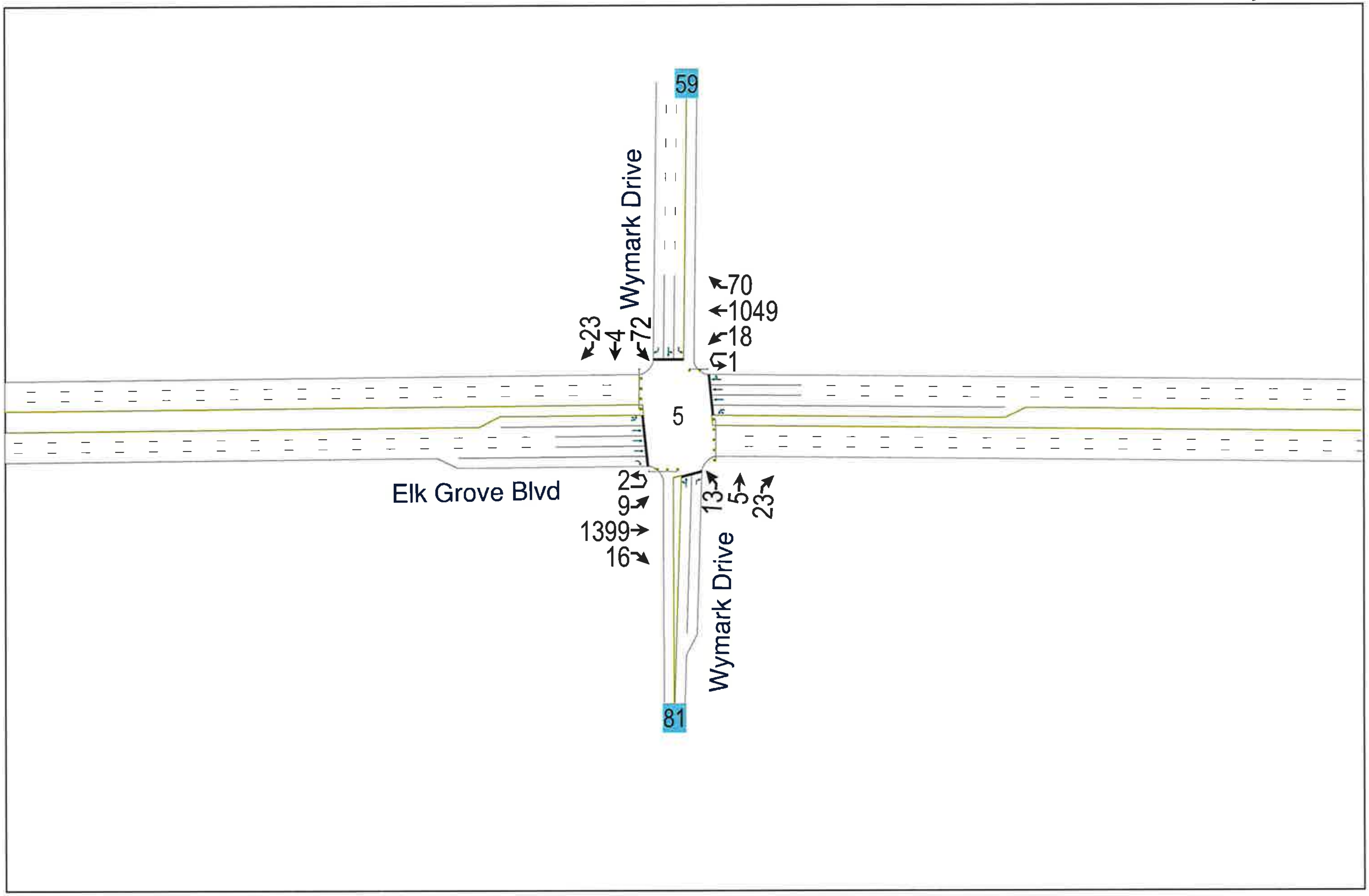
Elk Grove Civic Center Aquatics Complex

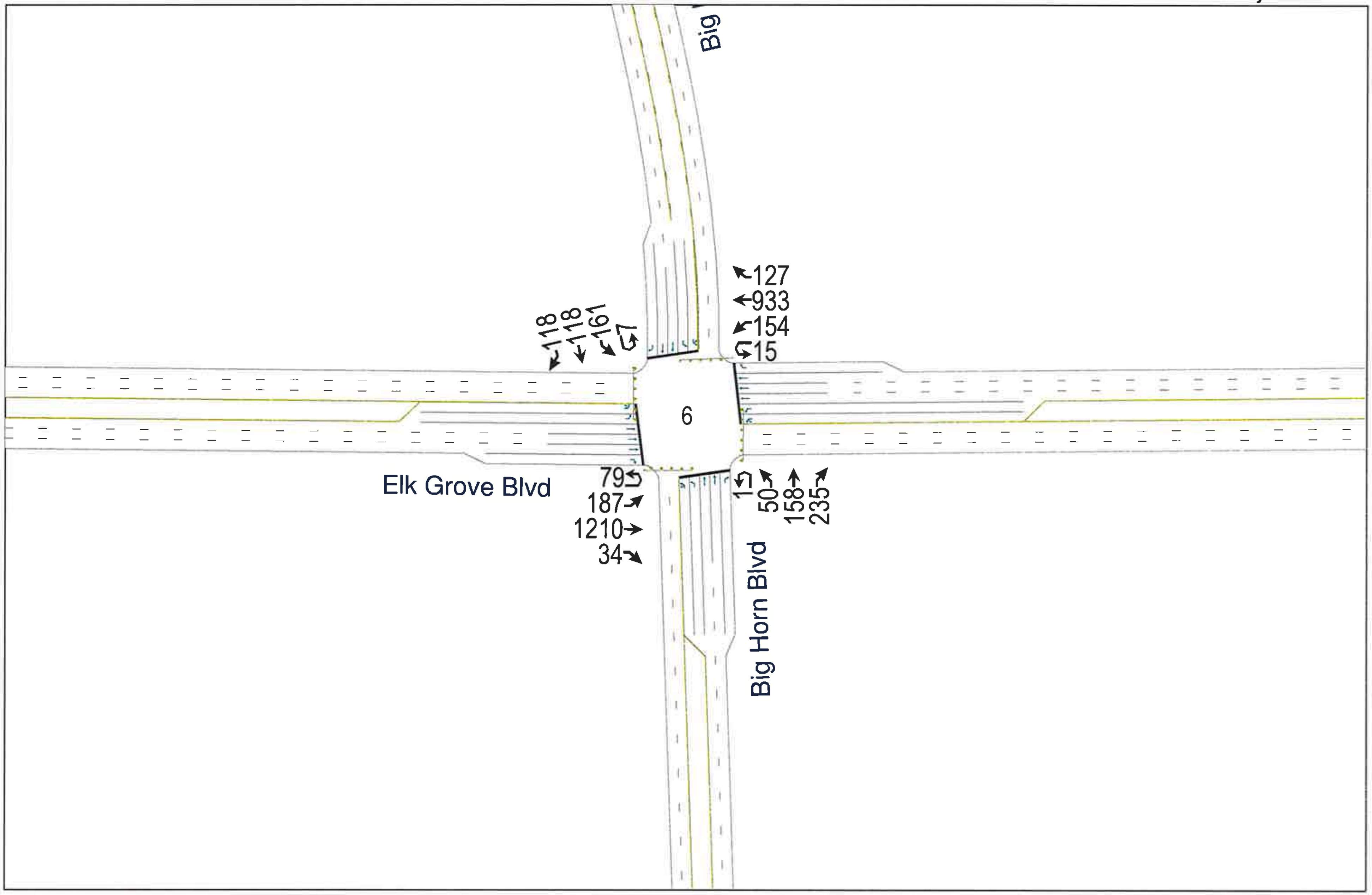
Existing Saturday Conditions
Saturday Peak Hour



Elk Grove Civic Center Aquatics Complex

Existing Saturday Conditions
Saturday Peak Hour




Big
127
933
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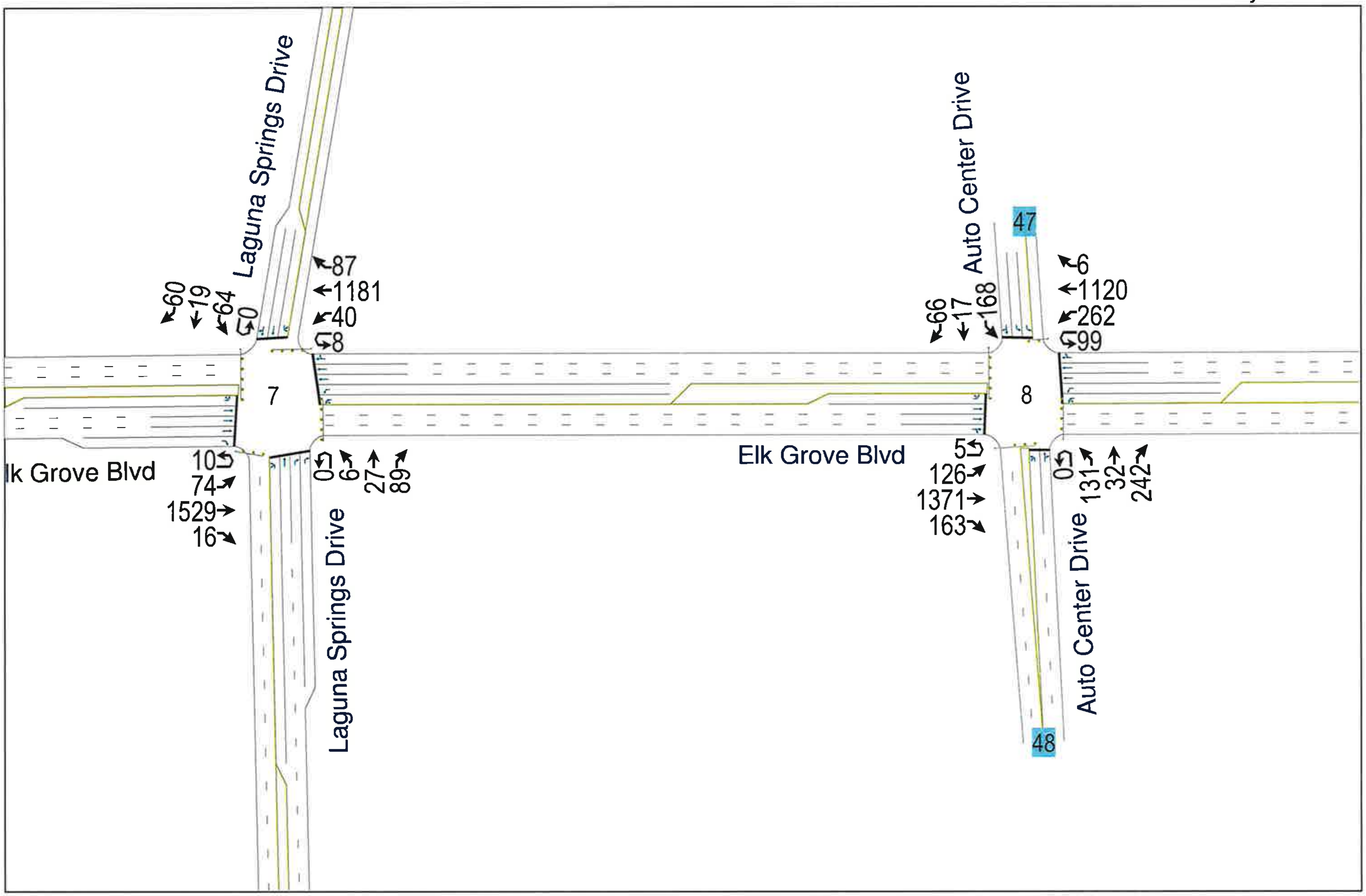
15
118
118
161
7
6
Elk Grove Blvd
79
187
1210
34
1
50
158
235
Big Horn Blvd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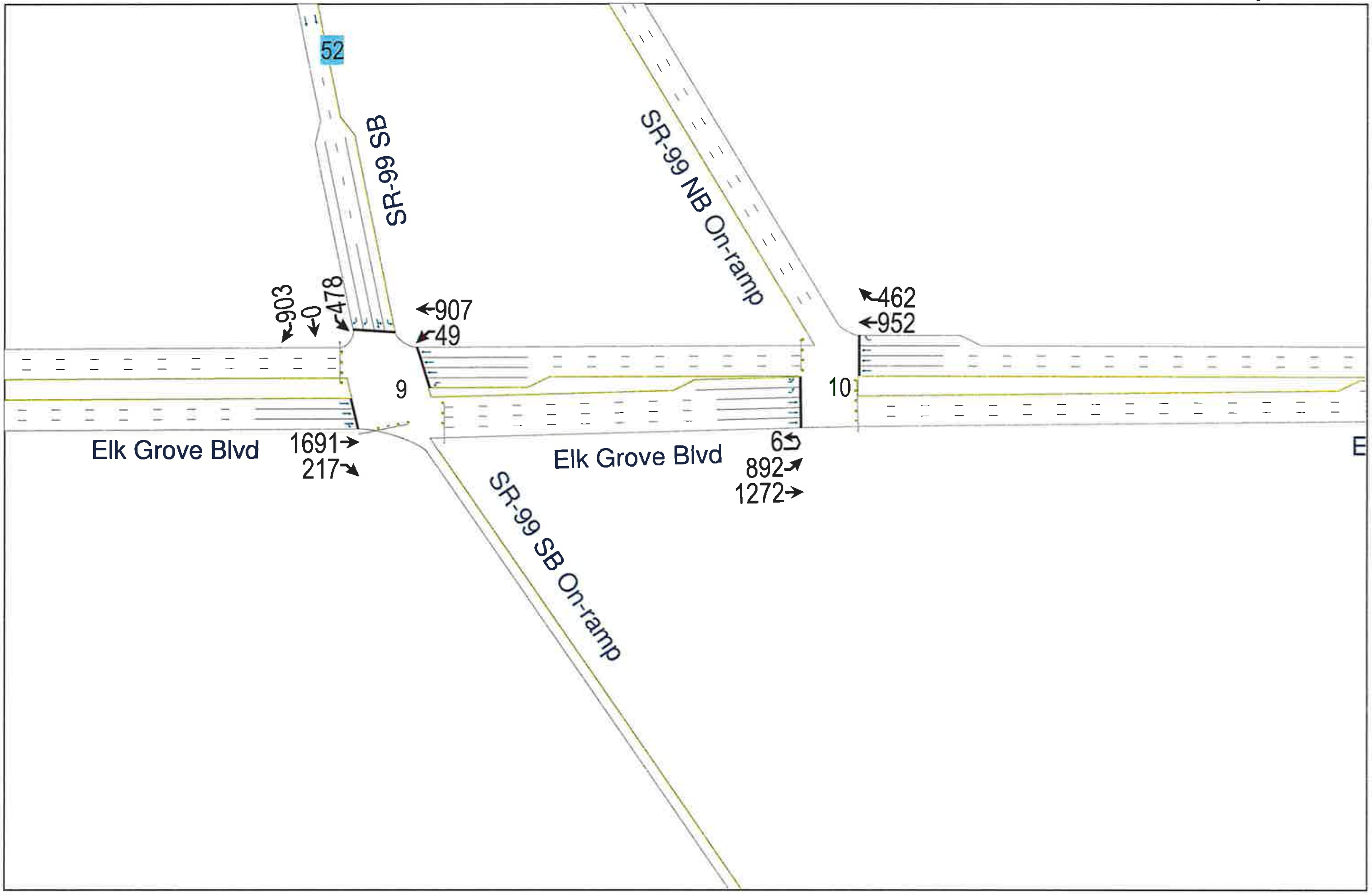
87
1181
40
8
60
19
64
0
7
lk Grove Blvd
10
74
1529
16
0
6
27
89
Laguna Springs Drive
Auto Center Drive
47
6
1120
262
99
66
17
168
8
Elk Grove Blvd
5
126
1371
163
0
131
32
242
Auto Center Drive
48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SR-99 SB
SR-99 NB On-ramp
903
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478
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49
462
952
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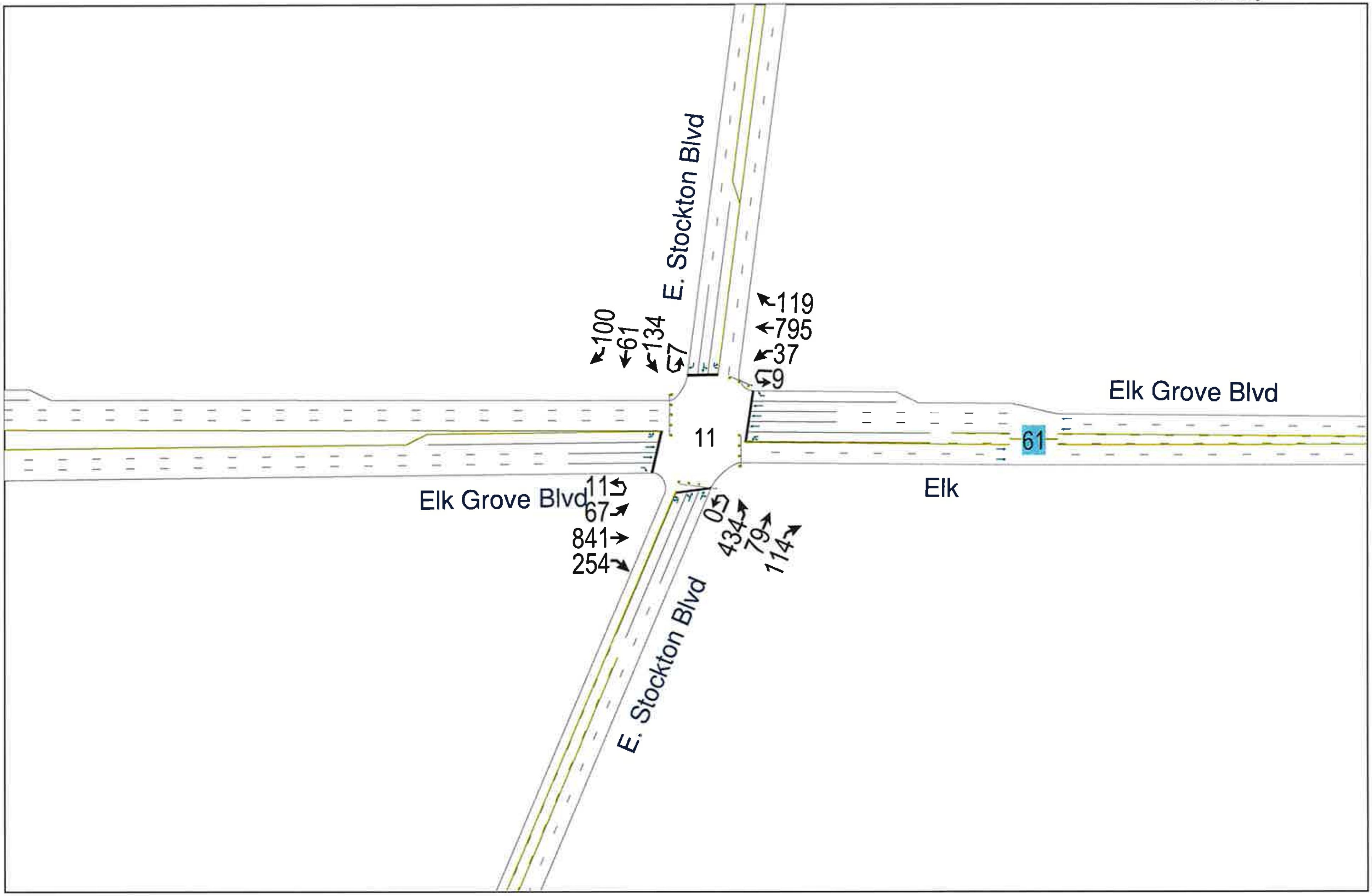
10
Elk Grove Blvd
1691
217
Elk Grove Blvd
6
892
1272
SR-99 SB On-ramp
E


E. Stockton Blvd
119
795
37
9
100
61
134
7
Elk Grove Blvd
61
11
Elk
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11
67
841
254
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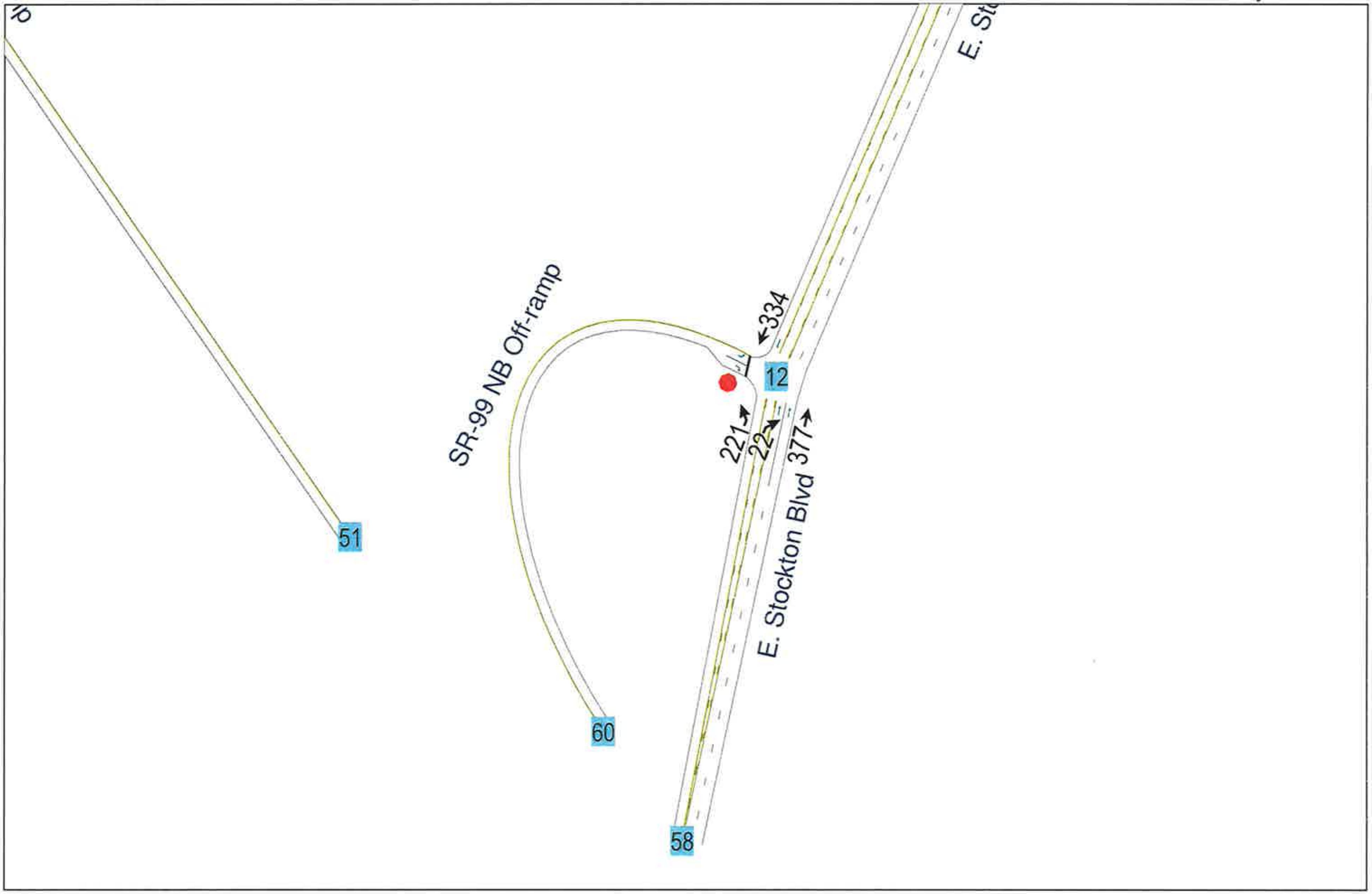
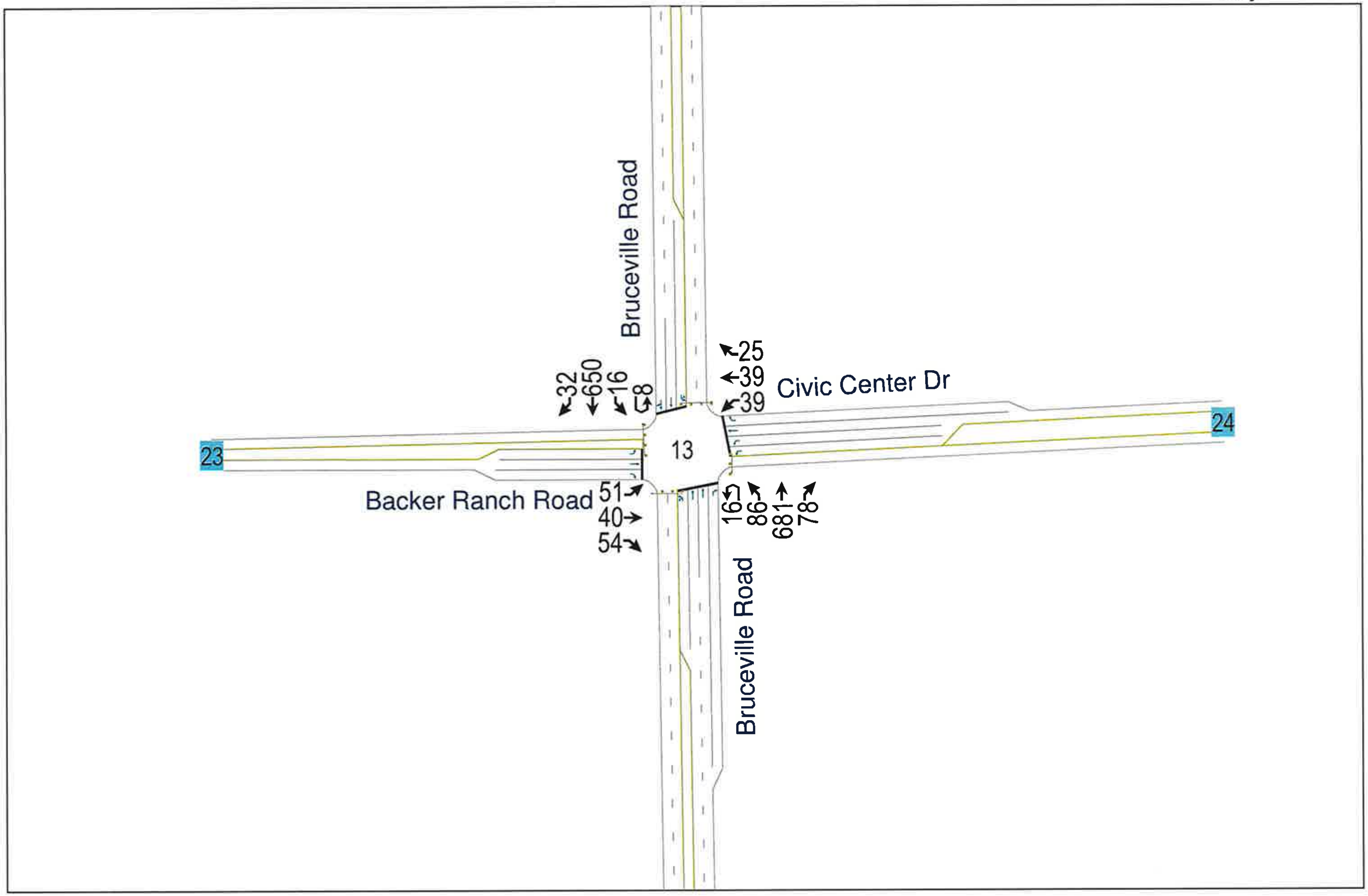
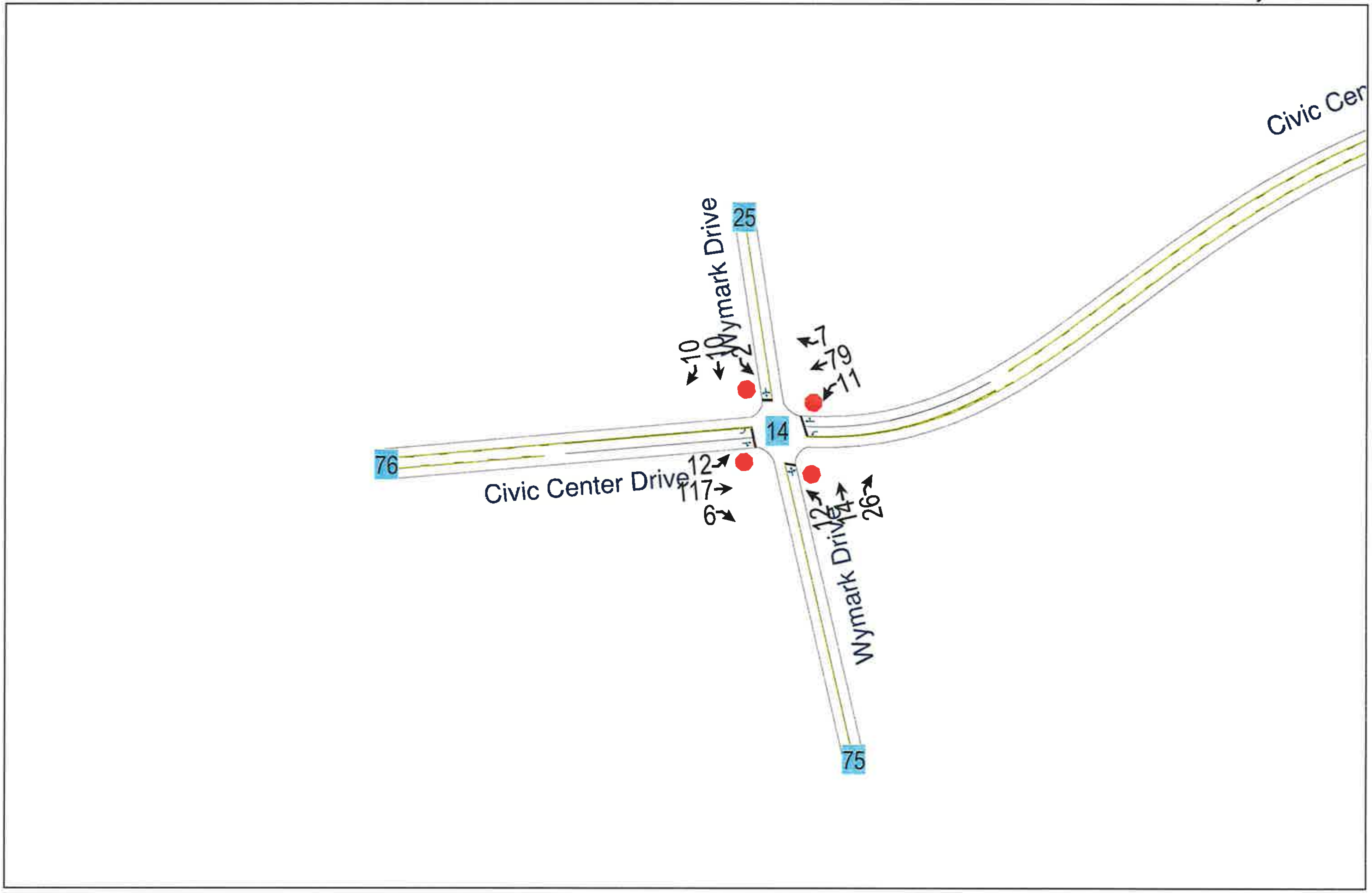
434
79
114
E. Stockton Blvd

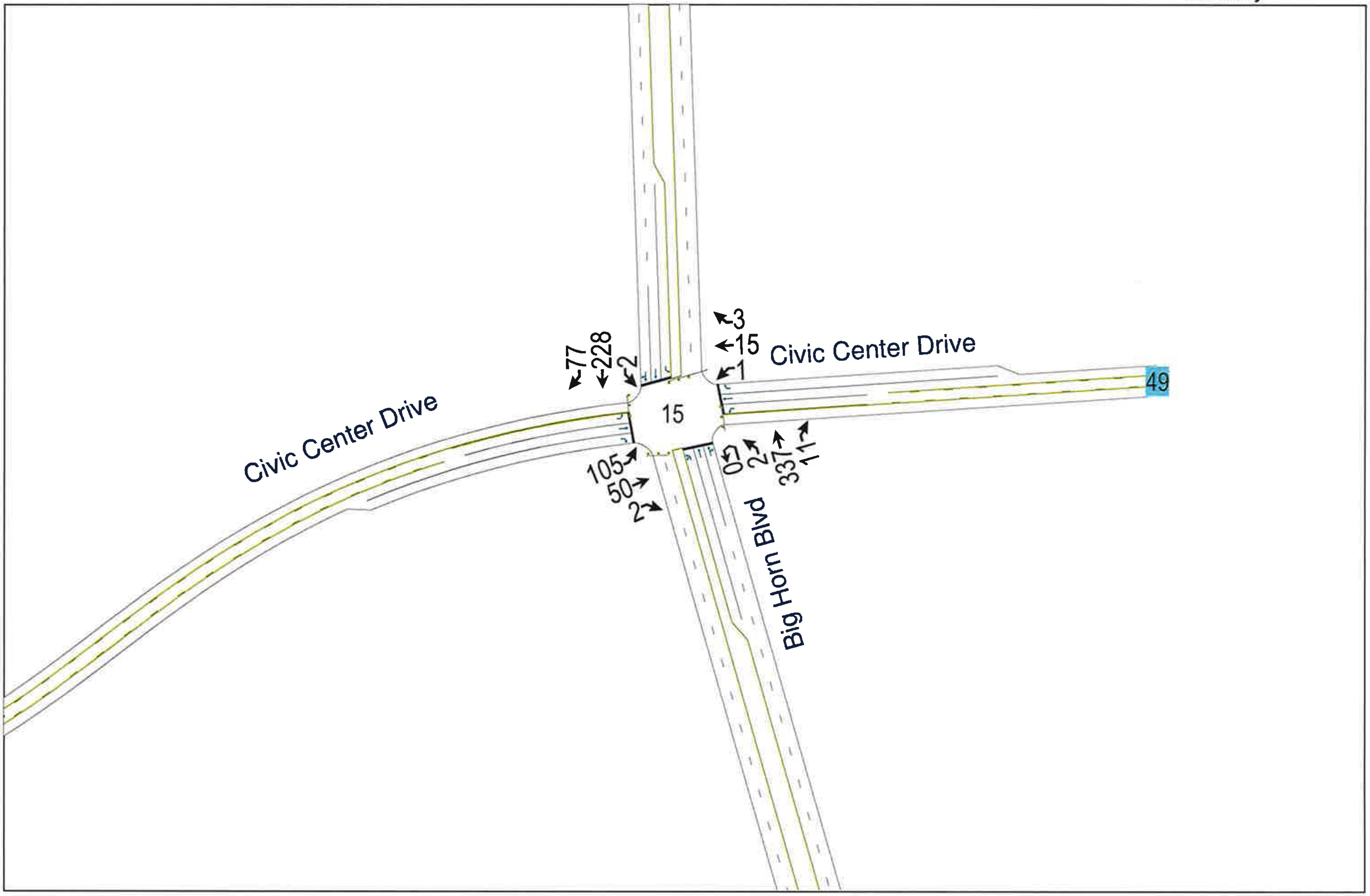

SR-99 NB Off-ramp
E. Stockton Blvd
334
12
221
22
377
51
60
58

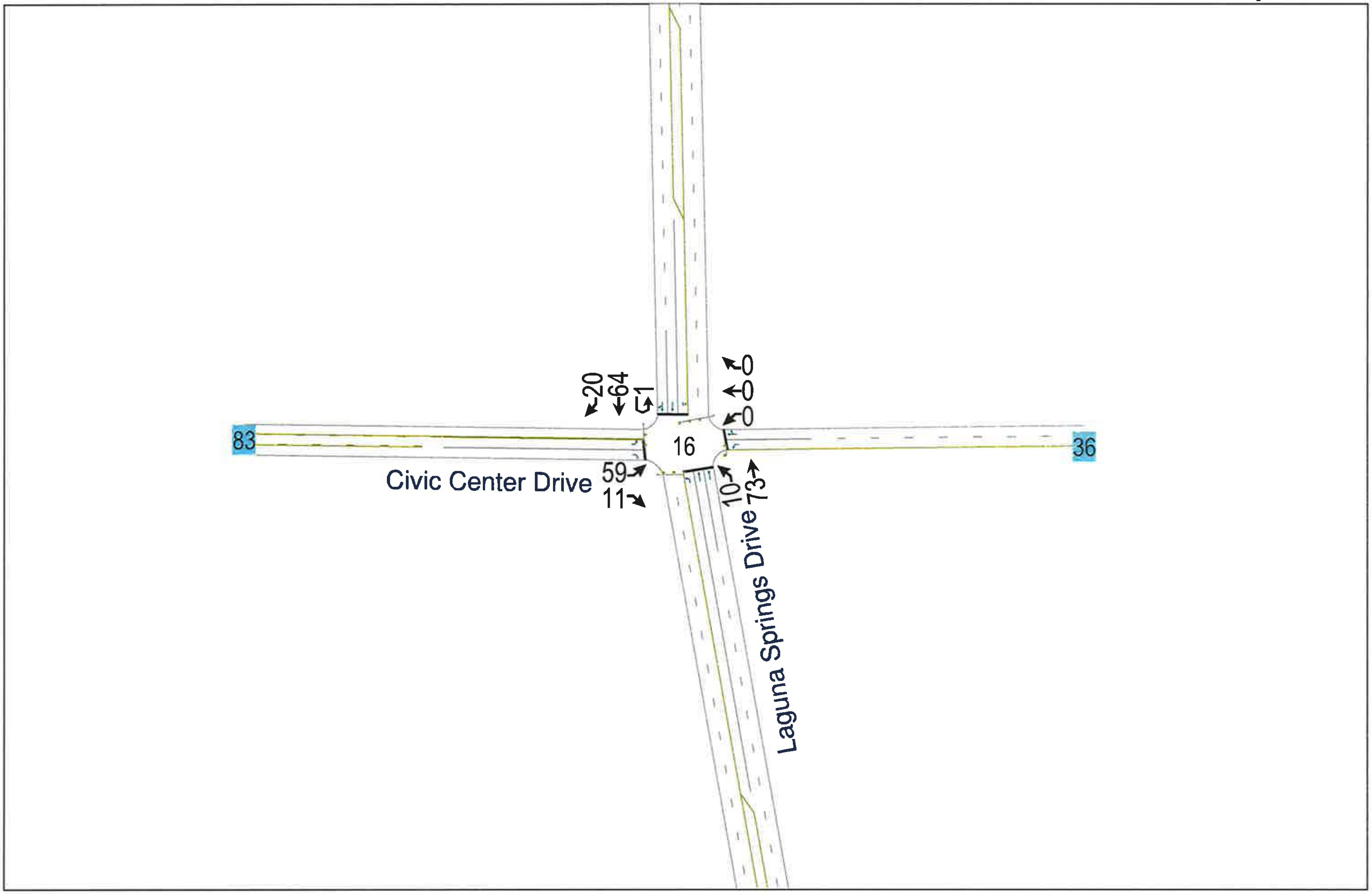

Bruceville Road
32
650
16
8
25
39
39
Civic Center Dr
24
23
13
Backer Ranch Road
51
40
54
16
86
681
78
Bruceville Road

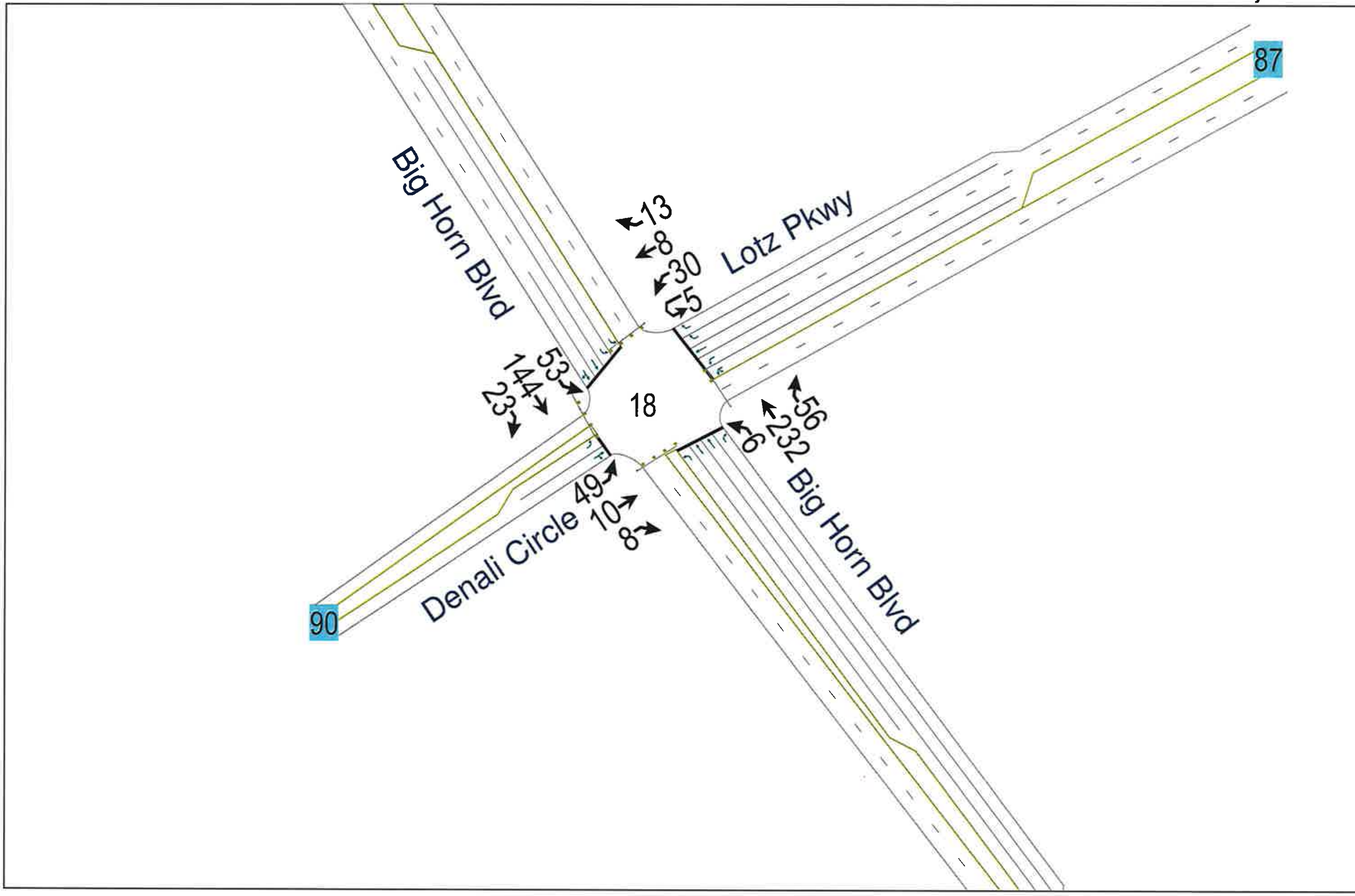

Civic Cen
Wymark Drive
25
10
10
2
7
79
11
14
76
Civic Center Drive
12
117
6
12
14
26
Wymark Drive
75

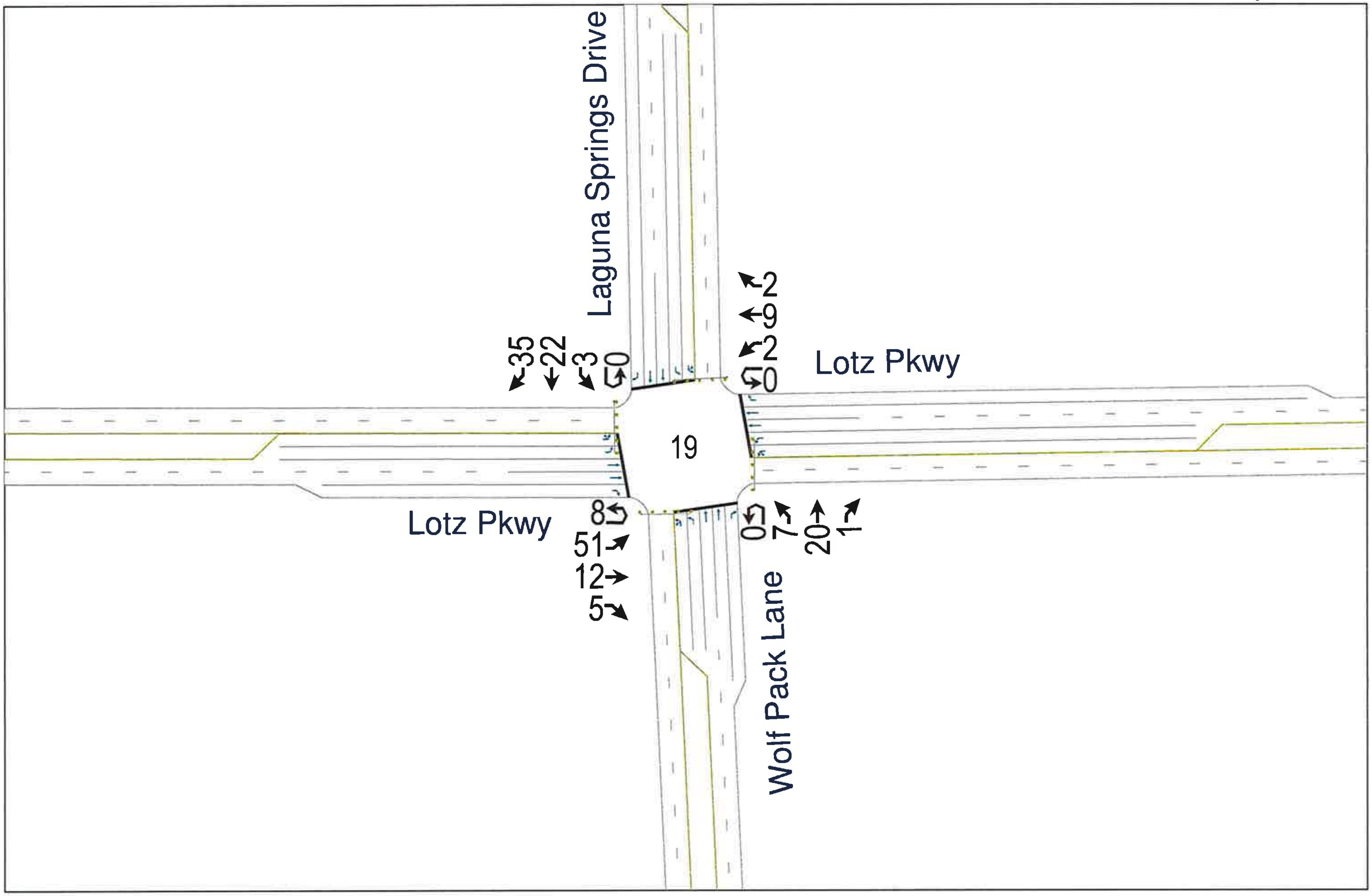
Elk Grove Civic Center Aquatics Complex

Existing Saturday Conditions
Saturday Peak Hour




20
64
1
0
0
0
83
16
36
Civic Center Drive
59
11
10
73
Laguna Springs Drive


87
Big Horn Blvd
13
8
30
5
Lotz Pkwy
53
144
23
18
56
232
6
49
10
8
Denali Circle
Big Horn Blvd
90


Laguna Springs Drive
Lotz Pkwy
Lotz Pkwy
Wolf Pack Lane
19
35
22
3
0
2
9
2
0
8
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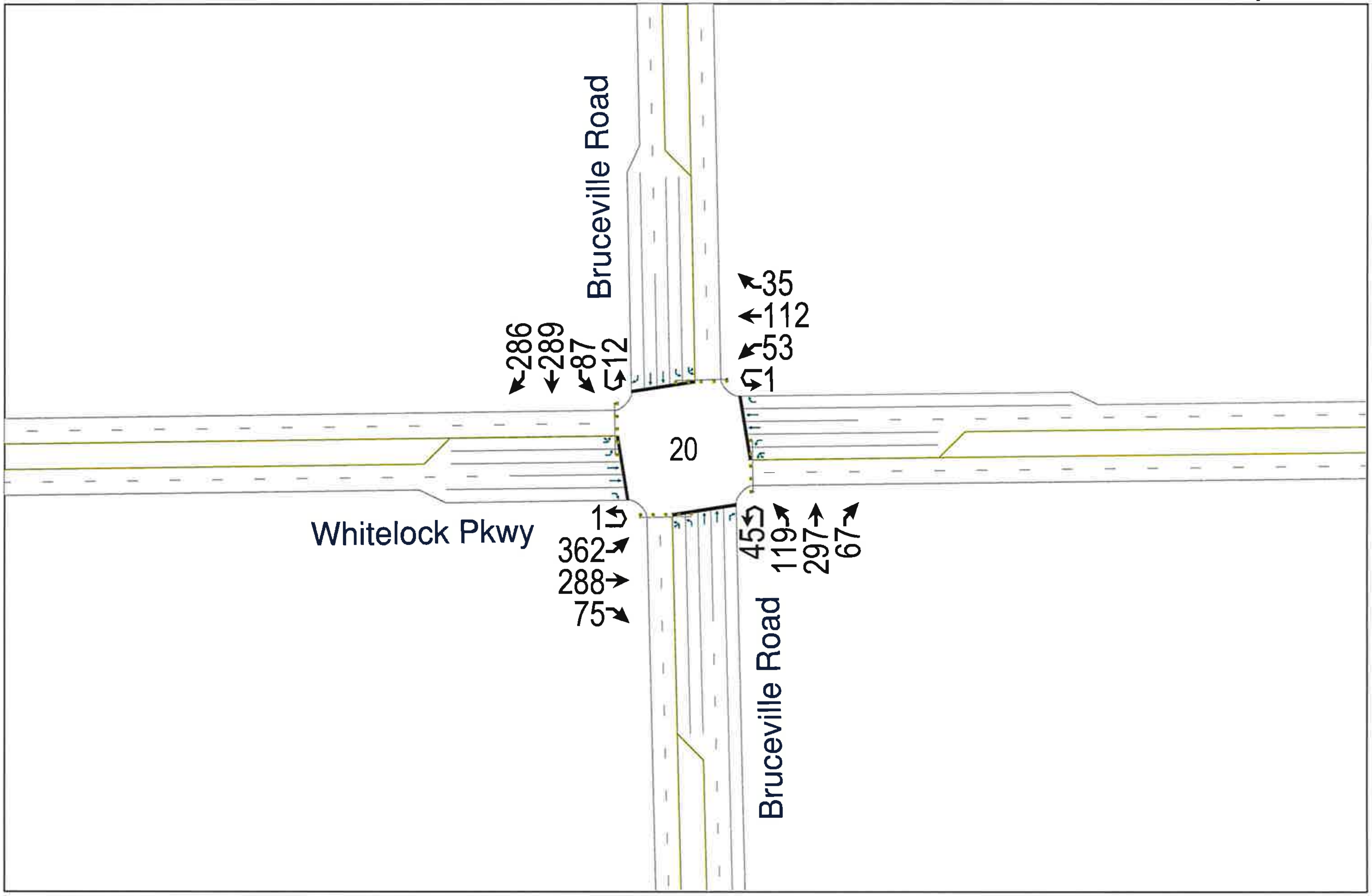
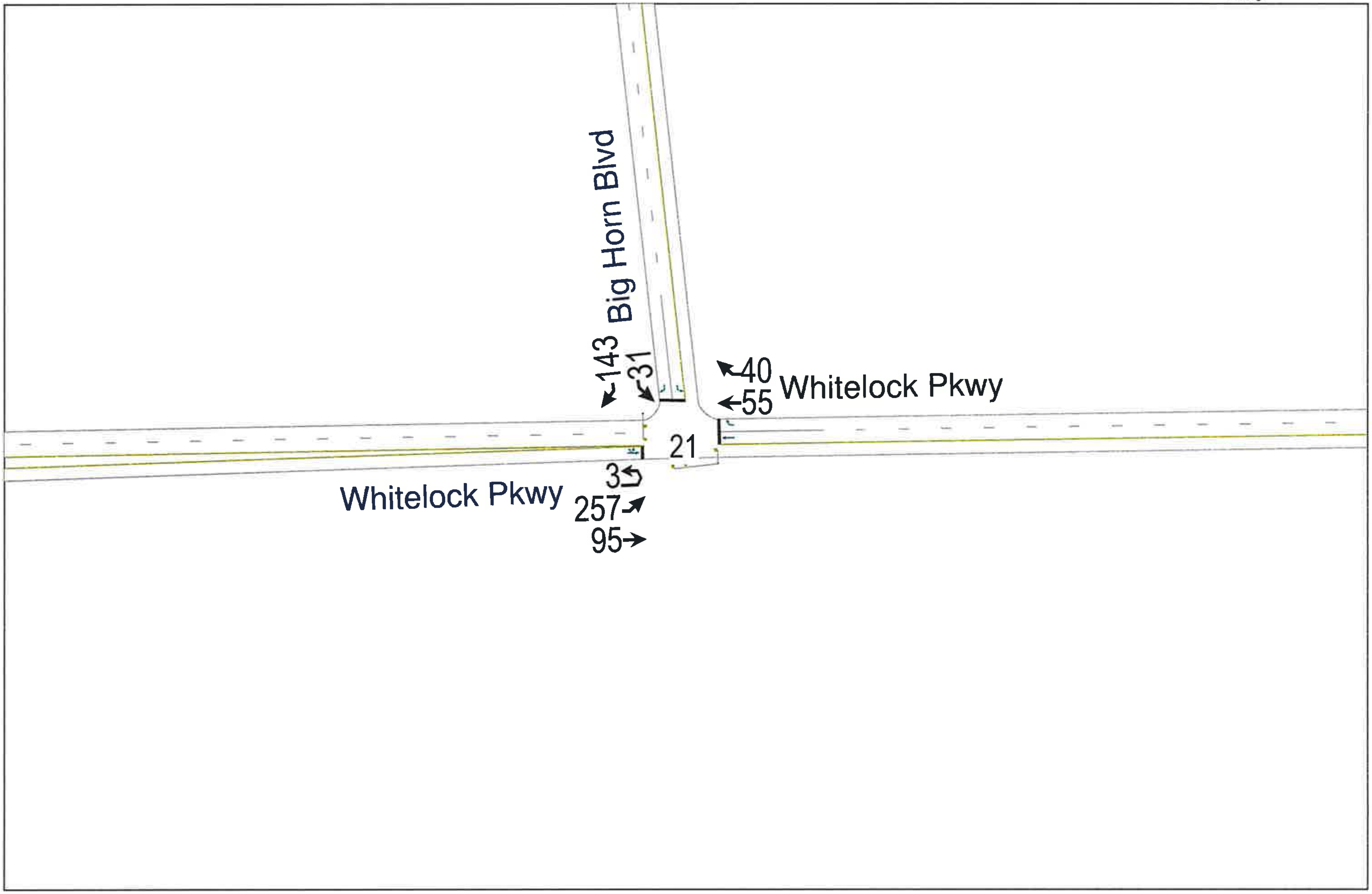
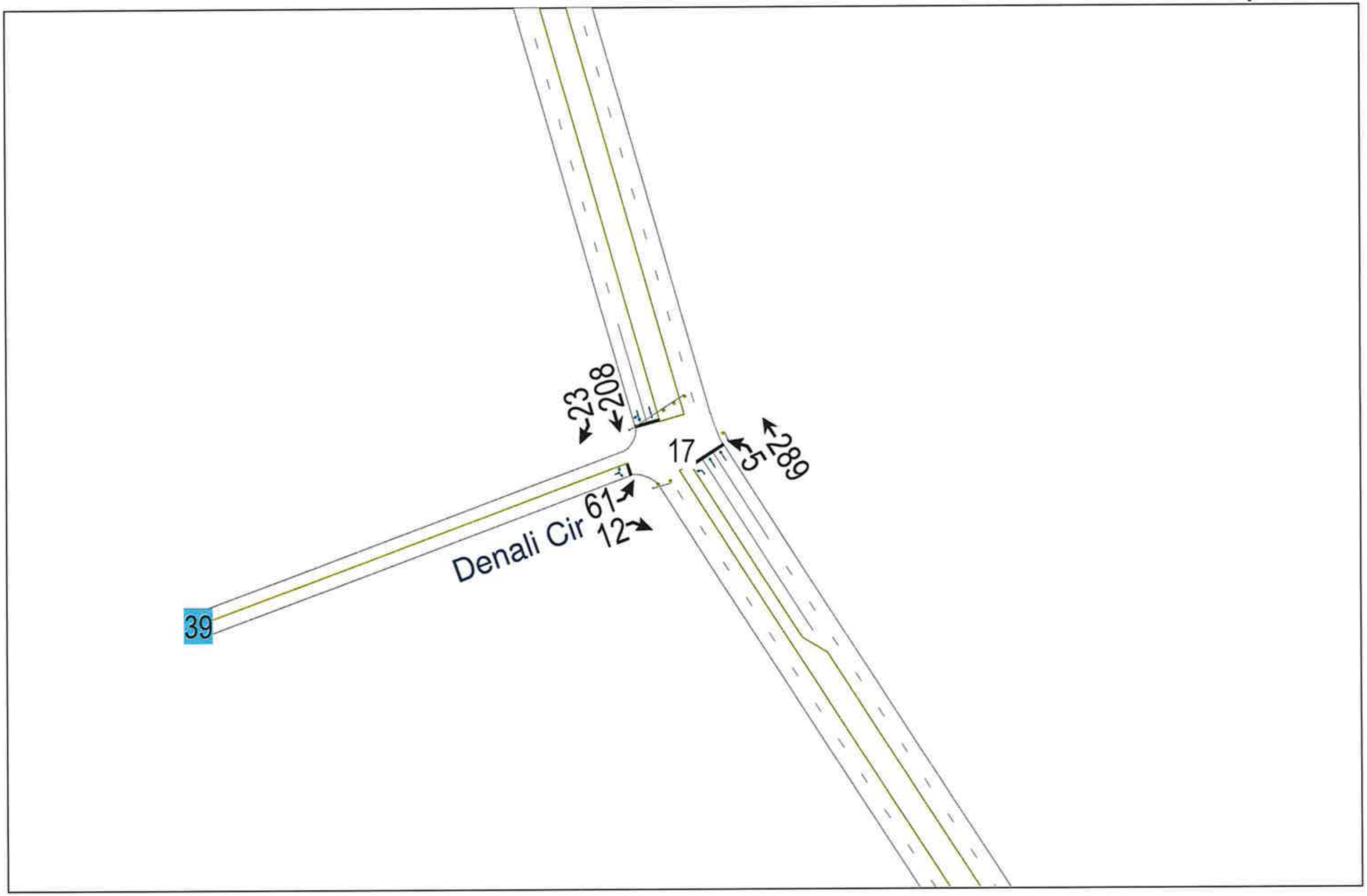
5
0
7
20
1


Bruceville Road
286
289
87
12
35
112
53
1
20
Whitelock Pkwy
1
362
288
75
45
119
297
67
Bruceville Road


Big Horn Blvd
143
31
40
55
Whitelock Pkwy
21
3
257
95
Whitelock Pkwy


23
208
17
5
289
61
12
Denali Cir
39

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	1	11	5	97	1413	6
Sign Control		Stop	Stop		Free	
Grade		0%	0%		0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	1	12	5	102	1487	6
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	2981	2978	2981	0	0	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2981	2978	2981	0	0	
tC, single (s)	7.1	6.7	6.5	6.2	4.1	
tC, 2 stage (s)						
tF (s)	3.5	4.2	4.0	3.3	2.2	
p0 queue free %	0	0	0	91	8	
cM capacity (veh/h)	0	1	1	1085	1623	

Direction, Lane #	EB 1	EB 2	WB 1	SB 1	SB 2
Volume Total	5	8	107	992	502
Volume Left	1	0	0	992	496
Volume Right	0	0	102	0	6
cSH	0	1	23	1623	1623
Volume to Capacity	Err	7.53	4.60	0.92	0.92
Queue Length 95th (ft)	Err	Err	Err	415	415
Control Delay (s)	Err	Err	Err	24.0	24.0
Lane LOS	F	F	F	C	C
Approach Delay (s)	Err		9999.0	24.0	
Approach LOS	F		F		

Intersection Summary			
Average Delay	Err		
Intersection Capacity Utilization	53.4%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	7	1417	0	0	101	518	1	0	216	0	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	7	1461	0	0	104	534	1	0	223	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)									17			
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	104			1461			1579	1579	730	960	1579	104
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	104			1461			1579	1579	730	960	1579	104
tC, single (s)	4.7			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.5			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			100			99	100	39	100	100	100
cM capacity (veh/h)	1309			459			73	108	365	82	108	930

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1
Volume Total	7	730	730	104	267	267	224
Volume Left	7	0	0	0	0	0	1
Volume Right	0	0	0	0	267	267	223
cSH	1309	1700	1700	1700	1700	1700	366
Volume to Capacity	0.01	0.43	0.43	0.06	0.16	0.16	0.61
Queue Length 95th (ft)	0	0	0	0	0	0	97
Control Delay (s)	7.8	0.0	0.0	0.0	0.0	0.0	29.3
Lane LOS	A						D
Approach Delay (s)	0.0			0.0			29.3
Approach LOS							D

Intersection Summary			
Average Delay	2.8		
Intersection Capacity Utilization	54.8%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Lane Configurations												
Volume (vph)	3	184	1320	537	1	76	751	273	122	345	257	85
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.6	6.8	6.8		5.6	7.2	7.2		5.6	7.2	7.2
Lane Util. Factor		0.97	0.91	0.88		0.97	0.91	1.00		0.97	0.91	1.00
Frpb, ped/bikes		1.00	1.00	0.98		1.00	1.00	0.98		1.00	1.00	0.98
Flpb, ped/bikes		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00
Frt		1.00	1.00	0.85		1.00	1.00	0.85		1.00	1.00	0.85
Flt Protected		0.95	1.00	1.00		0.95	1.00	1.00		0.95	1.00	1.00
Satd. Flow (prot)		3433	5085	2726		3433	5085	1560		3433	5085	1559
Flt Permitted		0.95	1.00	1.00		0.95	1.00	1.00		0.95	1.00	1.00
Satd. Flow (perm)		3433	5085	2726		3433	5085	1560		3433	5085	1559
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	3	200	1435	584	1	83	816	297	133	375	279	92
RTOR Reduction (vph)	0	0	0	330	0	0	0	182	0	0	0	76
Lane Group Flow (vph)	0	203	1435	254	0	84	816	115	0	508	279	16
Confl. Peds. (#/hr)								3				4
Confl. Bikes (#/hr)				2								
Turn Type	Prot	Prot		Perm	Prot	Prot		Perm	Prot	Prot		Perm
Protected Phases	1	1	6		5	5	2		3	3	8	
Permitted Phases				6				2				8
Actuated Green, G (s)		11.5	52.2	52.2		6.3	46.6	46.6		22.1	20.7	20.7
Effective Green, g (s)		11.5	52.2	52.2		6.3	46.6	46.6		22.1	20.7	20.7
Actuated g/C Ratio		0.10	0.44	0.44		0.05	0.39	0.39		0.18	0.17	0.17
Clearance Time (s)		5.6	6.8	6.8		5.6	7.2	7.2		5.6	7.2	7.2
Vehicle Extension (s)		2.0	2.0	2.0		2.0	2.0	2.0		2.0	2.0	2.0
Lane Grp Cap (vph)		329	2212	1186		180	1975	606		632	877	269
v/s Ratio Prot		c0.06	c0.28			0.02	0.16			c0.15	0.05	
v/s Ratio Perm				0.09				0.07				0.01
v/c Ratio		0.62	0.65	0.21		0.47	0.41	0.19		0.80	0.32	0.06
Uniform Delay, d1		52.1	26.7	21.1		55.2	26.7	24.2		46.9	43.5	41.5
Progression Factor		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2		2.4	1.5	0.4		0.7	0.6	0.7		6.9	0.1	0.0
Delay (s)		54.6	28.2	21.5		55.9	27.4	24.9		53.8	43.5	41.5
Level of Service		D	C	C		E	C	C		D	D	D
Approach Delay (s)			28.8				28.8				49.3	
Approach LOS			C				C				D	

Intersection Summary			
HCM Average Control Delay	37.3	HCM Level of Service	D
HCM Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	24.3
Intersection Capacity Utilization	83.4%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBU	SBL	SBT	SBR
Lane Configurations				
Volume (vph)	2	345	379	242
Ideal Flow (vphpl)	1900	1900	1900	1900
Total Lost time (s)		5.6	6.3	6.3
Lane Util. Factor		0.97	0.91	1.00
Frpb, ped/bikes		1.00	1.00	0.98
Flpb, ped/bikes		1.00	1.00	1.00
Frt		1.00	1.00	0.85
Flt Protected		0.95	1.00	1.00
Satd. Flow (prot)		3433	5085	1556
Flt Permitted		0.95	1.00	1.00
Satd. Flow (perm)		3433	5085	1556
Peak-hour factor, PHF	0.92	0.92	0.92	0.92
Adj. Flow (vph)	2	375	412	263
RTOR Reduction (vph)	0	0	0	230
Lane Group Flow (vph)	0	377	412	33
Confl. Peds. (#/hr)				
Confl. Bikes (#/hr)				3
Turn Type	Prot	Prot		Perm
Protected Phases	7	7	4	
Permitted Phases				4
Actuated Green, G (s)		15.6	15.1	15.1
Effective Green, g (s)		15.6	15.1	15.1
Actuated g/C Ratio		0.13	0.13	0.13
Clearance Time (s)		5.6	6.3	6.3
Vehicle Extension (s)		2.0	2.0	2.0
Lane Grp Cap (vph)		446	640	196
v/s Ratio Prot		0.11	c0.08	
v/s Ratio Perm				0.02
v/c Ratio		0.85	0.64	0.17
Uniform Delay, d1		51.0	49.9	46.8
Progression Factor		1.00	1.00	1.00
Incremental Delay, d2		13.2	1.7	0.1
Delay (s)		64.2	51.6	47.0
Level of Service		E	D	D
Approach Delay (s)			55.0	
Approach LOS			D	

Intersection Summary

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Lane Configurations												
Volume (vph)	26	292	1058	123	3	446	1084	223	5	113	348	183
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.6	6.0	6.0		5.6	6.0	6.0		5.6	5.7	5.7
Lane Util. Factor		0.97	0.91	1.00		0.97	0.91	1.00		0.97	0.91	1.00
Frpb, ped/bikes		1.00	1.00	0.99		1.00	1.00	0.99		1.00	1.00	0.98
Flpb, ped/bikes		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00
Frt		1.00	1.00	0.85		1.00	1.00	0.85		1.00	1.00	0.85
Flt Protected		0.95	1.00	1.00		0.95	1.00	1.00		0.95	1.00	1.00
Satd. Flow (prot)		3433	5085	1563		3433	5085	1562		3433	5085	1544
Flt Permitted		0.95	1.00	1.00		0.95	1.00	1.00		0.95	1.00	1.00
Satd. Flow (perm)		3433	5085	1563		3433	5085	1562		3433	5085	1544
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	27	304	1102	128	3	465	1129	232	5	118	362	191
RTOR Reduction (vph)	0	0	0	66	0	0	0	111	0	0	0	160
Lane Group Flow (vph)	0	331	1102	62	0	468	1129	121	0	123	362	31
Confl. Peds. (#/hr)				1				1				6
Confl. Bikes (#/hr)								1				5
Turn Type	Prot	Prot		Perm	Prot	Prot		Perm	Prot	Prot		Perm
Protected Phases	1	1	6		5	5	2		3	3	8	
Permitted Phases				6				2				8
Actuated Green, G (s)		15.9	44.3	44.3		20.7	49.1	49.1		8.7	19.3	19.3
Effective Green, g (s)		15.9	44.3	44.3		20.7	49.1	49.1		8.7	19.3	19.3
Actuated g/C Ratio		0.13	0.37	0.37		0.17	0.41	0.41		0.07	0.16	0.16
Clearance Time (s)		5.6	6.0	6.0		5.6	6.0	6.0		5.6	5.7	5.7
Vehicle Extension (s)		2.0	2.0	2.0		2.0	2.0	2.0		2.0	2.0	2.0
Lane Grp Cap (vph)		455	1877	577		592	2081	639		249	818	248
v/s Ratio Prot		0.10	c0.22			c0.14	c0.22			0.04	0.07	
v/s Ratio Perm				0.04				0.08				0.02
v/c Ratio		0.73	0.59	0.11		0.79	0.54	0.19		0.49	0.44	0.12
Uniform Delay, d1		50.0	30.5	24.9		47.6	26.9	22.7		53.5	45.5	43.1
Progression Factor		1.00	1.00	1.00		1.09	0.42	0.53		1.00	1.00	1.00
Incremental Delay, d2		4.9	1.4	0.4		5.6	0.9	0.5		0.6	0.1	0.1
Delay (s)		54.8	31.8	25.2		57.6	12.2	12.6		54.1	45.6	43.2
Level of Service		D	C	C		E	B	B		D	D	D
Approach Delay (s)			36.2				23.9				46.5	
Approach LOS			D				C				D	

Intersection Summary			
HCM Average Control Delay	36.9	HCM Level of Service	D
HCM Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	28.9
Intersection Capacity Utilization	83.4%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBU	SBL	SBT	SBR
Lane Configurations				
Volume (vph)	46	210	723	224
Ideal Flow (vphpl)	1900	1900	1900	1900
Total Lost time (s)		5.6	5.7	5.7
Lane Util. Factor		0.97	0.86	0.86
Frpb, ped/bikes		1.00	1.00	0.98
Flpb, ped/bikes		1.00	1.00	1.00
Frt		1.00	1.00	0.85
Flt Protected		0.95	1.00	1.00
Satd. Flow (prot)		3433	4782	1340
Flt Permitted		0.95	1.00	1.00
Satd. Flow (perm)		3433	4782	1340
Peak-hour factor, PHF	0.96	0.96	0.96	0.96
Adj. Flow (vph)	48	219	753	233
RTOR Reduction (vph)	0	0	2	169
Lane Group Flow (vph)	0	267	774	41
Confl. Peds. (#/hr)				3
Confl. Bikes (#/hr)				1
Turn Type	Prot	Prot		Perm
Protected Phases	7	7	4	
Permitted Phases				4
Actuated Green, G (s)		12.8	23.4	23.4
Effective Green, g (s)		12.8	23.4	23.4
Actuated g/C Ratio		0.11	0.19	0.19
Clearance Time (s)		5.6	5.7	5.7
Vehicle Extension (s)		2.0	2.0	2.0
Lane Grp Cap (vph)		366	932	261
v/s Ratio Prot		c0.08	c0.16	
v/s Ratio Perm				0.03
v/c Ratio		0.73	0.83	0.16
Uniform Delay, d1		51.9	46.4	40.1
Progression Factor		1.00	1.00	1.00
Incremental Delay, d2		6.1	6.1	0.1
Delay (s)		58.0	52.5	40.2
Level of Service		E	D	D
Approach Delay (s)			51.6	
Approach LOS			D	

Intersection Summary

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL
Lane Configurations												
Volume (vph)	1	13	1409	31	2	24	1833	118	18	6	47	54
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.7	6.7	6.7		5.6	6.7			5.6	5.6	5.6
Lane Util. Factor		1.00	0.91	1.00		1.00	0.91			1.00	1.00	0.95
Frpb, ped/bikes		1.00	1.00	0.97		1.00	1.00			1.00	0.99	1.00
Flpb, ped/bikes		1.00	1.00	1.00		1.00	1.00			1.00	1.00	1.00
Frt		1.00	1.00	0.85		1.00	0.99			1.00	0.85	1.00
Flt Protected		0.95	1.00	1.00		0.95	1.00			0.96	1.00	0.95
Satd. Flow (prot)		1770	5085	1543		1770	5030			1795	1561	1681
Flt Permitted		0.95	1.00	1.00		0.95	1.00			0.96	1.00	0.95
Satd. Flow (perm)		1770	5085	1543		1770	5030			1795	1561	1681
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	1	14	1468	32	2	25	1909	123	19	6	49	56
RTOR Reduction (vph)	0	0	0	9	0	0	4	0	0	0	46	0
Lane Group Flow (vph)	0	15	1468	23	0	27	2028	0	0	25	3	31
Confl. Peds. (#/hr)				1				3			2	
Confl. Bikes (#/hr)				5				5				
Turn Type	Prot	Prot		Perm	Prot	Prot			Split		Perm	Split
Protected Phases	1	1	6		5	5	2		3	3		4
Permitted Phases				6							3	
Actuated Green, G (s)		2.7	77.0	77.0		4.5	77.7			7.3	7.3	7.7
Effective Green, g (s)		2.7	77.0	77.0		4.5	77.7			7.3	7.3	7.7
Actuated g/C Ratio		0.02	0.64	0.64		0.04	0.65			0.06	0.06	0.06
Clearance Time (s)		6.7	6.7	6.7		5.6	6.7			5.6	5.6	5.6
Vehicle Extension (s)		2.0	3.0	3.0		2.0	3.0			2.0	2.0	2.0
Lane Grp Cap (vph)		40	3263	990		66	3257			109	95	108
v/s Ratio Prot		0.01	0.29			c0.02	c0.40			c0.01		0.02
v/s Ratio Perm				0.02							0.00	
v/c Ratio		0.38	0.45	0.02		0.41	0.62			0.23	0.03	0.29
Uniform Delay, d1		57.8	10.8	7.8		56.5	12.5			53.7	53.0	53.5
Progression Factor		0.70	1.60	1.67		1.31	0.35			1.00	1.00	1.00
Incremental Delay, d2		1.8	0.4	0.0		1.3	0.8			0.4	0.0	0.5
Delay (s)		42.3	17.7	13.1		75.4	5.1			54.1	53.1	54.1
Level of Service		D	B	B		E	A			D	D	D
Approach Delay (s)			17.9				6.0			53.4		
Approach LOS			B				A			D		

Intersection Summary			
HCM Average Control Delay	12.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.8
Intersection Capacity Utilization	63.6%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBT	SBR
Lane Configurations		
Volume (vph)	7	9
Ideal Flow (vphpl)	1900	1900
Total Lost time (s)	5.6	5.6
Lane Util. Factor	0.95	1.00
Frpb, ped/bikes	1.00	0.98
Flpb, ped/bikes	1.00	1.00
Frt	1.00	0.85
Flt Protected	0.96	1.00
Satd. Flow (prot)	1703	1557
Flt Permitted	0.96	1.00
Satd. Flow (perm)	1703	1557
Peak-hour factor, PHF	0.96	0.96
Adj. Flow (vph)	7	9
RTOR Reduction (vph)	0	8
Lane Group Flow (vph)	32	1
Confl. Peds. (#/hr)		1
Confl. Bikes (#/hr)		1
Turn Type		Perm
Protected Phases	4	
Permitted Phases		4
Actuated Green, G (s)	7.7	7.7
Effective Green, g (s)	7.7	7.7
Actuated g/C Ratio	0.06	0.06
Clearance Time (s)	5.6	5.6
Vehicle Extension (s)	2.0	2.0
Lane Grp Cap (vph)	109	100
v/s Ratio Prot	c0.02	
v/s Ratio Perm		0.00
v/c Ratio	0.29	0.01
Uniform Delay, d1	53.6	52.6
Progression Factor	1.00	1.00
Incremental Delay, d2	0.5	0.0
Delay (s)	54.1	52.6
Level of Service	D	D
Approach Delay (s)	53.9	
Approach LOS	D	

Intersection Summary

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Lane Configurations												
Volume (vph)	64	135	1220	60	7	211	1574	197	1	77	92	188
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.7	5.7	5.7		6.7	5.7	5.7		6.3	5.3	5.3
Lane Util. Factor		0.97	0.91	1.00		0.97	0.91	1.00		0.97	0.95	1.00
Frpb, ped/bikes		1.00	1.00	0.98		1.00	1.00	0.99		1.00	1.00	0.98
Flpb, ped/bikes		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00
Frt		1.00	1.00	0.85		1.00	1.00	0.85		1.00	1.00	0.85
Flt Protected		0.95	1.00	1.00		0.95	1.00	1.00		0.95	1.00	1.00
Satd. Flow (prot)		3433	5085	1559		3433	5085	1562		3433	3539	1546
Flt Permitted		0.95	1.00	1.00		0.95	1.00	1.00		0.95	1.00	1.00
Satd. Flow (perm)		3433	5085	1559		3433	5085	1562		3433	3539	1546
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	67	141	1271	62	7	220	1640	205	1	80	96	196
RTOR Reduction (vph)	0	0	0	23	0	0	0	56	0	0	0	176
Lane Group Flow (vph)	0	208	1271	39	0	227	1640	149	0	81	96	20
Confl. Peds. (#/hr)				2								6
Confl. Bikes (#/hr)				2				4				2
Turn Type	Prot	Prot		Perm	Prot	Prot		Perm	Prot	Prot		Perm
Protected Phases	1	1	6		5	5	2		3	3	8	
Permitted Phases				6				2				8
Actuated Green, G (s)		11.6	60.4	60.4		12.1	60.9	60.9		6.2	12.5	12.5
Effective Green, g (s)		11.6	60.4	60.4		12.1	60.9	60.9		6.2	12.5	12.5
Actuated g/C Ratio		0.10	0.50	0.50		0.10	0.51	0.51		0.05	0.10	0.10
Clearance Time (s)		6.7	5.7	5.7		6.7	5.7	5.7		6.3	5.3	5.3
Vehicle Extension (s)		2.0	2.0	2.0		2.0	2.0	2.0		2.0	2.0	2.0
Lane Grp Cap (vph)		332	2559	785		346	2581	793		177	369	161
v/s Ratio Prot		0.06	0.25			c0.07	c0.32			0.02	0.03	
v/s Ratio Perm				0.03				0.10				0.01
v/c Ratio		0.63	0.50	0.05		0.66	0.64	0.19		0.46	0.26	0.13
Uniform Delay, d1		52.1	19.7	15.2		51.9	21.5	16.1		55.3	49.5	48.8
Progression Factor		1.18	0.72	1.50		1.52	0.36	0.10		1.00	1.00	1.00
Incremental Delay, d2		2.5	0.6	0.1		2.6	0.9	0.4		0.7	0.1	0.1
Delay (s)		64.2	14.8	22.8		81.6	8.7	2.0		56.0	49.6	48.9
Level of Service		E	B	C		F	A	A		E	D	D
Approach Delay (s)			21.8				16.0				50.6	
Approach LOS			C				B				D	

Intersection Summary			
HCM Average Control Delay	25.1	HCM Level of Service	C
HCM Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	18.3
Intersection Capacity Utilization	75.7%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBU	SBL	SBT	SBR
Lane Configurations				
Volume (vph)	1	182	195	199
Ideal Flow (vphpl)	1900	1900	1900	1900
Total Lost time (s)		6.3	5.3	5.3
Lane Util. Factor		0.97	0.95	1.00
Frpb, ped/bikes		1.00	1.00	0.98
Flpb, ped/bikes		1.00	1.00	1.00
Frt		1.00	1.00	0.85
Flt Protected		0.95	1.00	1.00
Satd. Flow (prot)		3433	3539	1554
Flt Permitted		0.95	1.00	1.00
Satd. Flow (perm)		3433	3539	1554
Peak-hour factor, PHF	0.96	0.96	0.96	0.96
Adj. Flow (vph)	1	190	203	207
RTOR Reduction (vph)	0	0	0	177
Lane Group Flow (vph)	0	191	203	30
Confl. Peds. (#/hr)				6
Confl. Bikes (#/hr)				
Turn Type	Prot	Prot		Perm
Protected Phases	7	7	4	
Permitted Phases				4
Actuated Green, G (s)		11.0	17.3	17.3
Effective Green, g (s)		11.0	17.3	17.3
Actuated g/C Ratio		0.09	0.14	0.14
Clearance Time (s)		6.3	5.3	5.3
Vehicle Extension (s)		2.0	2.0	2.0
Lane Grp Cap (vph)		315	510	224
v/s Ratio Prot		c0.06	c0.06	
v/s Ratio Perm				0.02
v/c Ratio		0.61	0.40	0.13
Uniform Delay, d1		52.4	46.6	44.8
Progression Factor		1.00	1.00	1.00
Incremental Delay, d2		2.3	0.2	0.1
Delay (s)		54.7	46.8	44.9
Level of Service		D	D	D
Approach Delay (s)			48.7	
Approach LOS			D	

Intersection Summary

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Lane Configurations												
Volume (vph)	10	95	1398	27	3	109	1726	72	2	69	70	132
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.6	5.7	5.7		5.6	5.7			5.6	5.3	5.3
Lane Util. Factor		1.00	0.91	1.00		0.97	0.91			1.00	1.00	0.88
Frpb, ped/bikes		1.00	1.00	0.99		1.00	1.00			1.00	1.00	0.99
Flpb, ped/bikes		1.00	1.00	1.00		1.00	1.00			1.00	1.00	1.00
Frt		1.00	1.00	0.85		1.00	0.99			1.00	1.00	0.85
Flt Protected		0.95	1.00	1.00		0.95	1.00			0.95	1.00	1.00
Satd. Flow (prot)		1770	5085	1562		3433	5049			1770	1863	2750
Flt Permitted		0.95	1.00	1.00		0.95	1.00			0.95	1.00	1.00
Satd. Flow (perm)		1770	5085	1562		3433	5049			1770	1863	2750
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	10	98	1441	28	3	112	1779	74	2	71	72	136
RTOR Reduction (vph)	0	0	0	9	0	0	2	0	0	0	0	123
Lane Group Flow (vph)	0	108	1441	19	0	115	1851	0	0	73	72	13
Confl. Peds. (#/hr)								3				1
Confl. Bikes (#/hr)				4				2				
Turn Type	Prot	Prot		Perm	Prot	Prot			Prot	Prot		Perm
Protected Phases	1	1	6		5	5	2		3	3	8	
Permitted Phases				6								8
Actuated Green, G (s)		11.7	63.9	63.9		8.4	60.6			8.3	11.5	11.5
Effective Green, g (s)		11.7	63.9	63.9		8.4	60.6			8.3	11.5	11.5
Actuated g/C Ratio		0.10	0.53	0.53		0.07	0.51			0.07	0.10	0.10
Clearance Time (s)		5.6	5.7	5.7		5.6	5.7			5.6	5.3	5.3
Vehicle Extension (s)		2.0	2.0	2.0		2.0	2.0			2.0	2.0	2.0
Lane Grp Cap (vph)		173	2708	832		240	2550			122	179	264
v/s Ratio Prot		c0.06	c0.28			0.03	c0.37			0.04	c0.04	
v/s Ratio Perm				0.01								0.00
v/c Ratio		0.62	0.53	0.02		0.48	0.73			0.60	0.40	0.05
Uniform Delay, d1		52.0	18.3	13.3		53.7	23.2			54.2	51.0	49.3
Progression Factor		1.04	0.87	0.50		1.46	0.38			1.00	1.00	1.00
Incremental Delay, d2		4.5	0.7	0.0		0.4	1.3			5.2	0.5	0.0
Delay (s)		58.5	16.5	6.7		78.9	10.0			59.4	51.6	49.3
Level of Service		E	B	A		E	B			E	D	D
Approach Delay (s)			19.2				14.1				52.5	
Approach LOS			B				B				D	

Intersection Summary			
HCM Average Control Delay	21.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	27.9
Intersection Capacity Utilization	71.8%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBL	SBT	SBR
Lane Configurations			
Volume (vph)	138	66	142
Ideal Flow (vphpl)	1900	1900	1900
Total Lost time (s)	5.6	5.3	
Lane Util. Factor	1.00	0.95	
Frpb, ped/bikes	1.00	0.99	
Flpb, ped/bikes	1.00	1.00	
Frt	1.00	0.90	
Flt Protected	0.95	1.00	
Satd. Flow (prot)	1770	3148	
Flt Permitted	0.95	1.00	
Satd. Flow (perm)	1770	3148	
Peak-hour factor, PHF	0.97	0.97	0.97
Adj. Flow (vph)	142	68	146
RTOR Reduction (vph)	0	125	0
Lane Group Flow (vph)	142	89	0
Confl. Peds. (#/hr)			1
Confl. Bikes (#/hr)			
Turn Type	Prot		
Protected Phases	7	4	
Permitted Phases			
Actuated Green, G (s)	14.0	17.2	
Effective Green, g (s)	14.0	17.2	
Actuated g/C Ratio	0.12	0.14	
Clearance Time (s)	5.6	5.3	
Vehicle Extension (s)	2.0	2.0	
Lane Grp Cap (vph)	207	451	
v/s Ratio Prot	c0.08	0.03	
v/s Ratio Perm			
v/c Ratio	0.69	0.20	
Uniform Delay, d1	50.9	45.3	
Progression Factor	1.00	1.00	
Incremental Delay, d2	7.3	0.1	
Delay (s)	58.2	45.4	
Level of Service	E	D	
Approach Delay (s)		50.5	
Approach LOS		D	

Intersection Summary

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL
Lane Configurations												
Volume (vph)	2	115	1428	68	47	176	1731	6	149	24	244	189
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.6	5.7			5.6	5.7		5.6	4.6		5.9
Lane Util. Factor		1.00	0.91			0.97	0.91		1.00	1.00		0.97
Frpb, ped/bikes		1.00	1.00			1.00	1.00		1.00	1.00		1.00
Flpb, ped/bikes		1.00	1.00			1.00	1.00		1.00	1.00		1.00
Frt		1.00	0.99			1.00	1.00		1.00	0.86		1.00
Flt Protected		0.95	1.00			0.95	1.00		0.95	1.00		0.95
Satd. Flow (prot)		1770	5042			3433	5082		1770	1608		3433
Flt Permitted		0.95	1.00			0.95	1.00		0.95	1.00		0.95
Satd. Flow (perm)		1770	5042			3433	5082		1770	1608		3433
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	2	120	1488	71	49	183	1803	6	155	25	254	197
RTOR Reduction (vph)	0	0	3	0	0	0	0	0	0	236	0	0
Lane Group Flow (vph)	0	122	1556	0	0	232	1809	0	155	43	0	197
Confl. Peds. (#/hr)				18				15				
Confl. Bikes (#/hr)				2				4				
Turn Type	Prot	Prot			Prot	Prot			Prot			Prot
Protected Phases	1	1	6		5	5	2		7	4		3
Permitted Phases												
Actuated Green, G (s)		12.6	59.5			12.5	59.4		14.8	8.7		17.5
Effective Green, g (s)		12.6	59.5			12.5	59.4		14.8	8.7		17.5
Actuated g/C Ratio		0.10	0.50			0.10	0.49		0.12	0.07		0.15
Clearance Time (s)		5.6	5.7			5.6	5.7		5.6	4.6		5.9
Vehicle Extension (s)		2.0	2.0			2.0	2.0		2.0	2.0		2.0
Lane Grp Cap (vph)		186	2500			358	2516		218	117		501
v/s Ratio Prot		c0.07	0.31			0.07	c0.36		c0.09	0.03		c0.06
v/s Ratio Perm												
v/c Ratio		0.66	0.62			0.65	0.72		0.71	0.37		0.39
Uniform Delay, d1		51.6	22.1			51.6	23.8		50.5	53.0		46.4
Progression Factor		1.11	0.77			1.18	0.48		1.00	1.00		1.00
Incremental Delay, d2		5.5	1.0			2.1	1.3		8.8	0.7		0.2
Delay (s)		63.0	18.1			63.3	12.7		59.3	53.8		46.6
Level of Service		E	B			E	B		E	D		D
Approach Delay (s)			21.3				18.4			55.7		
Approach LOS			C				B			E		

Intersection Summary			
HCM Average Control Delay	25.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.9
Intersection Capacity Utilization	83.2%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBT	SBR
Lane Configurations		
Volume (vph)	12	116
Ideal Flow (vphpl)	1900	1900
Total Lost time (s)	4.9	
Lane Util. Factor	1.00	
Frpb, ped/bikes	0.98	
Flpb, ped/bikes	1.00	
Frt	0.86	
Flt Protected	1.00	
Satd. Flow (prot)	1573	
Flt Permitted	1.00	
Satd. Flow (perm)	1573	
Peak-hour factor, PHF	0.96	0.96
Adj. Flow (vph)	12	121
RTOR Reduction (vph)	110	0
Lane Group Flow (vph)	23	0
Confl. Peds. (#/hr)		13
Confl. Bikes (#/hr)		
Turn Type		
Protected Phases	8	
Permitted Phases		
Actuated Green, G (s)	11.4	
Effective Green, g (s)	11.4	
Actuated g/C Ratio	0.10	
Clearance Time (s)	4.9	
Vehicle Extension (s)	2.0	
Lane Grp Cap (vph)	149	
v/s Ratio Prot	0.01	
v/s Ratio Perm		
v/c Ratio	0.16	
Uniform Delay, d1	49.9	
Progression Factor	1.00	
Incremental Delay, d2	0.2	
Delay (s)	50.1	
Level of Service	D	
Approach Delay (s)	48.0	
Approach LOS	D	

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	1749	215	94	1182	0	0	0	0	684	0	971
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0		5.6	5.7					6.7	6.7	6.7
Lane Util. Factor		0.91		1.00	0.91					0.95	0.95	0.88
Frpb, ped/bikes		1.00		1.00	1.00					1.00	1.00	0.99
Flpb, ped/bikes		1.00		1.00	1.00					1.00	1.00	1.00
Frt		0.98		1.00	1.00					1.00	1.00	0.85
Flt Protected		1.00		0.95	1.00					0.95	0.95	1.00
Satd. Flow (prot)		4982		1770	5085					1681	1681	2745
Flt Permitted		1.00		0.95	1.00					0.95	0.95	1.00
Satd. Flow (perm)		4982		1770	5085					1681	1681	2745
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	0	1785	219	96	1206	0	0	0	0	698	0	991
RTOR Reduction (vph)	0	11	0	0	0	0	0	0	0	0	0	78
Lane Group Flow (vph)	0	1993	0	96	1206	0	0	0	0	349	349	913
Confl. Peds. (#/hr)			5			7						3
Confl. Bikes (#/hr)			4			6						
Turn Type				Prot						Split		Perm
Protected Phases		2		1	6					4	4	
Permitted Phases												4
Actuated Green, G (s)		52.5		10.9	69.3					38.3	38.3	38.3
Effective Green, g (s)		52.5		10.9	69.3					38.3	38.3	38.3
Actuated g/C Ratio		0.44		0.09	0.58					0.32	0.32	0.32
Clearance Time (s)		6.0		5.6	5.7					6.7	6.7	6.7
Vehicle Extension (s)		2.0		2.0	2.0					1.0	1.0	1.0
Lane Grp Cap (vph)		2180		161	2937					537	537	876
v/s Ratio Prot		c0.40		c0.05	0.24					0.21	0.21	
v/s Ratio Perm												c0.33
v/c Ratio		0.91		0.60	0.41					0.65	0.65	1.04
Uniform Delay, d1		31.6		52.4	14.0					35.1	35.1	40.9
Progression Factor		0.51		0.41	1.41					1.00	1.00	1.00
Incremental Delay, d2		6.3		2.9	0.3					2.0	2.0	42.1
Delay (s)		22.5		24.2	20.1					37.1	37.1	83.0
Level of Service		C		C	C					D	D	F
Approach Delay (s)		22.5			20.4			0.0			64.0	
Approach LOS		C			C			A			E	

Intersection Summary			
HCM Average Control Delay	36.0	HCM Level of Service	D
HCM Volume to Capacity ratio	0.93		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	18.3
Intersection Capacity Utilization	79.1%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↰↰	↑↑↑	↑↑↑	↱		
Volume (vph)	745	1688	1276	507	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.6	6.0	5.7	5.7		
Lane Util. Factor	0.97	0.91	0.91	1.00		
Frt	1.00	1.00	1.00	0.85		
Flt Protected	0.95	1.00	1.00	1.00		
Satd. Flow (prot)	3433	5085	5085	1583		
Flt Permitted	0.95	1.00	1.00	1.00		
Satd. Flow (perm)	3433	5085	5085	1583		
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	801	1815	1372	545	0	0
RTOR Reduction (vph)	0	0	0	76	0	0
Lane Group Flow (vph)	801	1815	1372	469	0	0
Turn Type	Prot			Perm		
Protected Phases	1	6	2			
Permitted Phases				2		
Actuated Green, G (s)	59.4	120.0	49.3	49.3		
Effective Green, g (s)	59.4	120.0	49.3	49.3		
Actuated g/C Ratio	0.49	1.00	0.41	0.41		
Clearance Time (s)	5.6	6.0	5.7	5.7		
Vehicle Extension (s)	2.0	3.0	2.0	2.0		
Lane Grp Cap (vph)	1699	5085	2089	650		
v/s Ratio Prot	c0.23	0.36	0.27			
v/s Ratio Perm				c0.30		
v/c Ratio	0.47	0.36	0.66	0.72		
Uniform Delay, d1	20.0	0.0	28.5	29.6		
Progression Factor	0.72	1.00	0.80	0.73		
Incremental Delay, d2	0.0	0.1	1.3	5.5		
Delay (s)	14.4	0.1	24.0	27.1		
Level of Service	B	A	C	C		
Approach Delay (s)		4.5	24.9		0.0	
Approach LOS		A	C		A	

Intersection Summary			
HCM Average Control Delay	13.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	11.3
Intersection Capacity Utilization	79.1%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBU
Lane Configurations												
Volume (vph)	12	114	1012	477	6	55	1136	103	494	113	93	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.6	5.7	5.7		5.6	5.7	5.7	5.6	5.6		
Lane Util. Factor		1.00	0.95	1.00		1.00	0.91	1.00	0.91	0.91		
Frpb, ped/bikes		1.00	1.00	0.97		1.00	1.00	0.98	1.00	1.00		
Flpb, ped/bikes		1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00		
Frt		1.00	1.00	0.85		1.00	1.00	0.85	1.00	0.97		
Flt Protected		0.95	1.00	1.00		0.95	1.00	1.00	0.95	0.97		
Satd. Flow (prot)		1770	3539	1529		1770	5085	1547	1610	3186		
Flt Permitted		0.95	1.00	1.00		0.95	1.00	1.00	0.95	0.97		
Satd. Flow (perm)		1770	3539	1529		1770	5085	1547	1610	3186		
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	13	120	1065	502	6	58	1196	108	520	119	98	8
RTOR Reduction (vph)	0	0	0	237	0	0	0	50	0	19	0	0
Lane Group Flow (vph)	0	133	1065	265	0	64	1196	58	260	458	0	0
Confl. Peds. (#/hr)				4				7			6	
Confl. Bikes (#/hr)				4				2				
Turn Type	Prot	Prot		Perm	Prot	Prot		Perm	Split			Split
Protected Phases	1	1	6		5	5	2		3	3		4
Permitted Phases				6				2				
Actuated Green, G (s)		12.3	51.0	51.0		7.7	46.4	46.4	22.1	22.1		
Effective Green, g (s)		12.3	51.0	51.0		7.7	46.4	46.4	22.1	22.1		
Actuated g/C Ratio		0.10	0.42	0.42		0.06	0.39	0.39	0.18	0.18		
Clearance Time (s)		5.6	5.7	5.7		5.6	5.7	5.7	5.6	5.6		
Vehicle Extension (s)		2.0	3.9	3.9		2.0	3.9	3.9	2.0	2.0		
Lane Grp Cap (vph)		181	1504	650		114	1966	598	297	587		
v/s Ratio Prot		c0.08	c0.30			0.04	0.24		c0.16	0.14		
v/s Ratio Perm				0.17				0.04				
v/c Ratio		0.73	0.71	0.41		0.56	0.61	0.10	0.88	0.78		
Uniform Delay, d1		52.3	28.4	24.0		54.5	29.5	23.5	47.6	46.6		
Progression Factor		0.85	0.76	1.61		1.00	1.00	1.00	1.00	1.00		
Incremental Delay, d2		11.9	2.7	1.8		3.7	1.4	0.3	23.1	6.2		
Delay (s)		56.4	24.2	40.4		58.2	30.9	23.8	70.7	52.8		
Level of Service		E	C	D		E	C	C	E	D		
Approach Delay (s)			31.5				31.6			59.1		
Approach LOS			C				C			E		

Intersection Summary			
HCM Average Control Delay	38.9	HCM Level of Service	D
HCM Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	21.5
Intersection Capacity Utilization	77.1%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBL	SBT	SBR
Lane Configurations			
Volume (vph)	209	135	128
Ideal Flow (vphpl)	1900	1900	1900
Total Lost time (s)	4.6	4.6	4.6
Lane Util. Factor	0.95	0.95	1.00
Frpb, ped/bikes	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00
Frt	1.00	1.00	0.85
Flt Protected	0.95	0.99	1.00
Satd. Flow (prot)	1681	1748	1583
Flt Permitted	0.95	0.99	1.00
Satd. Flow (perm)	1681	1748	1583
Peak-hour factor, PHF	0.95	0.95	0.95
Adj. Flow (vph)	220	142	135
RTOR Reduction (vph)	0	0	115
Lane Group Flow (vph)	182	188	20
Confl. Peds. (#/hr)			
Confl. Bikes (#/hr)			
Turn Type	Split		Perm
Protected Phases	4	4	
Permitted Phases			4
Actuated Green, G (s)	17.7	17.7	17.7
Effective Green, g (s)	17.7	17.7	17.7
Actuated g/C Ratio	0.15	0.15	0.15
Clearance Time (s)	4.6	4.6	4.6
Vehicle Extension (s)	2.0	2.0	2.0
Lane Grp Cap (vph)	248	258	233
v/s Ratio Prot	c0.11	0.11	
v/s Ratio Perm			0.01
v/c Ratio	0.73	0.73	0.09
Uniform Delay, d1	48.9	48.9	44.2
Progression Factor	1.00	1.00	1.00
Incremental Delay, d2	9.3	8.4	0.1
Delay (s)	58.2	57.3	44.2
Level of Service	E	E	D
Approach Delay (s)		54.1	
Approach LOS		D	

Intersection Summary

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	258	9	0	398	586	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	266	9	0	410	604	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)		1				
Median type				TWLTL	TWLTL	
Median storage veh)				2	2	
Upstream signal (ft)					808	
pX, platoon unblocked	0.97	0.97	0.97			
vC, conflicting volume	809	604	604			
vC1, stage 1 conf vol	604					
vC2, stage 2 conf vol	205					
vCu, unblocked vol	785	573	573			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.3	2.2			
p0 queue free %	44	98	100			
cM capacity (veh/h)	479	447	962			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1
Volume Total	275	205	205	604
Volume Left	266	0	0	0
Volume Right	9	0	0	0
cSH	484	1700	1700	1700
Volume to Capacity	0.57	0.12	0.12	0.36
Queue Length 95th (ft)	87	0	0	0
Control Delay (s)	21.8	0.0	0.0	0.0
Lane LOS	C			
Approach Delay (s)	21.8	0.0		0.0
Approach LOS	C			

Intersection Summary			
Average Delay	4.7		
Intersection Capacity Utilization	51.8%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL
Lane Configurations												
Volume (vph)	72	46	105	60	62	34	14	82	683	57	20	33
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.6	4.6	4.6	5.6	4.6	4.6		5.6	5.3	5.3		5.6
Lane Util. Factor	1.00	1.00	1.00	0.97	1.00	1.00		1.00	0.95	1.00		1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.98		1.00	1.00	0.98		1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00		1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	1.00	0.85		1.00
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.95	1.00	1.00		0.95
Satd. Flow (prot)	1770	1863	1583	3433	1863	1558		1770	3539	1549		1770
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00		0.95	1.00	1.00		0.95
Satd. Flow (perm)	1770	1863	1583	3433	1863	1558		1770	3539	1549		1770
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	79	51	115	66	68	37	15	90	751	63	22	36
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	31	0	0
Lane Group Flow (vph)	79	51	115	66	68	37	0	105	751	32	0	58
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)	1					2		1		2		1
Turn Type	Prot		Perm	Prot		Perm	Prot	Prot		Perm	Prot	Prot
Protected Phases	3	8		7	4		1	1	6		5	5
Permitted Phases			8			4				6		
Actuated Green, G (s)	10.6	15.9	15.9	5.6	10.9	10.9		12.2	51.8	51.8		7.1
Effective Green, g (s)	10.6	15.9	15.9	5.6	10.9	10.9		12.2	51.8	51.8		7.1
Actuated g/C Ratio	0.10	0.16	0.16	0.06	0.11	0.11		0.12	0.51	0.51		0.07
Clearance Time (s)	5.6	4.6	4.6	5.6	4.6	4.6		5.6	5.3	5.3		5.6
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0		2.0
Lane Grp Cap (vph)	185	292	248	189	200	167		213	1806	791		124
v/s Ratio Prot	c0.04	0.03		0.02	0.04			c0.06	c0.21			0.03
v/s Ratio Perm			c0.07			0.02				0.02		
v/c Ratio	0.43	0.17	0.46	0.35	0.34	0.22		0.49	0.42	0.04		0.47
Uniform Delay, d1	42.6	37.1	38.9	46.2	42.0	41.4		41.8	15.4	12.4		45.4
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00		1.00
Incremental Delay, d2	0.6	0.1	0.5	0.4	0.4	0.2		0.7	0.1	0.0		1.0
Delay (s)	43.2	37.2	39.4	46.6	42.3	41.7		42.4	15.5	12.4		46.4
Level of Service	D	D	D	D	D	D		D	B	B		D
Approach Delay (s)		40.2			43.8				18.4			
Approach LOS		D			D				B			

Intersection Summary			
HCM Average Control Delay	25.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	101.5	Sum of lost time (s)	26.4
Intersection Capacity Utilization	63.9%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBT	SBR
Lane Configurations	↑↱	
Volume (vph)	1055	63
Ideal Flow (vphpl)	1900	1900
Total Lost time (s)	5.3	
Lane Util. Factor	0.95	
Frpb, ped/bikes	1.00	
Flpb, ped/bikes	1.00	
Frt	0.99	
Flt Protected	1.00	
Satd. Flow (prot)	3504	
Flt Permitted	1.00	
Satd. Flow (perm)	3504	
Peak-hour factor, PHF	0.91	0.91
Adj. Flow (vph)	1159	69
RTOR Reduction (vph)	2	0
Lane Group Flow (vph)	1226	0
Confl. Peds. (#/hr)		2
Confl. Bikes (#/hr)		1
Turn Type		
Protected Phases	2	
Permitted Phases		
Actuated Green, G (s)	46.7	
Effective Green, g (s)	46.7	
Actuated g/C Ratio	0.46	
Clearance Time (s)	5.3	
Vehicle Extension (s)	2.0	
Lane Grp Cap (vph)	1612	
v/s Ratio Prot	c0.35	
v/s Ratio Perm		
v/c Ratio	0.76	
Uniform Delay, d1	22.8	
Progression Factor	1.00	
Incremental Delay, d2	1.9	
Delay (s)	24.7	
Level of Service	C	
Approach Delay (s)	25.7	
Approach LOS	C	

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	17	127	19	16	146	5	14	9	7	10	21	18
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	18	135	20	17	155	5	15	10	7	11	22	19

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total (vph)	18	155	17	161	32	52
Volume Left (vph)	18	0	17	0	15	11
Volume Right (vph)	0	20	0	5	7	19
Hadj (s)	0.53	-0.06	0.53	0.01	-0.01	-0.15
Departure Headway (s)	5.4	4.8	5.4	4.9	4.8	4.6
Degree Utilization, x	0.03	0.21	0.03	0.22	0.04	0.07
Capacity (veh/h)	653	730	647	721	697	717
Control Delay (s)	7.3	7.8	7.3	8.0	8.0	7.9
Approach Delay (s)	7.8		7.9		8.0	7.9
Approach LOS	A		A		A	A

Intersection Summary			
Delay	7.9		
HCM Level of Service	A		
Intersection Capacity Utilization	24.2%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Lane Configurations												
Volume (vph)	66	45	15	4	41	12	12	278	7	2	3	478
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.6	4.6	4.6	5.6	5.6	5.6	6.3	5.3			6.3	5.3
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95			1.00	0.95
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00			1.00	0.97
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00			0.95	1.00
Satd. Flow (prot)	1770	1863	1583	1770	1863	1583	1770	3526			1770	3429
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00			0.95	1.00
Satd. Flow (perm)	1770	1863	1583	1770	1863	1583	1770	3526			1770	3429
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	72	49	16	4	45	13	13	302	8	2	3	520
RTOR Reduction (vph)	0	0	12	0	0	12	0	1	0	0	0	13
Lane Group Flow (vph)	72	49	4	4	45	1	13	309	0	0	5	644
Turn Type	Prot		Perm	Prot		Perm	Prot			Prot	Prot	
Protected Phases	3	8		7	4		1	6		5	5	2
Permitted Phases			8			4						
Actuated Green, G (s)	6.5	13.6	13.6	0.5	6.6	6.6	0.7	24.4			0.6	24.3
Effective Green, g (s)	6.5	13.6	13.6	0.5	6.6	6.6	0.7	24.4			0.6	24.3
Actuated g/C Ratio	0.11	0.22	0.22	0.01	0.11	0.11	0.01	0.40			0.01	0.40
Clearance Time (s)	5.6	4.6	4.6	5.6	5.6	5.6	6.3	5.3			6.3	5.3
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0			2.0	2.0
Lane Grp Cap (vph)	189	416	354	15	202	172	20	1413			17	1368
v/s Ratio Prot	c0.04	0.03		0.00	c0.02		c0.01	0.09			0.00	c0.19
v/s Ratio Perm			0.00			0.00						
v/c Ratio	0.38	0.12	0.01	0.27	0.22	0.01	0.65	0.22			0.29	0.47
Uniform Delay, d1	25.3	18.9	18.4	30.0	24.8	24.2	30.0	12.0			29.9	13.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00
Incremental Delay, d2	0.5	0.0	0.0	3.5	0.2	0.0	45.4	0.0			3.5	0.1
Delay (s)	25.8	18.9	18.4	33.5	25.0	24.2	75.4	12.0			33.4	13.6
Level of Service	C	B	B	C	C	C	E	B			C	B
Approach Delay (s)		22.5			25.4			14.6				13.8
Approach LOS		C			C			B				B

Intersection Summary			
HCM Average Control Delay	15.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.42		
Actuated Cycle Length (s)	60.9	Sum of lost time (s)	22.8
Intersection Capacity Utilization	38.5%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBR
Lane Configurations	
Volume (vph)	126
Ideal Flow (vphpl)	1900
Total Lost time (s)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Peak-hour factor, PHF	0.92
Adj. Flow (vph)	137
RTOR Reduction (vph)	0
Lane Group Flow (vph)	0
Turn Type	
Protected Phases	
Permitted Phases	
Actuated Green, G (s)	
Effective Green, g (s)	
Actuated g/C Ratio	
Clearance Time (s)	
Vehicle Extension (s)	
Lane Grp Cap (vph)	
v/s Ratio Prot	
v/s Ratio Perm	
v/c Ratio	
Uniform Delay, d1	
Progression Factor	
Incremental Delay, d2	
Delay (s)	
Level of Service	
Approach Delay (s)	
Approach LOS	

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Lane Configurations												
Volume (vph)	65	0	12	0	0	0	20	208	0	0	0	166
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.6		5.6				5.6	4.6				4.6
Lane Util. Factor	1.00		1.00				1.00	0.95				0.95
Frt	1.00		0.85				1.00	1.00				0.97
Flt Protected	0.95		1.00				0.95	1.00				1.00
Satd. Flow (prot)	1770		1583				1770	3539				3441
Flt Permitted	0.95		1.00				0.95	1.00				1.00
Satd. Flow (perm)	1770		1583				1770	3539				3441
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	74	0	14	0	0	0	23	236	0	0	0	189
RTOR Reduction (vph)	0	0	11	0	0	0	0	0	0	0	0	10
Lane Group Flow (vph)	74	0	3	0	0	0	23	236	0	0	0	222
Turn Type	Prot		custom	Prot			Prot			Prot		
Protected Phases	3			7	4		1	6		5		2
Permitted Phases			8									
Actuated Green, G (s)	4.4		12.9				0.6	30.7				24.5
Effective Green, g (s)	4.4		12.9				0.6	30.7				24.5
Actuated g/C Ratio	0.08		0.24				0.01	0.57				0.46
Clearance Time (s)	5.6		5.6				5.6	4.6				4.6
Vehicle Extension (s)	2.0		2.0				2.0	2.0				2.0
Lane Grp Cap (vph)	145		380				20	2019				1567
v/s Ratio Prot	c0.04						c0.01	0.07				c0.06
v/s Ratio Perm			c0.00									
v/c Ratio	0.51		0.01				1.15	0.12				0.14
Uniform Delay, d1	23.7		15.6				26.6	5.3				8.5
Progression Factor	1.00		1.00				1.00	1.00				1.00
Incremental Delay, d2	1.3		0.0				252.2	0.0				0.0
Delay (s)	24.9		15.6				278.8	5.3				8.5
Level of Service	C		B				F	A				A
Approach Delay (s)		23.4			0.0			29.6				8.5
Approach LOS		C			A			C				A

Intersection Summary			
HCM Average Control Delay	20.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.17		
Actuated Cycle Length (s)	53.8	Sum of lost time (s)	15.8
Intersection Capacity Utilization	25.4%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBR
Lane Configurations	
Volume (vph)	38
Ideal Flow (vphpl)	1900
Total Lost time (s)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Peak-hour factor, PHF	0.88
Adj. Flow (vph)	43
RTOR Reduction (vph)	0
Lane Group Flow (vph)	0
Turn Type	
Protected Phases	
Permitted Phases	
Actuated Green, G (s)	
Effective Green, g (s)	
Actuated g/C Ratio	
Clearance Time (s)	
Vehicle Extension (s)	
Lane Grp Cap (vph)	
v/s Ratio Prot	
v/s Ratio Perm	
v/c Ratio	
Uniform Delay, d1	
Progression Factor	
Incremental Delay, d2	
Delay (s)	
Level of Service	
Approach Delay (s)	
Approach LOS	

Intersection Summary

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	45	4	6	252	440	57
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.6		5.3	5.3	5.3	
Lane Util. Factor	1.00		1.00	0.95	0.95	
Frt	0.99		1.00	1.00	0.98	
Flt Protected	0.96		0.95	1.00	1.00	
Satd. Flow (prot)	1762		1770	3539	3478	
Flt Permitted	0.96		0.95	1.00	1.00	
Satd. Flow (perm)	1762		1770	3539	3478	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	49	4	7	274	478	62
RTOR Reduction (vph)	3	0	0	0	6	0
Lane Group Flow (vph)	50	0	7	274	534	0
Turn Type			Prot			
Protected Phases	3		1	6	2	
Permitted Phases						
Actuated Green, G (s)	4.3		0.6	32.3	26.4	
Effective Green, g (s)	4.3		0.6	32.3	26.4	
Actuated g/C Ratio	0.09		0.01	0.69	0.57	
Clearance Time (s)	4.6		5.3	5.3	5.3	
Vehicle Extension (s)	2.0		2.0	2.0	2.0	
Lane Grp Cap (vph)	163		23	2458	1975	
v/s Ratio Prot	c0.03		0.00	c0.08	c0.15	
v/s Ratio Perm						
v/c Ratio	0.31		0.30	0.11	0.27	
Uniform Delay, d1	19.7		22.7	2.4	5.1	
Progression Factor	1.00		1.00	1.00	1.00	
Incremental Delay, d2	0.4		2.7	0.0	0.0	
Delay (s)	20.1		25.5	2.4	5.2	
Level of Service	C		C	A	A	
Approach Delay (s)	20.1			2.9	5.2	
Approach LOS	C			A	A	

Intersection Summary			
HCM Average Control Delay	5.3	HCM Level of Service	A
HCM Volume to Capacity ratio	0.28		
Actuated Cycle Length (s)	46.5	Sum of lost time (s)	15.2
Intersection Capacity Utilization	26.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Volume (vph)	44	18	2	2	60	23	48	12	166	62	88	303
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.6	7.2			5.6	5.6	6.3	6.3	5.3	5.3	6.3	5.3
Lane Util. Factor	1.00	1.00			0.97	1.00	0.88	1.00	0.95	1.00	0.97	0.95
Frt	1.00	0.99			1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98
Flt Protected	0.95	1.00			0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	1837			3433	1863	2787	1770	3539	1583	3433	3460
Flt Permitted	0.95	1.00			0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1770	1837			3433	1863	2787	1770	3539	1583	3433	3460
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	50	20	2	2	68	26	55	14	189	70	100	344
RTOR Reduction (vph)	0	2	0	0	0	0	44	0	0	43	0	6
Lane Group Flow (vph)	50	20	0	0	70	26	11	14	189	27	100	398
Turn Type	Prot			Prot	Prot		pm+ov	Prot		Perm	Prot	
Protected Phases	3	8		7	7	4	5	1	6		5	2
Permitted Phases							4			6		
Actuated Green, G (s)	4.0	4.6			3.7	5.9	12.3	0.6	24.4	24.4	6.4	30.2
Effective Green, g (s)	4.0	4.6			3.7	5.9	12.3	0.6	24.4	24.4	6.4	30.2
Actuated g/C Ratio	0.06	0.07			0.06	0.09	0.19	0.01	0.38	0.38	0.10	0.48
Clearance Time (s)	5.6	7.2			5.6	5.6	6.3	6.3	5.3	5.3	6.3	5.3
Vehicle Extension (s)	2.0	2.0			2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	111	133			200	173	540	17	1360	608	346	1646
v/s Ratio Prot	c0.03	0.01			0.02	c0.01	0.00	0.01	0.05		c0.03	c0.11
v/s Ratio Perm							0.00			0.02		
v/c Ratio	0.45	0.15			0.35	0.15	0.02	0.82	0.14	0.04	0.29	0.24
Uniform Delay, d1	28.7	27.6			28.7	26.5	20.7	31.4	12.7	12.2	26.4	9.9
Progression Factor	1.00	1.00			1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.1	0.2			0.4	0.1	0.0	127.9	0.0	0.0	0.2	0.0
Delay (s)	29.7	27.8			29.1	26.6	20.7	159.3	12.7	12.3	26.6	9.9
Level of Service	C	C			C	C	C	F	B	B	C	A
Approach Delay (s)		29.2				25.6			20.1			13.2
Approach LOS		C				C			C			B

Intersection Summary			
HCM Average Control Delay	18.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.28		
Actuated Cycle Length (s)	63.5	Sum of lost time (s)	22.8
Intersection Capacity Utilization	38.6%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBR
Lane Configurations	
Volume (vph)	53
Ideal Flow (vphpl)	1900
Total Lost time (s)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Peak-hour factor, PHF	0.88
Adj. Flow (vph)	60
RTOR Reduction (vph)	0
Lane Group Flow (vph)	0
Turn Type	
Protected Phases	
Permitted Phases	
Actuated Green, G (s)	
Effective Green, g (s)	
Actuated g/C Ratio	
Clearance Time (s)	
Vehicle Extension (s)	
Lane Grp Cap (vph)	
v/s Ratio Prot	
v/s Ratio Perm	
v/c Ratio	
Uniform Delay, d1	
Progression Factor	
Incremental Delay, d2	
Delay (s)	
Level of Service	
Approach Delay (s)	
Approach LOS	

Intersection Summary

Movement	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL
Lane Configurations												
Volume (vph)	17	69	9	6	6	15	16	29	87	6	2	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.6	6.6	6.6	5.6	6.6	6.6	5.6	5.6	5.6		5.6
Lane Util. Factor		0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.95	1.00		0.97
Frpb, ped/bikes		1.00	1.00	0.99	1.00	1.00	1.00	1.00	1.00	0.98		1.00
Flpb, ped/bikes		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00
Frt		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85		1.00
Flt Protected		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00		0.95
Satd. Flow (prot)		3433	3539	1563	3433	3539	1583	3433	3539	1558		3433
Flt Permitted		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00		0.95
Satd. Flow (perm)		3433	3539	1563	3433	3539	1583	3433	3539	1558		3433
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	19	76	10	7	7	16	18	32	96	7	2	3
RTOR Reduction (vph)	0	0	0	4	0	0	12	0	0	6	0	0
Lane Group Flow (vph)	0	95	10	3	7	16	6	32	96	1	0	5
Confl. Peds. (#/hr)										2		
Confl. Bikes (#/hr)				2						2		1
Turn Type	Prot	Prot		Perm	Prot		Perm	Prot		Perm	Prot	Prot
Protected Phases	3	3	8		7	4		1	6		5	5
Permitted Phases				8			4			6		
Actuated Green, G (s)		5.8	25.7	25.7	0.4	20.3	20.3	0.5	7.7	7.7		0.4
Effective Green, g (s)		5.8	25.7	25.7	0.4	20.3	20.3	0.5	7.7	7.7		0.4
Actuated g/C Ratio		0.10	0.45	0.45	0.01	0.35	0.35	0.01	0.13	0.13		0.01
Clearance Time (s)		5.6	6.6	6.6	5.6	6.6	6.6	5.6	5.6	5.6		5.6
Vehicle Extension (s)		2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0		2.0
Lane Grp Cap (vph)		346	1579	697	24	1247	558	30	473	208		24
v/s Ratio Prot		c0.03	c0.00		0.00	c0.00		c0.01	c0.03			0.00
v/s Ratio Perm				0.00			0.00			0.00		
v/c Ratio		0.27	0.01	0.00	0.29	0.01	0.01	1.07	0.20	0.00		0.21
Uniform Delay, d1		24.0	8.9	8.9	28.5	12.1	12.1	28.6	22.2	21.6		28.4
Progression Factor		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00
Incremental Delay, d2		0.2	0.0	0.0	2.5	0.0	0.0	185.4	0.1	0.0		1.6
Delay (s)		24.1	8.9	8.9	30.9	12.1	12.1	213.9	22.3	21.6		30.0
Level of Service		C	A	A	C	B	B	F	C	C		C
Approach Delay (s)			21.8			15.3			67.7			
Approach LOS			C			B			E			

Intersection Summary			
HCM Average Control Delay	36.0	HCM Level of Service	D
HCM Volume to Capacity ratio	0.10		
Actuated Cycle Length (s)	57.6	Sum of lost time (s)	24.4
Intersection Capacity Utilization	34.0%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBT	SBR
Lane Configurations	↑↑	↱
Volume (vph)	57	54
Ideal Flow (vphpl)	1900	1900
Total Lost time (s)	4.6	4.6
Lane Util. Factor	0.95	1.00
Frpb, ped/bikes	1.00	0.99
Flpb, ped/bikes	1.00	1.00
Frt	1.00	0.85
Flt Protected	1.00	1.00
Satd. Flow (prot)	3539	1561
Flt Permitted	1.00	1.00
Satd. Flow (perm)	3539	1561
Peak-hour factor, PHF	0.91	0.91
Adj. Flow (vph)	63	59
RTOR Reduction (vph)	0	50
Lane Group Flow (vph)	63	9
Confl. Peds. (#/hr)		1
Confl. Bikes (#/hr)		1
Turn Type		Perm
Protected Phases	2	
Permitted Phases		2
Actuated Green, G (s)	8.6	8.6
Effective Green, g (s)	8.6	8.6
Actuated g/C Ratio	0.15	0.15
Clearance Time (s)	4.6	4.6
Vehicle Extension (s)	2.0	2.0
Lane Grp Cap (vph)	528	233
v/s Ratio Prot	0.02	
v/s Ratio Perm		0.01
v/c Ratio	0.12	0.04
Uniform Delay, d1	21.2	21.0
Progression Factor	1.00	1.00
Incremental Delay, d2	0.0	0.0
Delay (s)	21.3	21.0
Level of Service	C	C
Approach Delay (s)	21.5	
Approach LOS	C	

Intersection Summary

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Lane Configurations												
Volume (vph)	1	320	192	37	1	129	231	43	21	104	244	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.6	4.9	4.9		5.6	4.9	4.9		6.3	5.3	5.3
Lane Util. Factor		0.97	0.95	1.00		0.97	0.95	1.00		0.97	0.95	1.00
Frt		1.00	1.00	0.85		1.00	1.00	0.85		1.00	1.00	0.85
Flt Protected		0.95	1.00	1.00		0.95	1.00	1.00		0.95	1.00	1.00
Satd. Flow (prot)		3433	3539	1583		3433	3539	1583		3433	3539	1583
Flt Permitted		0.95	1.00	1.00		0.95	1.00	1.00		0.95	1.00	1.00
Satd. Flow (perm)		3433	3539	1583		3433	3539	1583		3433	3539	1583
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	1	344	206	40	1	139	248	46	23	112	262	54
RTOR Reduction (vph)	0	0	0	30	0	0	0	38	0	0	0	38
Lane Group Flow (vph)	0	345	206	10	0	140	248	8	0	135	262	16
Turn Type	Prot	Prot		Perm	Prot	Prot		Perm	Prot	Prot		Perm
Protected Phases	3	3	8		7	7	4		1	1	6	
Permitted Phases				8				4				6
Actuated Green, G (s)		13.6	19.0	19.0		8.6	14.0	14.0		8.5	22.6	22.6
Effective Green, g (s)		13.6	19.0	19.0		8.6	14.0	14.0		8.5	22.6	22.6
Actuated g/C Ratio		0.17	0.24	0.24		0.11	0.18	0.18		0.11	0.29	0.29
Clearance Time (s)		5.6	4.9	4.9		5.6	4.9	4.9		6.3	5.3	5.3
Vehicle Extension (s)		2.0	2.0	2.0		2.0	2.0	2.0		2.0	2.0	2.0
Lane Grp Cap (vph)		599	862	386		379	635	284		374	1025	459
v/s Ratio Prot		c0.10	c0.06			0.04	c0.07			c0.04	c0.07	
v/s Ratio Perm				0.01				0.01				0.01
v/c Ratio		0.58	0.24	0.03		0.37	0.39	0.03		0.36	0.26	0.03
Uniform Delay, d1		29.6	23.7	22.5		32.2	28.2	26.4		32.2	21.2	19.9
Progression Factor		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2		0.8	0.1	0.0		0.2	0.1	0.0		0.2	0.0	0.0
Delay (s)		30.4	23.7	22.5		32.4	28.4	26.4		32.4	21.3	19.9
Level of Service		C	C	C		C	C	C		C	C	B
Approach Delay (s)			27.5				29.5				24.5	
Approach LOS			C				C				C	

Intersection Summary			
HCM Average Control Delay	26.4	HCM Level of Service	C
HCM Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	78.0	Sum of lost time (s)	32.3
Intersection Capacity Utilization	67.6%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBU	SBL	SBT	SBR
Lane Configurations				
Volume (vph)	14	68	400	472
Ideal Flow (vphpl)	1900	1900	1900	1900
Total Lost time (s)		6.3	5.3	5.3
Lane Util. Factor		0.97	0.95	1.00
Frt		1.00	1.00	0.85
Flt Protected		0.95	1.00	1.00
Satd. Flow (prot)		3433	3539	1583
Flt Permitted		0.95	1.00	1.00
Satd. Flow (perm)		3433	3539	1583
Peak-hour factor, PHF	0.93	0.93	0.93	0.93
Adj. Flow (vph)	15	73	430	508
RTOR Reduction (vph)	0	0	0	379
Lane Group Flow (vph)	0	88	430	129
Turn Type	Prot	Prot		Perm
Protected Phases	5	5	2	
Permitted Phases				2
Actuated Green, G (s)		5.7	19.8	19.8
Effective Green, g (s)		5.7	19.8	19.8
Actuated g/C Ratio		0.07	0.25	0.25
Clearance Time (s)		6.3	5.3	5.3
Vehicle Extension (s)		2.0	2.0	2.0
Lane Grp Cap (vph)		251	898	402
v/s Ratio Prot		0.03	c0.12	
v/s Ratio Perm				0.08
v/c Ratio		0.35	0.48	0.32
Uniform Delay, d1		34.4	24.7	23.6
Progression Factor		1.00	1.00	1.00
Incremental Delay, d2		0.3	0.1	0.2
Delay (s)		34.7	24.9	23.8
Level of Service		C	C	C
Approach Delay (s)			25.2	
Approach LOS			C	

Intersection Summary

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	201	66	124	42	12	261
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.6	4.6	4.6	5.3	5.3
Lane Util. Factor		1.00	1.00	1.00	1.00	1.00
Frt		1.00	1.00	0.85	1.00	0.85
Flt Protected		0.96	1.00	1.00	0.95	1.00
Satd. Flow (prot)		1795	1863	1583	1770	1583
Flt Permitted		0.96	1.00	1.00	0.95	1.00
Satd. Flow (perm)		1795	1863	1583	1770	1583
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	216	71	133	45	13	281
RTOR Reduction (vph)	0	0	0	36	0	228
Lane Group Flow (vph)	0	287	133	9	13	53
Turn Type	Split			Perm		Perm
Protected Phases	3	3	4		2	
Permitted Phases				4		2
Actuated Green, G (s)		13.4	9.6	9.6	9.0	9.0
Effective Green, g (s)		13.4	9.6	9.6	9.0	9.0
Actuated g/C Ratio		0.28	0.20	0.20	0.19	0.19
Clearance Time (s)		5.6	4.6	4.6	5.3	5.3
Vehicle Extension (s)		2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)		506	377	320	335	300
v/s Ratio Prot		c0.16	c0.07		0.01	
v/s Ratio Perm				0.01		c0.03
v/c Ratio		0.57	0.35	0.03	0.04	0.18
Uniform Delay, d1		14.6	16.3	15.2	15.7	16.1
Progression Factor		1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		0.9	0.2	0.0	0.0	0.1
Delay (s)		15.4	16.5	15.2	15.7	16.2
Level of Service		B	B	B	B	B
Approach Delay (s)		15.4	16.2		16.2	
Approach LOS		B	B		B	

Intersection Summary			
HCM Average Control Delay	15.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.39		
Actuated Cycle Length (s)	47.5	Sum of lost time (s)	15.5
Intersection Capacity Utilization	38.2%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	1	1	0	138	449	2
Sign Control		Stop	Stop		Free	
Grade		0%	0%		0%	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	1	1	0	159	516	2
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1033	1033	1034	0	0	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1033	1033	1034	0	0	
tC, single (s)	7.1	6.5	6.5	6.2	4.1	
tC, 2 stage (s)						
tF (s)	3.5	4.0	4.0	3.3	2.2	
p0 queue free %	99	99	100	85	68	
cM capacity (veh/h)	135	158	158	1085	1623	

Direction, Lane #	EB 1	EB 2	WB 1	SB 1	SB 2
Volume Total	2	1	159	344	174
Volume Left	1	0	0	344	172
Volume Right	0	0	159	0	2
cSH	141	158	1085	1623	1623
Volume to Capacity	0.01	0.00	0.15	0.32	0.32
Queue Length 95th (ft)	1	0	13	35	35
Control Delay (s)	30.9	27.8	8.9	8.2	8.2
Lane LOS	D	D	A	A	A
Approach Delay (s)	29.9		8.9	8.2	
Approach LOS	D		A		

Intersection Summary			
Average Delay	8.5		
Intersection Capacity Utilization	28.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	6	440	0	0	135	616	2	1	109	0	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	6	454	0	0	139	635	2	1	112	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)									17			
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	139			454			605	605	227	435	605	139
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	139			454			605	605	227	435	605	139
tC, single (s)	4.4			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.4			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			99	100	86	100	100	100
cM capacity (veh/h)	1339			1103			380	408	776	429	408	884

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1
Volume Total	6	227	227	139	318	318	115
Volume Left	6	0	0	0	0	0	2
Volume Right	0	0	0	0	318	318	112
cSH	1339	1700	1700	1700	1700	1700	797
Volume to Capacity	0.00	0.13	0.13	0.08	0.19	0.19	0.14
Queue Length 95th (ft)	0	0	0	0	0	0	13
Control Delay (s)	7.7	0.0	0.0	0.0	0.0	0.0	10.5
Lane LOS	A						B
Approach Delay (s)	0.1			0.0			10.5
Approach LOS							B

Intersection Summary			
Average Delay	0.9		
Intersection Capacity Utilization	38.2%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Lane Configurations												
Volume (vph)	2	152	741	213	4	47	553	188	58	317	293	88
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.6	6.8	6.8		5.6	7.2	7.2		5.6	7.2	7.2
Lane Util. Factor		0.97	0.91	0.88		0.97	0.91	1.00		0.97	0.91	1.00
Frpb, ped/bikes		1.00	1.00	0.98		1.00	1.00	0.98		1.00	1.00	0.97
Flpb, ped/bikes		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00
Frt		1.00	1.00	0.85		1.00	1.00	0.85		1.00	1.00	0.85
Flt Protected		0.95	1.00	1.00		0.95	1.00	1.00		0.95	1.00	1.00
Satd. Flow (prot)		3433	5085	2729		3433	5085	1552		3433	5085	1541
Flt Permitted		0.95	1.00	1.00		0.95	1.00	1.00		0.95	1.00	1.00
Satd. Flow (perm)		3433	5085	2729		3433	5085	1552		3433	5085	1541
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	2	165	805	232	4	51	601	204	63	345	318	96
RTOR Reduction (vph)	0	0	0	117	0	0	0	111	0	0	0	83
Lane Group Flow (vph)	0	167	805	115	0	55	601	93	0	408	318	13
Confl. Peds. (#/hr)								7				9
Confl. Bikes (#/hr)				1				1				4
Turn Type	Prot	Prot		Perm	Prot	Prot		Perm	Prot	Prot		Perm
Protected Phases	1	1	6		5	5	2		3	3	8	
Permitted Phases				6				2				8
Actuated Green, G (s)		10.2	59.7	59.7		5.4	54.5	54.5		18.7	16.1	16.1
Effective Green, g (s)		10.2	59.7	59.7		5.4	54.5	54.5		18.7	16.1	16.1
Actuated g/C Ratio		0.08	0.50	0.50		0.05	0.45	0.45		0.16	0.13	0.13
Clearance Time (s)		5.6	6.8	6.8		5.6	7.2	7.2		5.6	7.2	7.2
Vehicle Extension (s)		2.0	2.0	2.0		2.0	2.0	2.0		2.0	2.0	2.0
Lane Grp Cap (vph)		292	2530	1358		154	2309	705		535	682	207
v/s Ratio Prot		c0.05	c0.16			0.02	0.12			c0.12	c0.06	
v/s Ratio Perm				0.04				0.06				0.01
v/c Ratio		0.57	0.32	0.08		0.36	0.26	0.13		0.76	0.47	0.06
Uniform Delay, d1		52.8	18.0	15.8		55.6	20.3	19.0		48.5	48.0	45.4
Progression Factor		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2		1.7	0.3	0.1		0.5	0.3	0.4		5.7	0.2	0.0
Delay (s)		54.5	18.3	15.9		56.1	20.5	19.4		54.3	48.2	45.4
Level of Service		D	B	B		E	C	B		D	D	D
Approach Delay (s)			22.9				22.5				50.9	
Approach LOS			C				C				D	

Intersection Summary			
HCM Average Control Delay	34.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.47		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	25.2
Intersection Capacity Utilization	74.8%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBU	SBL	SBT	SBR
Lane Configurations				
Volume (vph)	5	249	181	137
Ideal Flow (vphpl)	1900	1900	1900	1900
Total Lost time (s)		5.6	6.3	6.3
Lane Util. Factor		0.97	0.91	1.00
Frpb, ped/bikes		1.00	1.00	0.97
Flpb, ped/bikes		1.00	1.00	1.00
Frt		1.00	1.00	0.85
Flt Protected		0.95	1.00	1.00
Satd. Flow (prot)		3433	5085	1543
Flt Permitted		0.95	1.00	1.00
Satd. Flow (perm)		3433	5085	1543
Peak-hour factor, PHF	0.92	0.92	0.92	0.92
Adj. Flow (vph)	5	271	197	149
RTOR Reduction (vph)	0	0	0	134
Lane Group Flow (vph)	0	276	197	15
Confl. Peds. (#/hr)				
Confl. Bikes (#/hr)				6
Turn Type	Prot	Prot		Perm
Protected Phases	7	7	4	
Permitted Phases				4
Actuated Green, G (s)		13.6	11.9	11.9
Effective Green, g (s)		13.6	11.9	11.9
Actuated g/C Ratio		0.11	0.10	0.10
Clearance Time (s)		5.6	6.3	6.3
Vehicle Extension (s)		2.0	2.0	2.0
Lane Grp Cap (vph)		389	504	153
v/s Ratio Prot		0.08	0.04	
v/s Ratio Perm				0.01
v/c Ratio		0.71	0.39	0.10
Uniform Delay, d1		51.3	50.7	49.2
Progression Factor		1.00	1.00	1.00
Incremental Delay, d2		4.8	0.2	0.1
Delay (s)		56.1	50.8	49.3
Level of Service		E	D	D
Approach Delay (s)			52.8	
Approach LOS			D	

Intersection Summary

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Lane Configurations												
Volume (vph)	19	300	970	80	1	376	540	139	3	106	342	246
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.6	6.0	6.0		5.6	6.0	6.0		5.6	5.7	5.7
Lane Util. Factor		0.97	0.91	1.00		0.97	0.91	1.00		0.97	0.91	1.00
Frpb, ped/bikes		1.00	1.00	0.98		1.00	1.00	0.99		1.00	1.00	0.98
Flpb, ped/bikes		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00
Frt		1.00	1.00	0.85		1.00	1.00	0.85		1.00	1.00	0.85
Flt Protected		0.95	1.00	1.00		0.95	1.00	1.00		0.95	1.00	1.00
Satd. Flow (prot)		3433	5085	1556		3433	5085	1561		3433	5085	1557
Flt Permitted		0.95	1.00	1.00		0.95	1.00	1.00		0.95	1.00	1.00
Satd. Flow (perm)		3433	5085	1556		3433	5085	1561		3433	5085	1557
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	21	330	1066	88	1	413	593	153	3	116	376	270
RTOR Reduction (vph)	0	0	0	43	0	0	0	86	0	0	0	235
Lane Group Flow (vph)	0	351	1066	45	0	414	593	67	0	119	376	35
Confl. Peds. (#/hr)				3				2				1
Confl. Bikes (#/hr)				4								2
Turn Type	Prot	Prot		Perm	Prot	Prot		Perm	Prot	Prot		Perm
Protected Phases	1	1	6		5	5	2		3	3	8	
Permitted Phases				6				2				8
Actuated Green, G (s)		16.6	50.1	50.1		18.9	52.4	52.4		8.6	15.6	15.6
Effective Green, g (s)		16.6	50.1	50.1		18.9	52.4	52.4		8.6	15.6	15.6
Actuated g/C Ratio		0.14	0.42	0.42		0.16	0.44	0.44		0.07	0.13	0.13
Clearance Time (s)		5.6	6.0	6.0		5.6	6.0	6.0		5.6	5.7	5.7
Vehicle Extension (s)		2.0	2.0	2.0		2.0	2.0	2.0		2.0	2.0	2.0
Lane Grp Cap (vph)		475	2123	650		541	2220	682		246	661	202
v/s Ratio Prot		0.10	c0.21			c0.12	0.12			0.03	0.07	
v/s Ratio Perm				0.03				0.04				0.02
v/c Ratio		0.74	0.50	0.07		0.77	0.27	0.10		0.48	0.57	0.17
Uniform Delay, d1		49.6	25.8	21.0		48.4	21.6	19.9		53.6	49.0	46.5
Progression Factor		1.00	1.00	1.00		1.37	0.33	0.43		1.00	1.00	1.00
Incremental Delay, d2		5.1	0.9	0.2		5.5	0.3	0.3		0.5	0.7	0.1
Delay (s)		54.8	26.6	21.2		71.9	7.5	8.8		54.1	49.7	46.6
Level of Service		D	C	C		E	A	A		D	D	D
Approach Delay (s)			32.9				30.6				49.3	
Approach LOS			C				C				D	

Intersection Summary			
HCM Average Control Delay	39.0	HCM Level of Service	D
HCM Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	22.9
Intersection Capacity Utilization	81.2%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBU	SBL	SBT	SBR
Lane Configurations				
Volume (vph)	36	190	482	166
Ideal Flow (vphpl)	1900	1900	1900	1900
Total Lost time (s)		5.6	5.7	5.7
Lane Util. Factor		0.97	0.86	0.86
Frpb, ped/bikes		1.00	1.00	0.98
Flpb, ped/bikes		1.00	1.00	1.00
Frt		1.00	0.99	0.85
Flt Protected		0.95	1.00	1.00
Satd. Flow (prot)		3433	4771	1339
Flt Permitted		0.95	1.00	1.00
Satd. Flow (perm)		3433	4771	1339
Peak-hour factor, PHF	0.91	0.91	0.91	0.91
Adj. Flow (vph)	40	209	530	182
RTOR Reduction (vph)	0	0	4	132
Lane Group Flow (vph)	0	249	550	26
Confl. Peds. (#/hr)				2
Confl. Bikes (#/hr)				2
Turn Type	Prot	Prot		Perm
Protected Phases	7	7	4	
Permitted Phases				4
Actuated Green, G (s)		12.5	19.5	19.5
Effective Green, g (s)		12.5	19.5	19.5
Actuated g/C Ratio		0.10	0.16	0.16
Clearance Time (s)		5.6	5.7	5.7
Vehicle Extension (s)		2.0	2.0	2.0
Lane Grp Cap (vph)		358	775	218
v/s Ratio Prot		c0.07	c0.12	
v/s Ratio Perm				0.02
v/c Ratio		0.70	0.71	0.12
Uniform Delay, d1		51.9	47.6	42.9
Progression Factor		1.00	1.00	1.00
Incremental Delay, d2		4.7	2.4	0.1
Delay (s)		56.6	50.0	43.0
Level of Service		E	D	D
Approach Delay (s)			50.6	
Approach LOS			D	

Intersection Summary

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL
Lane Configurations												
Volume (vph)	2	9	1399	16	1	18	1049	70	13	5	23	72
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.7	6.7	6.7		5.6	6.7			5.6	5.6	5.6
Lane Util. Factor		1.00	0.91	1.00		1.00	0.91			1.00	1.00	0.95
Frpb, ped/bikes		1.00	1.00	0.98		1.00	1.00			1.00	0.99	1.00
Flpb, ped/bikes		1.00	1.00	1.00		1.00	1.00			1.00	1.00	1.00
Frt		1.00	1.00	0.85		1.00	0.99			1.00	0.85	1.00
Flt Protected		0.95	1.00	1.00		0.95	1.00			0.97	1.00	0.95
Satd. Flow (prot)		1770	5085	1549		1770	5027			1648	1563	1681
Flt Permitted		0.95	1.00	1.00		0.95	1.00			0.97	1.00	0.95
Satd. Flow (perm)		1770	5085	1549		1770	5027			1648	1563	1681
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	2	10	1572	18	1	20	1179	79	15	6	26	81
RTOR Reduction (vph)	0	0	0	4	0	0	4	0	0	0	25	0
Lane Group Flow (vph)	0	12	1572	14	0	21	1254	0	0	21	1	42
Confl. Peds. (#/hr)								5			1	
Confl. Bikes (#/hr)				3								
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	15%	2%	2%	2%
Turn Type	Prot	Prot		Perm	Prot	Prot			Split		Perm	Split
Protected Phases	1	1	6		5	5	2		3	3		4
Permitted Phases				6							3	
Actuated Green, G (s)		2.6	79.1	79.1		2.9	78.3			6.3	6.3	8.2
Effective Green, g (s)		2.6	79.1	79.1		2.9	78.3			6.3	6.3	8.2
Actuated g/C Ratio		0.02	0.66	0.66		0.02	0.65			0.05	0.05	0.07
Clearance Time (s)		6.7	6.7	6.7		5.6	6.7			5.6	5.6	5.6
Vehicle Extension (s)		2.0	3.0	3.0		2.0	3.0			2.0	2.0	2.0
Lane Grp Cap (vph)		38	3352	1021		43	3280			87	82	115
v/s Ratio Prot		0.01	c0.31			c0.01	0.25			c0.01		0.02
v/s Ratio Perm				0.01							0.00	
v/c Ratio		0.32	0.47	0.01		0.49	0.38			0.24	0.02	0.37
Uniform Delay, d1		57.8	10.1	7.0		57.8	9.7			54.6	53.9	53.4
Progression Factor		0.71	1.72	1.55		1.35	0.24			1.00	1.00	1.00
Incremental Delay, d2		1.5	0.4	0.0		2.9	0.3			0.5	0.0	0.7
Delay (s)		42.5	17.7	10.9		81.0	2.7			55.1	53.9	54.1
Level of Service		D	B	B		F	A			E	D	D
Approach Delay (s)			17.9				3.9			54.5		
Approach LOS			B				A			D		

Intersection Summary			
HCM Average Control Delay	13.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.42		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.8
Intersection Capacity Utilization	53.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	SBT	SBR
Lane Configurations		
Volume (vph)	4	23
Ideal Flow (vphpl)	1900	1900
Total Lost time (s)	5.6	5.6
Lane Util. Factor	0.95	1.00
Frpb, ped/bikes	1.00	0.98
Flpb, ped/bikes	1.00	1.00
Frt	1.00	0.85
Flt Protected	0.96	1.00
Satd. Flow (prot)	1693	1559
Flt Permitted	0.96	1.00
Satd. Flow (perm)	1693	1559
Peak-hour factor, PHF	0.89	0.89
Adj. Flow (vph)	4	26
RTOR Reduction (vph)	0	24
Lane Group Flow (vph)	43	2
Confl. Peds. (#/hr)		3
Confl. Bikes (#/hr)		
Heavy Vehicles (%)	2%	2%
Turn Type		Perm
Protected Phases	4	
Permitted Phases		4
Actuated Green, G (s)	8.2	8.2
Effective Green, g (s)	8.2	8.2
Actuated g/C Ratio	0.07	0.07
Clearance Time (s)	5.6	5.6
Vehicle Extension (s)	2.0	2.0
Lane Grp Cap (vph)	116	107
v/s Ratio Prot	c0.03	
v/s Ratio Perm		0.00
v/c Ratio	0.37	0.02
Uniform Delay, d1	53.4	52.1
Progression Factor	1.00	1.00
Incremental Delay, d2	0.7	0.0
Delay (s)	54.2	52.2
Level of Service	D	D
Approach Delay (s)	53.7	
Approach LOS	D	

Intersection Summary

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Lane Configurations		↰↰	↑↑↑	↱		↰↰	↑↑↑	↱		↰↰	↑↑	↱
Volume (vph)	79	187	1210	34	15	154	933	127	1	50	158	235
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.7	5.7	5.7		6.7	5.7	5.7		6.3	5.3	5.3
Lane Util. Factor		0.97	0.91	1.00		0.97	0.91	1.00		0.97	0.95	1.00
Frpb, ped/bikes		1.00	1.00	0.99		1.00	1.00	0.98		1.00	1.00	0.98
Flpb, ped/bikes		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00
Frt		1.00	1.00	0.85		1.00	1.00	0.85		1.00	1.00	0.85
Flt Protected		0.95	1.00	1.00		0.95	1.00	1.00		0.95	1.00	1.00
Satd. Flow (prot)		3433	5085	1563		3433	5085	1556		3433	3539	1553
Flt Permitted		0.95	1.00	1.00		0.95	1.00	1.00		0.95	1.00	1.00
Satd. Flow (perm)		3433	5085	1563		3433	5085	1556		3433	3539	1553
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	88	208	1344	38	17	171	1037	141	1	56	176	261
RTOR Reduction (vph)	0	0	0	14	0	0	0	65	0	0	0	219
Lane Group Flow (vph)	0	296	1344	24	0	188	1037	76	0	57	176	42
Confl. Peds. (#/hr)								4				
Confl. Bikes (#/hr)				2				1				4
Turn Type	Prot	Prot		Perm	Prot	Prot		Perm	Prot	Prot		Perm
Protected Phases	1	1	6		5	5	2		3	3	8	
Permitted Phases				6				2				8
Actuated Green, G (s)		13.7	59.7	59.7		10.9	56.9	56.9		5.5	14.5	14.5
Effective Green, g (s)		13.7	59.7	59.7		10.9	56.9	56.9		5.5	14.5	14.5
Actuated g/C Ratio		0.11	0.50	0.50		0.09	0.47	0.47		0.05	0.12	0.12
Clearance Time (s)		6.7	5.7	5.7		6.7	5.7	5.7		6.3	5.3	5.3
Vehicle Extension (s)		2.0	2.0	2.0		2.0	2.0	2.0		2.0	2.0	2.0
Lane Grp Cap (vph)		392	2530	778		312	2411	738		157	428	188
v/s Ratio Prot		c0.09	c0.26			0.05	0.20			0.02	c0.05	
v/s Ratio Perm				0.02				0.05				0.03
v/c Ratio		0.76	0.53	0.03		0.60	0.43	0.10		0.36	0.41	0.22
Uniform Delay, d1		51.5	20.6	15.4		52.5	20.8	17.4		55.6	48.8	47.7
Progression Factor		1.23	0.76	1.43		1.43	0.39	0.30		1.00	1.00	1.00
Incremental Delay, d2		6.7	0.7	0.1		2.1	0.5	0.3		0.5	0.2	0.2
Delay (s)		70.3	16.4	22.1		77.1	8.6	5.5		56.1	49.0	47.9
Level of Service		E	B	C		E	A	A		E	D	D
Approach Delay (s)			26.0				17.8				49.2	
Approach LOS			C				B				D	

Intersection Summary			
HCM Average Control Delay	28.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	29.3
Intersection Capacity Utilization	67.5%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBU	SBL	SBT	SBR
Lane Configurations				
Volume (vph)	7	161	118	118
Ideal Flow (vphpl)	1900	1900	1900	1900
Total Lost time (s)		6.3	5.3	5.3
Lane Util. Factor		0.97	0.95	1.00
Frpb, ped/bikes		1.00	1.00	0.98
Flpb, ped/bikes		1.00	1.00	1.00
Frt		1.00	1.00	0.85
Flt Protected		0.95	1.00	1.00
Satd. Flow (prot)		3433	3539	1549
Flt Permitted		0.95	1.00	1.00
Satd. Flow (perm)		3433	3539	1549
Peak-hour factor, PHF	0.90	0.90	0.90	0.90
Adj. Flow (vph)	8	179	131	131
RTOR Reduction (vph)	0	0	0	109
Lane Group Flow (vph)	0	187	131	22
Confl. Peds. (#/hr)				4
Confl. Bikes (#/hr)				4
Turn Type	Prot	Prot		Perm
Protected Phases	7	7	4	
Permitted Phases				4
Actuated Green, G (s)		10.9	19.9	19.9
Effective Green, g (s)		10.9	19.9	19.9
Actuated g/C Ratio		0.09	0.17	0.17
Clearance Time (s)		6.3	5.3	5.3
Vehicle Extension (s)		2.0	2.0	2.0
Lane Grp Cap (vph)		312	587	257
v/s Ratio Prot		c0.05	c0.04	
v/s Ratio Perm				0.01
v/c Ratio		0.60	0.22	0.08
Uniform Delay, d1		52.5	43.4	42.3
Progression Factor		1.00	1.00	1.00
Incremental Delay, d2		2.1	0.1	0.1
Delay (s)		54.5	43.4	42.4
Level of Service		D	D	D
Approach Delay (s)			47.7	
Approach LOS			D	

Intersection Summary

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL
Lane Configurations												
Volume (vph)	10	74	1529	16	8	40	1181	87	6	27	89	64
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.6	5.7	5.7		5.6	5.7		5.6	5.3	5.3	5.6
Lane Util. Factor		1.00	0.91	1.00		0.97	0.91		1.00	1.00	0.88	1.00
Frpb, ped/bikes		1.00	1.00	0.98		1.00	1.00		1.00	1.00	0.98	1.00
Flpb, ped/bikes		1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00
Frt		1.00	1.00	0.85		1.00	0.99		1.00	1.00	0.85	1.00
Flt Protected		0.95	1.00	1.00		0.95	1.00		0.95	1.00	1.00	0.95
Satd. Flow (prot)		1770	5085	1555		3433	5024		1770	1863	2737	1770
Flt Permitted		0.95	1.00	1.00		0.95	1.00		0.95	1.00	1.00	0.95
Satd. Flow (perm)		1770	5085	1555		3433	5024		1770	1863	2737	1770
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	11	78	1609	17	8	42	1243	92	6	28	94	67
RTOR Reduction (vph)	0	0	0	4	0	0	4	0	0	0	85	0
Lane Group Flow (vph)	0	89	1609	13	0	50	1331	0	6	28	9	67
Confl. Peds. (#/hr)				4				2			3	
Confl. Bikes (#/hr)				2				1			1	
Turn Type	Prot	Prot		Perm	Prot	Prot			Prot		Perm	Prot
Protected Phases	1	1	6		5	5	2		3	8		7
Permitted Phases				6							8	
Actuated Green, G (s)		10.4	73.5	73.5		5.3	68.4		1.2	11.1	11.1	7.9
Effective Green, g (s)		10.4	73.5	73.5		5.3	68.4		1.2	11.1	11.1	7.9
Actuated g/C Ratio		0.09	0.61	0.61		0.04	0.57		0.01	0.09	0.09	0.07
Clearance Time (s)		5.6	5.7	5.7		5.6	5.7		5.6	5.3	5.3	5.6
Vehicle Extension (s)		2.0	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0
Lane Grp Cap (vph)		153	3115	952		152	2864		18	172	253	117
v/s Ratio Prot		c0.05	c0.32			0.01	0.26		0.00	c0.02		c0.04
v/s Ratio Perm				0.01							0.00	
v/c Ratio		0.58	0.52	0.01		0.33	0.46		0.33	0.16	0.03	0.57
Uniform Delay, d1		52.7	13.2	9.1		55.6	15.1		59.0	50.2	49.6	54.4
Progression Factor		1.11	0.85	0.37		1.19	0.30		1.00	1.00	1.00	1.00
Incremental Delay, d2		3.2	0.5	0.0		0.4	0.5		3.9	0.2	0.0	4.2
Delay (s)		61.5	11.8	3.3		66.6	5.1		63.0	50.3	49.6	58.6
Level of Service		E	B	A		E	A		E	D	D	E
Approach Delay (s)			14.3				7.3			50.4		
Approach LOS			B				A			D		

Intersection Summary			
HCM Average Control Delay	14.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	22.2
Intersection Capacity Utilization	62.5%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	SBT	SBR
Lane Configurations		
Volume (vph)	19	60
Ideal Flow (vphpl)	1900	1900
Total Lost time (s)	5.3	
Lane Util. Factor	0.95	
Frpb, ped/bikes	0.99	
Flpb, ped/bikes	1.00	
Frt	0.89	
Flt Protected	1.00	
Satd. Flow (prot)	3093	
Flt Permitted	1.00	
Satd. Flow (perm)	3093	
Peak-hour factor, PHF	0.95	0.95
Adj. Flow (vph)	20	63
RTOR Reduction (vph)	54	0
Lane Group Flow (vph)	29	0
Confl. Peds. (#/hr)		4
Confl. Bikes (#/hr)		1
Turn Type		
Protected Phases	4	
Permitted Phases		
Actuated Green, G (s)	17.8	
Effective Green, g (s)	17.8	
Actuated g/C Ratio	0.15	
Clearance Time (s)	5.3	
Vehicle Extension (s)	2.0	
Lane Grp Cap (vph)	459	
v/s Ratio Prot	0.01	
v/s Ratio Perm		
v/c Ratio	0.06	
Uniform Delay, d1	43.9	
Progression Factor	1.00	
Incremental Delay, d2	0.0	
Delay (s)	44.0	
Level of Service	D	
Approach Delay (s)	50.5	
Approach LOS	D	

Intersection Summary

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL
Lane Configurations												
Volume (vph)	5	126	1371	163	99	262	1120	6	131	32	242	168
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.6	5.7			5.6	5.7		5.6	4.6		5.9
Lane Util. Factor		1.00	0.91			0.97	0.91		1.00	1.00		0.97
Frpb, ped/bikes		1.00	1.00			1.00	1.00		1.00	0.99		1.00
Flpb, ped/bikes		1.00	1.00			1.00	1.00		1.00	1.00		1.00
Frt		1.00	0.98			1.00	1.00		1.00	0.87		1.00
Flt Protected		0.95	1.00			0.95	1.00		0.95	1.00		0.95
Satd. Flow (prot)		1770	4989			3433	5081		1770	1596		3433
Flt Permitted		0.95	1.00			0.95	1.00		0.95	1.00		0.95
Satd. Flow (perm)		1770	4989			3433	5081		1770	1596		3433
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	5	133	1443	172	104	276	1179	6	138	34	255	177
RTOR Reduction (vph)	0	0	10	0	0	0	1	0	0	175	0	0
Lane Group Flow (vph)	0	138	1605	0	0	380	1184	0	138	114	0	177
Confl. Peds. (#/hr)				11				6				
Confl. Bikes (#/hr)				1				2			1	
Turn Type	Prot	Prot			Prot	Prot			Prot			Prot
Protected Phases	1	1	6		5	5	2		7	4		3
Permitted Phases												
Actuated Green, G (s)		13.7	54.8			16.9	58.0		13.6	12.8		13.7
Effective Green, g (s)		13.7	54.8			16.9	58.0		13.6	12.8		13.7
Actuated g/C Ratio		0.11	0.46			0.14	0.48		0.11	0.11		0.11
Clearance Time (s)		5.6	5.7			5.6	5.7		5.6	4.6		5.9
Vehicle Extension (s)		2.0	2.0			2.0	2.0		2.0	2.0		2.0
Lane Grp Cap (vph)		202	2278			483	2456		201	170		392
v/s Ratio Prot		0.08	c0.32			c0.11	c0.23		c0.08	0.07		c0.05
v/s Ratio Perm												
v/c Ratio		0.68	0.70			0.79	0.48		0.69	0.67		0.45
Uniform Delay, d1		51.1	26.1			49.8	20.9		51.2	51.6		49.6
Progression Factor		1.49	0.40			0.96	0.94		1.00	1.00		1.00
Incremental Delay, d2		6.7	1.7			5.7	0.5		7.5	7.9		0.3
Delay (s)		82.8	12.1			53.8	20.2		58.7	59.4		49.9
Level of Service		F	B			D	C		E	E		D
Approach Delay (s)			17.7				28.3			59.2		
Approach LOS			B				C			E		

Intersection Summary			
HCM Average Control Delay	28.4	HCM Level of Service	C
HCM Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	22.6
Intersection Capacity Utilization	82.4%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBT	SBR
Lane Configurations		
Volume (vph)	17	66
Ideal Flow (vphpl)	1900	1900
Total Lost time (s)	4.9	
Lane Util. Factor	1.00	
Frpb, ped/bikes	0.98	
Flpb, ped/bikes	1.00	
Frt	0.88	
Flt Protected	1.00	
Satd. Flow (prot)	1600	
Flt Permitted	1.00	
Satd. Flow (perm)	1600	
Peak-hour factor, PHF	0.95	0.95
Adj. Flow (vph)	18	69
RTOR Reduction (vph)	62	0
Lane Group Flow (vph)	25	0
Confl. Peds. (#/hr)		16
Confl. Bikes (#/hr)		2
Turn Type		
Protected Phases	8	
Permitted Phases		
Actuated Green, G (s)	12.9	
Effective Green, g (s)	12.9	
Actuated g/C Ratio	0.11	
Clearance Time (s)	4.9	
Vehicle Extension (s)	2.0	
Lane Grp Cap (vph)	172	
v/s Ratio Prot	0.02	
v/s Ratio Perm		
v/c Ratio	0.15	
Uniform Delay, d1	48.6	
Progression Factor	1.00	
Incremental Delay, d2	0.1	
Delay (s)	48.7	
Level of Service	D	
Approach Delay (s)	49.5	
Approach LOS	D	

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	1691	217	49	907	0	0	0	0	478	0	903
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0		5.6	5.7					6.7	6.7	6.7
Lane Util. Factor		0.91		1.00	0.91					0.95	0.95	0.88
Frpb, ped/bikes		1.00		1.00	1.00					1.00	1.00	0.99
Flpb, ped/bikes		1.00		1.00	1.00					1.00	1.00	1.00
Frt		0.98		1.00	1.00					1.00	1.00	0.85
Flt Protected		1.00		0.95	1.00					0.95	0.95	1.00
Satd. Flow (prot)		4982		1736	5085					1681	1681	2748
Flt Permitted		1.00		0.95	1.00					0.95	0.95	1.00
Satd. Flow (perm)		4982		1736	5085					1681	1681	2748
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	1879	241	54	1008	0	0	0	0	531	0	1003
RTOR Reduction (vph)	0	11	0	0	0	0	0	0	0	0	0	129
Lane Group Flow (vph)	0	2109	0	54	1008	0	0	0	0	265	266	874
Confl. Peds. (#/hr)			3			2						2
Confl. Bikes (#/hr)			1			2						
Heavy Vehicles (%)	2%	2%	2%	4%	2%	2%	2%	2%	2%	2%	2%	2%
Turn Type				Prot						Split		Perm
Protected Phases		2		1	6					4	4	
Permitted Phases												4
Actuated Green, G (s)		56.2		7.2	69.3					38.3	38.3	38.3
Effective Green, g (s)		56.2		7.2	69.3					38.3	38.3	38.3
Actuated g/C Ratio		0.47		0.06	0.58					0.32	0.32	0.32
Clearance Time (s)		6.0		5.6	5.7					6.7	6.7	6.7
Vehicle Extension (s)		2.0		2.0	2.0					1.0	1.0	1.0
Lane Grp Cap (vph)		2333		104	2937					537	537	877
v/s Ratio Prot		c0.42		c0.03	0.20					0.16	0.16	
v/s Ratio Perm												c0.32
v/c Ratio		0.90		0.52	0.34					0.49	0.50	1.00
Uniform Delay, d1		29.4		54.7	13.4					33.0	33.0	40.8
Progression Factor		0.69		0.40	1.21					1.00	1.00	1.00
Incremental Delay, d2		5.1		1.6	0.3					0.3	0.3	29.4
Delay (s)		25.5		23.3	16.4					33.3	33.3	70.2
Level of Service		C		C	B					C	C	E
Approach Delay (s)		25.5			16.8			0.0			57.4	
Approach LOS		C			B			A			E	

Intersection Summary			
HCM Average Control Delay	33.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	18.3
Intersection Capacity Utilization	70.4%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBU	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations							
Volume (vph)	6	892	1272	952	462	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.6	6.0	5.7	5.7		
Lane Util. Factor		0.97	0.91	0.91	1.00		
Frpb, ped/bikes		1.00	1.00	1.00	0.98		
Flpb, ped/bikes		1.00	1.00	1.00	1.00		
Frt		1.00	1.00	1.00	0.85		
Flt Protected		0.95	1.00	1.00	1.00		
Satd. Flow (prot)		3433	5085	5085	1559		
Flt Permitted		0.95	1.00	1.00	1.00		
Satd. Flow (perm)		3433	5085	5085	1559		
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	6	959	1368	1024	497	0	0
RTOR Reduction (vph)	0	0	0	0	49	0	0
Lane Group Flow (vph)	0	965	1368	1024	448	0	0
Confl. Peds. (#/hr)					1		
Confl. Bikes (#/hr)					2		
Turn Type	Prot	Prot			Perm		
Protected Phases	1	1	6	2			
Permitted Phases					2		
Actuated Green, G (s)		59.4	120.0	49.3	49.3		
Effective Green, g (s)		59.4	120.0	49.3	49.3		
Actuated g/C Ratio		0.49	1.00	0.41	0.41		
Clearance Time (s)		5.6	6.0	5.7	5.7		
Vehicle Extension (s)		2.0	3.0	2.0	2.0		
Lane Grp Cap (vph)		1699	5085	2089	640		
v/s Ratio Prot		c0.28	0.27	0.20			
v/s Ratio Perm					c0.29		
v/c Ratio		0.57	0.27	0.49	0.70		
Uniform Delay, d1		21.3	0.0	26.1	29.2		
Progression Factor		0.52	1.00	1.07	1.09		
Incremental Delay, d2		0.1	0.1	0.8	5.8		
Delay (s)		11.2	0.1	28.6	37.7		
Level of Service		B	A	C	D		
Approach Delay (s)			4.7	31.6		0.0	
Approach LOS			A	C		A	

Intersection Summary			
HCM Average Control Delay	15.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	11.3
Intersection Capacity Utilization	70.4%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBU
Lane Configurations												
Volume (vph)	11	67	841	254	9	37	795	119	434	79	114	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.6	5.7	5.7		5.6	5.7	5.7	5.6	5.6		
Lane Util. Factor		1.00	0.95	1.00		1.00	0.91	1.00	0.91	0.91		
Frpb, ped/bikes		1.00	1.00	0.97		1.00	1.00	0.98	1.00	0.99		
Flpb, ped/bikes		1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00		
Frt		1.00	1.00	0.85		1.00	1.00	0.85	1.00	0.96		
Flt Protected		0.95	1.00	1.00		0.95	1.00	1.00	0.95	0.97		
Satd. Flow (prot)		1770	3539	1542		1770	5085	1558	1610	3145		
Flt Permitted		0.95	1.00	1.00		0.95	1.00	1.00	0.95	0.97		
Satd. Flow (perm)		1770	3539	1542		1770	5085	1558	1610	3145		
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	12	72	904	273	10	40	855	128	467	85	123	8
RTOR Reduction (vph)	0	0	0	136	0	0	0	68	0	32	0	0
Lane Group Flow (vph)	0	84	904	137	0	50	855	60	233	410	0	0
Confl. Peds. (#/hr)				2				2			4	
Confl. Bikes (#/hr)				1				3			4	
Turn Type	Prot	Prot		Perm	Prot	Prot		Perm	Split			Split
Protected Phases	1	1	6		5	5	2		3	3		4
Permitted Phases				6				2				
Actuated Green, G (s)		8.9	58.6	58.6		6.9	56.6	56.6	20.9	20.9		
Effective Green, g (s)		8.9	58.6	58.6		6.9	56.6	56.6	20.9	20.9		
Actuated g/C Ratio		0.07	0.49	0.49		0.06	0.47	0.47	0.17	0.17		
Clearance Time (s)		5.6	5.7	5.7		5.6	5.7	5.7	5.6	5.6		
Vehicle Extension (s)		2.0	3.9	3.9		2.0	3.9	3.9	2.0	2.0		
Lane Grp Cap (vph)		131	1728	753		102	2398	735	280	548		
v/s Ratio Prot		c0.05	c0.26			0.03	0.17		c0.14	0.13		
v/s Ratio Perm				0.09				0.04				
v/c Ratio		0.64	0.52	0.18		0.49	0.36	0.08	0.83	0.75		
Uniform Delay, d1		54.0	21.1	17.2		54.8	20.1	17.4	47.9	47.0		
Progression Factor		0.84	0.93	2.55		1.00	1.00	1.00	1.00	1.00		
Incremental Delay, d2		7.6	1.1	0.5		1.3	0.4	0.2	17.9	4.9		
Delay (s)		53.2	20.7	44.5		56.2	20.5	17.6	65.7	51.9		
Level of Service		D	C	D		E	C	B	E	D		
Approach Delay (s)			28.0				21.9			56.7		
Approach LOS			C				C			E		

Intersection Summary			
HCM Average Control Delay	34.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	15.8
Intersection Capacity Utilization	64.6%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBL	SBT	SBR
Lane Configurations			
Volume (vph)	134	61	100
Ideal Flow (vphpl)	1900	1900	1900
Total Lost time (s)	4.6	4.6	4.6
Lane Util. Factor	0.95	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.99
Flpb, ped/bikes	1.00	1.00	1.00
Frt	1.00	1.00	0.85
Flt Protected	0.95	0.98	1.00
Satd. Flow (prot)	1681	1734	1561
Flt Permitted	0.95	0.98	1.00
Satd. Flow (perm)	1681	1734	1561
Peak-hour factor, PHF	0.93	0.93	0.93
Adj. Flow (vph)	144	66	108
RTOR Reduction (vph)	0	0	97
Lane Group Flow (vph)	107	111	11
Confl. Peds. (#/hr)			
Confl. Bikes (#/hr)			1
Turn Type	Split		Perm
Protected Phases	4	4	
Permitted Phases			4
Actuated Green, G (s)	12.1	12.1	12.1
Effective Green, g (s)	12.1	12.1	12.1
Actuated g/C Ratio	0.10	0.10	0.10
Clearance Time (s)	4.6	4.6	4.6
Vehicle Extension (s)	2.0	2.0	2.0
Lane Grp Cap (vph)	170	175	157
v/s Ratio Prot	0.06	c0.06	
v/s Ratio Perm			0.01
v/c Ratio	0.63	0.63	0.07
Uniform Delay, d1	51.8	51.8	48.9
Progression Factor	1.00	1.00	1.00
Incremental Delay, d2	5.2	5.4	0.1
Delay (s)	57.0	57.2	48.9
Level of Service	E	E	D
Approach Delay (s)		54.4	
Approach LOS		D	

Intersection Summary

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	221	22	0	377	334	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Hourly flow rate (vph)	243	24	0	414	367	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)		1				
Median type				TWLTL	TWLTL	
Median storage veh)				2	2	
Upstream signal (ft)					808	
pX, platoon unblocked						
vC, conflicting volume	574	367	367			
vC1, stage 1 conf vol	367					
vC2, stage 2 conf vol	207					
vCu, unblocked vol	574	367	367			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.3	2.2			
p0 queue free %	60	96	100			
cM capacity (veh/h)	614	630	1188			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1
Volume Total	267	207	207	367
Volume Left	243	0	0	0
Volume Right	24	0	0	0
cSH	645	1700	1700	1700
Volume to Capacity	0.41	0.12	0.12	0.22
Queue Length 95th (ft)	51	0	0	0
Control Delay (s)	14.5	0.0	0.0	0.0
Lane LOS	B			
Approach Delay (s)	14.5	0.0		0.0
Approach LOS	B			

Intersection Summary			
Average Delay	3.7		
Intersection Capacity Utilization	36.5%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL
Lane Configurations												
Volume (vph)	51	40	54	39	39	25	16	86	681	78	8	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.6	4.6	4.6	5.6	4.6	4.6		5.6	5.3	5.3		5.6
Lane Util. Factor	1.00	1.00	1.00	0.97	1.00	1.00		1.00	0.95	1.00		1.00
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00	0.98		1.00	1.00	0.97		1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00		1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	1.00	0.85		1.00
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.95	1.00	1.00		0.95
Satd. Flow (prot)	1770	1863	1560	3433	1863	1554		1770	3539	1528		1770
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00		0.95	1.00	1.00		0.95
Satd. Flow (perm)	1770	1863	1560	3433	1863	1554		1770	3539	1528		1770
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	57	44	60	43	43	28	18	96	757	87	9	18
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	44	0	0
Lane Group Flow (vph)	57	44	60	43	43	28	0	114	757	43	0	27
Confl. Peds. (#/hr)						4				8		
Confl. Bikes (#/hr)	1		2			2		1		3		1
Turn Type	Prot		Perm	Prot		Perm	Prot	Prot		Perm	Prot	Prot
Protected Phases	3	8		7	4		1	1	6		5	5
Permitted Phases			8			4				6		
Actuated Green, G (s)	6.1	12.1	12.1	3.3	9.3	9.3		10.6	38.7	38.7		2.3
Effective Green, g (s)	6.1	12.1	12.1	3.3	9.3	9.3		10.6	38.7	38.7		2.3
Actuated g/C Ratio	0.08	0.16	0.16	0.04	0.12	0.12		0.14	0.50	0.50		0.03
Clearance Time (s)	5.6	4.6	4.6	5.6	4.6	4.6		5.6	5.3	5.3		5.6
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0		2.0
Lane Grp Cap (vph)	139	291	244	146	224	186		242	1767	763		53
v/s Ratio Prot	c0.03	0.02		0.01	0.02			c0.06	c0.21			0.02
v/s Ratio Perm			c0.04			0.02				0.03		
v/c Ratio	0.41	0.15	0.25	0.29	0.19	0.15		0.47	0.43	0.06		0.51
Uniform Delay, d1	34.0	28.3	28.7	36.0	30.7	30.6		30.9	12.4	10.0		37.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00		1.00
Incremental Delay, d2	0.7	0.1	0.2	0.4	0.2	0.1		0.5	0.1	0.0		2.8
Delay (s)	34.7	28.3	28.9	36.4	30.9	30.7		31.4	12.4	10.0		39.8
Level of Service	C	C	C	D	C	C		C	B	B		D
Approach Delay (s)		30.8			32.9				14.5			
Approach LOS		C			C				B			

Intersection Summary			
HCM Average Control Delay	18.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	77.5	Sum of lost time (s)	26.4
Intersection Capacity Utilization	51.1%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBT	SBR
Lane Configurations	↑↱	
Volume (vph)	650	32
Ideal Flow (vphpl)	1900	1900
Total Lost time (s)	5.3	
Lane Util. Factor	0.95	
Frpb, ped/bikes	1.00	
Flpb, ped/bikes	1.00	
Frt	0.99	
Flt Protected	1.00	
Satd. Flow (prot)	3509	
Flt Permitted	1.00	
Satd. Flow (perm)	3509	
Peak-hour factor, PHF	0.90	0.90
Adj. Flow (vph)	722	36
RTOR Reduction (vph)	2	0
Lane Group Flow (vph)	756	0
Confl. Peds. (#/hr)		5
Confl. Bikes (#/hr)		3
Turn Type		
Protected Phases	2	
Permitted Phases		
Actuated Green, G (s)	30.4	
Effective Green, g (s)	30.4	
Actuated g/C Ratio	0.39	
Clearance Time (s)	5.3	
Vehicle Extension (s)	2.0	
Lane Grp Cap (vph)	1376	
v/s Ratio Prot	c0.22	
v/s Ratio Perm		
v/c Ratio	0.55	
Uniform Delay, d1	18.2	
Progression Factor	1.00	
Incremental Delay, d2	0.2	
Delay (s)	18.5	
Level of Service	B	
Approach Delay (s)	19.2	
Approach LOS	B	

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	12	117	6	11	79	7	12	14	26	2	10	10
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	14	134	7	13	91	8	14	16	30	2	11	11

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total (vph)	14	141	13	99	60	25
Volume Left (vph)	14	0	13	0	14	2
Volume Right (vph)	0	7	0	8	30	11
Hadj (s)	0.53	0.00	0.53	-0.02	-0.22	-0.22
Departure Headway (s)	5.3	4.8	5.4	4.8	4.3	4.4
Degree Utilization, x	0.02	0.19	0.02	0.13	0.07	0.03
Capacity (veh/h)	662	732	650	728	779	762
Control Delay (s)	7.2	7.7	7.3	7.3	7.7	7.5
Approach Delay (s)	7.7		7.3		7.7	7.5
Approach LOS	A		A		A	A

Intersection Summary			
Delay	7.5		
HCM Level of Service	A		
Intersection Capacity Utilization	21.6%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	105	50	2	1	15	3	2	337	11	2	228	77
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.6	4.6	4.6	5.6	5.6	5.6	6.3	5.3		6.3	5.3	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00		1.00	0.96	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1863	1583	1770	1863	1583	1770	3522		1770	3405	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	1863	1583	1770	1863	1583	1770	3522		1770	3405	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	111	53	2	1	16	3	2	355	12	2	240	81
RTOR Reduction (vph)	0	0	2	0	0	3	0	1	0	0	19	0
Lane Group Flow (vph)	111	53	0	1	16	0	2	366	0	2	302	0
Turn Type	Prot		Perm	Prot		Perm	Prot			Prot		
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases			8			4						
Actuated Green, G (s)	7.8	11.3	11.3	0.4	2.9	2.9	0.4	18.9		0.4	18.9	
Effective Green, g (s)	7.8	11.3	11.3	0.4	2.9	2.9	0.4	18.9		0.4	18.9	
Actuated g/C Ratio	0.15	0.21	0.21	0.01	0.05	0.05	0.01	0.36		0.01	0.36	
Clearance Time (s)	5.6	4.6	4.6	5.6	5.6	5.6	6.3	5.3		6.3	5.3	
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	261	399	339	13	102	87	13	1261		13	1219	
v/s Ratio Prot	c0.06	c0.03		0.00	0.01		c0.00	c0.10		0.00	0.09	
v/s Ratio Perm			0.00			0.00						
v/c Ratio	0.43	0.13	0.00	0.08	0.16	0.00	0.15	0.29		0.15	0.25	
Uniform Delay, d1	20.5	16.8	16.3	26.0	23.8	23.6	26.0	12.1		26.0	11.9	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.4	0.1	0.0	0.9	0.3	0.0	2.0	0.0		2.0	0.0	
Delay (s)	20.9	16.8	16.3	26.9	24.0	23.6	28.0	12.2		28.0	12.0	
Level of Service	C	B	B	C	C	C	C	B		C	B	
Approach Delay (s)		19.5			24.1			12.3			12.1	
Approach LOS		B			C			B			B	

Intersection Summary			
HCM Average Control Delay	13.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.27		
Actuated Cycle Length (s)	52.8	Sum of lost time (s)	17.2
Intersection Capacity Utilization	32.6%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Lane Configurations												
Volume (vph)	59	0	11	0	0	0	10	73	0	1	0	64
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.6		5.6				5.6	4.6		5.6		4.6
Lane Util. Factor	1.00		1.00				1.00	0.95		1.00		0.95
Frt	1.00		0.85				1.00	1.00		1.00		0.96
Flt Protected	0.95		1.00				0.95	1.00		0.95		1.00
Satd. Flow (prot)	1770		1583				1770	3539		1770		3411
Flt Permitted	0.95		1.00				0.95	1.00		0.95		1.00
Satd. Flow (perm)	1770		1583				1770	3539		1770		3411
Peak-hour factor, PHF	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78
Adj. Flow (vph)	76	0	14	0	0	0	13	94	0	1	0	82
RTOR Reduction (vph)	0	0	8	0	0	0	0	0	0	0	0	20
Lane Group Flow (vph)	76	0	6	0	0	0	13	94	0	1	0	88
Turn Type	Prot		custom	Prot			Prot			Prot		
Protected Phases	3			7	4		1	6		5		2
Permitted Phases			8									
Actuated Green, G (s)	8.4		16.5				0.5	9.2		0.4		9.1
Effective Green, g (s)	8.4		16.5				0.5	9.2		0.4		9.1
Actuated g/C Ratio	0.20		0.39				0.01	0.22		0.01		0.22
Clearance Time (s)	5.6		5.6				5.6	4.6		5.6		4.6
Vehicle Extension (s)	2.0		2.0				2.0	2.0		2.0		2.0
Lane Grp Cap (vph)	355		623				21	777		17		741
v/s Ratio Prot	c0.04						c0.01	c0.03		0.00		0.03
v/s Ratio Perm			c0.00									
v/c Ratio	0.21		0.01				0.62	0.12		0.06		0.12
Uniform Delay, d1	14.0		7.7				20.6	13.1		20.6		13.2
Progression Factor	1.00		1.00				1.00	1.00		1.00		1.00
Incremental Delay, d2	0.1		0.0				32.5	0.0		0.5		0.0
Delay (s)	14.1		7.7				53.1	13.1		21.1		13.2
Level of Service	B		A				D	B		C		B
Approach Delay (s)		13.1			0.0			18.0				13.3
Approach LOS		B			A			B				B

Intersection Summary			
HCM Average Control Delay	14.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.11		
Actuated Cycle Length (s)	41.9	Sum of lost time (s)	11.2
Intersection Capacity Utilization	17.7%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBR
Lane Configurations	
Volume (vph)	20
Ideal Flow (vphpl)	1900
Total Lost time (s)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Peak-hour factor, PHF	0.78
Adj. Flow (vph)	26
RTOR Reduction (vph)	0
Lane Group Flow (vph)	0
Turn Type	
Protected Phases	
Permitted Phases	
Actuated Green, G (s)	
Effective Green, g (s)	
Actuated g/C Ratio	
Clearance Time (s)	
Vehicle Extension (s)	
Lane Grp Cap (vph)	
v/s Ratio Prot	
v/s Ratio Perm	
v/c Ratio	
Uniform Delay, d1	
Progression Factor	
Incremental Delay, d2	
Delay (s)	
Level of Service	
Approach Delay (s)	
Approach LOS	
Intersection Summary	

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	61	12	5	289	208	23
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.6		5.3	5.3	5.3	
Lane Util. Factor	1.00		1.00	0.95	0.95	
Frt	0.98		1.00	1.00	0.99	
Flt Protected	0.96		0.95	1.00	1.00	
Satd. Flow (prot)	1748		1770	3539	3487	
Flt Permitted	0.96		0.95	1.00	1.00	
Satd. Flow (perm)	1748		1770	3539	3487	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	64	13	5	304	219	24
RTOR Reduction (vph)	6	0	0	0	6	0
Lane Group Flow (vph)	71	0	5	304	237	0
Turn Type			Prot			
Protected Phases	3		1	6	2	
Permitted Phases						
Actuated Green, G (s)	5.9		0.6	30.2	24.3	
Effective Green, g (s)	5.9		0.6	30.2	24.3	
Actuated g/C Ratio	0.13		0.01	0.66	0.53	
Clearance Time (s)	4.6		5.3	5.3	5.3	
Vehicle Extension (s)	2.0		2.0	2.0	2.0	
Lane Grp Cap (vph)	224		23	2323	1842	
v/s Ratio Prot	c0.04		0.00	c0.09	0.07	
v/s Ratio Perm						
v/c Ratio	0.32		0.22	0.13	0.13	
Uniform Delay, d1	18.2		22.5	3.0	5.5	
Progression Factor	1.00		1.00	1.00	1.00	
Incremental Delay, d2	0.3		1.7	0.0	0.0	
Delay (s)	18.5		24.2	3.0	5.5	
Level of Service	B		C	A	A	
Approach Delay (s)	18.5			3.3	5.5	
Approach LOS	B			A	A	

Intersection Summary			
HCM Average Control Delay	6.0	HCM Level of Service	A
HCM Volume to Capacity ratio	0.16		
Actuated Cycle Length (s)	46.0	Sum of lost time (s)	9.9
Intersection Capacity Utilization	20.4%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Volume (vph)	49	10	8	5	30	8	13	6	232	56	53	144
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.6	7.2			5.6	5.6	6.3	6.3	5.3	5.3	6.3	5.3
Lane Util. Factor	1.00	1.00			0.97	1.00	0.88	1.00	0.95	1.00	0.97	0.95
Frpb, ped/bikes	1.00	0.99			1.00	1.00	0.99	1.00	1.00	0.98	1.00	1.00
Flpb, ped/bikes	1.00	1.00			1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.93			1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98
Flt Protected	0.95	1.00			0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	1727			3433	1863	2749	1770	3539	1557	3433	3456
Flt Permitted	0.95	1.00			0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1770	1727			3433	1863	2749	1770	3539	1557	3433	3456
Peak-hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	56	11	9	6	34	9	15	7	267	64	61	166
RTOR Reduction (vph)	0	9	0	0	0	0	13	0	0	35	0	5
Lane Group Flow (vph)	56	11	0	0	40	9	2	7	267	29	61	187
Confl. Peds. (#/hr)			2									
Confl. Bikes (#/hr)							2			9		
Turn Type	Prot			Prot	Prot		pm+ov	Prot		Perm	Prot	
Protected Phases	3	8		7	7	4	5	1	6		5	2
Permitted Phases							4			6		
Actuated Green, G (s)	2.5	3.3			2.2	4.6	8.7	0.5	27.8	27.8	4.1	31.4
Effective Green, g (s)	2.5	3.3			2.2	4.6	8.7	0.5	27.8	27.8	4.1	31.4
Actuated g/C Ratio	0.04	0.05			0.04	0.07	0.14	0.01	0.45	0.45	0.07	0.51
Clearance Time (s)	5.6	7.2			5.6	5.6	6.3	6.3	5.3	5.3	6.3	5.3
Vehicle Extension (s)	2.0	2.0			2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	72	92			122	139	387	14	1592	700	228	1756
v/s Ratio Prot	c0.03	c0.01			0.01	0.00	0.00	0.00	c0.08		c0.02	c0.05
v/s Ratio Perm							0.00			0.02		
v/c Ratio	0.78	0.12			0.33	0.06	0.01	0.50	0.17	0.04	0.27	0.11
Uniform Delay, d1	29.4	27.9			29.1	26.6	22.8	30.5	10.1	9.5	27.4	7.9
Progression Factor	1.00	1.00			1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	37.0	0.2			0.6	0.1	0.0	9.9	0.0	0.0	0.2	0.0
Delay (s)	66.4	28.1			29.7	26.7	22.8	40.4	10.1	9.5	27.7	7.9
Level of Service	E	C			C	C	C	D	B	A	C	A
Approach Delay (s)		56.3				27.6			10.6			12.7
Approach LOS		E				C			B			B

Intersection Summary			
HCM Average Control Delay	17.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.21		
Actuated Cycle Length (s)	61.8	Sum of lost time (s)	22.5
Intersection Capacity Utilization	37.3%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBR
Lane Configurations	
Volume (vph)	23
Ideal Flow (vphpl)	1900
Total Lost time (s)	
Lane Util. Factor	
Frpb, ped/bikes	
Flpb, ped/bikes	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Peak-hour factor, PHF	0.87
Adj. Flow (vph)	26
RTOR Reduction (vph)	0
Lane Group Flow (vph)	0
Confl. Peds. (#/hr)	2
Confl. Bikes (#/hr)	3
Turn Type	
Protected Phases	
Permitted Phases	
Actuated Green, G (s)	
Effective Green, g (s)	
Actuated g/C Ratio	
Clearance Time (s)	
Vehicle Extension (s)	
Lane Grp Cap (vph)	
v/s Ratio Prot	
v/s Ratio Perm	
v/c Ratio	
Uniform Delay, d1	
Progression Factor	
Incremental Delay, d2	
Delay (s)	
Level of Service	
Approach Delay (s)	
Approach LOS	

Intersection Summary

Movement	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Volume (vph)	8	51	12	5	2	9	2	7	20	1	3	22
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.6	6.6	6.6	5.6	6.6	6.6	5.6	5.6	5.6	5.6	4.6
Lane Util. Factor		0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.95
Frpb, ped/bikes		1.00	1.00	0.99	1.00	1.00	0.99	1.00	1.00	0.98	1.00	1.00
Flpb, ped/bikes		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00
Flt Protected		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Satd. Flow (prot)		3433	3539	1564	3433	3539	1561	3433	3539	1558	3433	3539
Flt Permitted		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Satd. Flow (perm)		3433	3539	1564	3433	3539	1561	3433	3539	1558	3433	3539
Peak-hour factor, PHF	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78
Adj. Flow (vph)	10	65	15	6	3	12	3	9	26	1	4	28
RTOR Reduction (vph)	0	0	0	3	0	0	2	0	0	1	0	0
Lane Group Flow (vph)	0	75	15	3	3	12	1	9	26	0	4	28
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)				1			4			1	1	
Turn Type	Prot	Prot		Perm	Prot		Perm	Prot		Perm	Prot	
Protected Phases	3	3	8		7	4		1	6		5	2
Permitted Phases				8			4			6		
Actuated Green, G (s)		2.1	27.3	27.3	0.4	25.6	25.6	0.4	3.1	3.1	0.4	4.1
Effective Green, g (s)		2.1	27.3	27.3	0.4	25.6	25.6	0.4	3.1	3.1	0.4	4.1
Actuated g/C Ratio		0.04	0.50	0.50	0.01	0.47	0.47	0.01	0.06	0.06	0.01	0.08
Clearance Time (s)		5.6	6.6	6.6	5.6	6.6	6.6	5.6	5.6	5.6	5.6	4.6
Vehicle Extension (s)		2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)		132	1770	782	25	1659	732	25	201	88	25	266
v/s Ratio Prot		c0.02	c0.00		0.00	0.00		c0.00	0.01		0.00	c0.01
v/s Ratio Perm				0.00			0.00			0.00		
v/c Ratio		0.57	0.01	0.00	0.12	0.01	0.00	0.36	0.13	0.00	0.16	0.11
Uniform Delay, d1		25.8	6.9	6.8	26.9	7.7	7.7	27.0	24.5	24.3	26.9	23.5
Progression Factor		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		3.3	0.0	0.0	0.8	0.0	0.0	3.2	0.1	0.0	1.1	0.1
Delay (s)		29.1	6.9	6.8	27.7	7.7	7.7	30.2	24.6	24.3	28.0	23.6
Level of Service		C	A	A	C	A	A	C	C	C	C	C
Approach Delay (s)			24.2			11.1			26.0			23.7
Approach LOS			C			B			C			C

Intersection Summary			
HCM Average Control Delay	23.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.05		
Actuated Cycle Length (s)	54.6	Sum of lost time (s)	15.8
Intersection Capacity Utilization	33.1%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBR
Lane Configurations	
Volume (vph)	35
Ideal Flow (vphpl)	1900
Total Lost time (s)	4.6
Lane Util. Factor	1.00
Frpb, ped/bikes	0.98
Flpb, ped/bikes	1.00
Frt	0.85
Flt Protected	1.00
Satd. Flow (prot)	1558
Flt Permitted	1.00
Satd. Flow (perm)	1558
Peak-hour factor, PHF	0.78
Adj. Flow (vph)	45
RTOR Reduction (vph)	42
Lane Group Flow (vph)	3
Confl. Peds. (#/hr)	3
Confl. Bikes (#/hr)	1
Turn Type	Perm
Protected Phases	
Permitted Phases	2
Actuated Green, G (s)	4.1
Effective Green, g (s)	4.1
Actuated g/C Ratio	0.08
Clearance Time (s)	4.6
Vehicle Extension (s)	2.0
Lane Grp Cap (vph)	117
v/s Ratio Prot	
v/s Ratio Perm	0.00
v/c Ratio	0.03
Uniform Delay, d1	23.4
Progression Factor	1.00
Incremental Delay, d2	0.0
Delay (s)	23.4
Level of Service	C
Approach Delay (s)	
Approach LOS	

Intersection Summary

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Lane Configurations												
Volume (vph)	1	362	288	75	1	53	112	35	45	119	297	67
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.6	4.9	4.9		5.6	4.9	4.9		6.3	5.3	5.3
Lane Util. Factor		0.97	0.95	1.00		0.97	0.95	1.00		0.97	0.95	1.00
Frpb, ped/bikes		1.00	1.00	0.98		1.00	1.00	0.98		1.00	1.00	0.98
Flpb, ped/bikes		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00
Frt		1.00	1.00	0.85		1.00	1.00	0.85		1.00	1.00	0.85
Flt Protected		0.95	1.00	1.00		0.95	1.00	1.00		0.95	1.00	1.00
Satd. Flow (prot)		3433	3539	1547		3433	3539	1548		3433	3539	1555
Flt Permitted		0.95	1.00	1.00		0.95	1.00	1.00		0.95	1.00	1.00
Satd. Flow (perm)		3433	3539	1547		3433	3539	1548		3433	3539	1555
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	1	411	327	85	1	60	127	40	51	135	338	76
RTOR Reduction (vph)	0	0	0	58	0	0	0	33	0	0	0	59
Lane Group Flow (vph)	0	412	327	27	0	61	127	7	0	186	338	17
Confl. Peds. (#/hr)				14				5				7
Confl. Bikes (#/hr)				4				6				1
Turn Type	Prot	Prot		Perm	Prot	Prot		Perm	Prot	Prot		Perm
Protected Phases	3	3	8		7	7	4		1	1	6	
Permitted Phases				8				4				6
Actuated Green, G (s)		16.1	23.9	23.9		5.2	13.0	13.0		9.8	16.9	16.9
Effective Green, g (s)		16.1	23.9	23.9		5.2	13.0	13.0		9.8	16.9	16.9
Actuated g/C Ratio		0.21	0.31	0.31		0.07	0.17	0.17		0.13	0.22	0.22
Clearance Time (s)		5.6	4.9	4.9		5.6	4.9	4.9		6.3	5.3	5.3
Vehicle Extension (s)		2.0	2.0	2.0		2.0	2.0	2.0		2.0	2.0	2.0
Lane Grp Cap (vph)		727	1113	486		235	605	265		443	787	346
v/s Ratio Prot		c0.12	c0.09			0.02	0.04			c0.05	c0.10	
v/s Ratio Perm				0.02				0.00				0.01
v/c Ratio		0.57	0.29	0.06		0.26	0.21	0.03		0.42	0.43	0.05
Uniform Delay, d1		26.8	19.7	18.2		33.6	27.1	26.2		30.5	25.4	23.2
Progression Factor		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2		0.6	0.1	0.0		0.2	0.1	0.0		0.2	0.1	0.0
Delay (s)		27.4	19.7	18.2		33.8	27.1	26.2		30.7	25.5	23.3
Level of Service		C	B	B		C	C	C		C	C	C
Approach Delay (s)			23.4				28.8				26.9	
Approach LOS			C				C				C	

Intersection Summary			
HCM Average Control Delay	26.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.39		
Actuated Cycle Length (s)	76.0	Sum of lost time (s)	11.9
Intersection Capacity Utilization	61.5%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBU	SBL	SBT	SBR
Lane Configurations				
Volume (vph)	12	87	289	286
Ideal Flow (vphpl)	1900	1900	1900	1900
Total Lost time (s)		6.3	5.3	5.3
Lane Util. Factor		0.97	0.95	1.00
Frpb, ped/bikes		1.00	1.00	0.98
Flpb, ped/bikes		1.00	1.00	1.00
Frt		1.00	1.00	0.85
Flt Protected		0.95	1.00	1.00
Satd. Flow (prot)		3433	3539	1555
Flt Permitted		0.95	1.00	1.00
Satd. Flow (perm)		3433	3539	1555
Peak-hour factor, PHF	0.88	0.88	0.88	0.88
Adj. Flow (vph)	14	99	328	325
RTOR Reduction (vph)	0	0	0	261
Lane Group Flow (vph)	0	113	328	64
Confl. Peds. (#/hr)				4
Confl. Bikes (#/hr)				3
Turn Type	Prot	Prot		Perm
Protected Phases	5	5	2	
Permitted Phases				2
Actuated Green, G (s)		7.9	15.0	15.0
Effective Green, g (s)		7.9	15.0	15.0
Actuated g/C Ratio		0.10	0.20	0.20
Clearance Time (s)		6.3	5.3	5.3
Vehicle Extension (s)		2.0	2.0	2.0
Lane Grp Cap (vph)		357	698	307
v/s Ratio Prot		0.03	0.09	
v/s Ratio Perm				0.04
v/c Ratio		0.32	0.47	0.21
Uniform Delay, d1		31.5	27.0	25.5
Progression Factor		1.00	1.00	1.00
Incremental Delay, d2		0.2	0.2	0.1
Delay (s)		31.7	27.2	25.7
Level of Service		C	C	C
Approach Delay (s)			27.2	
Approach LOS			C	

Intersection Summary

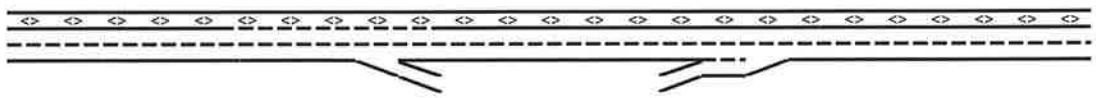
Movement	EBU	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations							
Volume (vph)	3	257	95	55	40	31	143
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)			5.6	4.6	4.6	5.3	5.3
Lane Util. Factor			1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes			1.00	1.00	0.98	1.00	0.98
Flpb, ped/bikes			1.00	1.00	1.00	1.00	1.00
Frt			1.00	1.00	0.85	1.00	0.85
Flt Protected			0.96	1.00	1.00	0.95	1.00
Satd. Flow (prot)			1797	1863	1545	1770	1559
Flt Permitted			0.96	1.00	1.00	0.95	1.00
Satd. Flow (perm)			1797	1863	1545	1770	1559
Peak-hour factor, PHF	0.81	0.81	0.81	0.81	0.81	0.81	0.81
Adj. Flow (vph)	4	317	117	68	49	38	177
RTOR Reduction (vph)	0	0	0	0	42	0	144
Lane Group Flow (vph)	0	0	438	68	7	38	33
Confl. Peds. (#/hr)					1		
Confl. Bikes (#/hr)					1		3
Turn Type	Split	Split			Perm		Perm
Protected Phases	3	3	3	4		2	
Permitted Phases					4		2
Actuated Green, G (s)			18.7	6.7	6.7	9.5	9.5
Effective Green, g (s)			18.7	6.7	6.7	9.5	9.5
Actuated g/C Ratio			0.37	0.13	0.13	0.19	0.19
Clearance Time (s)			5.6	4.6	4.6	5.3	5.3
Vehicle Extension (s)			2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)			667	248	205	334	294
v/s Ratio Prot			c0.24	c0.04		c0.02	
v/s Ratio Perm					0.00		0.02
v/c Ratio			0.66	0.27	0.03	0.11	0.11
Uniform Delay, d1			13.2	19.7	19.0	17.0	17.0
Progression Factor			1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2			1.8	0.2	0.0	0.1	0.1
Delay (s)			15.0	19.9	19.0	17.0	17.0
Level of Service			B	B	B	B	B
Approach Delay (s)			15.0	19.5		17.0	
Approach LOS			B	B		B	

Intersection Summary			
HCM Average Control Delay	16.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.44		
Actuated Cycle Length (s)	50.4	Sum of lost time (s)	15.5
Intersection Capacity Utilization	44.0%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Project: Elk Grove Civic Center
Freeway Corridor: State Route 99 NB

Alternative: Existing Conditions
Time Period: Weekday PM Peak Hou

Location	1	2	3	4	5



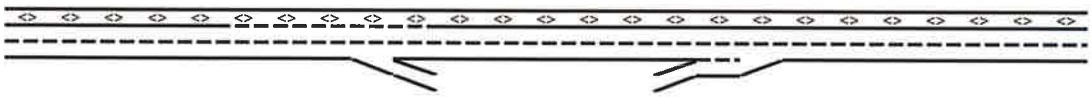
Key

<> Express Lane (HOV)

No Trucks

Name	SR 99 south of Elk Grove Blvd	East Stockton Loop Off-Ramp	E. Stockton Off to Elk Grove On	Elk Grove Blvd On-Ramp	SR 99 north of Elk Grove
Define Freeway Segment					
Type	Basic	Diverge	Basic	Merge	Basic
Length (ft)	1,050	1,500	2,550	1,500	180
Accel Length				1,200	
Decel Length		170			
Mainline Volume	2,160	2,160	1,893	1,893	3,145
On Ramp Volume				1,252	
Off Ramp Volume		267			
Express Lane Volume	648	648	568	568	944
EL On Ramp Volume					
EL Off Ramp Volume					
Calculate Flow Rate in General Purpose Lanes (GP)					
GP Volume (vph)	1,512	1,512	1,325	2,577	2,202
PHF	0.93	0.97	0.93	0.93	0.93
GP Lanes	2	2	2	2	2
Terrain	Level	Level	Level	Level	Level
Grade %	0.0%	0.0%	0.0%	0.0%	0.0%
Grade Length (mi)	0.00	0.00	0.00	0.00	0.00
Truck & Bus %	15.0%	5.0%	10.0%	5.0%	10.0%
RV %	0.0%	0.0%	0.0%	0.0%	0.0%
E_T	1.5	1.5	1.5	1.5	1.5
E_R	1.2	1.2	1.2	1.2	1.2
f_{HV}	0.930	0.976	0.952	0.976	0.952
f_P	1.00	1.00	1.00	1.00	1.00
GP Flow (pcph)	1,748	1,598	1,496	2,840	2,486
GP Flow (pcphpl)	874	799	748	1,420	1,243
Calculate Speed in General Purpose Lanes					
Lane Width (ft)	12	12	12	12	12
Shoulder Width	>6	>6	>6	>6	>6
TRD	1.8	1.8	1.8	1.8	1.8
f_{LW}	0.0	0.0	0.0	0.0	0.0
f_{LC}	0.0	0.0	0.0	0.0	0.0
Calc'd FFS	70.1	70.1	70.1	70.1	70.1
Measured FFS	70.0	70.0	70.0	70.0	70.0
FFS	70	70	70	70	70

Location	1	2	3	4	5



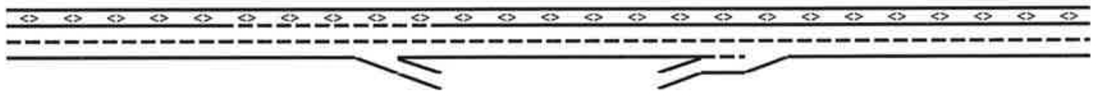
Key

<> Express Lane (HOV)

No Trucks

Name	SR 99 south of Elk Grove Blvd	East Stockton Loop Off-Ramp	E. Stockton Off to Elk Grove On	Elk Grove Blvd On-Ramp	SR 99 north of Elk Grove
Calculate Operations in General Purpose Lanes					
v/c ratio	0.36	0.33	0.31	0.59	0.52
Speed (mph)	70.0	70.0	70.0	69.4	70.0
Density (pcphpl)	12.5	11.4	10.7	20.5	17.8
LOS	B	B	A	C	B
Calculate Operations for Entering GP Lanes					
GP_{IN} Vol (pcph)				1,460	
GP_{IN} Cap (pcph)				4,800	
GP_{IN} v/c ratio				0.30	
Calculate Operations for Exiting GP Lanes					
GP_{OUT} Vol (pcph)		1,316			
GP_{OUT} Cap (pcph)		4,800			
GP_{OUT} v/c ratio		0.27			
Calculate On Ramp Flow Rate					
On Volume (vph)				1,252	
PHF				0.93	
Total Lanes				1	
Terrain				Level	
Grade %				0.0%	
Grade Length (mi)				0.00	
Truck & Bus %				5.0%	
RV %				0.0%	
E_T				1.5	
E_R				1.2	
f_{HV}				0.976	
f_P				1.00	
On Flow (pcph)				1,380	
On Flow (pcphpl)				1,380	
Calculate On Ramp Roadway Operations					
On Ramp Type				Right	
On Ramp Speed (mph)				45	
On Ramp Cap (pcph)				2,100	
On Ramp v/c ratio				0.66	

Location	1	2	[illegible]	4	[illegible]



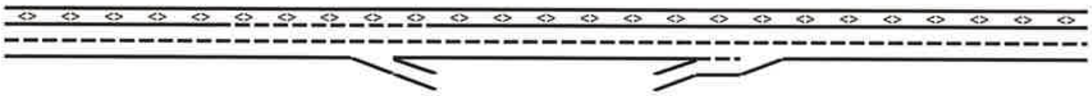
Key

<> Express Lane (HOV)

No Trucks

Name	SR 99 south of Elk Grove Blvd	East Stockton Loop Off-Ramp	E. Stockton Off to Elk Grove On	Elk Grove Blvd On-Ramp	SR 99 north of Elk Grove
Calculate Off Ramp Flow Rate					
Off Volume (vph)		267			
PHF		0.97			
Total Lanes		1			
Terrain		Level			
Grade %		0.0%			
Grade Length (mi)		0.00			
Truck & Bus %		5.0%			
RV %		0.0%			
E_T		1.5			
E_R		1.2			
f_{HV}		0.976			
f_P		1.00			
Off Flow (pcph)		282			
Off Flow (pcphpl)		282			
Calculate Off Ramp Roadway Operations					
Off Ramp Type		Right			
Off Ramp Speed		35			
Off Ramp Cap (pcph)		2,000			
Off Ramp v/c ratio		0.14			
Determine Adjacent Ramp for Three-Lane Mainline Segments with One-Lane Ramps					
Up Type					
Up Distance					
Up Flow (pcph)					
Down Type					
Down Distance					
Down Flow (pcph)					

Location	1	2	3	4	5



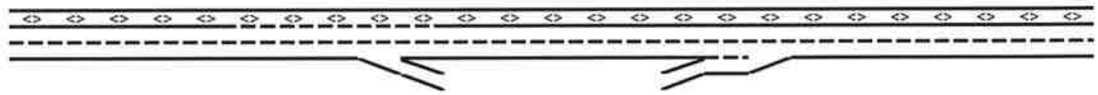
Key

<> Express Lane (HOV)

No Trucks

Name	SR 99 south of Elk Grove Blvd	East Stockton Loop Off-Ramp	E. Stockton Off to Elk Grove On	Elk Grove Blvd On-Ramp	SR 99 north of Elk Grove
Calculate Merge Influence Area Operations					
Effective v_P (pcph)				1,460	
Up Ramp L_{EQ}					
Down Ramp L_{EQ}					
P_{FM} (Eqn 13-3)				0.611	
P_{FM} (Eqn 13-4)					
P_{FM} (Eqn 13-5)					
P_{FM}				1.000	
v_{12} (pcph)				1,460	
v_3 (pcph)					
v_{34} (pcph)					
v_{12a} (pcph)				1,460	
v_{R12a} (pcph)				2,840	
Merge Speed Index				0.28	
Merge Area Speed				62.2	
Outer Lanes Volume					
Outer Lanes Speed					
Segment Speed				62.2	
Merge v/c ratio				0.62	
Merge Density				19.5	
Merge LOS				B	
Calculate Diverge Influence Area Operations					
Effective v_P (pcph)		1,598			
Up Ramp L_{EQ}					
Down Ramp L_{EQ}					
P_{FD} (Eqn 13-9)		0.707			
P_{FD} (Eqn 13-10)					
P_{FD} (Eqn 13-11)					
P_{FD}		1.000			
v_{12} (pcph)		1,598			
v_3 (pcph)					
v_{34} (pcph)					
v_{12a} (pcph)		1,598			
Diverge Speed Index		0.45			
Diverge Area Speed		57.3			
Outer Lanes Volume					
Outer Lanes Speed					
Segment Speed		57.3			
Diverge v/c ratio		0.36			
Diverge Density		16.5			
Diverge LOS		B			

Location	1	2	3	4	5



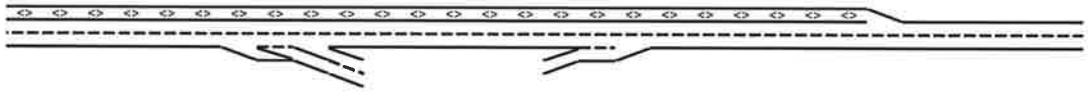
Key

<> Express Lane (HOV)

No Trucks

Name	SR 99 south of Elk Grove Blvd	East Stockton Loop Off-Ramp	E. Stockton Off to Elk Grove On	Elk Grove Blvd On-Ramp	SR 99 north of Elk Grove
Summarize Segment Operations					
Segment v/c ratio	0.36	0.36	0.31	0.62	0.52
Segment Density	12.5	16.5	10.7	19.5	17.8
Segment LOS	B	B	A	B	B
Over Capacity					

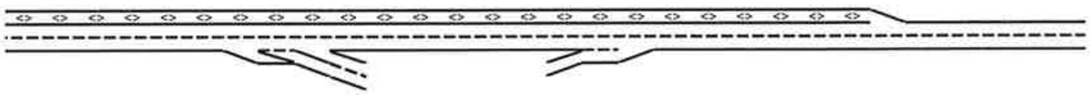
Project: Elk Grove Civic Center **Alternative:** Existing Conditions
Freeway Corridor: State Route 99 SB **Time Period:** Wkdy PM Peak Hour



Key
<> Express Lane (HOV)
No Trucks

Location	1	2	3	4	5	6
Name	SR 99 north of Elk Grove Blvd	Elk Grove Off-Ramp	Elk Grove Off-Ramp to On-Ramp	Elk Grove On-Ramp	SR 99 south of Elk Grove Blvd	SR 99 south of Elk Grove Blvd
Define Freeway Segment						
Type	Basic	Diverge	Basic	Merge	Basic	Basic
Length (ft)	250	1,500	2,250	1,500	400	8,050
Accel Length				300		
Decel Length		1,500				
Mainline Volume	3,640	3,640	1,985	1,985	2,294	2,294
On Ramp Volume				309		
Off Ramp Volume		1,655				
Express Lane Volume	1,092	1,092				
EL On Ramp Volume						
EL Off Ramp Volume						
Calculate Flow Rate in General Purpose Lanes (GP)						
GP Volume (vph)	2,548	2,548	1,985	2,294	2,294	2,294
PHF	0.95	0.98	0.95	0.98	0.95	0.95
GP Lanes	2	2	2	2	2	2
Terrain	Level	Level	Level	Level	Level	Level
Grade %	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Grade Length (mi)	0.00	0.00	0.00	0.00	0.00	0.00
Truck & Bus %	10.0%	5.0%	10.0%	5.0%	15.0%	15.0%
RV %	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
E_T	1.5	1.5	1.5	1.5	1.5	1.5
E_R	1.2	1.2	1.2	1.2	1.2	1.2
f_{HV}	0.952	0.976	0.952	0.976	0.930	0.930
f_P	1.00	1.00	1.00	1.00	1.00	1.00
GP Flow (pcph)	2,816	2,665	2,194	2,399	2,596	2,596
GP Flow (pcphpl)	1,408	1,333	1,097	1,200	1,298	1,298
Calculate Speed in General Purpose Lanes						
Lane Width (ft)	12	12	12	12	12	12
Shoulder Width	>6	>6	>6	>6	>6	>6
TRD	1.8	1.8	1.8	1.8	1.8	1.8
f_{LW}	0.0	0.0	0.0	0.0	0.0	0.0
f_{LC}	0.0	0.0	0.0	0.0	0.0	0.0
Calc'd FFS	70.1	70.1	70.1	70.1	70.1	70.1
Measured FFS	70.0	70.0	70.0	70.0	70.0	70.0
FFS	70	70	70	70	70	70

Location	1	2	3	4	5	6



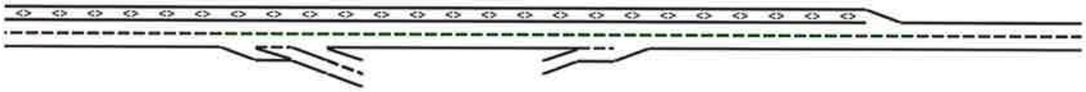
Key

<> Express Lane (HOV)

No Trucks

Name	SR 99 north of Elk Grove Blvd	Elk Grove Off-Ramp	Elk Grove Off-Ramp to On-Ramp	Elk Grove On-Ramp	SR 99 south of Elk Grove Blvd	SR 99 south of Elk Grove Blvd
Calculate Operations in General Purpose Lanes						
v/c ratio	0.59	0.56	0.46	0.50	0.54	0.54
Speed (mph)	69.5	69.8	70.0	70.0	69.9	69.9
Density (pcphpl)	20.3	19.1	15.7	17.1	18.6	18.6
LOS	C	C	B	B	C	C
Calculate Operations for Entering GP Lanes						
GP_{IN} Vol (pcph)				2,076		
GP_{IN} Cap (pcph)				4,800		
GP_{IN} v/c ratio				0.43		
Calculate Operations for Exiting GP Lanes						
GP_{OUT} Vol (pcph)		934				
GP_{OUT} Cap (pcph)		4,800				
GP_{OUT} v/c ratio		0.19				
Calculate On Ramp Flow Rate						
On Volume (vph)				309		
PHF				0.98		
Total Lanes				1		
Terrain				Level		
Grade %				0.0%		
Grade Length (mi)				0.00		
Truck & Bus %				5.0%		
RV %				0.0%		
E_T				1.5		
E_R				1.2		
f_{HV}				0.976		
f_P				1.00		
On Flow (pcph)				323		
On Flow (pcphpl)				323		
Calculate On Ramp Roadway Operations						
On Ramp Type				Right		
On Ramp Speed (mph)				60		
On Ramp Cap (pcph)				2,200		
On Ramp v/c ratio				0.15		

Location	1	2	3	4	5	6



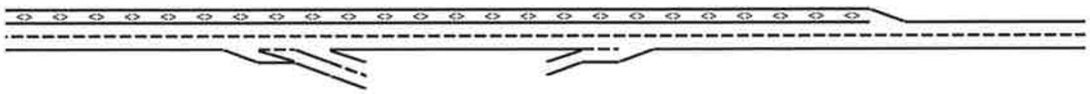
Key

<> Express Lane (HOV)

No Trucks

Name	SR 99 north of Elk Grove Blvd	Elk Grove Off-Ramp	Elk Grove Off-Ramp to On-Ramp	Elk Grove On-Ramp	SR 99 south of Elk Grove Blvd	SR 99 south of Elk Grove Blvd
Calculate Off Ramp Flow Rate						
Off Volume (vph)		1,655				
PHF		0.98				
Total Lanes		2				
Terrain		Level				
Grade %		0.0%				
Grade Length (mi)		0.00				
Truck & Bus %		5.0%				
RV %		0.0%				
E_T		1.5				
E_R		1.2				
f_{HV}		0.976				
f_P		1.00				
Off Flow (pcph)		1,731				
Off Flow (pcphpl)		865				
Calculate Off Ramp Roadway Operations						
Off Ramp Type		Right				
Off Ramp Speed		35				
Off Ramp Cap (pcph)		4,000				
Off Ramp v/c ratio		0.43				
Determine Adjacent Ramp for Three-Lane Mainline Segments with One-Lane Ramps						
Up Type						
Up Distance						
Up Flow (pcph)						
Down Type						
Down Distance						
Down Flow (pcph)						

Location	1	2	3	4	5	6



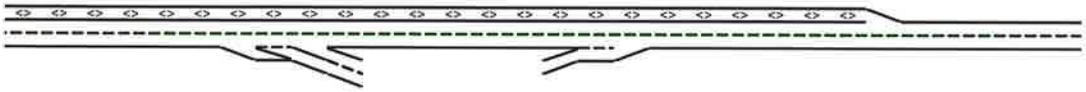
Key

<> Express Lane (HOV)

No Trucks

Name	SR 99 north of Elk Grove Blvd	Elk Grove Off-Ramp	Elk Grove Off-Ramp to On-Ramp	Elk Grove On-Ramp	SR 99 south of Elk Grove Blvd	SR 99 south of Elk Grove Blvd
Calculate Merge Influence Area Operations						
Effective v_P (pcph)				2,076		
Up Ramp L_{EQ}						
Down Ramp L_{EQ}						
P_{FM} (Eqn 13-3)				0.586		
P_{FM} (Eqn 13-4)						
P_{FM} (Eqn 13-5)						
P_{FM}				1.000		
v_{12} (pcph)				2,076		
v_3 (pcph)						
v_{34} (pcph)						
v_{12a} (pcph)				2,076		
v_{R12a} (pcph)				2,399		
Merge Speed Index				0.33		
Merge Area Speed				60.8		
Outer Lanes Volume						
Outer Lanes Speed						
Segment Speed				60.8		
Merge v/c ratio				0.52		
Merge Density				22.2		
Merge LOS				C		
Calculate Diverge Influence Area Operations						
Effective v_P (pcph)		2,665				
Up Ramp L_{EQ}						
Down Ramp L_{EQ}						
P_{FD} (Eqn 13-9)		0.614				
P_{FD} (Eqn 13-10)						
P_{FD} (Eqn 13-11)						
P_{FD}		1.000				
v_{12} (pcph)		2,665				
v_3 (pcph)						
v_{34} (pcph)						
v_{12a} (pcph)		2,665				
Diverge Speed Index		0.58				
Diverge Area Speed		53.7				
Outer Lanes Volume						
Outer Lanes Speed						
Segment Speed		53.7				
Diverge v/c ratio		0.61				
Diverge Density		13.7				
Diverge LOS		B				

Location	.				5	



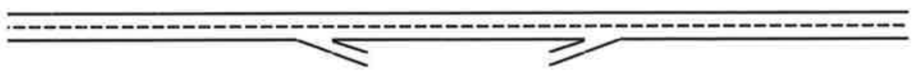
Key

<> Express Lane (HOV)

No Trucks

Name	SR 99 north of Elk Grove Blvd	Elk Grove Off-Ramp	Elk Grove Off-Ramp to On-Ramp	Elk Grove On-Ramp	SR 99 south of Elk Grove Blvd	SR 99 south of Elk Grove Blvd
Summarize Segment Operations						
Segment v/c ratio	0.59	0.61	0.46	0.52	0.54	0.54
Segment Density	20.3	13.7	15.7	22.2	18.6	18.6
Segment LOS	C	B	B	C	C	C
Over Capacity						

Project: Elk Grove Civic Center **Alternative:** Existing Conditions
Freeway Corridor: Interstate 5 NB **Time Period:** Weekday PM Peak Hou



Key
<> Express Lane (HOV)
No Trucks

Location	1	2	3	4	5
Name	I-5 south of Elk Grove B lvd	Elk Grove Blvd Off-Ramp	Elk Grove Off-Ramp to On-Ramp	Elk Grove On-Ramp	I-5 north of Elk Grove Blvd
Define Freeway Segment					
Type	Basic	Diverge	Basic	Merge	Basic
Length (ft)	6,900	1,500	3,100	1,500	500
Accel Length				750	
Decel Length		160			
Mainline Volume	1,950	1,950	1,733	1,733	2,258
On Ramp Volume				525	
Off Ramp Volume		217			
Express Lane Volume					
EL On Ramp Volume					
EL Off Ramp Volume					
Calculate Flow Rate in General Purpose Lanes (GP)					
GP Volume (vph)	1,950	1,950	1,733	2,258	2,258
PHF	0.89	0.97	0.89	0.97	0.89
GP Lanes	2	2	2	2	2
Terrain	Level	Level	Level	Level	Level
Grade %	0.0%	0.0%	0.0%	0.0%	0.0%
Grade Length (mi)	0.00	0.00	0.00	0.00	0.00
Truck & Bus %	18.0%	5.0%	18.0%	5.0%	18.0%
RV %	0.0%	0.0%	0.0%	0.0%	0.0%
E_T	1.5	1.5	1.5	1.5	1.5
E_R	1.2	1.2	1.2	1.2	1.2
f_{HV}	0.917	0.976	0.917	0.976	0.917
f_P	1.00	1.00	1.00	1.00	1.00
GP Flow (pcph)	2,388	2,061	2,122	2,386	2,765
GP Flow (pcphpl)	1,194	1,030	1,061	1,193	1,383
Calculate Speed in General Purpose Lanes					
Lane Width (ft)	12	12	12	12	12
Shoulder Width	>6	>6	>6	>6	>6
TRD	1.2	1.2	1.2	1.2	1.2
f_{LW}	0.0	0.0	0.0	0.0	0.0
f_{LC}	0.0	0.0	0.0	0.0	0.0
Calc'd FFS	71.7	71.7	71.7	71.7	71.7
Measured FFS	70.0	70.0	70.0	70.0	70.0
FFS	70	70	70	70	70
Calculate Operations in General Purpose Lanes					
v/c ratio	0.50	0.43	0.44	0.50	0.58
Speed (mph)	70.0	70.0	70.0	70.0	69.6
Density (pcphpl)	17.1	14.7	15.2	17.0	19.9
LOS	B	B	B	B	C
Calculate Operations for Entering GP Lanes					
GP_{IN} Vol (pcph)				1,831	
GP_{IN} Cap (pcph)				4,800	
GP_{IN} v/c ratio				0.38	
Calculate Operations for Exiting GP Lanes					
GP_{OUT} Vol (pcph)		1,831			
GP_{OUT} Cap (pcph)		4,800			
GP_{OUT} v/c ratio		0.38			

Location	1	2	3	4	5

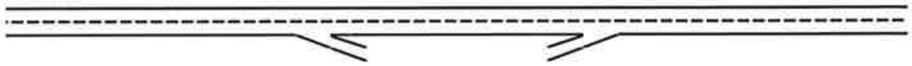
Key

<> Express Lane (HOV)

No Trucks

Name	I-5 south of Elk Grove B lvd	Elk Grove Blvd Off-Ramp	Elk Grove Off-Ramp to On-Ramp	Elk Grove On-Ramp	I-5 north of Elk Grove Blvd
Calculate On Ramp Flow Rate					
On Volume (vph)				525	
PHF				0.97	
Total Lanes				1	
Terrain				Level	
Grade %				0.0%	
Grade Length (mi)				0.00	
Truck & Bus %				5.0%	
RV %				0.0%	
E_T				1.5	
E_R				1.2	
f_{HV}				0.976	
f_P				1.00	
On Flow (pcph)				555	
On Flow (pcphpl)				555	
Calculate On Ramp Roadway Operations					
On Ramp Type				Right	
On Ramp Speed (mph)				45	
On Ramp Cap (pcph)				2,100	
On Ramp v/c ratio				0.26	

Location	1	2	3	4	5



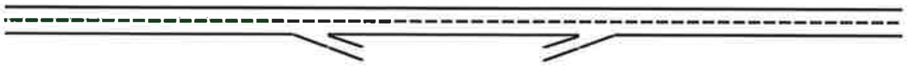
Key

<> Express Lane (HOV)

No Trucks

Name	I-5 south of Elk Grove B lvd	Elk Grove Blvd Off-Ramp	Elk Grove Off-Ramp to On-Ramp	Elk Grove On-Ramp	I-5 north of Elk Grove Blvd
Calculate Off Ramp Flow Rate					
Off Volume (vph)		217			
PHF		0.97			
Total Lanes		1			
Terrain		Level			
Grade %		0.0%			
Grade Length (mi)		0.00			
Truck & Bus %		5.0%			
RV %		0.0%			
E_T		1.5			
E_R		1.2			
f_{HV}		0.976			
f_P		1.00			
Off Flow (pcph)		229			
Off Flow (pcphpl)		229			
Calculate Off Ramp Roadway Operations					
Off Ramp Type		Right			
Off Ramp Speed		35			
Off Ramp Cap (pcph)		2,000			
Off Ramp v/c ratio		0.11			
Determine Adjacent Ramp for Three-Lane Mainline Segments with One-Lane Ramps					
Up Type					
Up Distance					
Up Flow (pcph)					
Down Type					
Down Distance					
Down Flow (pcph)					
Calculate Merge Influence Area Operations					
Effective v_P (pcph)				1,831	
Up Ramp L_{EQ}					
Down Ramp L_{EQ}					
P_{FM} (Eqn 13-3)				0.599	
P_{FM} (Eqn 13-4)					
P_{FM} (Eqn 13-5)					
P_{FM}				1.000	
v_{12} (pcph)				1,831	
v_3 (pcph)					
v_{34} (pcph)					
v_{12a} (pcph)				1,831	
v_{R12a} (pcph)				2,386	
Merge Speed Index				0.30	
Merge Area Speed				61.7	
Outer Lanes Volume					
Outer Lanes Speed					
Segment Speed				61.7	
Merge v/c ratio				0.52	
Merge Density				19.1	
Merge LOS				B	

Location	1	2	3	4	5



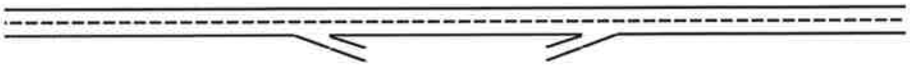
Key

<> Express Lane (HOV)

No Trucks

Name	I-5 south of Elk Grove B lvd	Elk Grove Blvd Off-Ramp	Elk Grove Off-Ramp to On-Ramp	Elk Grove On-Ramp	I-5 north of Elk Grove Blvd
Calculate Diverge Influence Area Operations					
Effective v_R (pcph)		2,061			
Up Ramp L_{EQ}					
Down Ramp L_{EQ}					
P_{FD} (Eqn 13-9)		0.698			
P_{FD} (Eqn 13-10)					
P_{FD} (Eqn 13-11)					
P_{FD}		1.000			
v_{12} (pcph)		2,061			
v_3 (pcph)					
v_{34} (pcph)					
v_{12a} (pcph)		2,061			
Diverge Speed Index		0.45			
Diverge Area Speed		57.4			
Outer Lanes Volume					
Outer Lanes Speed					
Segment Speed		57.4			
Diverge v/c ratio		0.47			
Diverge Density		20.5			
Diverge LOS		C			

Location					



Key

<> Express Lane (HOV)

No Trucks

Name	I-5 south of Elk Grove B lvd	Elk Grove Blvd Off-Ramp	Elk Grove Off-Ramp to On-Ramp	Elk Grove On-Ramp	I-5 north of Elk Grove Blvd
Summarize Segment Operations					
Segment v/c ratio	0.50	0.47	0.44	0.52	0.58
Segment Density	17.1	20.5	15.2	19.1	19.9
Segment LOS	B	C	B	B	C
Over Capacity					

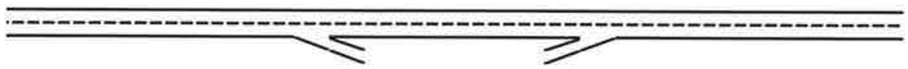
Project: Elk Grove Civic Center

Freeway Corridor: Interstate 5 SB

Alternative: Existing Conditions

Time Period: Weekday PM Peak Hou

Location	1	2	3	4	5



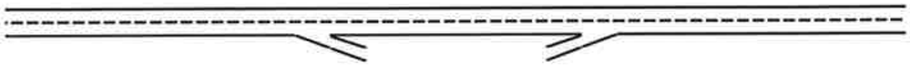
Key

<> Express Lane (HOV)

No Trucks

Name	I-5 north of Elk Grove Blvd	Elk Grove Off-Ramp	Elk Grove Off-Ramp to On-Ramp	Elk Grove Loop On-Ramp	I-5 south of Elk Grove Blvd
Define Freeway Segment					
Type	Basic	Diverge	Basic	Merge	Basic
Length (ft)	2,500	1,500	1,450	1,500	7,750
Accel Length				750	
Decel Length		160			
Mainline Volume	3,481	3,481	2,062	2,062	2,160
On Ramp Volume				98	
Off Ramp Volume		1,419			
Express Lane Volume					
EL On Ramp Volume					
EL Off Ramp Volume					
Calculate Flow Rate in General Purpose Lanes (GP)					
GP Volume (vph)	3,481	3,481	2,062	2,160	2,160
PHF	0.94	0.95	0.94	0.95	0.94
GP Lanes	2	2	2	2	2
Terrain	Level	Level	Level	Level	Level
Grade %	0.0%	0.0%	0.0%	0.0%	0.0%
Grade Length (mi)	0.00	0.00	0.00	0.00	0.00
Truck & Bus %	18.0%	5.0%	18.0%	5.0%	18.0%
RV %	0.0%	0.0%	0.0%	0.0%	0.0%
E_T	1.5	1.5	1.5	1.5	1.5
E_R	1.2	1.2	1.2	1.2	1.2
f_{HV}	0.917	0.976	0.917	0.976	0.917
f_P	1.00	1.00	1.00	1.00	1.00
GP Flow (pcph)	4,036	3,756	2,391	2,331	2,505
GP Flow (pcphpl)	2,018	1,878	1,196	1,165	1,252
Calculate Speed in General Purpose Lanes					
Lane Width (ft)	12	12	12	12	12
Shoulder Width	>6	>6	>6	>6	>6
TRD	1.2	1.2	1.2	1.2	1.2
f_{LW}	0.0	0.0	0.0	0.0	0.0
f_{LC}	0.0	0.0	0.0	0.0	0.0
Calc'd FFS	71.7	71.7	71.7	71.7	71.7
Measured FFS	70.0	70.0	70.0	70.0	70.0
FFS	70	70	70	70	70
Calculate Operations in General Purpose Lanes					
v/c ratio	0.84	0.78	0.50	0.49	0.52
Speed (mph)	62.2	64.7	70.0	70.0	70.0
Density (pcphpl)	32.4	29.0	17.1	16.6	17.9
LOS	D	D	B	B	B
Calculate Operations for Entering GP Lanes					
GP_{IN} Vol (pcph)				2,225	
GP_{IN} Cap (pcph)				4,800	
GP_{IN} v/c ratio				0.46	
Calculate Operations for Exiting GP Lanes					
GP_{OUT} Vol (pcph)		2,225			
GP_{OUT} Cap (pcph)		4,800			
GP_{OUT} v/c ratio		0.46			

Location	1	[illegible]	3	4	[illegible]



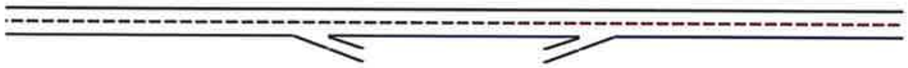
Key

<> Express Lane (HOV)

No Trucks

Name	I-5 north of Elk Grove Blvd	Elk Grove Off-Ramp	Elk Grove Off-Ramp to On-Ramp	Elk Grove Loop On-Ramp	I-5 south of Elk Grove Blvd
Calculate On Ramp Flow Rate					
On Volume (vph)				98	
PHF				0.95	
Total Lanes				1	
Terrain				Level	
Grade %				0.0%	
Grade Length (mi)				0.00	
Truck & Bus %				5.0%	
RV %				0.0%	
E_T				1.5	
E_R				1.2	
f_{HV}				0.976	
f_P				1.00	
On Flow (pcph)				106	
On Flow (pcphpl)				106	
Calculate On Ramp Roadway Operations					
On Ramp Type				Right	
On Ramp Speed (mph)				45	
On Ramp Cap (pcph)				2,100	
On Ramp v/c ratio				0.05	

Location	1		3	4	



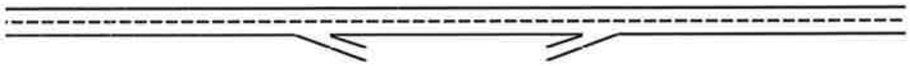
Key

<> Express Lane (HOV)

No Trucks

Name	I-5 north of Elk Grove Blvd	Elk Grove Off-Ramp	Elk Grave Off-Ramp to On-Ramp	Elk Grove Loop On-Ramp	I-5 south of Elk Grove Blvd
Calculate Off Ramp Flow Rate					
Off Volume (vph)		1,419			
PHF		0.95			
Total Lanes		1			
Terrain		Level			
Grade %		0.0%			
Grade Length (mi)		0.00			
Truck & Bus %		5.0%			
RV %		0.0%			
E_T		1.5			
E_R		1.2			
f_{HV}		0.976			
f_P		1.00			
Off Flow (pcph)		1,531			
Off Flow (pcphpl)		1,531			
Calculate Off Ramp Roadway Operations					
Off Ramp Type		Right			
Off Ramp Speed		35			
Off Ramp Cap (pcph)		2,000			
Off Ramp v/c ratio		0.77			
Determine Adjacent Ramp for Three-Lane Mainline Segments with One-Lane Ramps					
Up Type					
Up Distance					
Up Flow (pcph)					
Down Type					
Down Distance					
Down Flow (pcph)					
Calculate Merge Influence Area Operations					
Effective v_P (pcph)				2,225	
Up Ramp L_{EQ}					
Down Ramp L_{EQ}					
P_{FM} (Eqn 13-3)				0.599	
P_{FM} (Eqn 13-4)					
P_{FM} (Eqn 13-5)					
P_{FM}				1.000	
v_{12} (pcph)				2,225	
v_3 (pcph)					
v_{34} (pcph)					
v_{12a} (pcph)				2,225	
v_{R12a} (pcph)				2,331	
Merge Speed Index				0.29	
Merge Area Speed				61.8	
Outer Lanes Volume					
Outer Lanes Speed					
Segment Speed				61.8	
Merge v/c ratio				0.51	
Merge Density				18.9	
Merge LOS				B	

Location	1	2			



Key

<> Express Lane (HOV)

No Trucks

Name	I-5 north of Elk Grove Blvd	Elk Grove Off-Ramp	Elk Grave Off-Ramp to On-Ramp	Elk Grove Loop On-Ramp	I-5 south of Elk Grove Blvd
Calculate Diverge Influence Area Operations					
Effective v_P (pcph)		3,756			
Up Ramp L_{EQ}					
Down Ramp L_{EQ}					
P_{FD} (Eqn 13-9)		0.596			
P_{FD} (Eqn 13-10)					
P_{FD} (Eqn 13-11)					
P_{FD}		1.000			
v_{12} (pcph)		3,756			
v_3 (pcph)					
v_{34} (pcph)					
v_{12a} (pcph)		3,756			
Diverge Speed Index		0.57			
Diverge Area Speed		54.2			
Outer Lanes Volume					
Outer Lanes Speed					
Segment Speed		54.2			
Diverge v/c ratio		0.85			
Diverge Density		35.1			
Diverge LOS		E			

Location	1	2	3	4	

Key

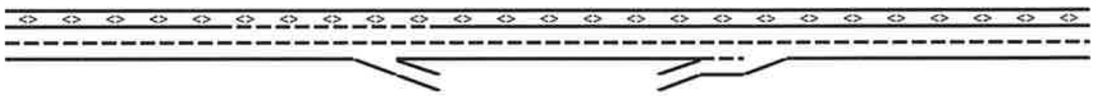
<> Express Lane (HOV)

No Trucks

Name	I-5 north of Elk Grove Blvd	Elk Grove Off-Ramp	Elk Grave Off-Ramp to On-Ramp	Elk Grove Loop On-Ramp	I-5 south of Elk Grove Blvd
Summarize Segment Operations					
Segment v/c ratio	0.84	0.85	0.50	0.51	0.52
Segment Density	32.4	35.1	17.1	18.9	17.9
Segment LOS	D	E	B	B	B
Over Capacity					

Project: Elk Grove Civic Center
Freeway Corridor: State Route 99 NB
Alternative: Existing Conditions
Time Period: Sat. AM Peak Hour

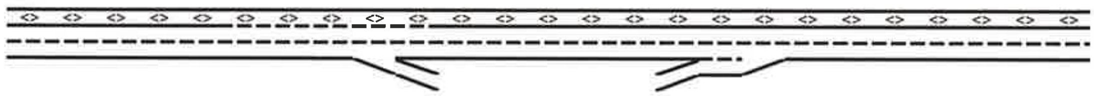
Location	1	2	3	4	5



Key
<> Express Lane (HOV)
No Trucks

Name	SR 99 south of Elk Grove Blvd	East Stockton Loop Off-Ramp	E. Stockton Off to Elk Grove On	Elk Grove Blvd On-Ramp	SR 99 north of Elk Grove
Define Freeway Segment					
Type	Basic	Diverge	Basic	Merge	Basic
Length (ft)	1,050	1,500	2,550	1,500	180
Accel Length				1,200	
Decel Length		170			
Mainline Volume	1,970	1,970	1,727	1,727	3,081
On Ramp Volume				1,354	
Off Ramp Volume		243			
Express Lane Volume	591	591	518	518	924
EL On Ramp Volume					
EL Off Ramp Volume					
Calculate Flow Rate in General Purpose Lanes (GP)					
GP Volume (vph)	1,379	1,379	1,209	2,563	2,157
PHF	0.92	0.91	0.92	0.93	0.92
GP Lanes	2	2	2	2	2
Terrain	Level	Level	Level	Level	Level
Grade %	0.0%	0.0%	0.0%	0.0%	0.0%
Grade Length (mi)	0.00	0.00	0.00	0.00	0.00
Truck & Bus %	15.0%	5.0%	10.0%	5.0%	10.0%
RV %	0.0%	0.0%	0.0%	0.0%	0.0%
E_T	1.5	1.5	1.5	1.5	1.5
E_R	1.2	1.2	1.2	1.2	1.2
f_{HV}	0.930	0.976	0.952	0.976	0.952
f_P	1.00	1.00	1.00	1.00	1.00
GP Flow (pcph)	1,611	1,553	1,380	2,825	2,461
GP Flow (pcphpl)	806	777	690	1,412	1,231
Calculate Speed in General Purpose Lanes					
Lane Width (ft)	12	12	12	12	12
Shoulder Width	>6	>6	>6	>6	>6
TRD	1.8	1.8	1.8	1.8	1.8
f_{LW}	0.0	0.0	0.0	0.0	0.0
f_{LC}	0.0	0.0	0.0	0.0	0.0
Calc'd FFS	70.1	70.1	70.1	70.1	70.1
Measured FFS	70.0	70.0	70.0	70.0	70.0
FFS	70	70	70	70	70

Location	1	2	3	4	5



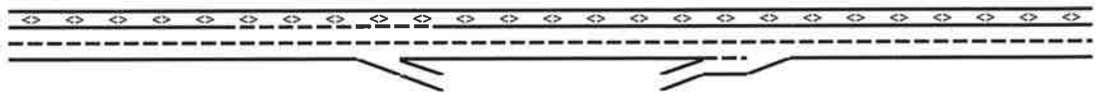
Key

<> Express Lane (HOV)

No Trucks

Name	SR 99 south of Elk Grove Blvd	East Stockton Loop Off-Ramp	E. Stockton Off to Elk Grove On	Elk Grove Blvd On-Ramp	SR 99 north of Elk Grove
Calculate Operations in General Purpose Lanes					
v/c ratio	0.34	0.32	0.29	0.59	0.51
Speed (mph)	70.0	70.0	70.0	69.5	70.0
Density (pcphpl)	11.5	11.1	9.9	20.3	17.6
LOS	B	B	A	C	B
Calculate Operations for Entering GP Lanes					
GP_{IN} Vol (pcph)				1,332	
GP_{IN} Cap (pcph)				4,800	
GP_{IN} v/c ratio				0.28	
Calculate Operations for Exiting GP Lanes					
GP_{OUT} Vol (pcph)		1,280			
GP_{OUT} Cap (pcph)		4,800			
GP_{OUT} v/c ratio		0.27			
Calculate On Ramp Flow Rate					
On Volume (vph)				1,354	
PHF				0.93	
Total Lanes				1	
Terrain				Level	
Grade %				0.0%	
Grade Length (mi)				0.00	
Truck & Bus %				5.0%	
RV %				0.0%	
E_T				1.5	
E_R				1.2	
f_{HV}				0.976	
f_P				1.00	
On Flow (pcph)				1,492	
On Flow (pcphpl)				1,492	
Calculate On Ramp Roadway Operations					
On Ramp Type				Right	
On Ramp Speed (mph)				45	
On Ramp Cap (pcph)				2,100	
On Ramp v/c ratio				0.71	

Location	1		3	4	



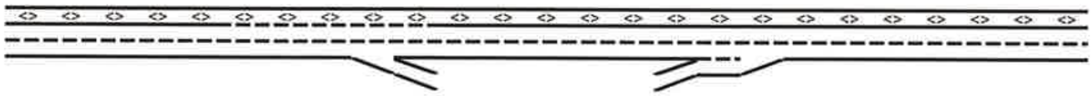
Key

<> Express Lane (HOV)

No Trucks

Name	SR 99 south of Elk Grove Blvd	East Stockton Loop Off-Ramp	E. Stockton Off to Elk Grove On	Elk Grove Blvd On-Ramp	SR 99 north of Elk Grove
Calculate Off Ramp Flow Rate					
Off Volume (vph)		243			
PHF		0.91			
Total Lanes		1			
Terrain		Level			
Grade %		0.0%			
Grade Length (mi)		0.00			
Truck & Bus %		5.0%			
RV %		0.0%			
E_T		1.5			
E_R		1.2			
f_{HV}		0.976			
f_P		1.00			
Off Flow (pcph)		274			
Off Flow (pcphpl)		274			
Calculate Off Ramp Roadway Operations					
Off Ramp Type		Right			
Off Ramp Speed		35			
Off Ramp Cap (pcph)		2,000			
Off Ramp v/c ratio		0.14			
Determine Adjacent Ramp for Three-Lane Mainline Segments with One-Lane Ramps					
Up Type					
Up Distance					
Up Flow (pcph)					
Down Type					
Down Distance					
Down Flow (pcph)					

Location	1	2	3	4	5



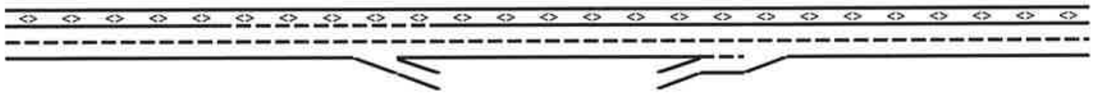
Key

<> Express Lane (HOV)

No Trucks

Name	SR 99 south of Elk Grove Blvd	East Stockton Loop Off-Ramp	E. Stockton Off to Elk Grove On	Elk Grove Blvd On-Ramp	SR 99 north of Elk Grove
Calculate Merge Influence Area Operations					
Effective v_P (pcph)				1,332	
Up Ramp L_{EQ}					
Down Ramp L_{EQ}					
P_{FM} (Eqn 13-3)				0.611	
P_{FM} (Eqn 13-4)					
P_{FM} (Eqn 13-5)					
P_{FM}				1.000	
v_{12} (pcph)				1,332	
v_3 (pcph)					
v_{34} (pcph)					
v_{12a} (pcph)				1,332	
v_{R12a} (pcph)				2,825	
Merge Speed Index				0.28	
Merge Area Speed				62.2	
Outer Lanes Volume					
Outer Lanes Speed					
Segment Speed				62.2	
Merge v/c ratio				0.61	
Merge Density				19.3	
Merge LOS				B	
Calculate Diverge Influence Area Operations					
Effective v_P (pcph)		1,553			
Up Ramp L_{EQ}					
Down Ramp L_{EQ}					
P_{FD} (Eqn 13-9)		0.709			
P_{FD} (Eqn 13-10)					
P_{FD} (Eqn 13-11)					
P_{FD}		1.000			
v_{12} (pcph)		1,553			
v_3 (pcph)					
v_{34} (pcph)					
v_{12a} (pcph)		1,553			
Diverge Speed Index		0.45			
Diverge Area Speed		57.3			
Outer Lanes Volume					
Outer Lanes Speed					
Segment Speed		57.3			
Diverge v/c ratio		0.35			
Diverge Density		16.1			
Diverge LOS		B			

Location	1	2	3	4	5



Key

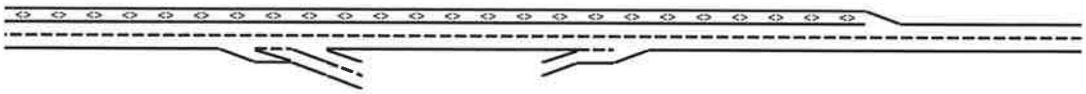
<> Express Lane (HOV)

No Trucks

Name	SR 99 south of Elk Grove Blvd	East Stockton Loop Off-Ramp	E. Stockton Off to Elk Grove On	Elk Grove Blvd On-Ramp	SR 99 north of Elk Grove
Summarize Segment Operations					
Segment v/c ratio	0.34	0.35	0.29	0.61	0.51
Segment Density	11.5	16.1	9.9	19.3	17.6
Segment LOS	B	B	A	B	B
Over Capacity					

Project: Elk Grove Civic Center **Alternative:** Existing Conditions

Freeway Corridor: State Route 99 SB **Time Period:** Sat. AM Peak Hour



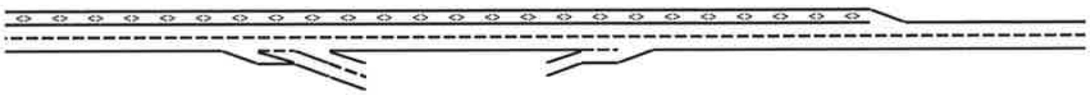
Key

<> Express Lane (HOV)

No Trucks

Location	1	2	3	4	5	6
Name	SR 99 north of Elk Grove Blvd	Elk Grove Off-Ramp	Elk Grove Off-Ramp to On-Ramp	Elk Grove On-Ramp	SR 99 south of Elk Grove Blvd	SR 99 south of Elk Grove Blvd
Define Freeway Segment						
Type	Basic	Diverge	Basic	Merge	Basic	Basic
Length (ft)	250	1,500	2,250	1,500	400	8,050
Accel Length				300		
Decel Length		1,500				
Mainline Volume	2,885	2,885	1,504	1,504	1,770	1,770
On Ramp Volume				266		
Off Ramp Volume		1,381				
Express Lane Volume	866	866				
EL On Ramp Volume						
EL Off Ramp Volume						
Calculate Flow Rate in General Purpose Lanes (GP)						
GP Volume (vph)	2,020	2,020	1,504	1,770	1,770	1,770
PHF	0.92	0.9	0.92	0.9	0.92	0.92
GP Lanes	2	2	2	2	2	2
Terrain	Level	Level	Level	Level	Level	Level
Grade %	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Grade Length (mi)	0.00	0.00	0.00	0.00	0.00	0.00
Truck & Bus %	10.0%	5.0%	10.0%	5.0%	15.0%	15.0%
RV %	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
E_T	1.5	1.5	1.5	1.5	1.5	1.5
E_R	1.2	1.2	1.2	1.2	1.2	1.2
f_{HV}	0.952	0.976	0.952	0.976	0.930	0.930
f_P	1.00	1.00	1.00	1.00	1.00	1.00
GP Flow (pcph)	2,305	2,300	1,717	2,016	2,068	2,068
GP Flow (pcphpl)	1,152	1,150	858	1,008	1,034	1,034
Calculate Speed in General Purpose Lanes						
Lane Width (ft)	12	12	12	12	12	12
Shoulder Width	>6	>6	>6	>6	>6	>6
TRD	1.8	1.8	1.8	1.8	1.8	1.8
f_{LW}	0.0	0.0	0.0	0.0	0.0	0.0
f_{LC}	0.0	0.0	0.0	0.0	0.0	0.0
Calc'd FFS	70.1	70.1	70.1	70.1	70.1	70.1
Measured FFS	70.0	70.0	70.0	70.0	70.0	70.0
FFS	70	70	70	70	70	70

Location	1	2	3	4	5	6



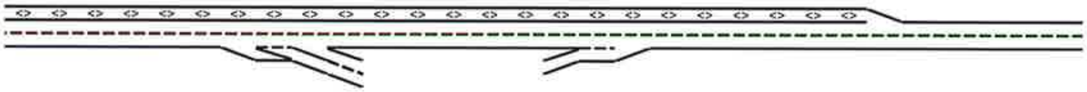
Key

<> Express Lane (HOV)

No Trucks

Name	SR 99 north of Elk Grove Blvd	Elk Grove Off-Ramp	Elk Grove Off-Ramp to On-Ramp	Elk Grove On-Ramp	SR 99 south of Elk Grove Blvd	SR 99 south of Elk Grove Blvd
Calculate Operations in General Purpose Lanes						
v/c ratio	0.48	0.48	0.36	0.42	0.43	0.43
Speed (mph)	70.0	70.0	70.0	70.0	70.0	70.0
Density (pcphpl)	16.5	16.4	12.3	14.4	14.8	14.8
LOS	B	B	B	B	B	B
Calculate Operations for Entering GP Lanes						
GP_{IN} Vol (pcph)				1,713		
GP_{IN} Cap (pcph)				4,800		
GP_{IN} v/c ratio				0.36		
Calculate Operations for Exiting GP Lanes						
GP_{OUT} Vol (pcph)		727				
GP_{OUT} Cap (pcph)		4,800				
GP_{OUT} v/c ratio		0.15				
Calculate On Ramp Flow Rate						
On Volume (vph)				266		
PHF				0.9		
Total Lanes				1		
Terrain				Level		
Grade %				0.0%		
Grade Length (mi)				0.00		
Truck & Bus %				5.0%		
RV %				0.0%		
E_T				1.5		
E_R				1.2		
f_{HV}				0.976		
f_P				1.00		
On Flow (pcph)				303		
On Flow (pcphpl)				303		
Calculate On Ramp Roadway Operations						
On Ramp Type				Right		
On Ramp Speed (mph)				60		
On Ramp Cap (pcph)				2,200		
On Ramp v/c ratio				0.14		

Location	1	2	3	4	5	6



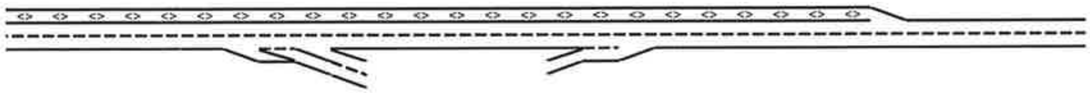
Key

<> Express Lane (HOV)

No Trucks

Name	SR 99 north of Elk Grove Blvd	Elk Grove Off-Ramp	Elk Grove Off-Ramp to On-Ramp	Elk Grove On-Ramp	SR 99 south of Elk Grove Blvd	SR 99 south of Elk Grove Blvd
Calculate Off Ramp Flow Rate						
Off Volume (vph)		1,381				
PHF		0.9				
Total Lanes		2				
Terrain		Level				
Grade %		0.0%				
Grade Length (mi)		0.00				
Truck & Bus %		5.0%				
RV %		0.0%				
E_T		1.5				
E_R		1.2				
f_{HV}		0.976				
f_P		1.00				
Off Flow (pcph)		1,573				
Off Flow (pcphpl)		786				
Calculate Off Ramp Roadway Operations						
Off Ramp Type		Right				
Off Ramp Speed		35				
Off Ramp Cap (pcph)		4,000				
Off Ramp v/c ratio		0.39				
Determine Adjacent Ramp for Three-Lane Mainline Segments with One-Lane Ramps						
Up Type						
Up Distance						
Up Flow (pcph)						
Down Type						
Down Distance						
Down Flow (pcph)						

Location	1	2	3	4	5	6



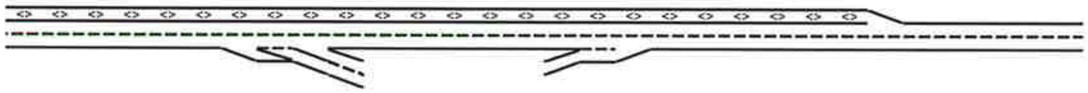
Key

<> Express Lane (HOV)

No Trucks

Name	SR 99 north of Elk Grove Blvd	Elk Grove Off-Ramp	Elk Grove Off-Ramp to On-Ramp	Elk Grove On-Ramp	SR 99 south of Elk Grove Blvd	SR 99 south of Elk Grove Blvd
Calculate Merge Influence Area Operations						
Effective v_P (pcph)				1,713		
Up Ramp L_{EQ}						
Down Ramp L_{EQ}						
P_{FM} (Eqn 13-3)				0.586		
P_{FM} (Eqn 13-4)						
P_{FM} (Eqn 13-5)						
P_{FM}				1.000		
v_{12} (pcph)				1,713		
v_3 (pcph)						
v_{34} (pcph)						
v_{12a} (pcph)				1,713		
v_{R12a} (pcph)				2,016		
Merge Speed Index				0.31		
Merge Area Speed				61.2		
Outer Lanes Volume						
Outer Lanes Speed						
Segment Speed				61.2		
Merge v/c ratio				0.44		
Merge Density				19.2		
Merge LOS				B		
Calculate Diverge Influence Area Operations						
Effective v_P (pcph)		2,300				
Up Ramp L_{EQ}						
Down Ramp L_{EQ}						
P_{FD} (Eqn 13-9)		0.630				
P_{FD} (Eqn 13-10)						
P_{FD} (Eqn 13-11)						
P_{FD}		1.000				
v_{12} (pcph)		2,300				
v_3 (pcph)						
v_{34} (pcph)						
v_{12a} (pcph)		2,300				
Diverge Speed Index		0.57				
Diverge Area Speed		54.1				
Outer Lanes Volume						
Outer Lanes Speed						
Segment Speed		54.1				
Diverge v/c ratio		0.52				
Diverge Density		10.5				
Diverge LOS		B				

Location	1	2	3	4	5	6



Key

<> Express Lane (HOV)

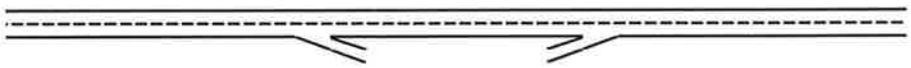
No Trucks

Name	SR 99 north of Elk Grove Blvd	Elk Grove Off-Ramp	Elk Grove Off-Ramp to On-Ramp	Elk Grove On-Ramp	SR 99 south of Elk Grove Blvd	SR 99 south of Elk Grove Blvd
Summarize Segment Operations						
Segment v/c ratio	0.48	0.52	0.36	0.44	0.43	0.43
Segment Density	16.5	10.5	12.3	19.2	14.8	14.8
Segment LOS	B	B	B	B	B	B
Over Capacity						

Project: Elk Grove Civic Center | **Alternative:** Existing Conditions

Freeway Corridor: Interstate 5 NB | **Time Period:** Sat. AM Peak Hour

Location	1	2	3	4	5



Key

<> Express Lane (HOV)

No Trucks

Name	I-5 south of Elk Grove Blvd	Elk Grove Blvd Off-Ramp	Elk Grove Off-Ramp to On-Ramp	Elk Grove On-Ramp	I-5 north of Elk Grove Blvd
Define Freeway Segment					
Type	Basic	Diverge	Basic	Merge	Basic
Length (ft)	6,900	1,500	3,100	1,500	500
Accel Length				750	
Decel Length		160			
Mainline Volume	1,620	1,620	1,509	1,509	2,131
On Ramp Volume				622	
Off Ramp Volume		111			
Express Lane Volume					
EL On Ramp Volume					
EL Off Ramp Volume					
Calculate Flow Rate in General Purpose Lanes (GP)					
GP Volume (vph)	1,620	1,620	1,509	2,131	2,131
PHF	0.92	0.97	0.92	0.97	0.92
GP Lanes	2	2	2	2	2
Terrain	Level	Level	Level	Level	Level
Grade %	0.0%	0.0%	0.0%	0.0%	0.0%
Grade Length (mi)	0.00	0.00	0.00	0.00	0.00
Truck & Bus %	18.0%	5.0%	18.0%	5.0%	18.0%
RV %	0.0%	0.0%	0.0%	0.0%	0.0%
E_T	1.5	1.5	1.5	1.5	1.5
E_R	1.2	1.2	1.2	1.2	1.2
f_{HV}	0.917	0.976	0.917	0.976	0.917
f_P	1.00	1.00	1.00	1.00	1.00
GP Flow (pcph)	1,919	1,712	1,788	2,252	2,525
GP Flow (pcphpl)	960	856	894	1,126	1,262
Calculate Speed in General Purpose Lanes					
Lane Width (ft)	12	12	12	12	12
Shoulder Width	>6	>6	>6	>6	>6
TRD	1.2	1.2	1.2	1.2	1.2
f_{LW}	0.0	0.0	0.0	0.0	0.0
f_{LC}	0.0	0.0	0.0	0.0	0.0
Calc'd FFS	71.7	71.7	71.7	71.7	71.7
Measured FFS	70.0	70.0	70.0	70.0	70.0
FFS	70	70	70	70	70
Calculate Operations in General Purpose Lanes					
v/c ratio	0.40	0.36	0.37	0.47	0.53
Speed (mph)	70.0	70.0	70.0	70.0	70.0
Density (pcphpl)	13.7	12.2	12.8	16.1	18.0
LOS	B	B	B	B	C
Calculate Operations for Entering GP Lanes					
GP_{IN} Vol (pcph)				1,595	
GP_{IN} Cap (pcph)				4,800	
GP_{IN} v/c ratio				0.33	
Calculate Operations for Exiting GP Lanes					
GP_{OUT} Vol (pcph)		1,595			
GP_{OUT} Cap (pcph)		4,800			
GP_{OUT} v/c ratio		0.33			

Location	1	2	3	4	5

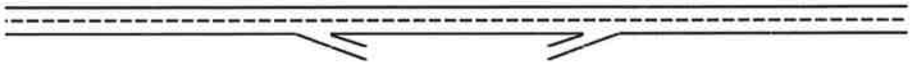
Key

<> Express Lane (HOV)

No Trucks

Name	I-5 south of Elk Grove B lvd	Elk Grove Blvd Off-Ramp	Elk Grove Off-Ramp to On-Ramp	Elk Grove On-Ramp	I-5 north of Elk Grove Blvd
Calculate On Ramp Flow Rate					
On Volume (vph)				622	
PHF				0.97	
Total Lanes				1	
Terrain				Level	
Grade %				0.0%	
Grade Length (mi)				0.00	
Truck & Bus %				5.0%	
RV %				0.0%	
E_T				1.5	
E_R				1.2	
f_{HV}				0.976	
f_P				1.00	
On Flow (pcph)				657	
On Flow (pcphpl)				657	
Calculate On Ramp Roadway Operations					
On Ramp Type				Right	
On Ramp Speed (mph)				45	
On Ramp Cap (pcph)				2,100	
On Ramp v/c ratio				0.31	

Location	1	2	3	4	5



Key

<> Express Lane (HOV)

No Trucks

Name	I-5 south of Elk Grove B lvd	Elk Grove Blvd Off-Ramp	Elk Grove Off-Ramp to On-Ramp	Elk Grove On-Ramp	I-5 north of Elk Grove Blvd
Calculate Off Ramp Flow Rate					
Off Volume (vph)		111			
PHF		0.97			
Total Lanes		1			
Terrain		Level			
Grade %		0.0%			
Grade Length (mi)		0.00			
Truck & Bus %		5.0%			
RV %		0.0%			
E_T		1.5			
E_R		1.2			
f_{HV}		0.976			
f_P		1.00			
Off Flow (pcph)		117			
Off Flow (pcphpl)		117			
Calculate Off Ramp Roadway Operations					
Off Ramp Type		Right			
Off Ramp Speed		35			
Off Ramp Cap (pcph)		2,000			
Off Ramp v/c ratio		0.06			
Determine Adjacent Ramp for Three-Lane Mainline Segments with One-Lane Ramps					
Up Type					
Up Distance					
Up Flow (pcph)					
Down Type					
Down Distance					
Down Flow (pcph)					
Calculate Merge Influence Area Operations					
Effective v_P (pcph)				1,595	
Up Ramp L_{EQ}					
Down Ramp L_{EQ}					
P_{FM} (Eqn 13-3)				0.599	
P_{FM} (Eqn 13-4)					
P_{FM} (Eqn 13-5)					
P_{FM}				1.000	
v_{12} (pcph)				1,595	
v_3 (pcph)					
v_{34} (pcph)					
v_{12a} (pcph)				1,595	
v_{R12a} (pcph)				2,252	
Merge Speed Index				0.29	
Merge Area Speed				61.9	
Outer Lanes Volume					
Outer Lanes Speed					
Segment Speed				61.9	
Merge v/c ratio				0.49	
Merge Density				18.0	
Merge LOS				B	

Location	1	2	3	4	5

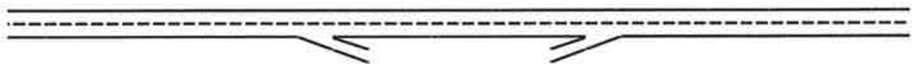
Key

<> Express Lane (HOV)

No Trucks

Name	I-5 south of Elk Grove B lvd	Elk Grove Blvd Off-Ramp	Elk Grove Off-Ramp to On-Ramp	Elk Grove On-Ramp	I-5 north of Elk Grove Blvd
Calculate Diverge Influence Area Operations					
Effective v_P (pcph)		1,712			
Up Ramp L_{EQ}					
Down Ramp L_{EQ}					
P_{FD} (Eqn 13-9)		0.712			
P_{FD} (Eqn 13-10)					
P_{FD} (Eqn 13-11)					
P_{FD}		1.000			
v_{12} (pcph)		1,712			
v_3 (pcph)					
v_{34} (pcph)					
v_{12a} (pcph)		1,712			
Diverge Speed Index		0.44			
Diverge Area Speed		57.7			
Outer Lanes Volume					
Outer Lanes Speed					
Segment Speed		57.7			
Diverge v/c ratio		0.39			
Diverge Density		17.5			
Diverge LOS		B			

Location	1	2	3	4	5



Key

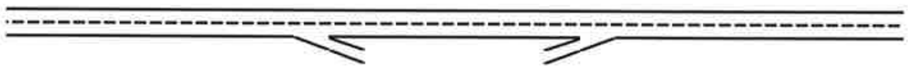
<> Express Lane (HOV)

No Trucks

Name	I-5 south of Elk Grove B lvd	Elk Grove Blvd Off-Ramp	Elk Grove Off-Ramp to On-Ramp	Elk Grove On-Ramp	I-5 north of Elk Grove Blvd
Summarize Segment Operations					
Segment v/c ratio	0.40	0.39	0.37	0.49	0.53
Segment Density	13.7	17.5	12.8	18.0	18.0
Segment LOS	B	B	B	B	C
Over Capacity					

Project:	Elk Grove Civic Center	Alternative:	Existing Conditions
Freeway Corridor:	Interstate 5 SB	Time Period:	Sat. AM Peak Hour

Location	1	2	3	4	5



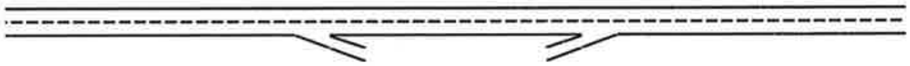
Key

<> Express Lane (HOV)

No Trucks

Name	I-5 north of Elk Grove Blvd	Elk Grove Off-Ramp	Elk Grave Off-Ramp to On-Ramp	Elk Grove Loop On-Ramp	I-5 south of Elk Grove Blvd
Define Freeway Segment					
Type	Basic	Diverge	Basic	Merge	Basic
Length (ft)	2,500	1,500	1,450	1,500	7,750
Accel Length				750	
Decel Length		160			
Mainline Volume	1,782	1,782	1,331	1,331	1,470
On Ramp Volume				139	
Off Ramp Volume		451			
Express Lane Volume					
EL On Ramp Volume					
EL Off Ramp Volume					
Calculate Flow Rate in General Purpose Lanes (GP)					
GP Volume (vph)	1,782	1,782	1,331	1,470	1,470
PHF	0.92	0.87	0.92	0.87	0.92
GP Lanes	2	2	2	2	2
Terrain	Level	Level	Level	Level	Level
Grade %	0.0%	0.0%	0.0%	0.0%	0.0%
Grade Length (mi)	0.00	0.00	0.00	0.00	0.00
Truck & Bus %	18.0%	5.0%	18.0%	5.0%	18.0%
RV %	0.0%	0.0%	0.0%	0.0%	0.0%
E_T	1.5	1.5	1.5	1.5	1.5
E_R	1.2	1.2	1.2	1.2	1.2
f_{HV}	0.917	0.976	0.917	0.976	0.917
f_P	1.00	1.00	1.00	1.00	1.00
GP Flow (pcph)	2,111	2,099	1,577	1,732	1,742
GP Flow (pcphpl)	1,056	1,050	788	866	871
Calculate Speed in General Purpose Lanes					
Lane Width (ft)	12	12	12	12	12
Shoulder Width	>6	>6	>6	>6	>6
TRD	1.2	1.2	1.2	1.2	1.2
f_{LW}	0.0	0.0	0.0	0.0	0.0
f_{LC}	0.0	0.0	0.0	0.0	0.0
Calc'd FFS	71.7	71.7	71.7	71.7	71.7
Measured FFS	70.0	70.0	70.0	70.0	70.0
FFS	70	70	70	70	70
Calculate Operations in General Purpose Lanes					
v/c ratio	0.44	0.44	0.33	0.36	0.36
Speed (mph)	70.0	70.0	70.0	70.0	70.0
Density (pcphpl)	15.1	15.0	11.3	12.4	12.4
LOS	B	B	B	B	B
Calculate Operations for Entering GP Lanes					
GP_{IN} Vol (pcph)				1,568	
GP_{IN} Cap (pcph)				4,800	
GP_{IN} v/c ratio				0.33	
Calculate Operations for Exiting GP Lanes					
GP_{OUT} Vol (pcph)		1,568			
GP_{OUT} Cap (pcph)		4,800			
GP_{OUT} v/c ratio		0.33			

Location	1	[illegible]	[illegible]	[illegible]	[illegible]



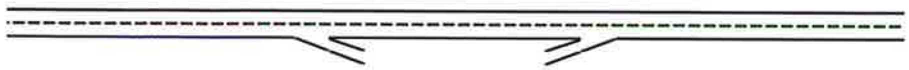
Key

<> Express Lane (HOV)

No Trucks

Name	I-5 north of Elk Grove Blvd	Elk Grove Off-Ramp	Elk Grave Off-Ramp to On-Ramp	Elk Grove Loop On-Ramp	I-5 south of Elk Grove Blvd
Calculate On Ramp Flow Rate					
On Volume (vph)				139	
PHF				0.87	
Total Lanes				1	
Terrain				Level	
Grade %				0.0%	
Grade Length (mi)				0.00	
Truck & Bus %				5.0%	
RV %				0.0%	
E_T				1.5	
E_R				1.2	
f_{HV}				0.976	
f_P				1.00	
On Flow (pcph)				164	
On Flow (pcphpl)				164	
Calculate On Ramp Roadway Operations					
On Ramp Type				Right	
On Ramp Speed (mph)				45	
On Ramp Cap (pcph)				2,100	
On Ramp v/c ratio				0.08	

Location	1	2	3	4	5



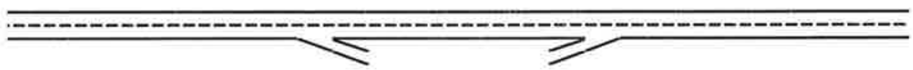
Key

<> Express Lane (HOV)

No Trucks

Name	I-5 north of Elk Grove Blvd	Elk Grove Off-Ramp	Elk Grove Off-Ramp to On-Ramp	Elk Grove Loop On-Ramp	I-5 south of Elk Grove Blvd
Calculate Off Ramp Flow Rate					
Off Volume (vph)		451			
PHF		0.87			
Total Lanes		1			
Terrain		Level			
Grade %		0.0%			
Grade Length (mi)		0.00			
Truck & Bus %		5.0%			
RV %		0.0%			
E_T		1.5			
E_R		1.2			
f_{HV}		0.976			
f_P		1.00			
Off Flow (pcph)		531			
Off Flow (pcphpl)		531			
Calculate Off Ramp Roadway Operations					
Off Ramp Type		Right			
Off Ramp Speed		35			
Off Ramp Cap (pcph)		2,000			
Off Ramp v/c ratio		0.27			
Determine Adjacent Ramp for Three-Lane Mainline Segments with One-Lane Ramps					
Up Type					
Up Distance					
Up Flow (pcph)					
Down Type					
Down Distance					
Down Flow (pcph)					
Calculate Merge Influence Area Operations					
Effective v_P (pcph)				1,568	
Up Ramp L_{EQ}					
Down Ramp L_{EQ}					
P_{FM} (Eqn 13-3)				0.599	
P_{FM} (Eqn 13-4)					
P_{FM} (Eqn 13-5)					
P_{FM}				1.000	
v_{12} (pcph)				1,568	
v_3 (pcph)					
v_{34} (pcph)					
v_{12a} (pcph)				1,568	
v_{R12a} (pcph)				1,732	
Merge Speed Index				0.28	
Merge Area Speed				62.3	
Outer Lanes Volume					
Outer Lanes Speed					
Segment Speed				62.3	
Merge v/c ratio				0.38	
Merge Density				14.2	
Merge LOS				B	

Location	1	2	3		



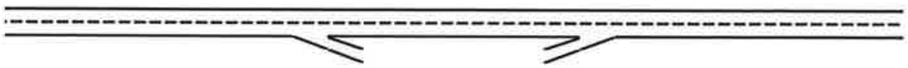
Key

<> Express Lane (HOV)

No Trucks

Name	I-5 north of Elk Grove Blvd	Elk Grove Off-Ramp	Elk Grave Off-Ramp to On-Ramp	Elk Grove Loop On-Ramp	I-5 south of Elk Grove Blvd
Calculate Diverge Influence Area Operations					
Effective v_F (pcph)		2,099			
Up Ramp L_{EQ}					
Down Ramp L_{EQ}					
P_{FD} (Eqn 13-9)		0.683			
P_{FD} (Eqn 13-10)					
P_{FD} (Eqn 13-11)					
P_{FD}		1.000			
v_{12} (pcph)		2,099			
v_3 (pcph)					
v_{34} (pcph)					
v_{12a} (pcph)		2,099			
Diverge Speed Index		0.48			
Diverge Area Speed		56.7			
Outer Lanes Volume					
Outer Lanes Speed					
Segment Speed		56.7			
Diverge v/c ratio		0.48			
Diverge Density		20.9			
Diverge LOS		C			

Location	1	[illegible]	[illegible]	4	5



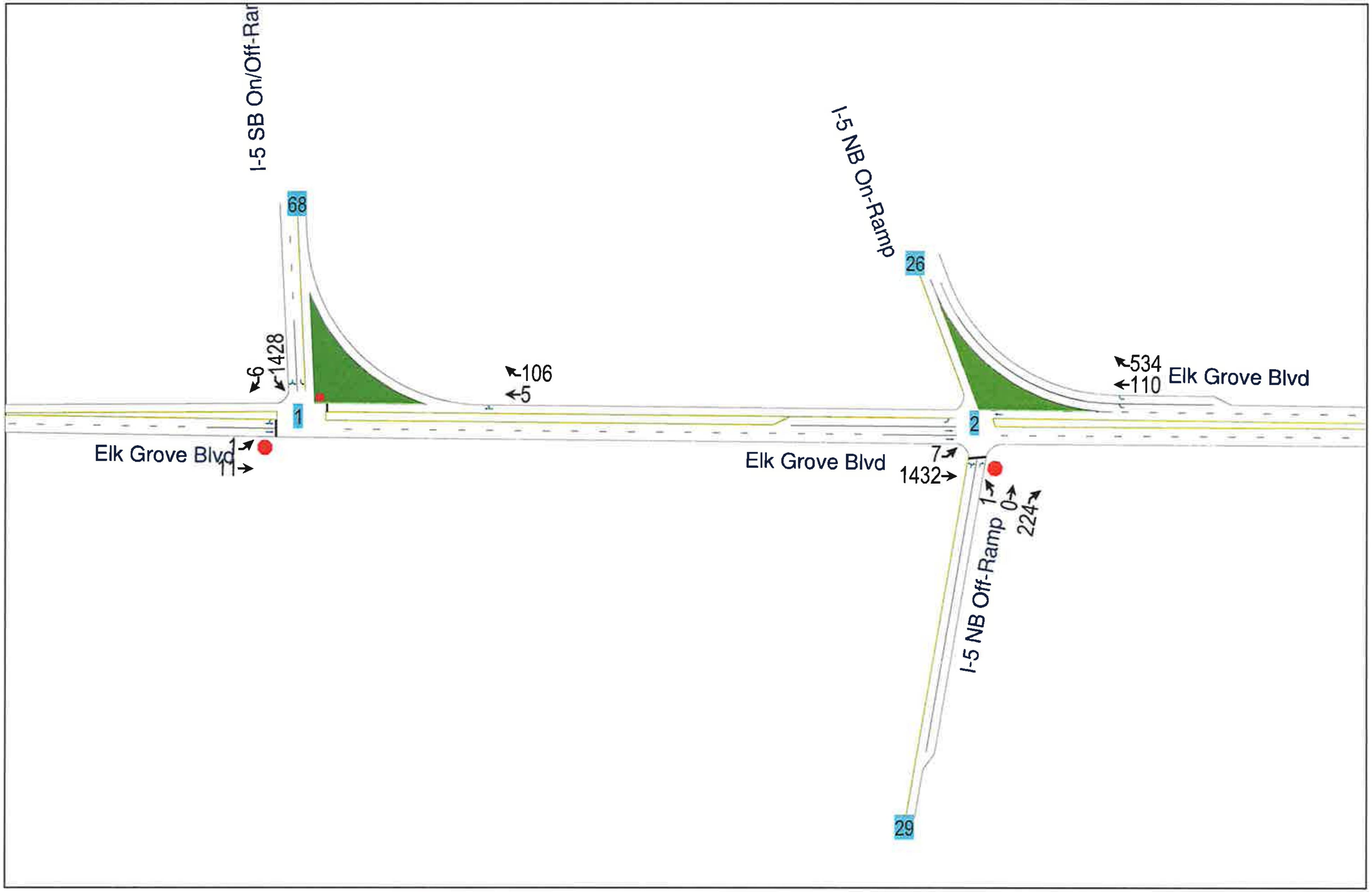
Key

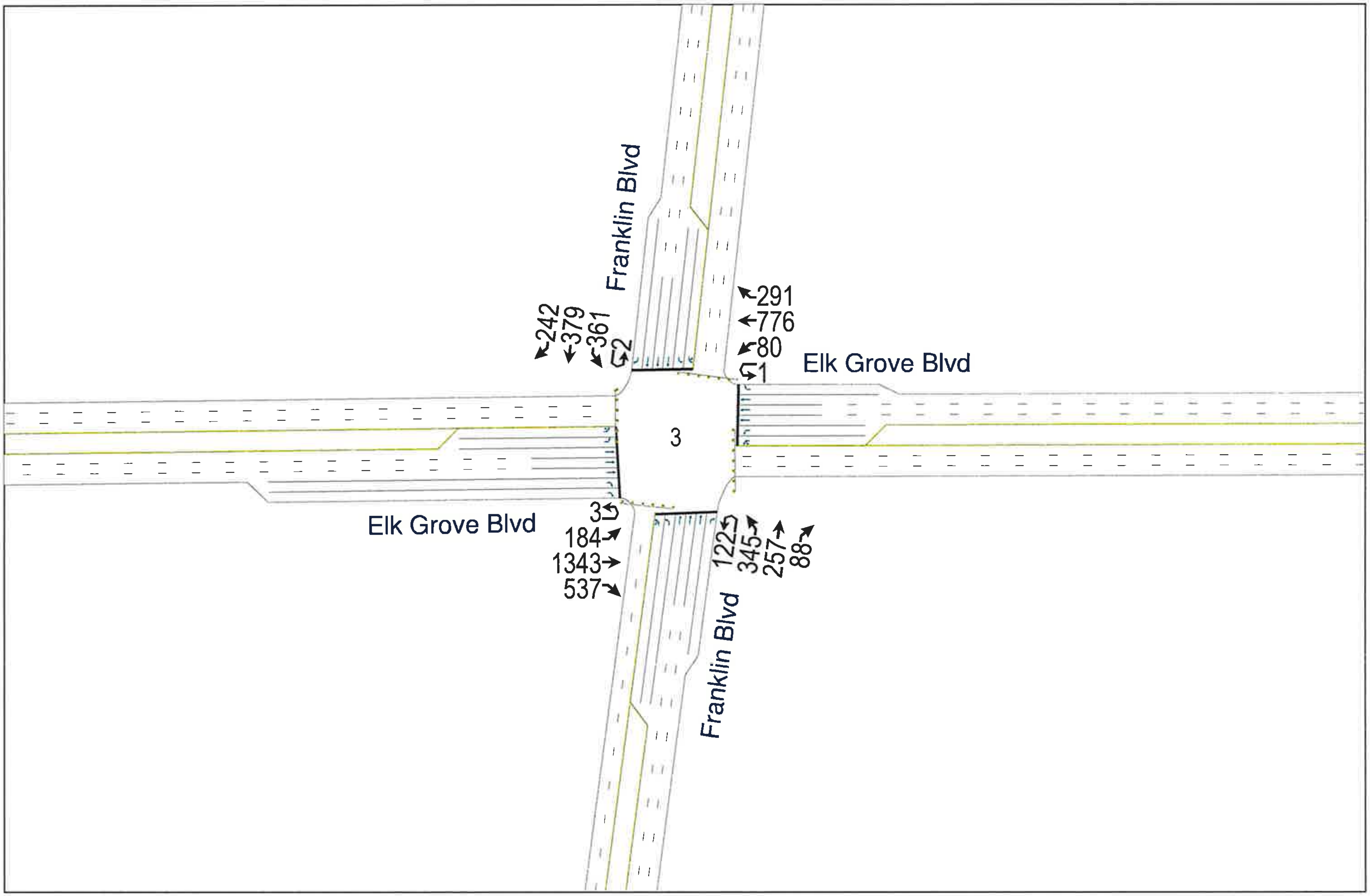
<> Express Lane (HOV)

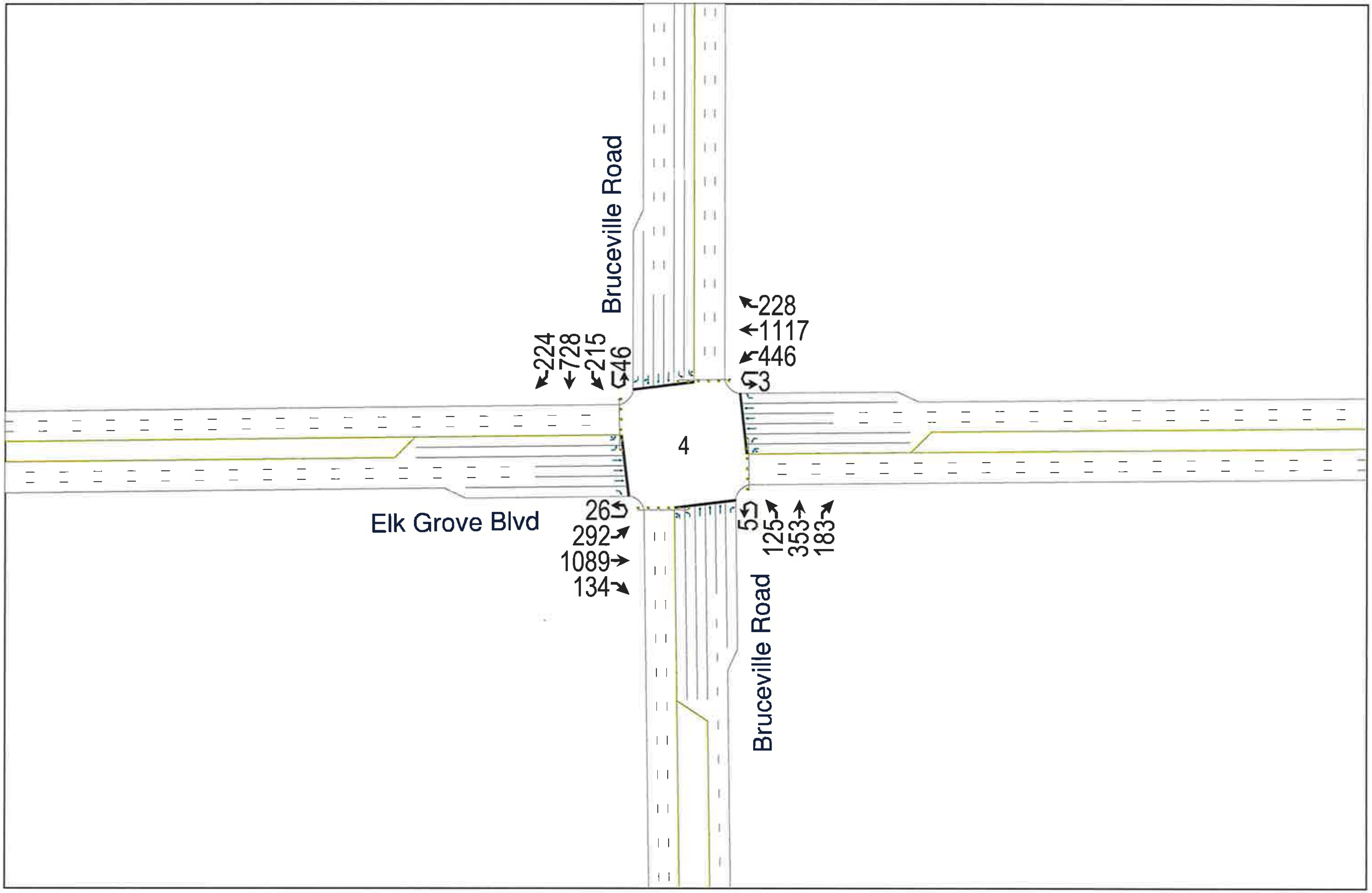
No Trucks

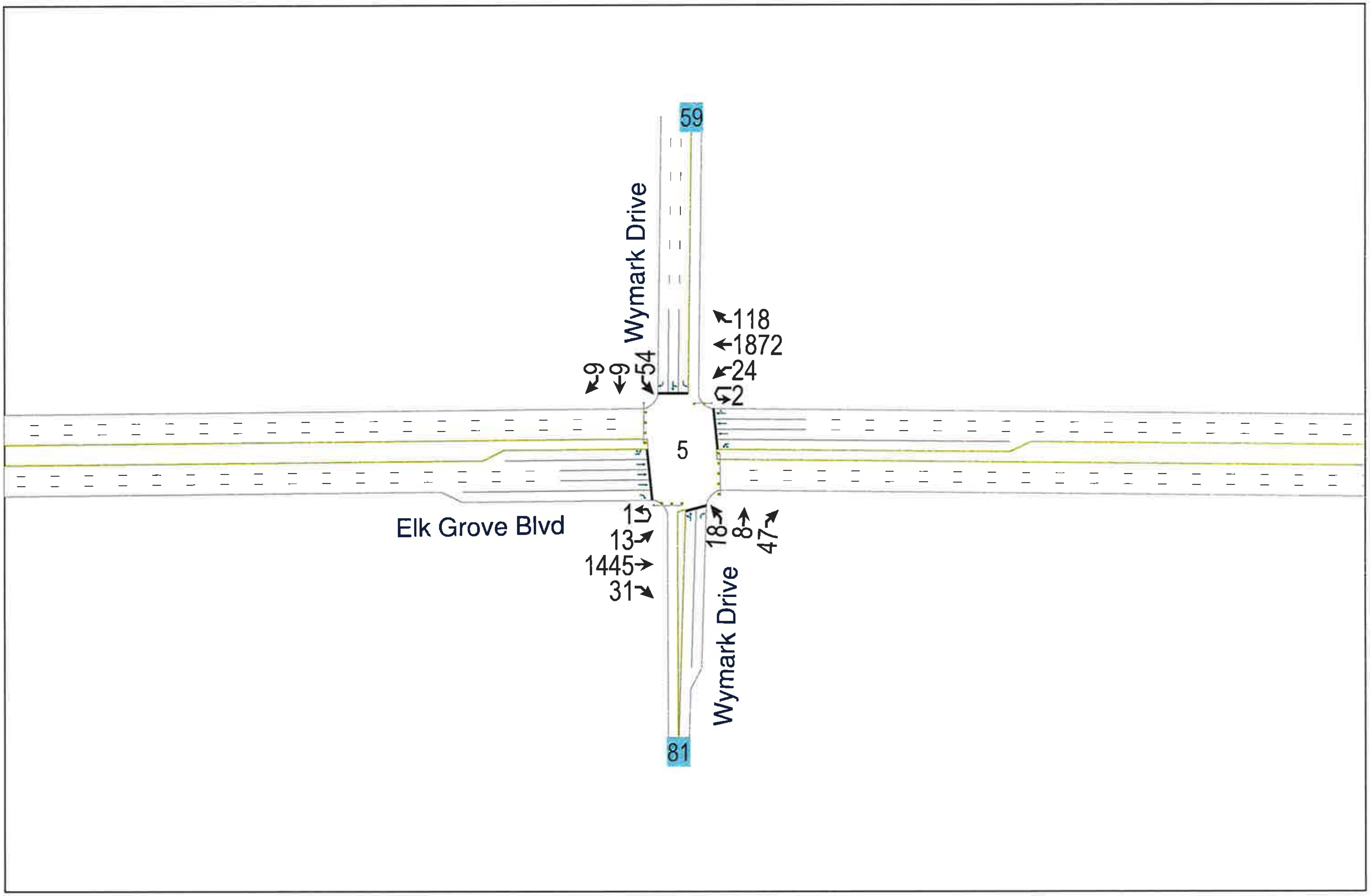
Name	I-5 north of Elk Grove Blvd	Elk Grove Off-Ramp	Elk Grove Off-Ramp to On-Ramp	Elk Grove Loop On-Ramp	I-5 south of Elk Grove Blvd
Summarize Segment Operations					
Segment v/c ratio	0.44	0.48	0.33	0.38	0.36
Segment Density	15.1	20.9	11.3	14.2	12.4
Segment LOS	B	C	B	B	B
Over Capacity					

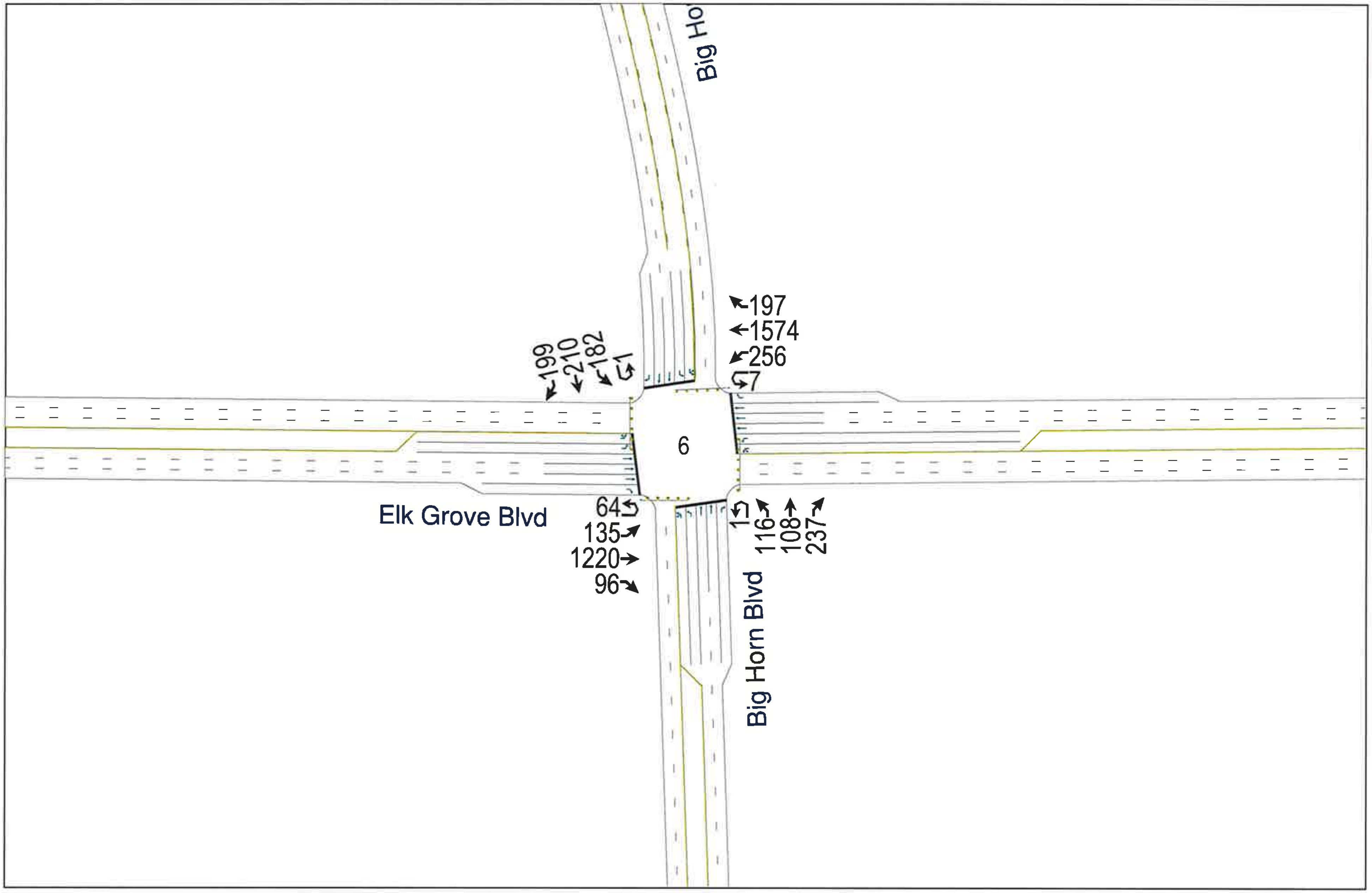
APPENDIX B: EXISTING PLUS PROJECT


I-5 SB On/Off-Rar
68
6
1428
1
106
5
Elk Grove Blvd
1
11
I-5 NB On-Ramp
26
534
110
Elk Grove Blvd
2
Elk Grove Blvd
7
1432
1
0
224
I-5 NB Off-Ramp
29


Franklin Blvd
242
379
361
2
291
776
80
1
Elk Grove Blvd
3
3
184
1343
537
Elk Grove Blvd
122
345
257
88
Franklin Blvd

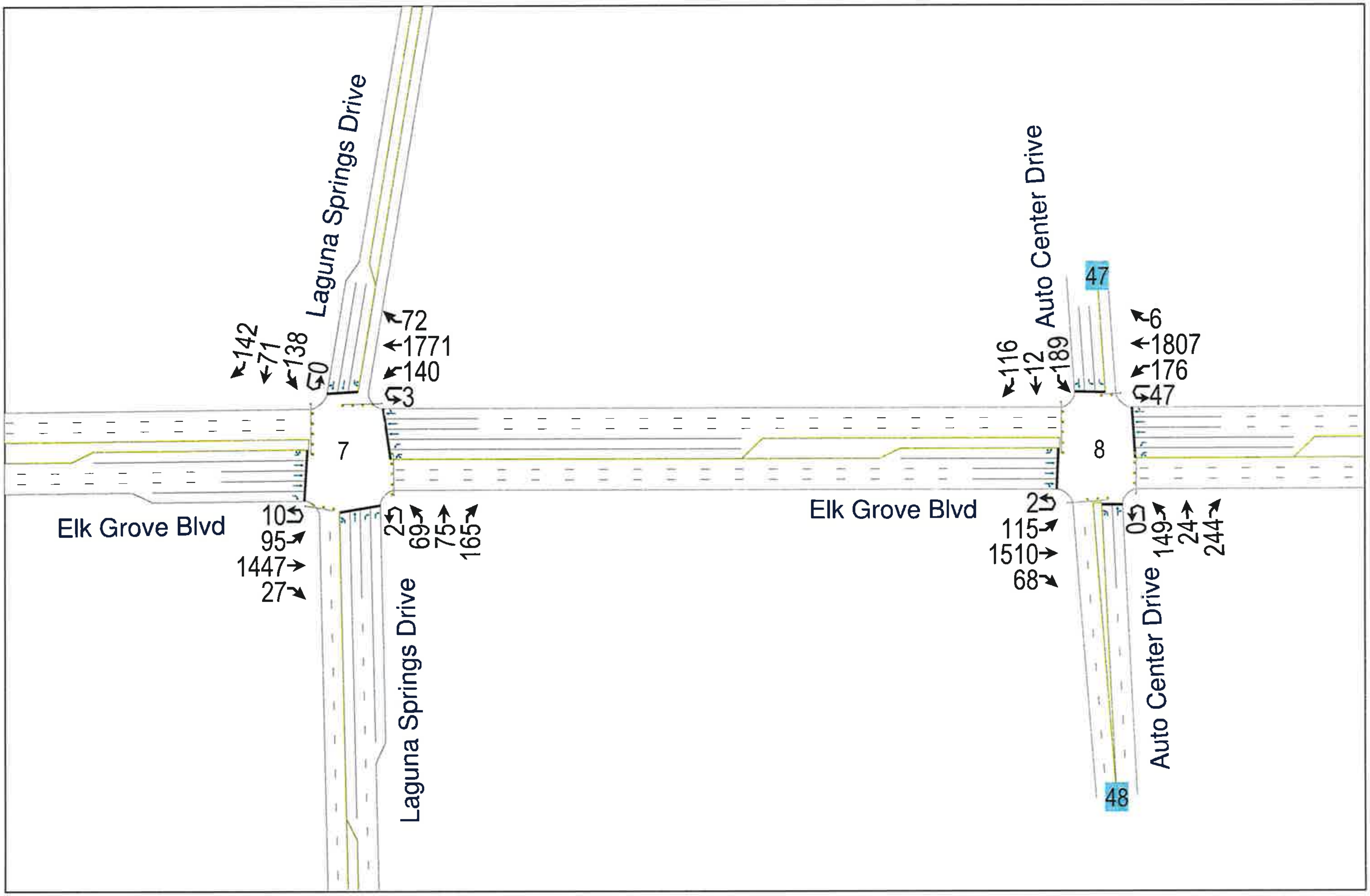

Bruceville Road
224
728
215
46
228
1117
446
3
4
Elk Grove Blvd
26
292
1089
134
5
125
353
183
Bruceville Road

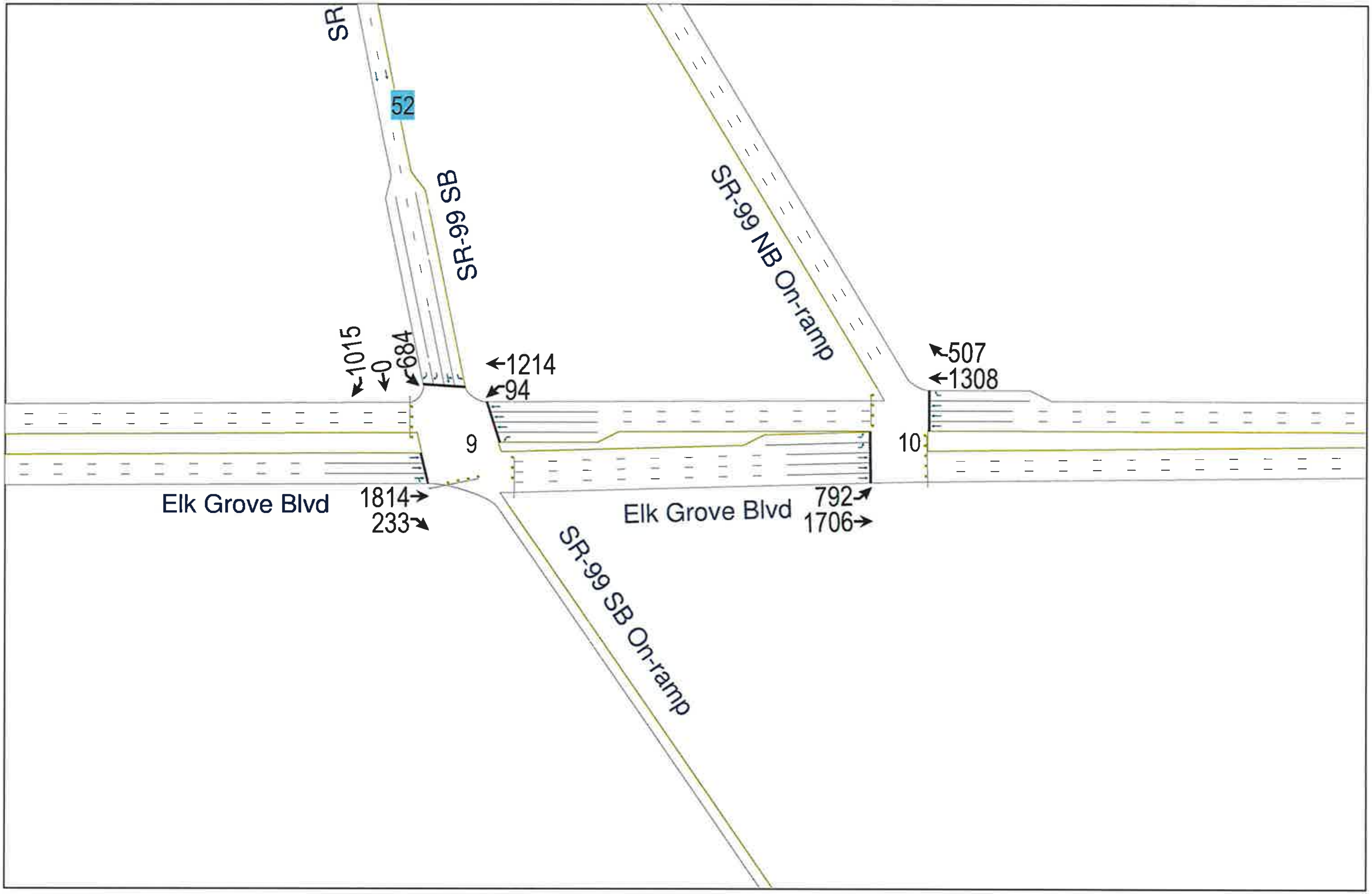

59
Wymark Drive
118
1872
24
2
9
9
54
5
Elk Grove Blvd
1
13
1445
31
18
8
47
Wymark Drive
81

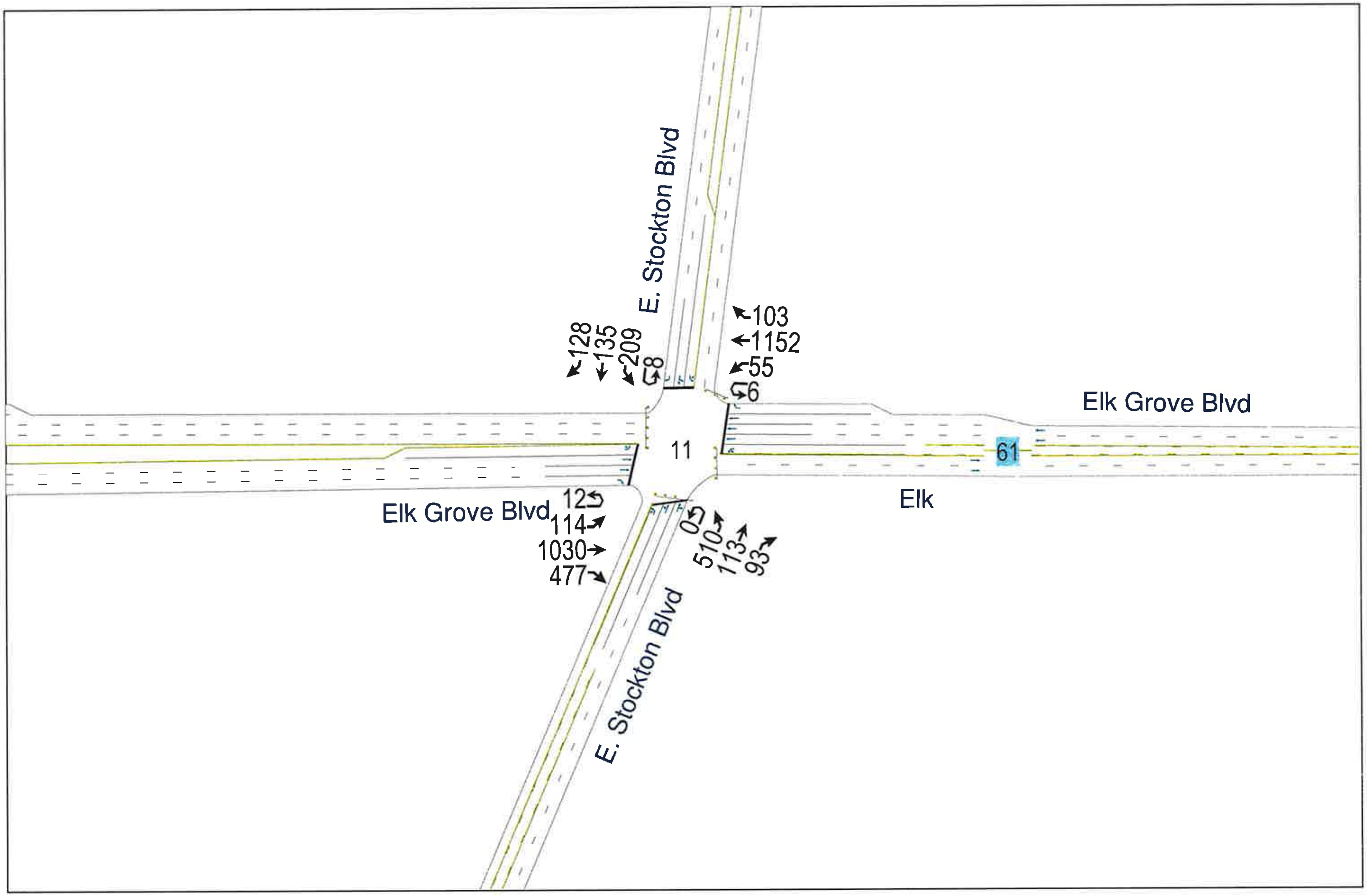

Big Ho
199
210
182
1
197
1574
256
7
6
Elk Grove Blvd
64
135
1220
96
1
116
108
237
Big Horn Blvd

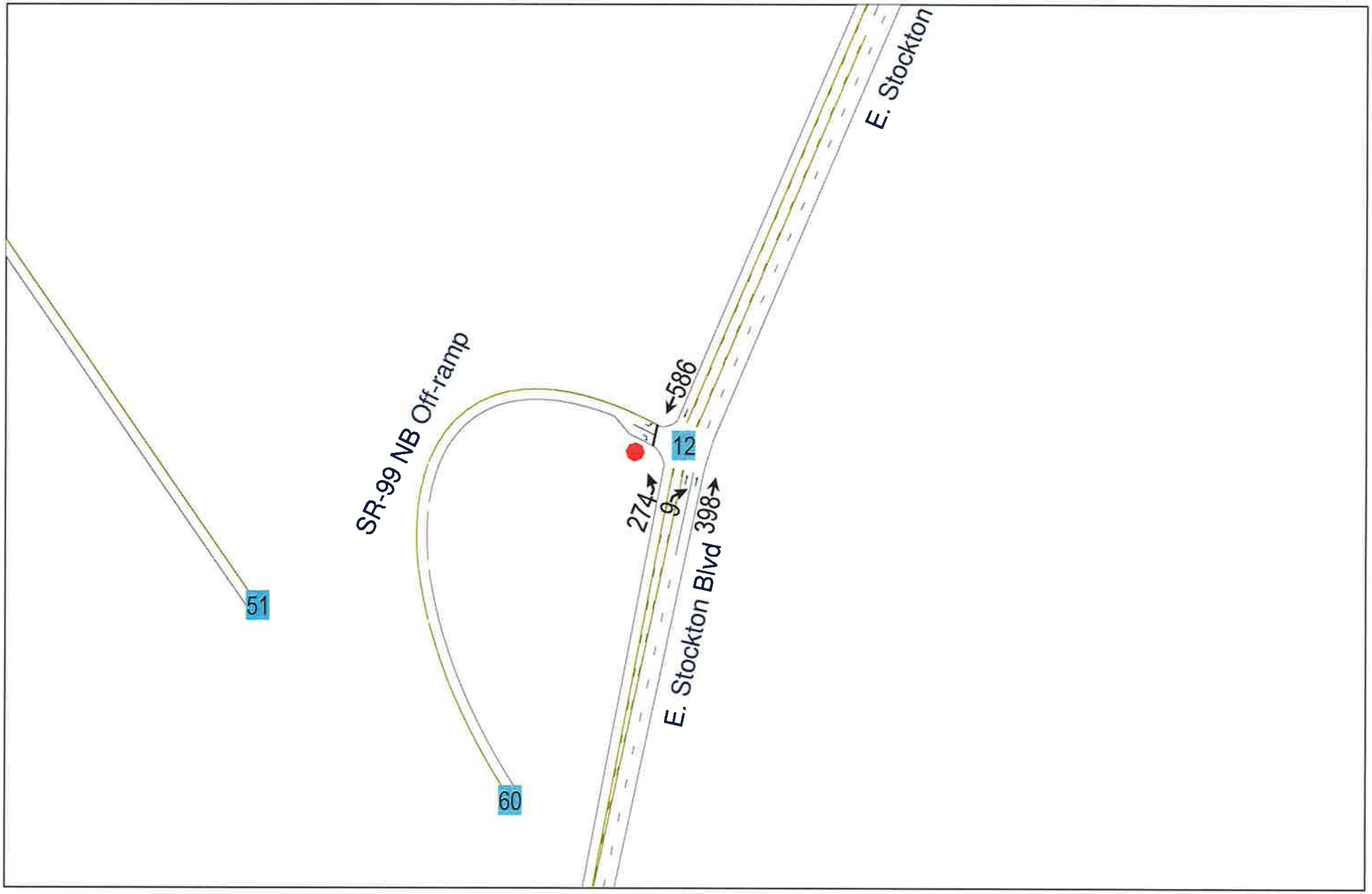
Elk Grove Civic Center Aquatics Complex

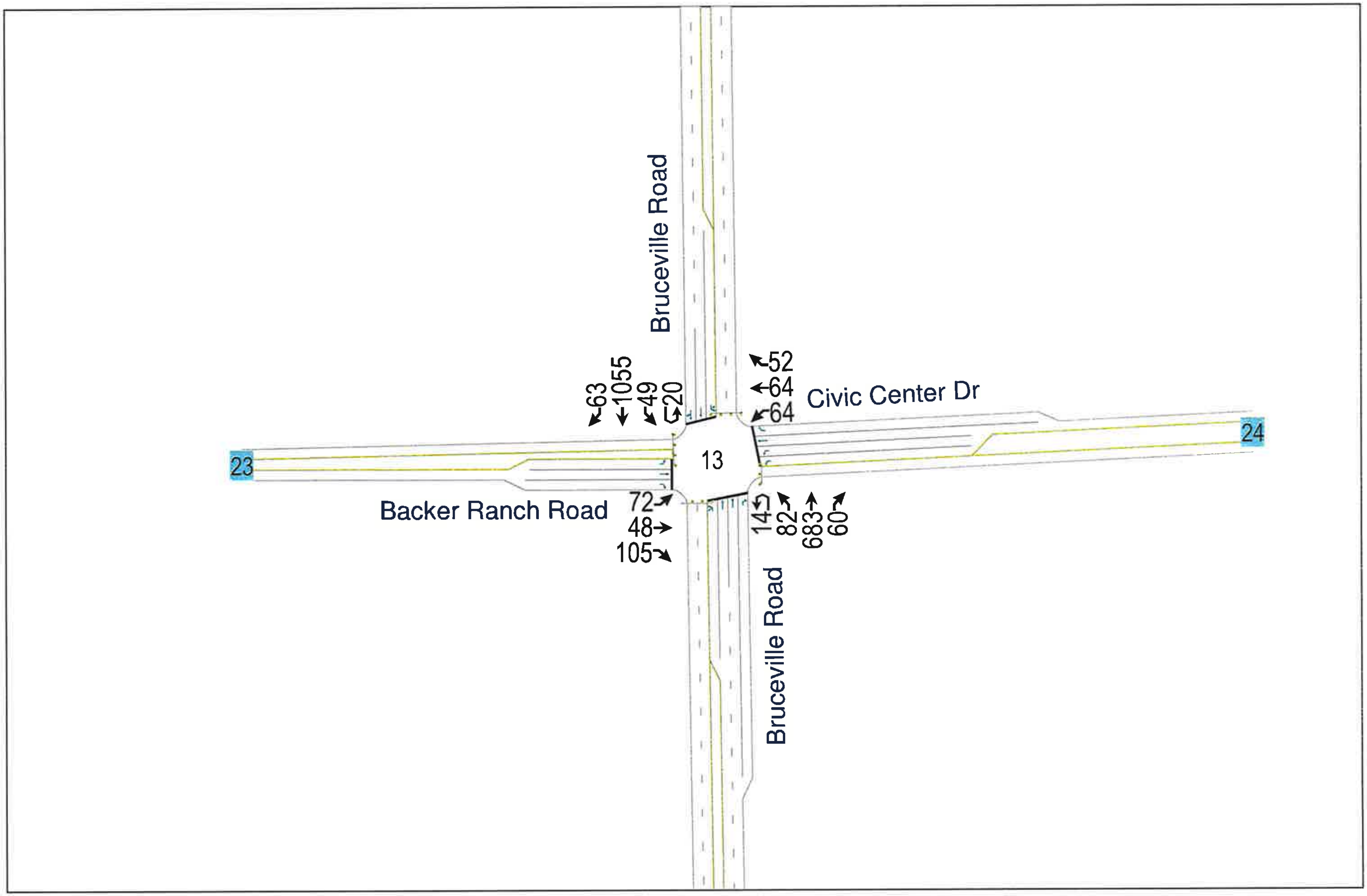
Existing Weekday Plus Project Conditions
PM Peak Hour



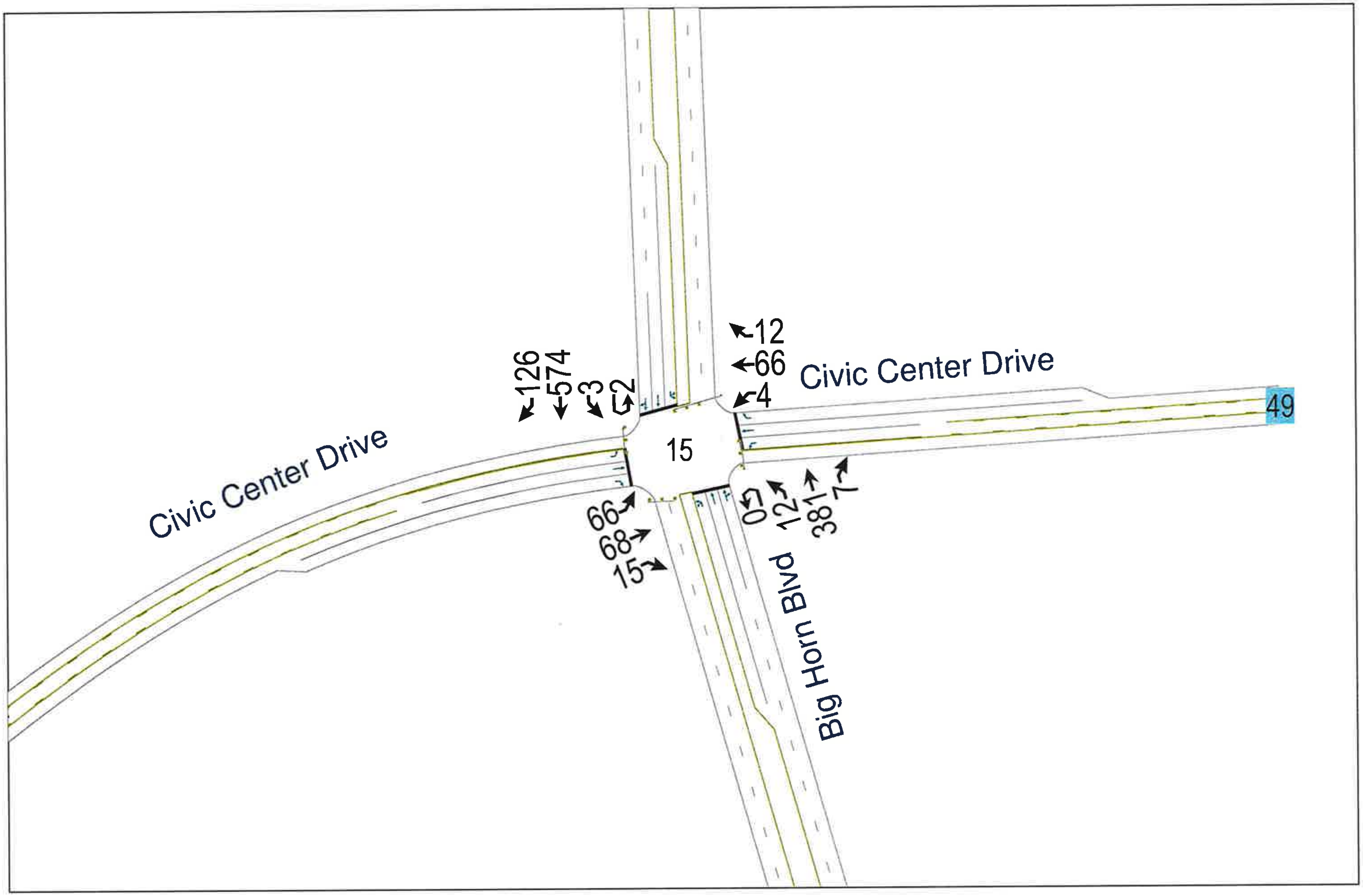

SR
52
SR-99 SB
SR-99 NB On-ramp
1015
0
684
1214
94
9
10
507
1308
1814
233
Elk Grove Blvd
Elk Grove Blvd
792
1706
SR-99 SB On-ramp


E. Stockton Blvd
103
1152
55
6
128
135
209
8
Elk Grove Blvd
61
11
Elk
Elk Grove Blvd
12
114
1030
477
0
510
113
93
E. Stockton Blvd


E. Stockton
586
12
274
9
398
E. Stockton Blvd
SR-99 NB Off-ramp
51
60

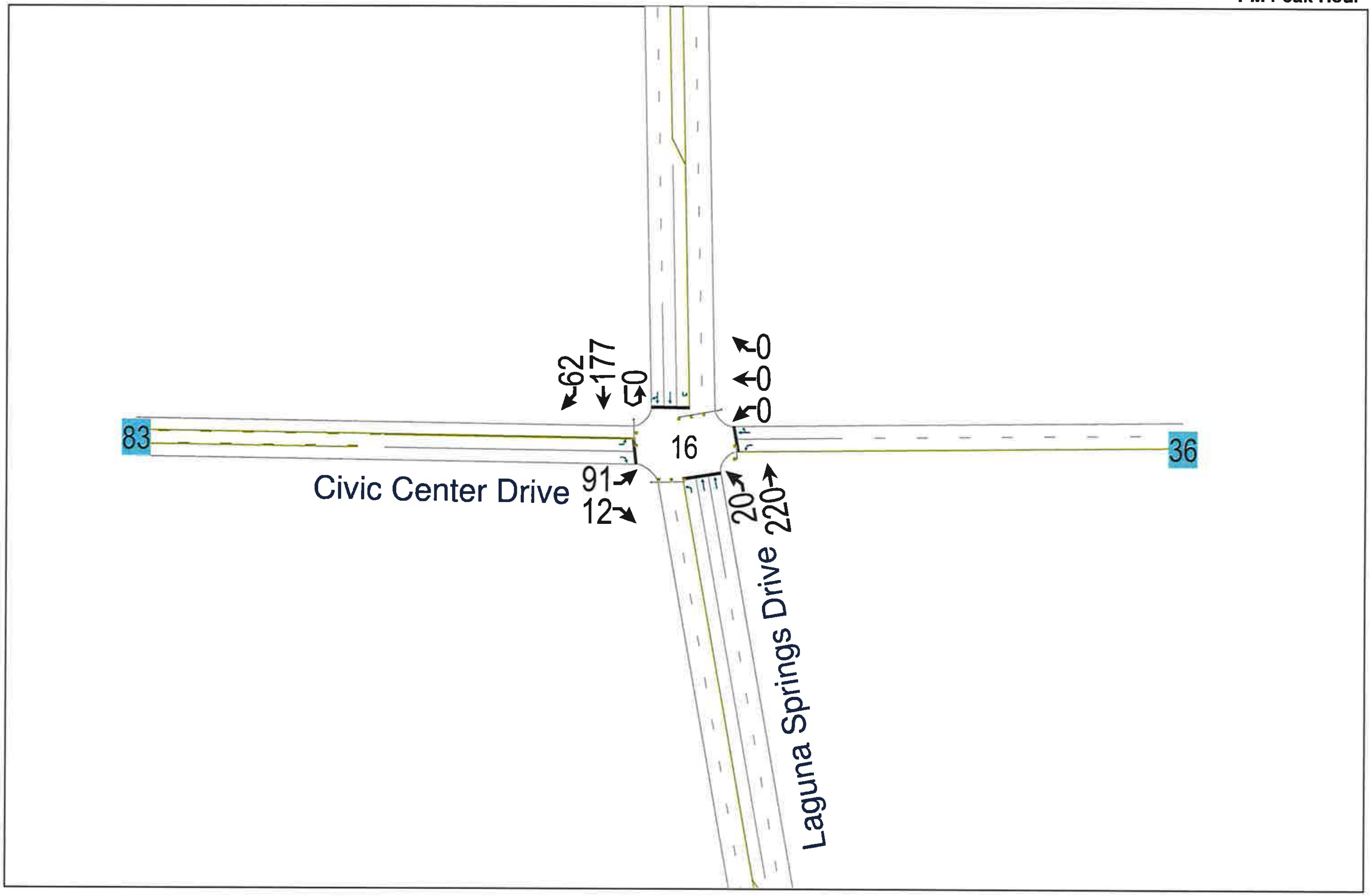

Bruceville Road
Civic Center Dr
Backer Ranch Road
Bruceville Road
13
23
24
63
1055
49
20
52
64
64
72
48
105
14
82
683
60

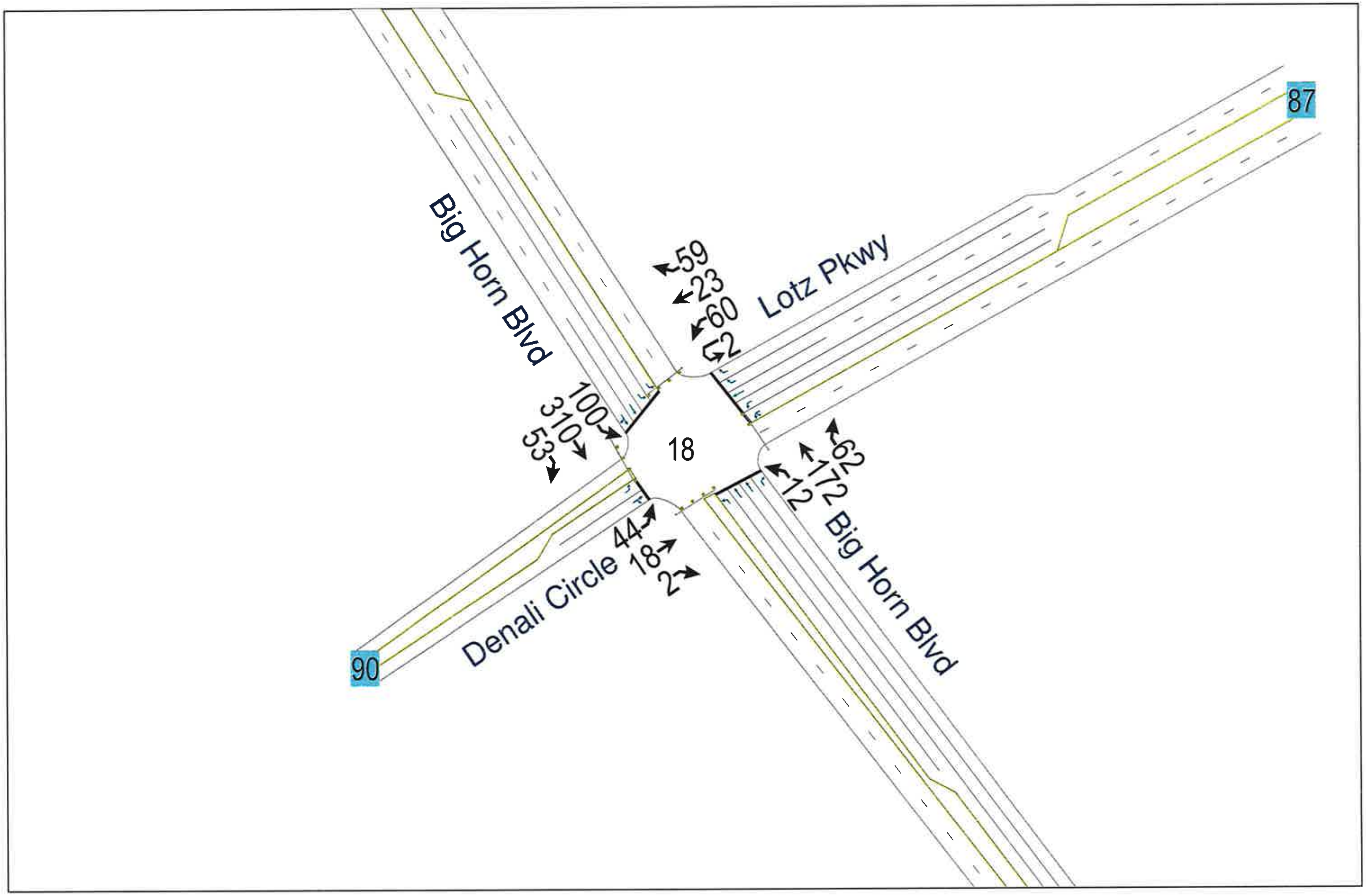

Civic
25
Wymark Drive
18
21
12
7
169
16
14
76
Civic Center Drive
17
148
19
14
9
7
Wymark Drive
75

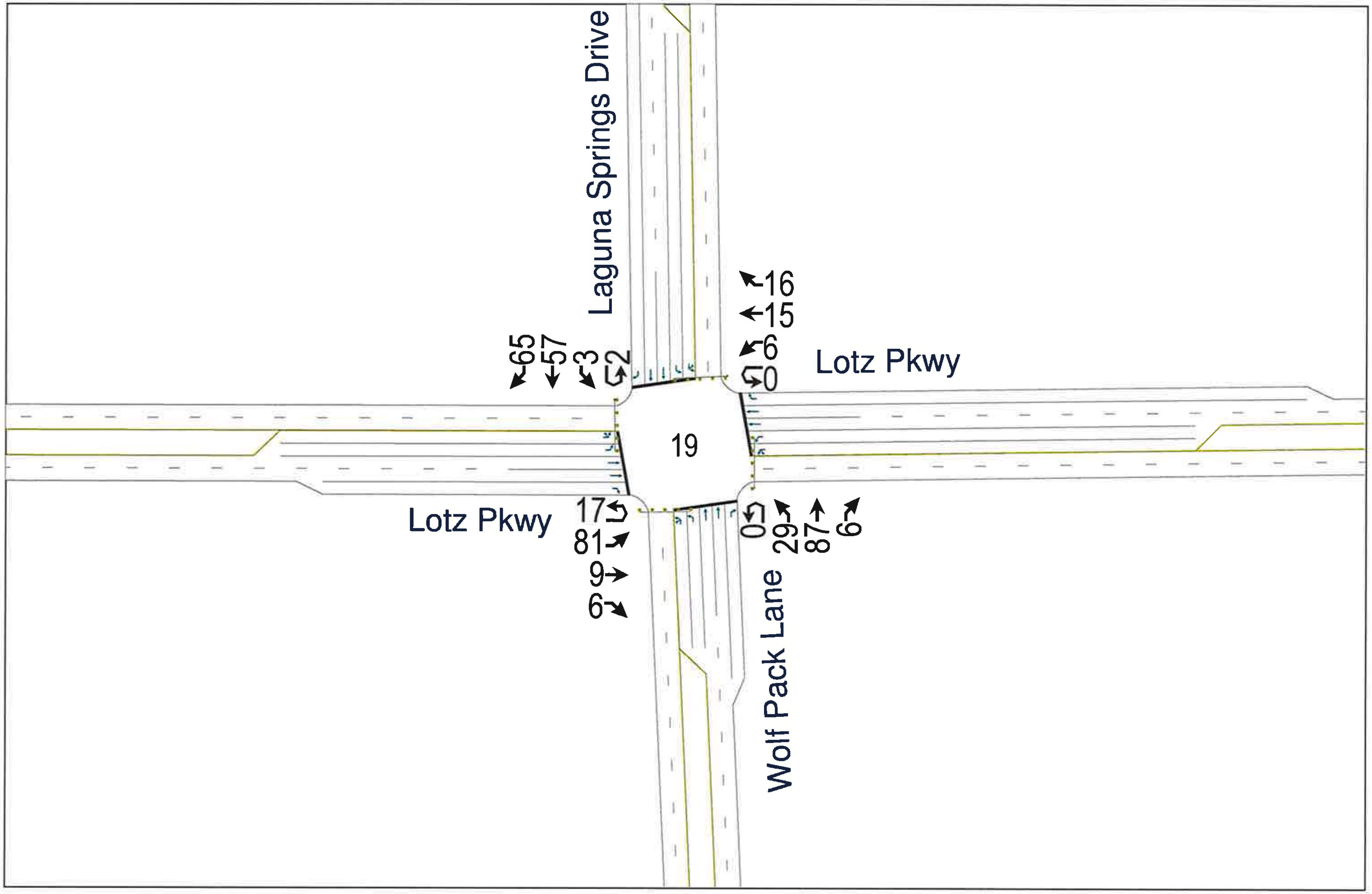

Civic Center Drive
Civic Center Drive
Big Horn Blvd
15
49
126
574
3
2
12
66
4
66
68
15
0
12
381
7

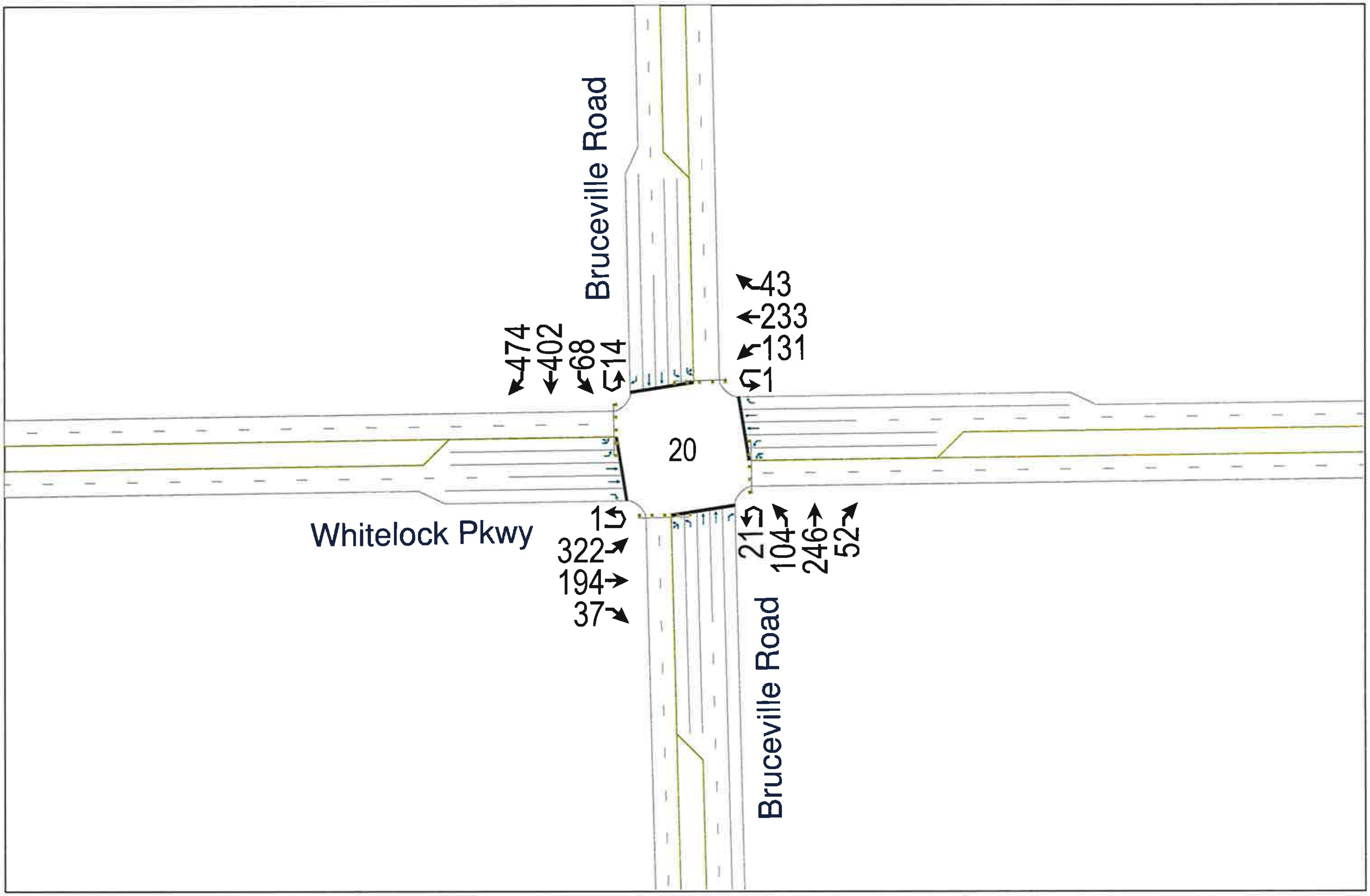
Elk Grove Civic Center Aquatics Complex

Existing Weekday Plus Project Conditions
PM Peak Hour

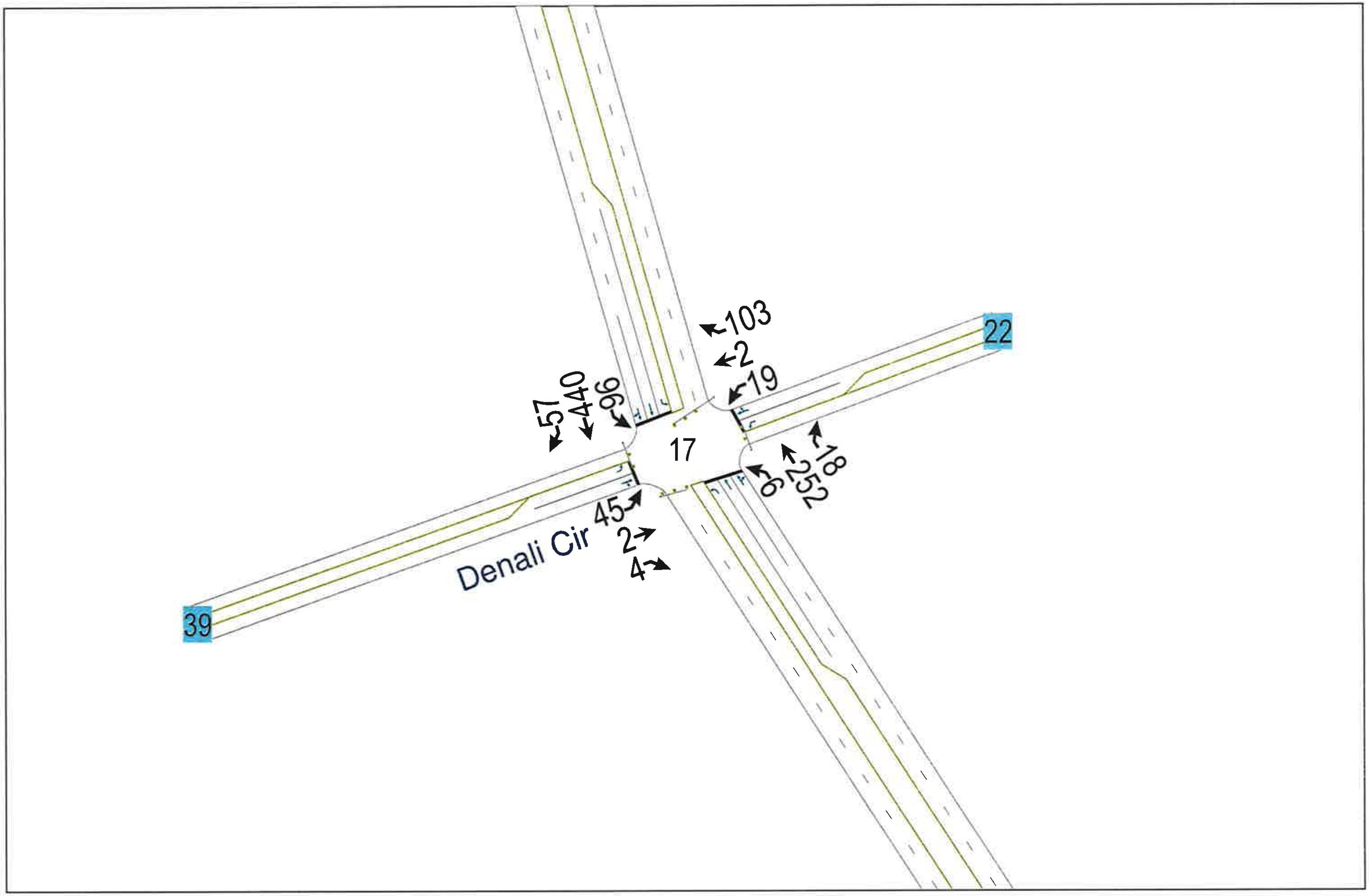



87
Big Horn Blvd
59
23
60
2
Lotz Pkwy
100
310
53
18
62
172
12
44
18
2
Denali Circle
Big Horn Blvd
90


Laguna Springs Drive
65
57
3
2
16
15
6
0
Lotz Pkwy
19
Lotz Pkwy
17
81
9
6
0
29
87
6
Wolf Pack Lane

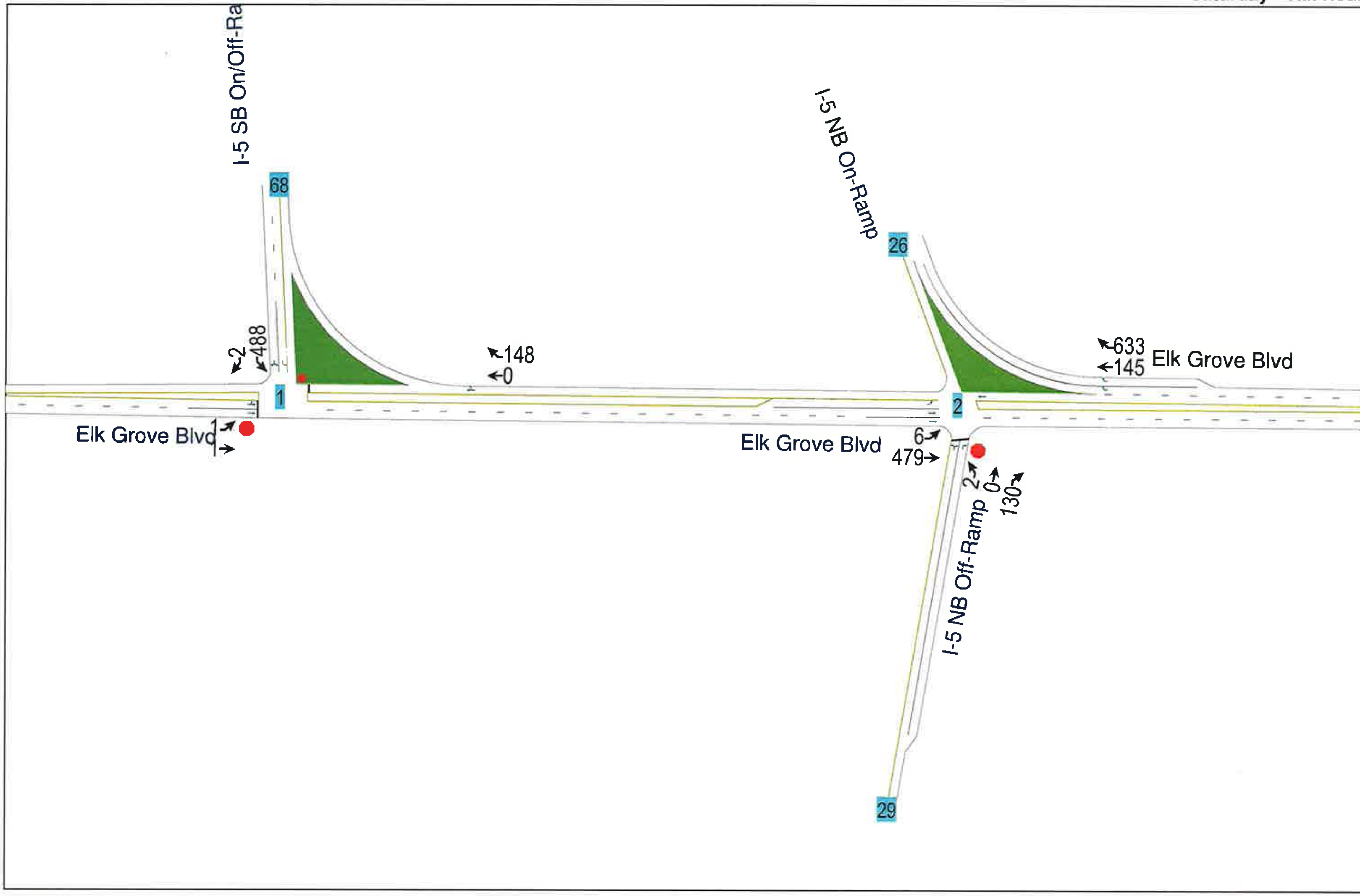

Bruceville Road
474
402
68
14
43
233
131
1
20
Whitelock Pkwy
1
322
194
37
21
104
246
52
Bruceville Road

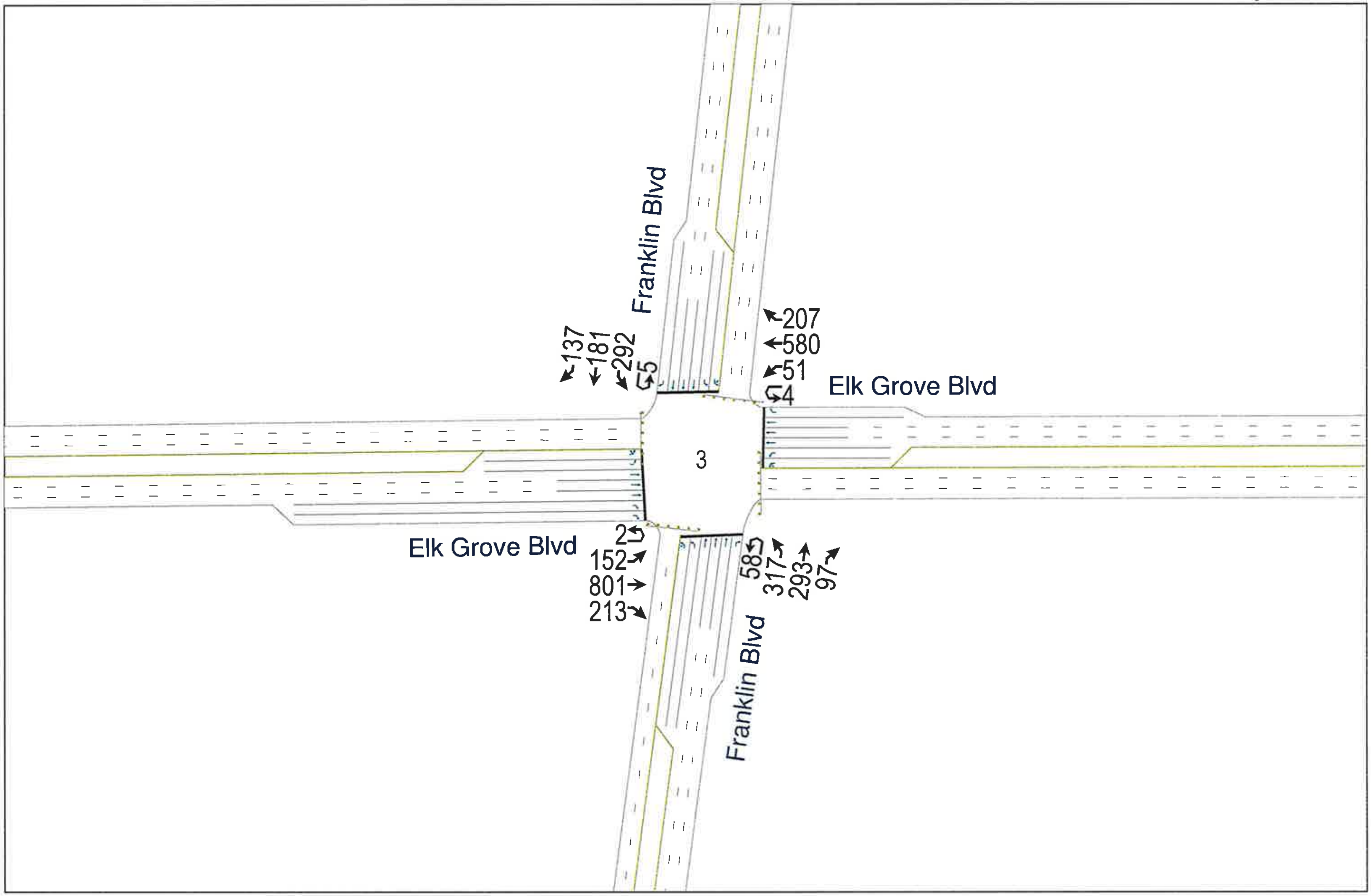

Big Horn Blvd
265
16
45
124
Whitelock Pkwy
21
204
66
Whitelock Pkwy


103
2
19
57
440
96
17
18
252
6
45
2
4
Denali Cir
22
39

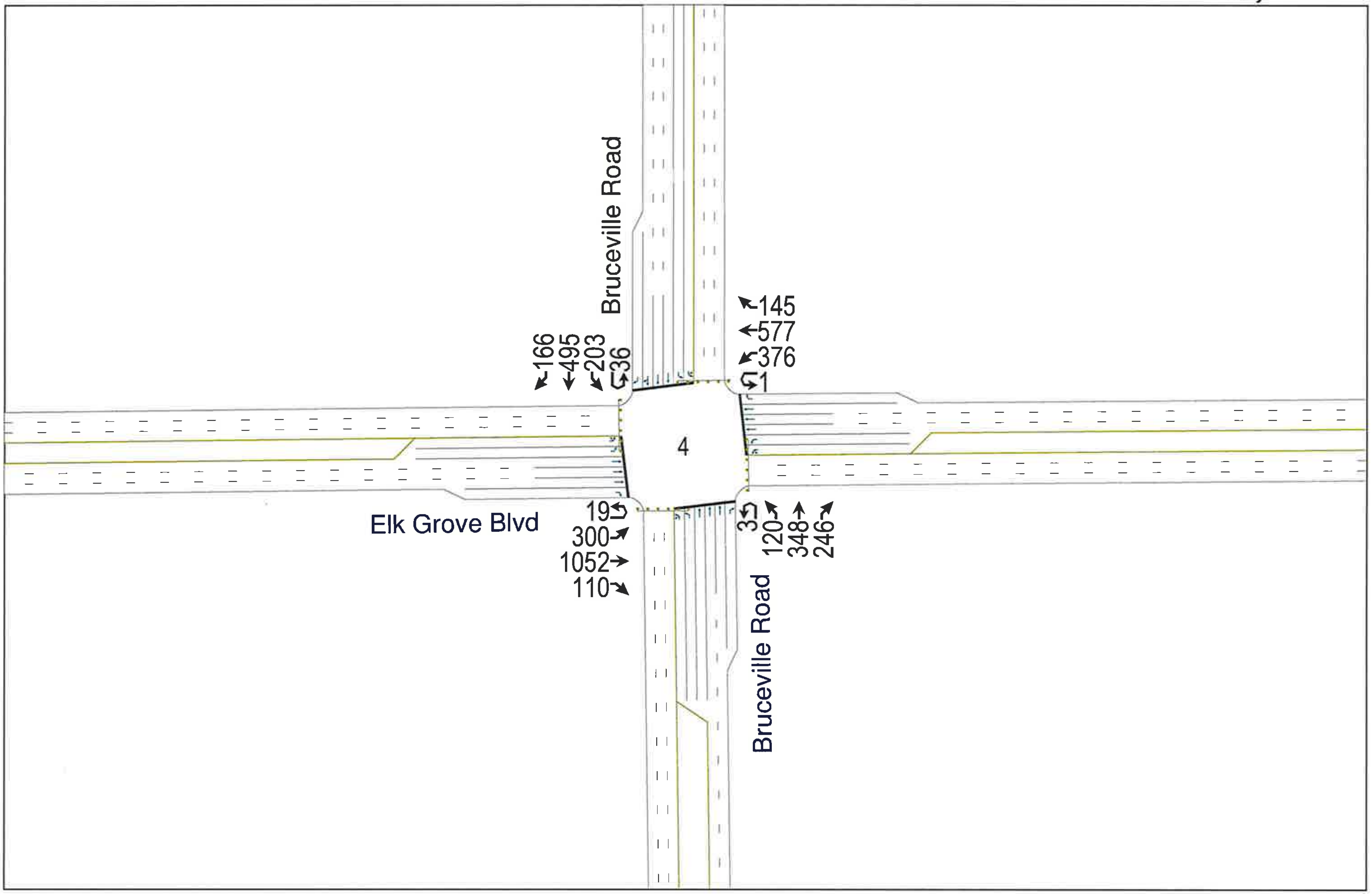
Elk Grove Civic Center Aquatics Complex

Existing Saturday Plus Project Conditions
Saturday Peak Hour



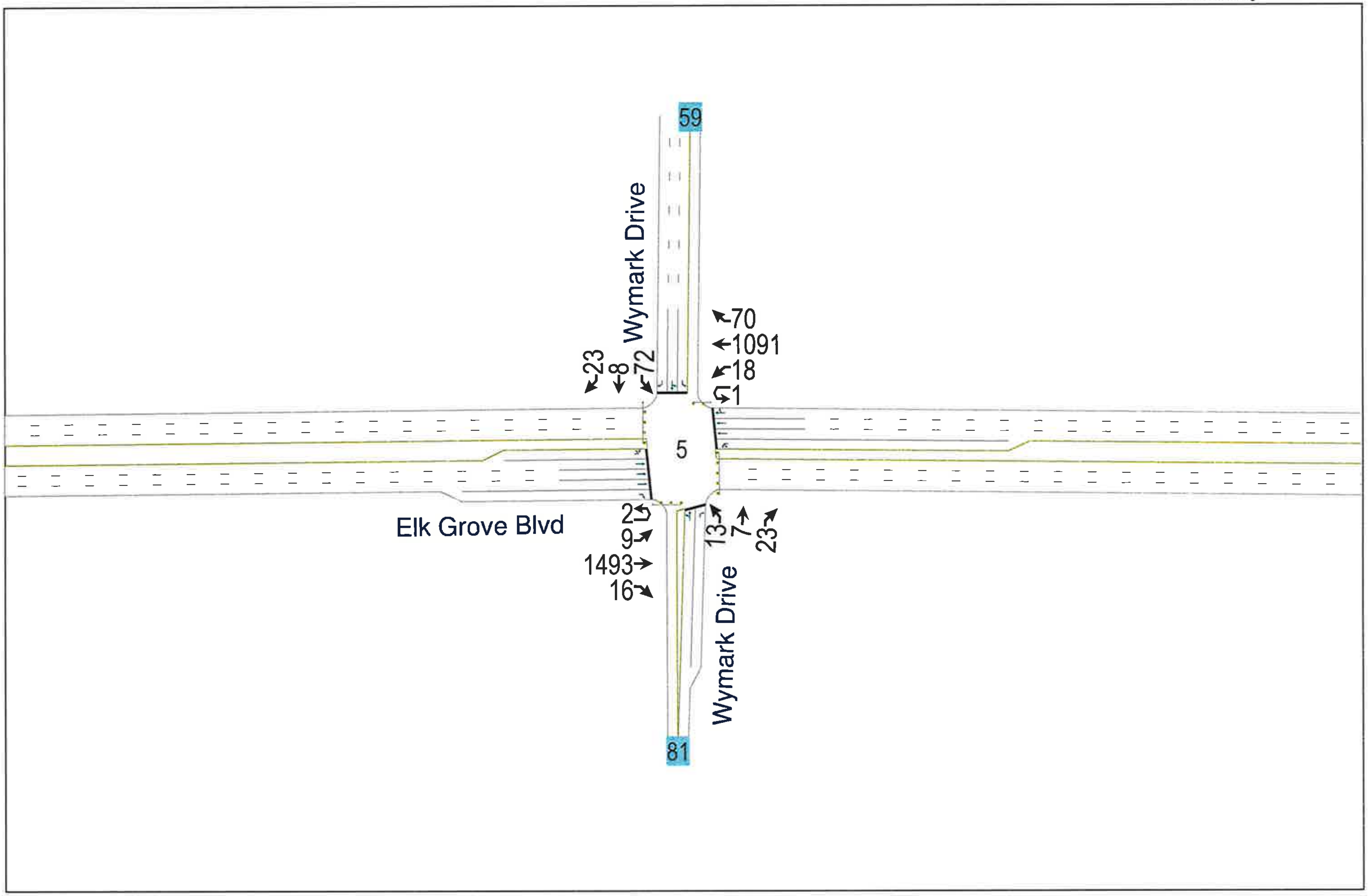

Franklin Blvd
137
181
292
5
207
580
51
4
Elk Grove Blvd
3
Elk Grove Blvd
2
152
801
213
58
317
293
97
Franklin Blvd

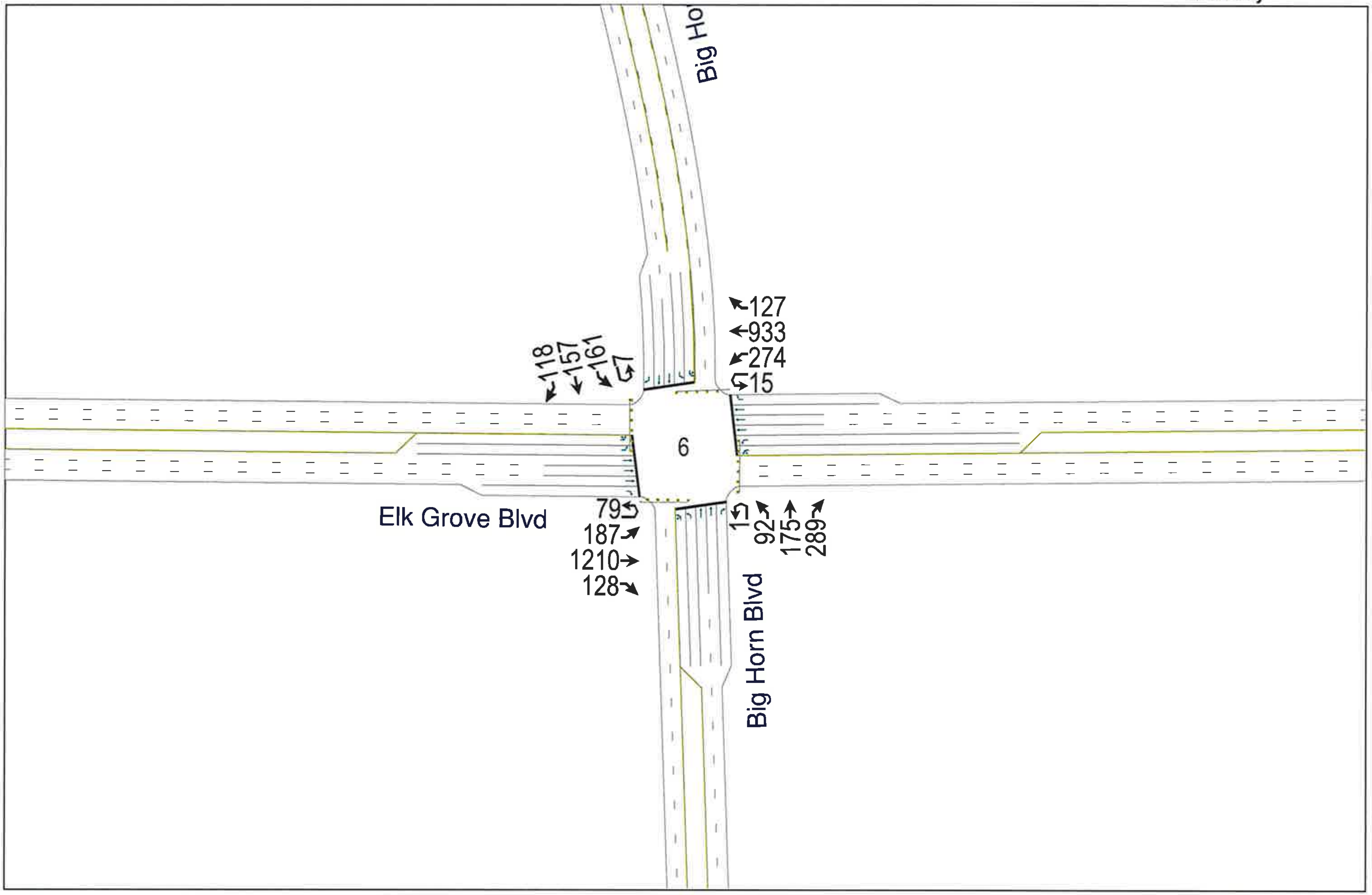
Existing Saturday Plus Project Conditions
Saturday Peak Hour

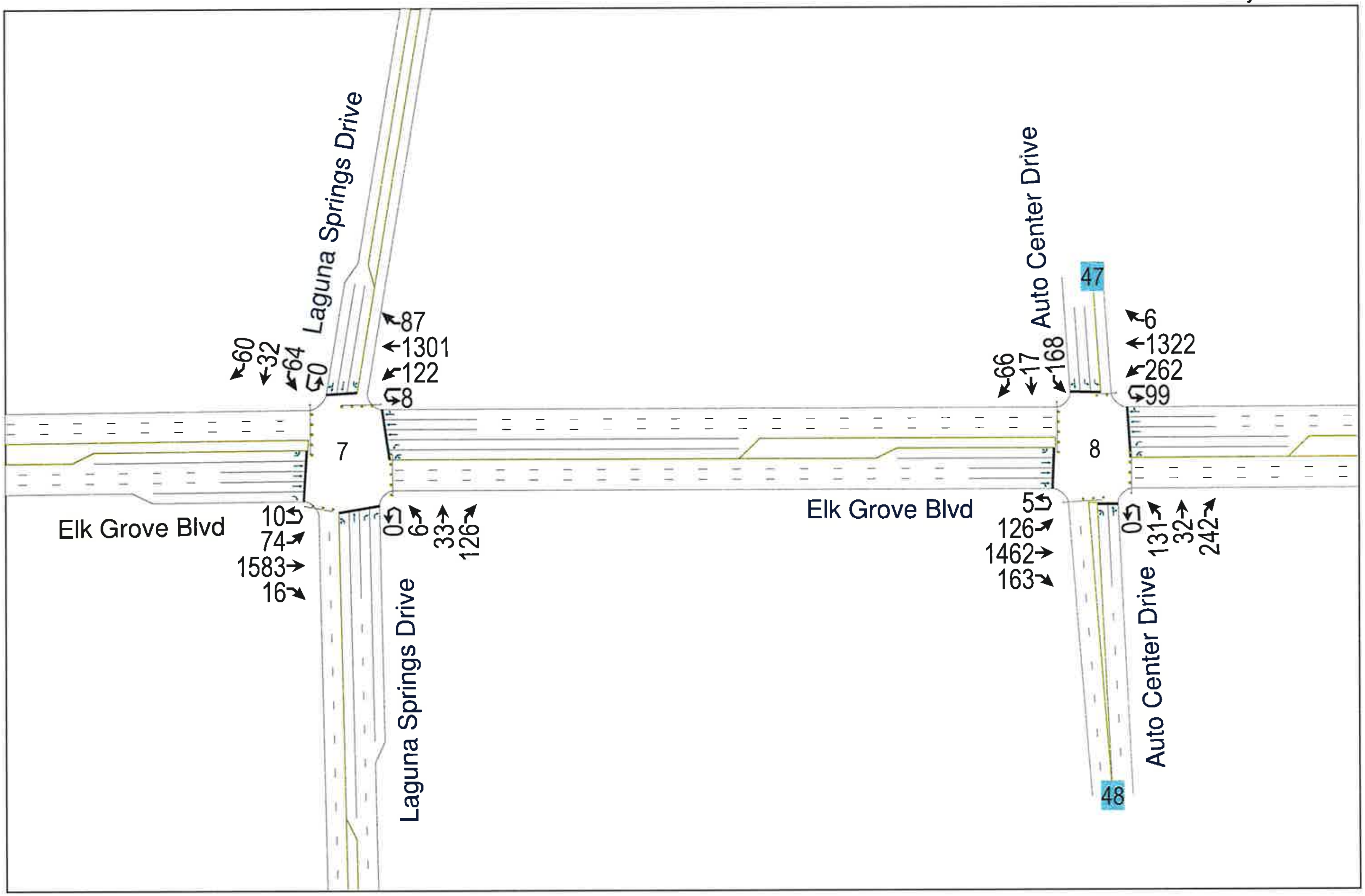


Elk Grove Civic Center Aquatics Complex

Existing Saturday Plus Project Conditions
Saturday Peak Hour

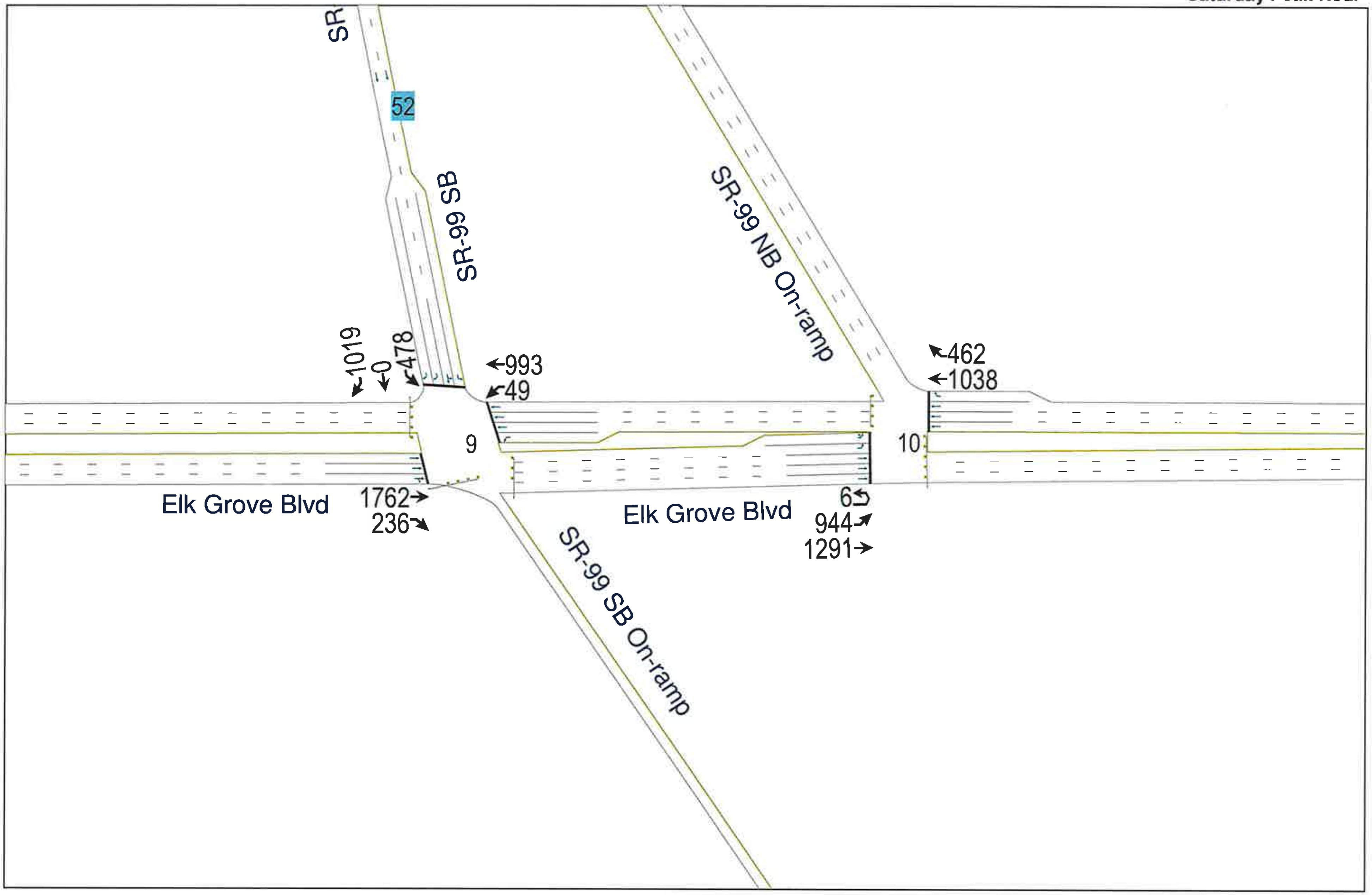


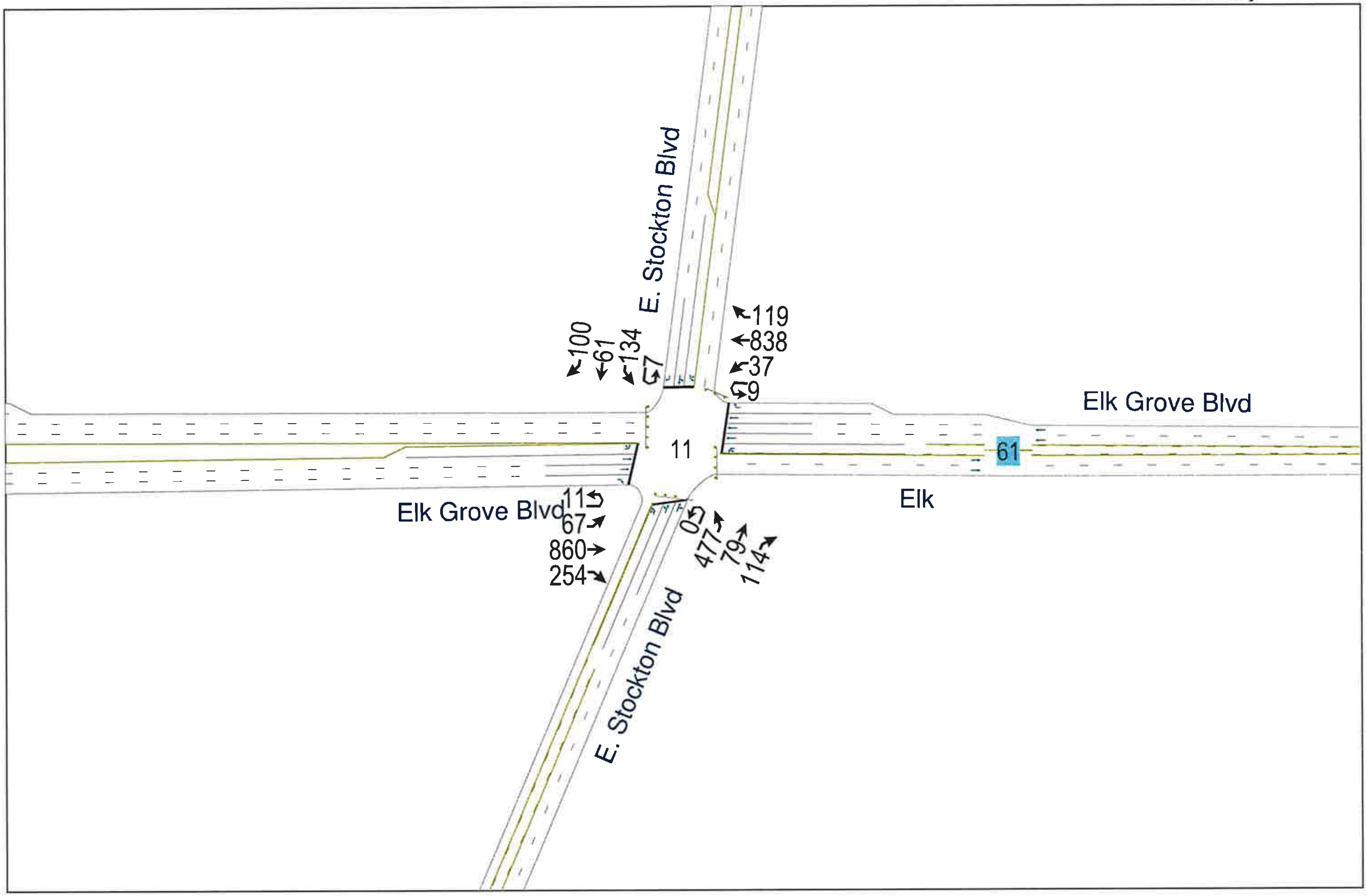

Big Ho
127
933
274
15
118
157
161
7
6
Elk Grove Blvd
79
187
1210
128
1
92
175
289
Big Horn Blvd

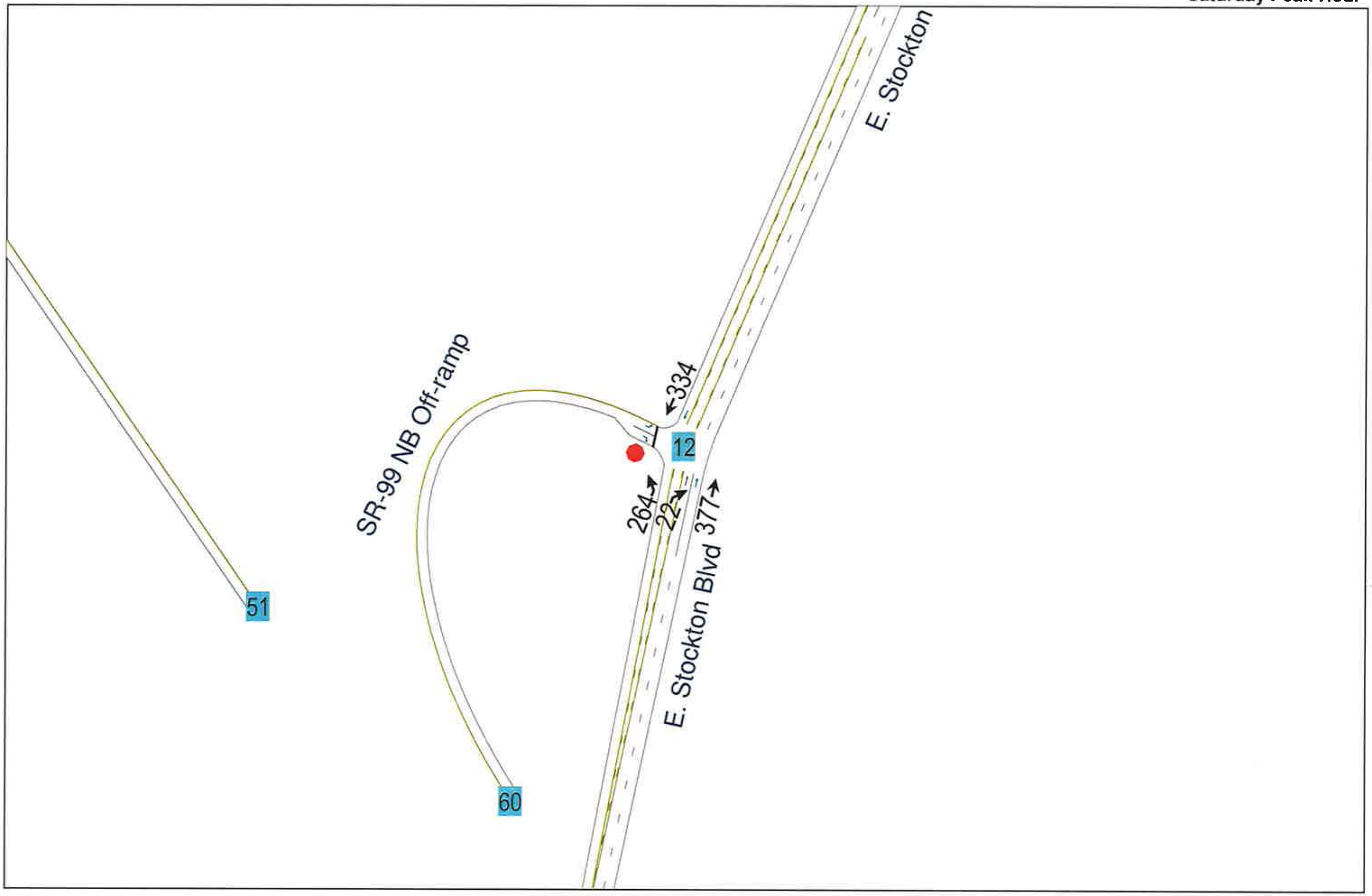

Laguna Springs Drive
60
32
64
0
87
1301
122
8
7
Elk Grove Blvd
10
74
1583
16
0
6
33
126
Laguna Springs Drive
Auto Center Drive
47
66
17
168
6
1322
262
99
8
Elk Grove Blvd
5
126
1462
163
0
131
32
242
Auto Center Drive
48

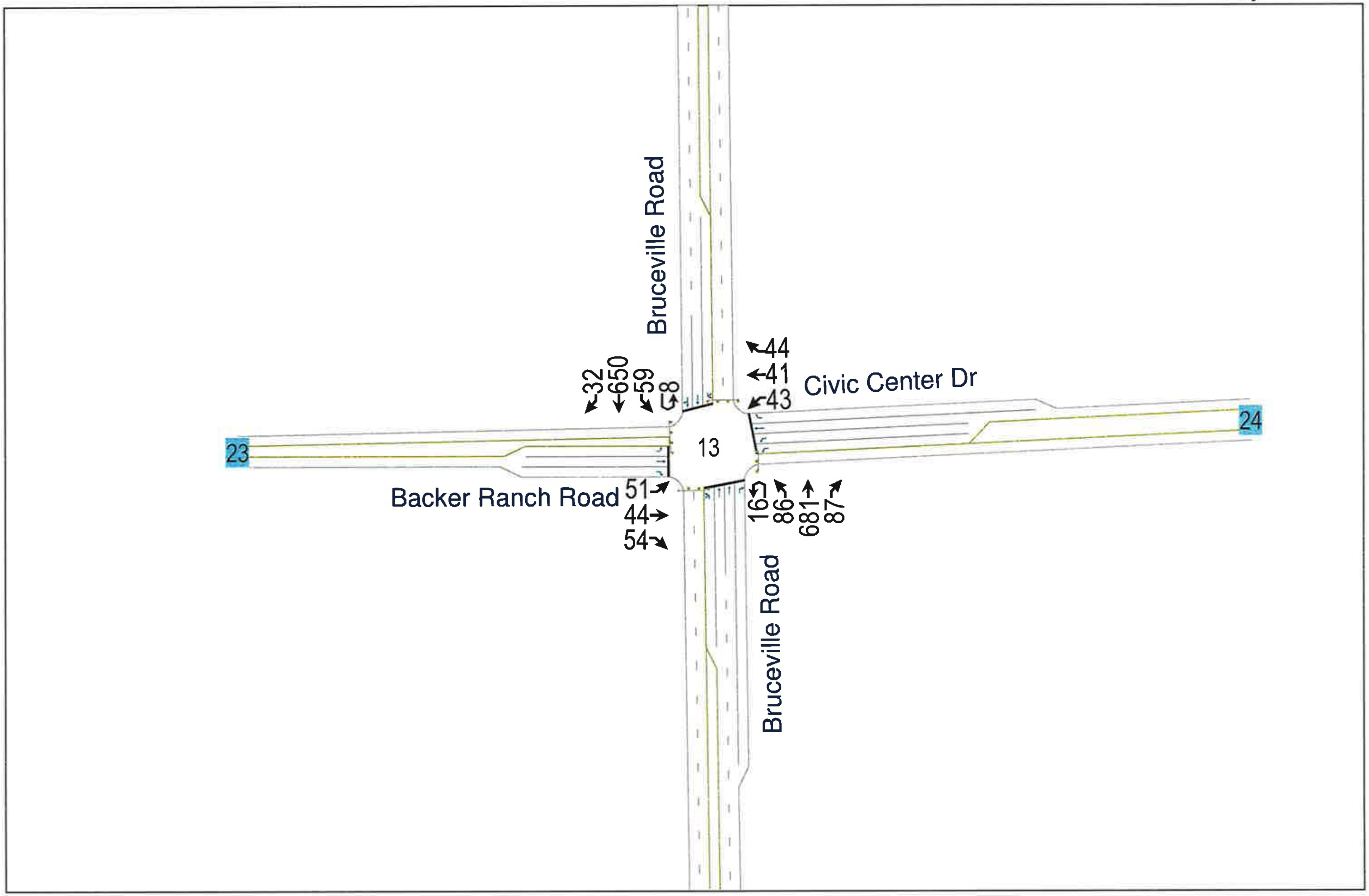
Elk Grove Civic Center Aquatics Complex

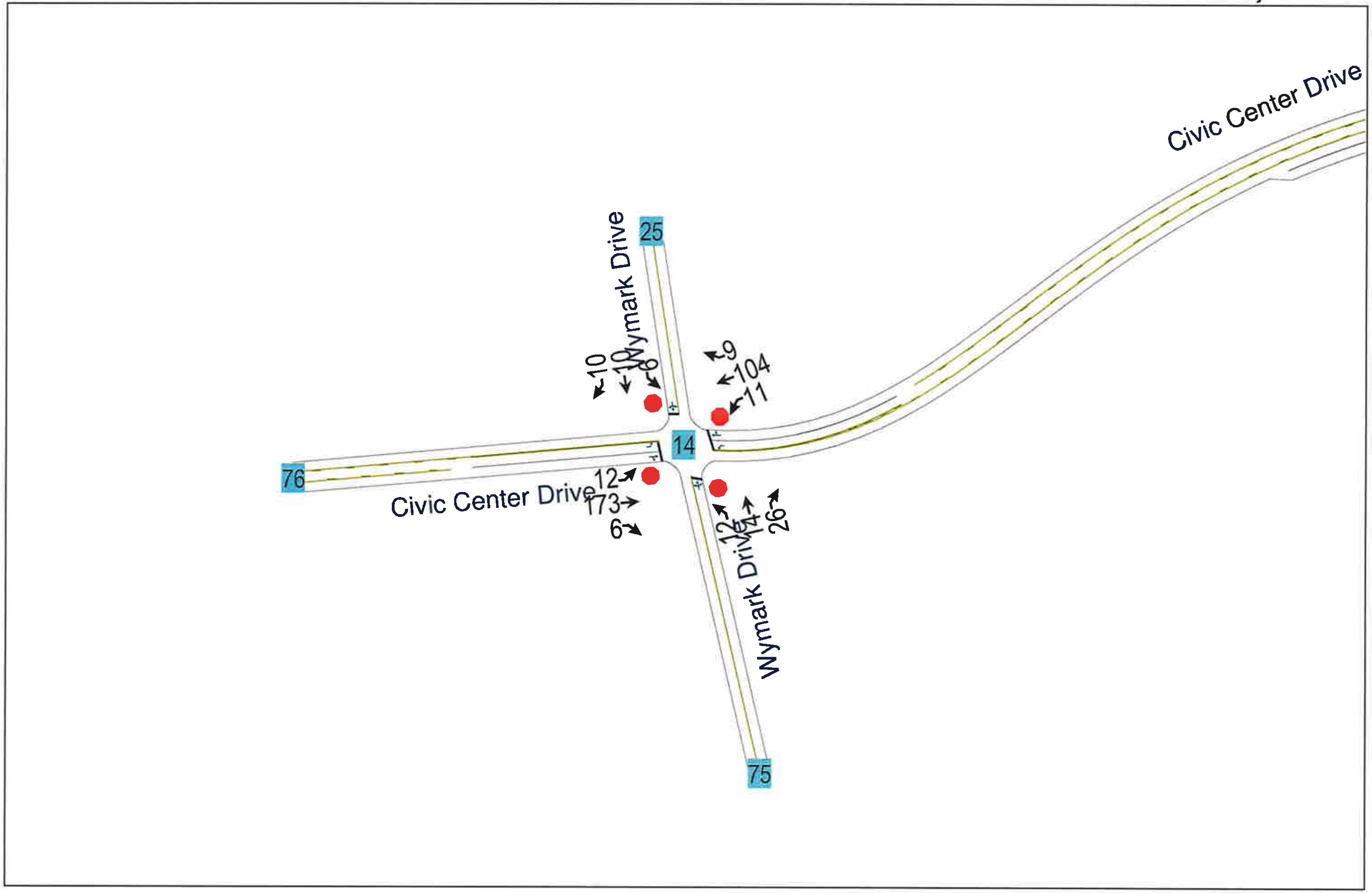
Existing Saturday Plus Project Conditions
Saturday Peak Hour

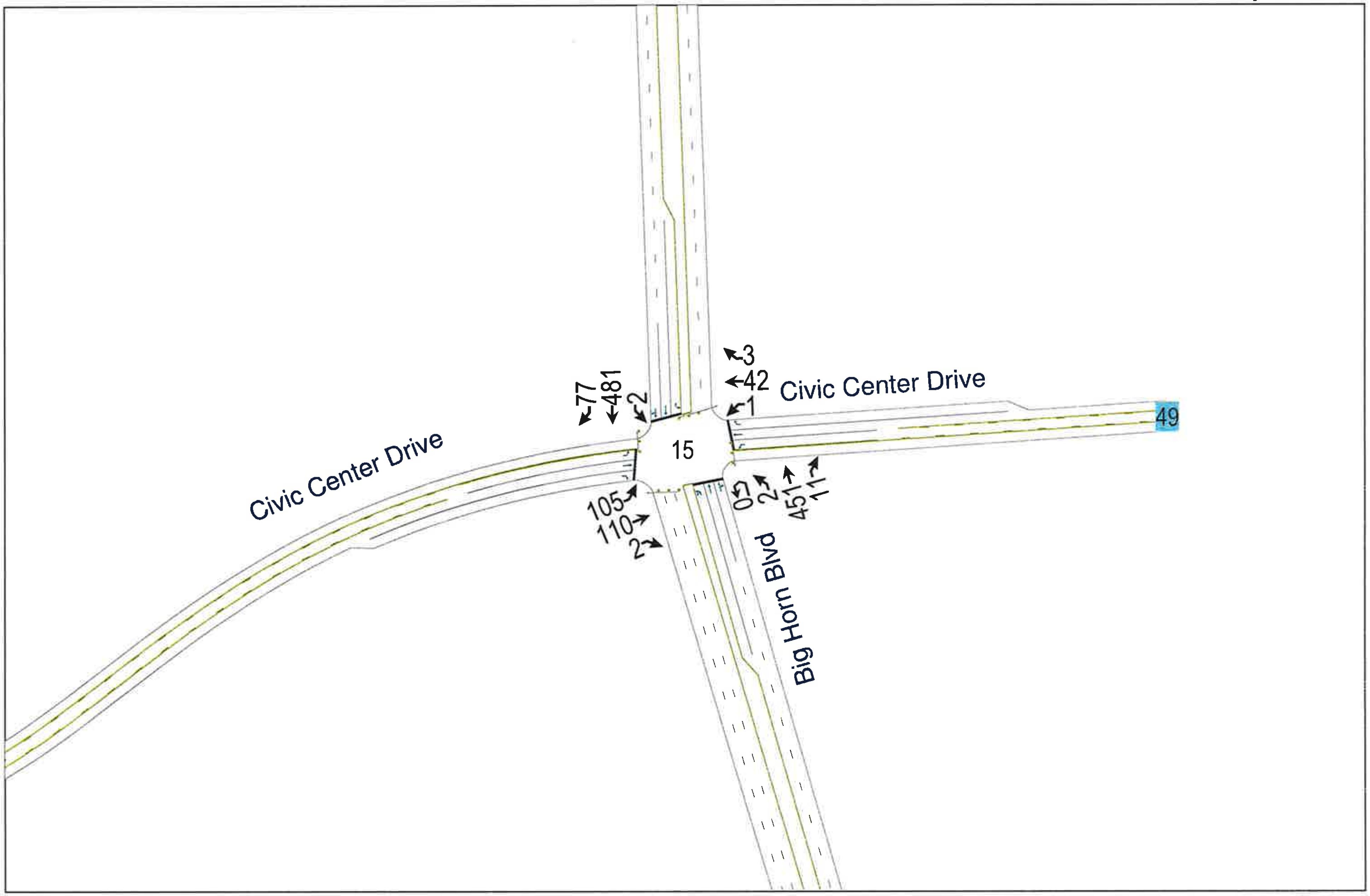


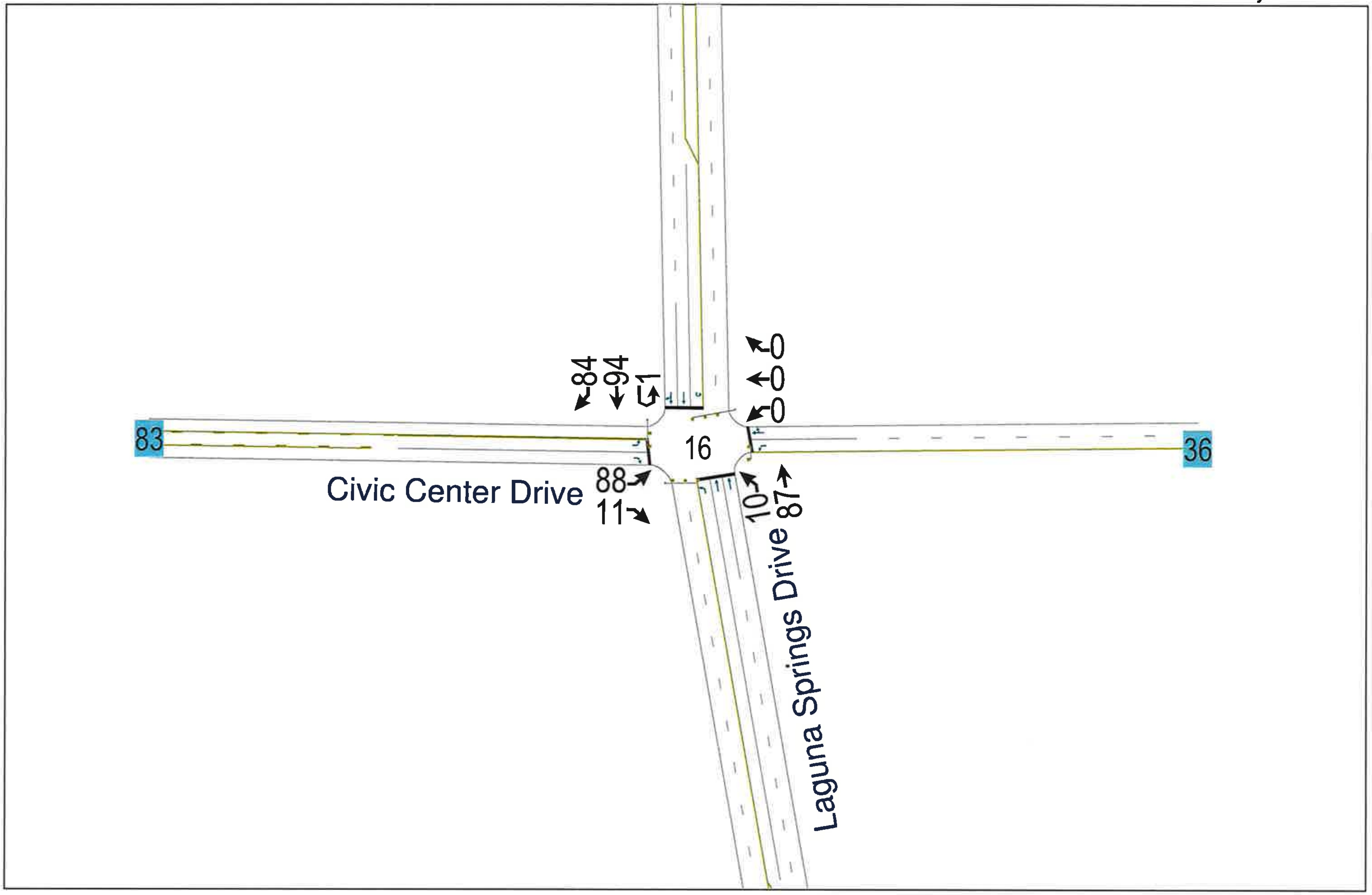

E. Stockton Blvd
119
838
37
9
100
61
134
7
11
61
Elk Grove Blvd
Elk
Elk Grove Blvd
11
67
860
254
0
477
79
114
E. Stockton Blvd

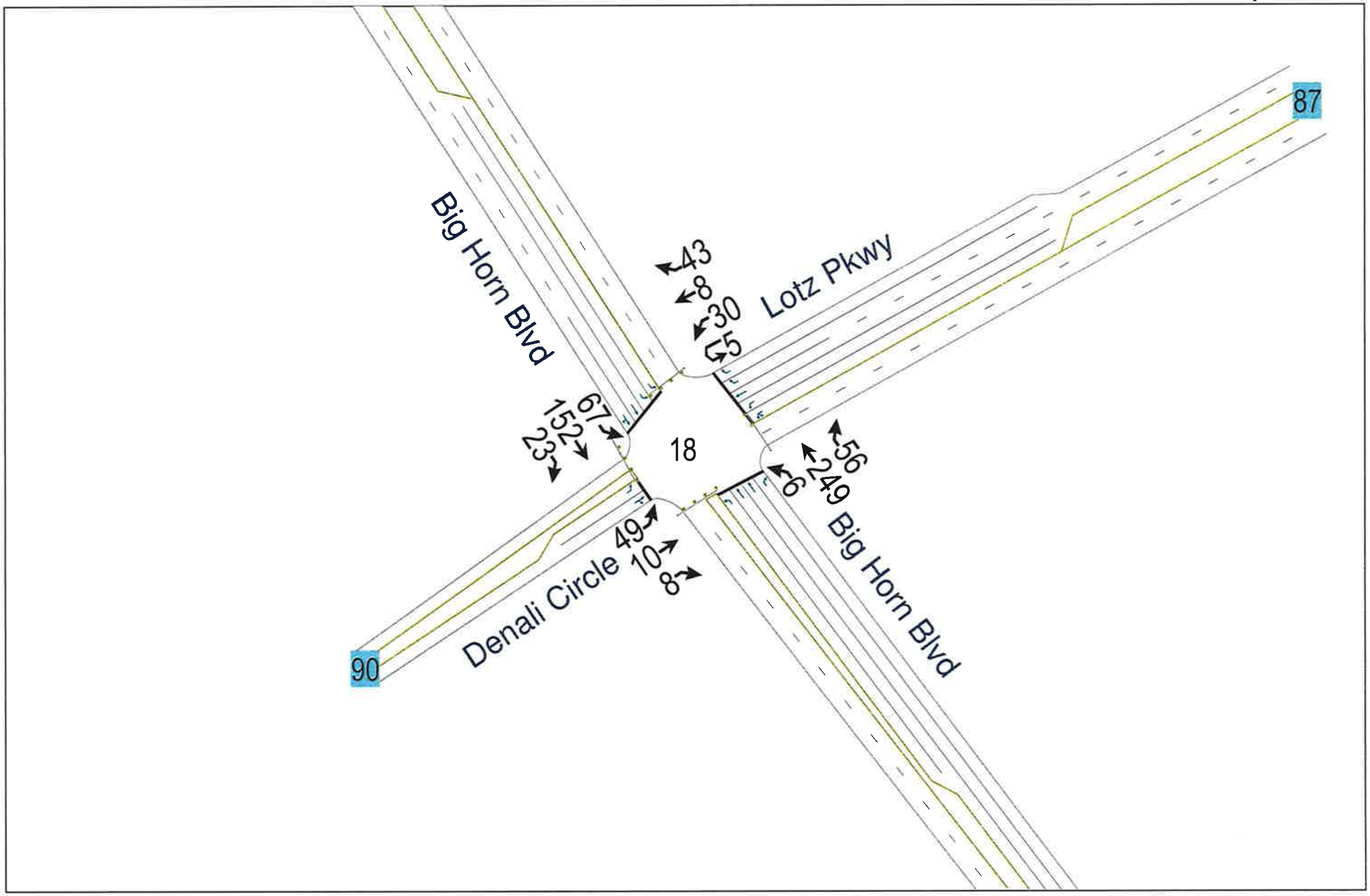

E. Stockton
334
12
264
22
377
E. Stockton Blvd
SR-99 NB Off-ramp
51
60

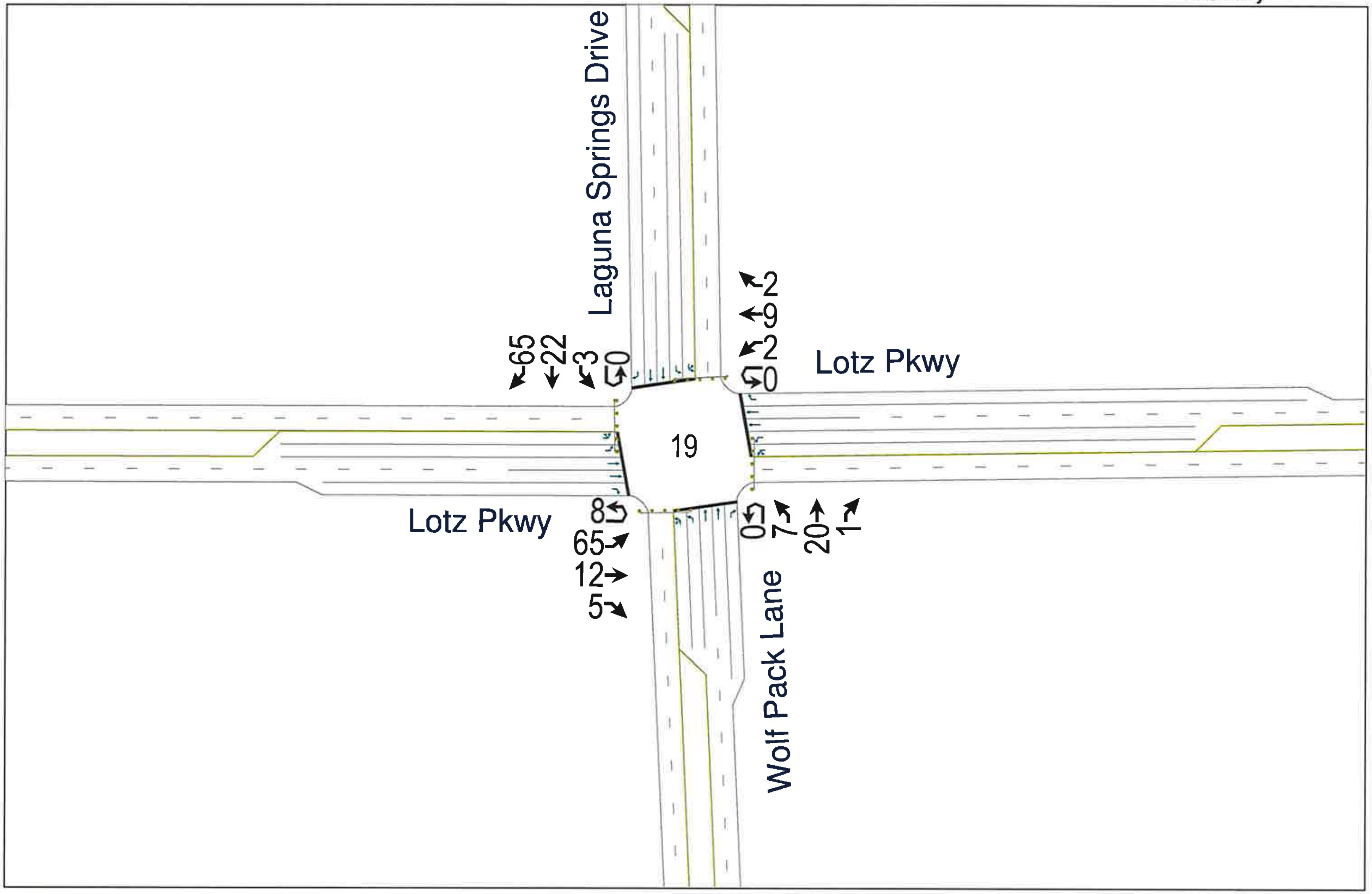

Bruceville Road
32
650
59
8
44
41
43
Civic Center Dr
23
13
24
Backer Ranch Road
51
44
54
16
86
681
87
Bruceville Road

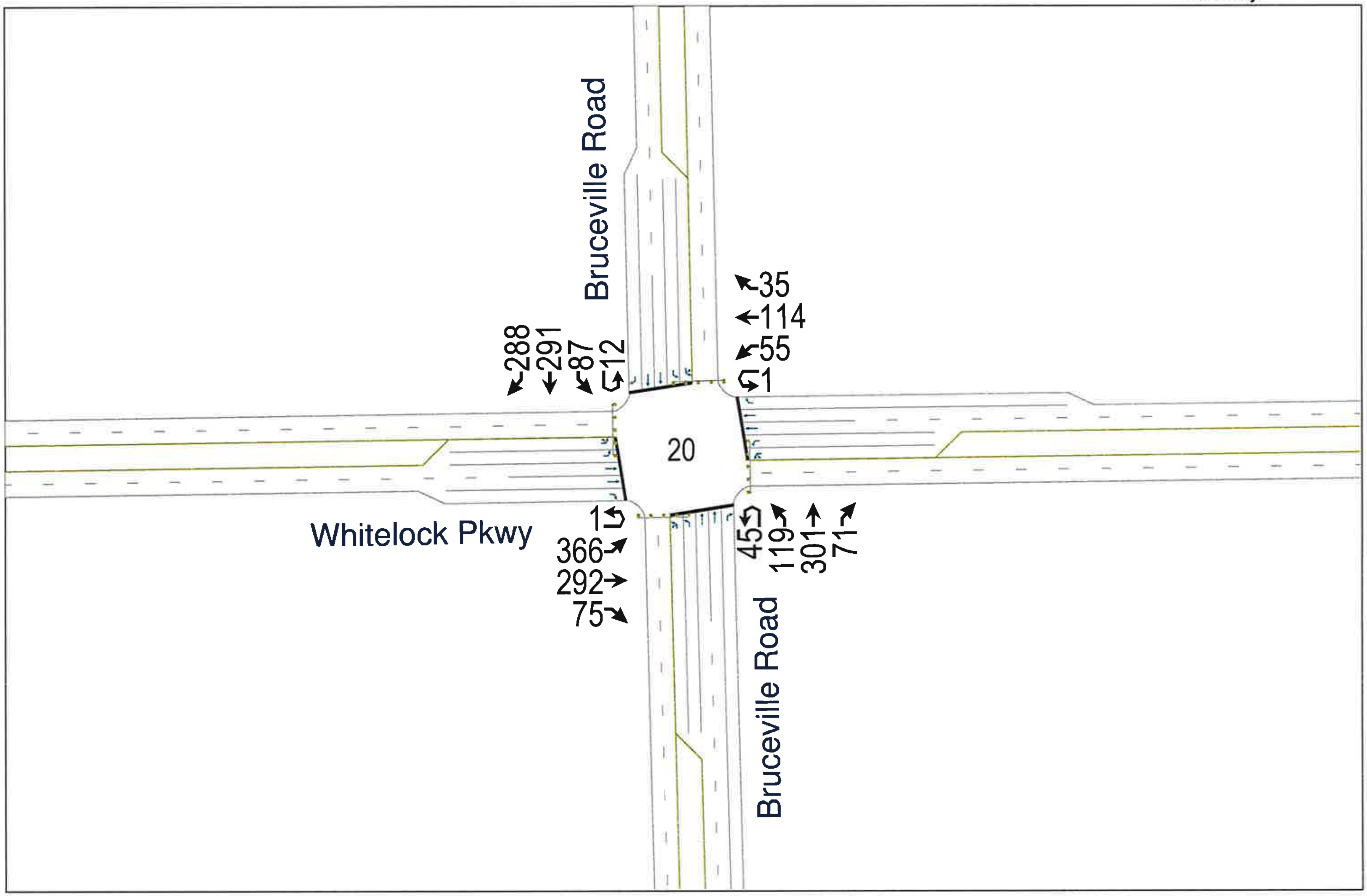

Civic Center Drive
Civic Center Drive
Wymark Drive
Wymark Drive
25
14
76
75
10
10
6
9
104
11
12
173
6
12
14
26

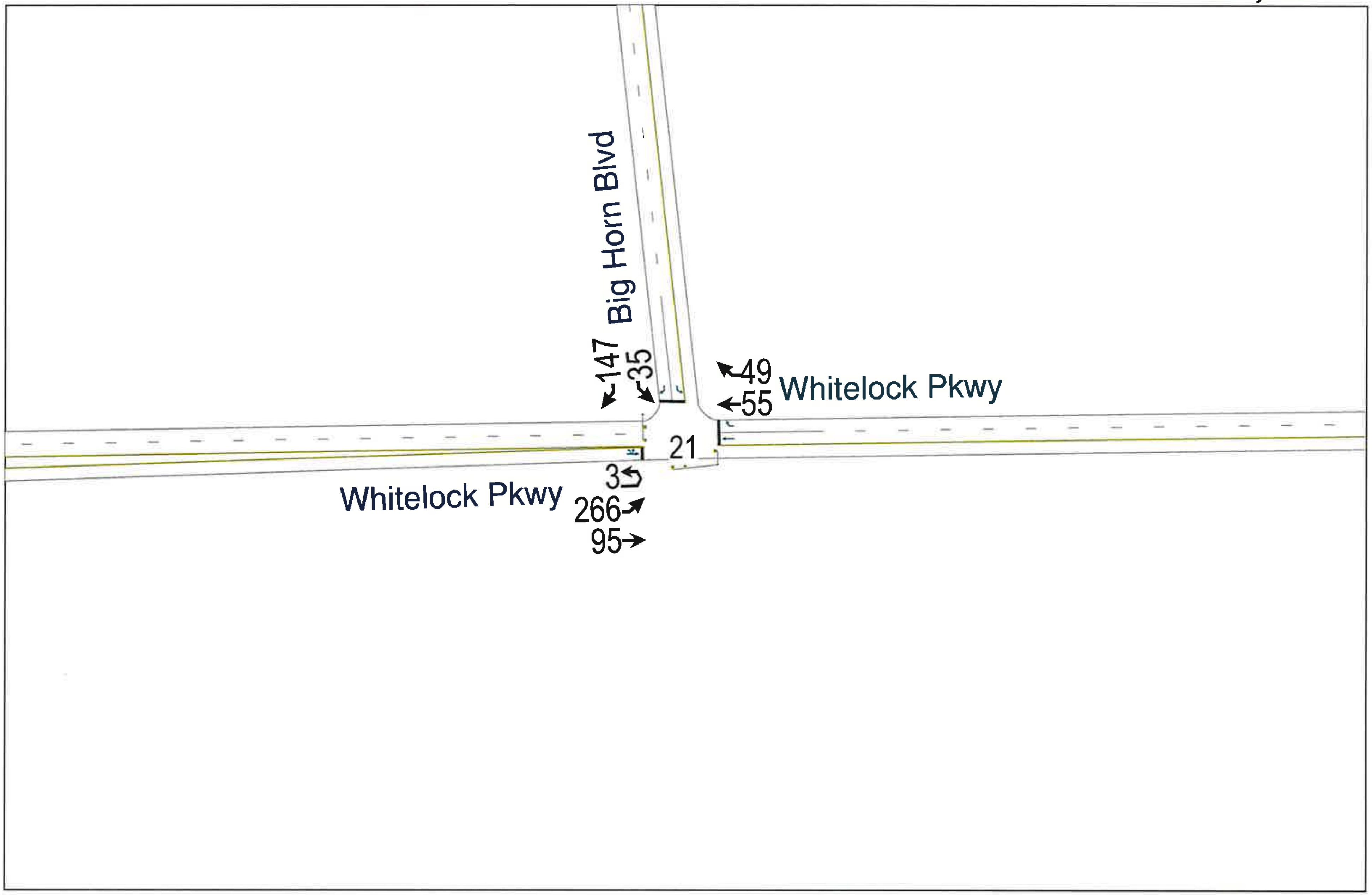

3
42
1
Civic Center Drive
49
77
481
2
15
Civic Center Drive
105
110
2
0
2
451
11
Big Horn Blvd

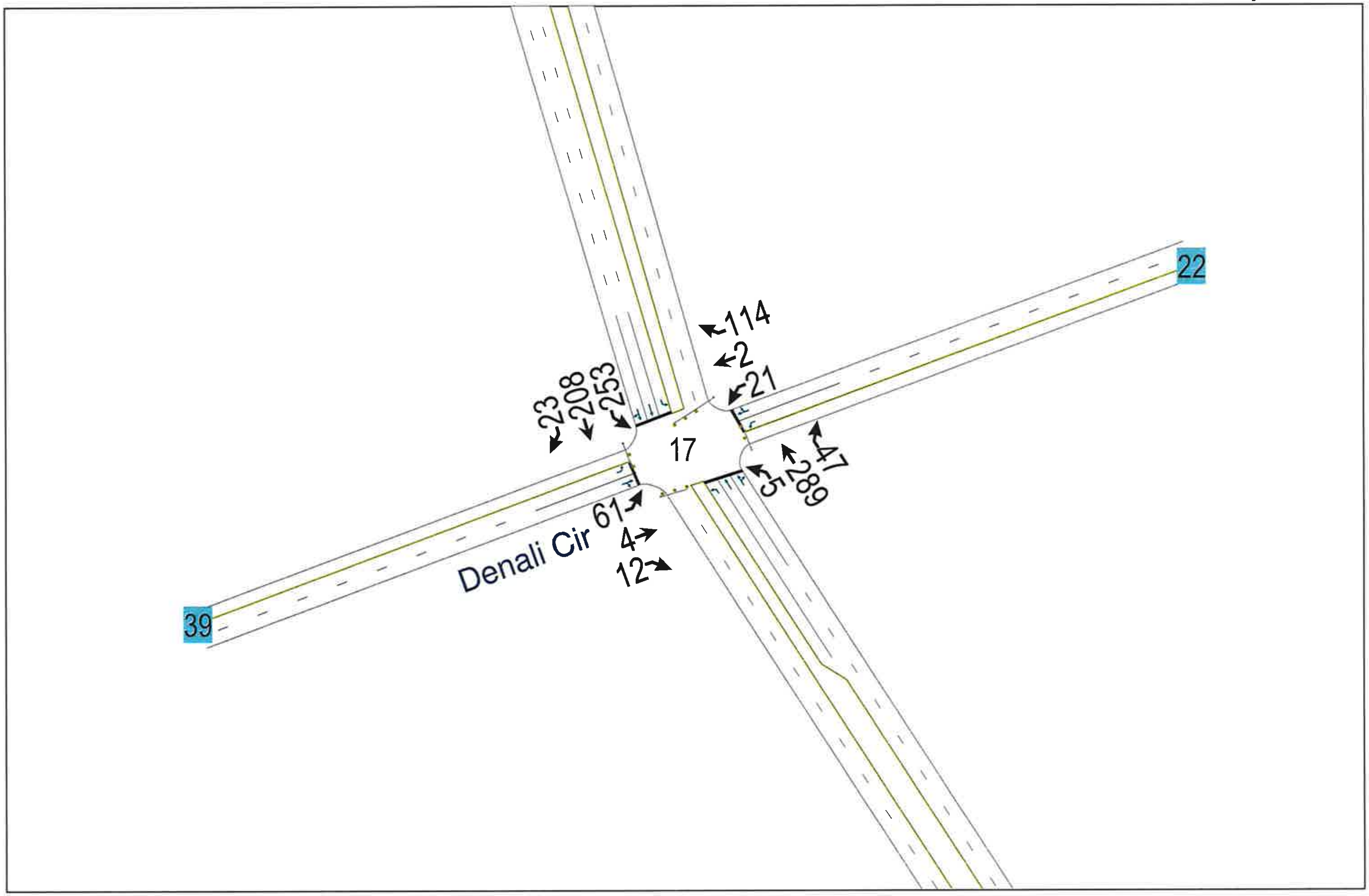

84
94
1
0
0
0
83
16
36
Civic Center Drive
88
11
10
87
Laguna Springs Drive


87
Big Horn Blvd
43
8
30
5
Lotz Pkwy
67
152
23
18
56
249
6
49
10
8
Denali Circle
Big Horn Blvd
90


Laguna Springs Drive
Lotz Pkwy
Lotz Pkwy
Wolf Pack Lane
19
65
22
3
0
2
9
2
0
8
65
12
5
0
7
20
1


Bruceville Road
288
291
87
12
35
114
55
1
20
Whitelock Pkwy
1
366
292
75
45
119
301
71
Bruceville Road


Big Horn Blvd
147
35
49
55
Whitelock Pkwy
21
3
266
95
Whitelock Pkwy


22
114
2
21
23
208
253
17
47
289
5
61
4
12
Denali Cir
39

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	1	11	5	106	1428	6
Sign Control		Stop	Stop		Free	
Grade		0%	0%		0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	1	12	5	112	1503	6
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	3012	3009	3013	0	0	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	3012	3009	3013	0	0	
tC, single (s)	7.1	6.7	6.5	6.2	4.1	
tC, 2 stage (s)						
tF (s)	3.5	4.2	4.0	3.3	2.2	
p0 queue free %	0	0	0	90	7	
cM capacity (veh/h)	0	1	1	1085	1623	

Direction, Lane #	EB 1	EB 2	WB 1	SB 1	SB 2
Volume Total	5	8	117	1002	507
Volume Left	1	0	0	1002	501
Volume Right	0	0	112	0	6
cSH	0	1	21	1623	1623
Volume to Capacity	Err	8.96	5.45	0.93	0.93
Queue Length 95th (ft)	Err	Err	Err	435	435
Control Delay (s)	Err	Err	Err	25.2	25.2
Lane LOS	F	F	F	D	D
Approach Delay (s)	Err		Err	25.2	
Approach LOS	F		F		

Intersection Summary			
Average Delay	Err		
Intersection Capacity Utilization	54.4%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	7	1432	0	0	110	534	1	0	224	0	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	7	1476	0	0	113	551	1	0	231	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)									17			
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	113			1476			1604	1604	738	981	1604	113
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	113			1476			1604	1604	738	981	1604	113
tC, single (s)	4.7			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.5			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			100			99	100	36	100	100	100
cM capacity (veh/h)	1297			452			70	104	360	73	104	918

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1
Volume Total	7	738	738	113	275	275	232
Volume Left	7	0	0	0	0	0	1
Volume Right	0	0	0	0	275	275	231
cSH	1297	1700	1700	1700	1700	1700	362
Volume to Capacity	0.01	0.43	0.43	0.07	0.16	0.16	0.64
Queue Length 95th (ft)	0	0	0	0	0	0	106
Control Delay (s)	7.8	0.0	0.0	0.0	0.0	0.0	31.3
Lane LOS	A						D
Approach Delay (s)	0.0			0.0			31.3
Approach LOS							D

Intersection Summary			
Average Delay	3.1		
Intersection Capacity Utilization	55.5%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Lane Configurations												
Volume (vph)	3	184	1343	537	1	80	776	291	122	345	257	88
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.6	6.8	6.8		5.6	7.2	7.2		5.6	7.2	7.2
Lane Util. Factor		0.97	0.91	0.88		0.97	0.91	1.00		0.97	0.91	1.00
Frpb, ped/bikes		1.00	1.00	0.98		1.00	1.00	0.98		1.00	1.00	0.98
Flpb, ped/bikes		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00
Frt		1.00	1.00	0.85		1.00	1.00	0.85		1.00	1.00	0.85
Flt Protected		0.95	1.00	1.00		0.95	1.00	1.00		0.95	1.00	1.00
Satd. Flow (prot)		3433	5085	2726		3433	5085	1560		3433	5085	1559
Flt Permitted		0.95	1.00	1.00		0.95	1.00	1.00		0.95	1.00	1.00
Satd. Flow (perm)		3433	5085	2726		3433	5085	1560		3433	5085	1559
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	3	200	1460	584	1	87	843	316	133	375	279	96
RTOR Reduction (vph)	0	0	0	336	0	0	0	191	0	0	0	80
Lane Group Flow (vph)	0	203	1460	248	0	88	843	125	0	508	279	16
Confl. Peds. (#/hr)								3				4
Confl. Bikes (#/hr)				2								
Turn Type	Prot	Prot		Perm	Prot	Prot		Perm	Prot	Prot		Perm
Protected Phases	1	1	6		5	5	2		3	3	8	
Permitted Phases				6				2				8
Actuated Green, G (s)		11.5	51.0	51.0		7.5	46.6	46.6		22.1	20.4	20.4
Effective Green, g (s)		11.5	51.0	51.0		7.5	46.6	46.6		22.1	20.4	20.4
Actuated g/C Ratio		0.10	0.42	0.42		0.06	0.39	0.39		0.18	0.17	0.17
Clearance Time (s)		5.6	6.8	6.8		5.6	7.2	7.2		5.6	7.2	7.2
Vehicle Extension (s)		2.0	2.0	2.0		2.0	2.0	2.0		2.0	2.0	2.0
Lane Grp Cap (vph)		329	2161	1159		215	1975	606		632	864	265
v/s Ratio Prot		c0.06	c0.29			0.03	0.17			c0.15	0.05	
v/s Ratio Perm				0.09				0.08				0.01
v/c Ratio		0.62	0.68	0.21		0.41	0.43	0.21		0.80	0.32	0.06
Uniform Delay, d1		52.1	27.8	21.8		54.1	26.9	24.4		46.9	43.7	41.8
Progression Factor		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2		2.4	1.7	0.4		0.5	0.7	0.8		6.9	0.1	0.0
Delay (s)		54.6	29.5	22.2		54.6	27.6	25.2		53.8	43.8	41.8
Level of Service		D	C	C		D	C	C		D	D	D
Approach Delay (s)			29.9				28.9				49.3	
Approach LOS			C				C				D	

Intersection Summary			
HCM Average Control Delay	37.9	HCM Level of Service	D
HCM Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	24.3
Intersection Capacity Utilization	83.4%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBU	SBL	SBT	SBR
Lane Configurations				
Volume (vph)	2	361	379	242
Ideal Flow (vphpl)	1900	1900	1900	1900
Total Lost time (s)		5.6	6.3	6.3
Lane Util. Factor		0.97	0.91	1.00
Frpb, ped/bikes		1.00	1.00	0.98
Flpb, ped/bikes		1.00	1.00	1.00
Frt		1.00	1.00	0.85
Flt Protected		0.95	1.00	1.00
Satd. Flow (prot)		3433	5085	1556
Flt Permitted		0.95	1.00	1.00
Satd. Flow (perm)		3433	5085	1556
Peak-hour factor, PHF	0.92	0.92	0.92	0.92
Adj. Flow (vph)	2	392	412	263
RTOR Reduction (vph)	0	0	0	230
Lane Group Flow (vph)	0	394	412	33
Confl. Peds. (#/hr)				
Confl. Bikes (#/hr)				3
Turn Type	Prot	Prot		Perm
Protected Phases	7	7	4	
Permitted Phases				4
Actuated Green, G (s)		15.9	15.1	15.1
Effective Green, g (s)		15.9	15.1	15.1
Actuated g/C Ratio		0.13	0.13	0.13
Clearance Time (s)		5.6	6.3	6.3
Vehicle Extension (s)		2.0	2.0	2.0
Lane Grp Cap (vph)		455	640	196
v/s Ratio Prot		0.11	c0.08	
v/s Ratio Perm				0.02
v/c Ratio		0.87	0.64	0.17
Uniform Delay, d1		51.0	49.9	46.8
Progression Factor		1.00	1.00	1.00
Incremental Delay, d2		15.3	1.7	0.1
Delay (s)		66.3	51.6	47.0
Level of Service		E	D	D
Approach Delay (s)			55.9	
Approach LOS			E	

Intersection Summary

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Lane Configurations												
Volume (vph)	26	292	1089	134	3	446	1117	228	5	125	353	183
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.6	6.0	6.0		5.6	6.0	6.0		5.6	5.7	5.7
Lane Util. Factor		0.97	0.91	1.00		0.97	0.91	1.00		0.97	0.91	1.00
Frpb, ped/bikes		1.00	1.00	0.99		1.00	1.00	0.99		1.00	1.00	0.98
Flpb, ped/bikes		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00
Frt		1.00	1.00	0.85		1.00	1.00	0.85		1.00	1.00	0.85
Flt Protected		0.95	1.00	1.00		0.95	1.00	1.00		0.95	1.00	1.00
Satd. Flow (prot)		3433	5085	1563		3433	5085	1562		3433	5085	1544
Flt Permitted		0.95	1.00	1.00		0.95	1.00	1.00		0.95	1.00	1.00
Satd. Flow (perm)		3433	5085	1563		3433	5085	1562		3433	5085	1544
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	27	304	1134	140	3	465	1164	238	5	130	368	191
RTOR Reduction (vph)	0	0	0	70	0	0	0	111	0	0	0	160
Lane Group Flow (vph)	0	331	1134	70	0	468	1164	127	0	135	368	31
Confl. Peds. (#/hr)				1				1				6
Confl. Bikes (#/hr)								1				5
Turn Type	Prot	Prot		Perm	Prot	Prot		Perm	Prot	Prot		Perm
Protected Phases	1	1	6		5	5	2		3	3	8	
Permitted Phases				6				2				8
Actuated Green, G (s)		15.9	43.9	43.9		20.7	48.7	48.7		9.1	19.6	19.6
Effective Green, g (s)		15.9	43.9	43.9		20.7	48.7	48.7		9.1	19.6	19.6
Actuated g/C Ratio		0.13	0.37	0.37		0.17	0.41	0.41		0.08	0.16	0.16
Clearance Time (s)		5.6	6.0	6.0		5.6	6.0	6.0		5.6	5.7	5.7
Vehicle Extension (s)		2.0	2.0	2.0		2.0	2.0	2.0		2.0	2.0	2.0
Lane Grp Cap (vph)		455	1860	572		592	2064	634		260	831	252
v/s Ratio Prot		0.10	c0.22			c0.14	c0.23			0.04	0.07	
v/s Ratio Perm				0.04				0.08				0.02
v/c Ratio		0.73	0.61	0.12		0.79	0.56	0.20		0.52	0.44	0.12
Uniform Delay, d1		50.0	31.1	25.3		47.6	27.5	23.1		53.3	45.3	42.9
Progression Factor		1.00	1.00	1.00		1.12	0.43	0.48		1.00	1.00	1.00
Incremental Delay, d2		4.9	1.5	0.4		5.6	0.9	0.6		0.7	0.1	0.1
Delay (s)		54.8	32.6	25.7		58.8	12.6	11.6		54.1	45.4	42.9
Level of Service		D	C	C		E	B	B		D	D	D
Approach Delay (s)			36.6				24.1				46.4	
Approach LOS			D				C				D	

Intersection Summary			
HCM Average Control Delay	37.1	HCM Level of Service	D
HCM Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	28.9
Intersection Capacity Utilization	83.6%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBU	SBL	SBT	SBR
Lane Configurations				
Volume (vph)	46	215	728	224
Ideal Flow (vphpl)	1900	1900	1900	1900
Total Lost time (s)		5.6	5.7	5.7
Lane Util. Factor		0.97	0.86	0.86
Frpb, ped/bikes		1.00	1.00	0.98
Flpb, ped/bikes		1.00	1.00	1.00
Frt		1.00	1.00	0.85
Flt Protected		0.95	1.00	1.00
Satd. Flow (prot)		3433	4782	1340
Flt Permitted		0.95	1.00	1.00
Satd. Flow (perm)		3433	4782	1340
Peak-hour factor, PHF	0.96	0.96	0.96	0.96
Adj. Flow (vph)	48	224	758	233
RTOR Reduction (vph)	0	0	2	169
Lane Group Flow (vph)	0	272	779	41
Confl. Peds. (#/hr)				3
Confl. Bikes (#/hr)				1
Turn Type	Prot	Prot		Perm
Protected Phases	7	7	4	
Permitted Phases				4
Actuated Green, G (s)		12.9	23.4	23.4
Effective Green, g (s)		12.9	23.4	23.4
Actuated g/C Ratio		0.11	0.19	0.19
Clearance Time (s)		5.6	5.7	5.7
Vehicle Extension (s)		2.0	2.0	2.0
Lane Grp Cap (vph)		369	932	261
v/s Ratio Prot		c0.08	c0.16	
v/s Ratio Perm				0.03
v/c Ratio		0.74	0.84	0.16
Uniform Delay, d1		51.9	46.4	40.1
Progression Factor		1.00	1.00	1.00
Incremental Delay, d2		6.5	6.3	0.1
Delay (s)		58.4	52.7	40.2
Level of Service		E	D	D
Approach Delay (s)			51.9	
Approach LOS			D	

Intersection Summary

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL
Lane Configurations												
Volume (vph)	1	13	1445	31	2	24	1872	118	18	8	47	54
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.7	6.7	6.7		5.6	6.7			5.6	5.6	5.6
Lane Util. Factor		1.00	0.91	1.00		1.00	0.91			1.00	1.00	0.95
Frpb, ped/bikes		1.00	1.00	0.97		1.00	1.00			1.00	0.99	1.00
Flpb, ped/bikes		1.00	1.00	1.00		1.00	1.00			1.00	1.00	1.00
Frt		1.00	1.00	0.85		1.00	0.99			1.00	0.85	1.00
Flt Protected		0.95	1.00	1.00		0.95	1.00			0.97	1.00	0.95
Satd. Flow (prot)		1770	5085	1543		1770	5031			1799	1561	1681
Flt Permitted		0.95	1.00	1.00		0.95	1.00			0.97	1.00	0.95
Satd. Flow (perm)		1770	5085	1543		1770	5031			1799	1561	1681
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	1	14	1505	32	2	25	1950	123	19	8	49	56
RTOR Reduction (vph)	0	0	0	9	0	0	4	0	0	0	46	0
Lane Group Flow (vph)	0	15	1505	23	0	27	2069	0	0	27	3	32
Confl. Peds. (#/hr)				1				3			2	
Confl. Bikes (#/hr)				5				5				
Turn Type	Prot	Prot		Perm	Prot	Prot			Split		Perm	Split
Protected Phases	1	1	6		5	5	2		3	3		4
Permitted Phases				6							3	
Actuated Green, G (s)		2.7	76.9	76.9		4.5	77.6			7.4	7.4	7.7
Effective Green, g (s)		2.7	76.9	76.9		4.5	77.6			7.4	7.4	7.7
Actuated g/C Ratio		0.02	0.64	0.64		0.04	0.65			0.06	0.06	0.06
Clearance Time (s)		6.7	6.7	6.7		5.6	6.7			5.6	5.6	5.6
Vehicle Extension (s)		2.0	3.0	3.0		2.0	3.0			2.0	2.0	2.0
Lane Grp Cap (vph)		40	3259	989		66	3253			111	96	108
v/s Ratio Prot		0.01	0.30			c0.02	c0.41			c0.02		0.02
v/s Ratio Perm				0.02							0.00	
v/c Ratio		0.38	0.46	0.02		0.41	0.64			0.24	0.03	0.30
Uniform Delay, d1		57.8	11.0	7.9		56.5	12.7			53.6	52.9	53.6
Progression Factor		0.71	1.59	1.63		1.31	0.37			1.00	1.00	1.00
Incremental Delay, d2		1.7	0.4	0.0		1.2	0.8			0.4	0.0	0.6
Delay (s)		42.8	17.8	12.9		75.0	5.5			54.0	53.0	54.1
Level of Service		D	B	B		E	A			D	D	D
Approach Delay (s)			18.0				6.4			53.4		
Approach LOS			B				A			D		

Intersection Summary			
HCM Average Control Delay	13.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.8
Intersection Capacity Utilization	64.3%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBT	SBR
Lane Configurations		
Volume (vph)	9	9
Ideal Flow (vphpl)	1900	1900
Total Lost time (s)	5.6	5.6
Lane Util. Factor	0.95	1.00
Frpb, ped/bikes	1.00	0.98
Flpb, ped/bikes	1.00	1.00
Frt	1.00	0.85
Flt Protected	0.96	1.00
Satd. Flow (prot)	1708	1557
Flt Permitted	0.96	1.00
Satd. Flow (perm)	1708	1557
Peak-hour factor, PHF	0.96	0.96
Adj. Flow (vph)	9	9
RTOR Reduction (vph)	0	8
Lane Group Flow (vph)	33	1
Confl. Peds. (#/hr)		1
Confl. Bikes (#/hr)		1
Turn Type		Perm
Protected Phases	4	
Permitted Phases		4
Actuated Green, G (s)	7.7	7.7
Effective Green, g (s)	7.7	7.7
Actuated g/C Ratio	0.06	0.06
Clearance Time (s)	5.6	5.6
Vehicle Extension (s)	2.0	2.0
Lane Grp Cap (vph)	110	100
v/s Ratio Prot	c0.02	
v/s Ratio Perm		0.00
v/c Ratio	0.30	0.01
Uniform Delay, d1	53.6	52.6
Progression Factor	1.00	1.00
Incremental Delay, d2	0.6	0.0
Delay (s)	54.1	52.6
Level of Service	D	D
Approach Delay (s)	53.9	
Approach LOS	D	

Intersection Summary

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Lane Configurations												
Volume (vph)	64	135	1220	96	7	256	1574	197	1	116	108	237
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.7	5.7	5.7		6.7	5.7	5.7		6.3	5.3	5.3
Lane Util. Factor		0.97	0.91	1.00		0.97	0.91	1.00		0.97	0.95	1.00
Frpb, ped/bikes		1.00	1.00	0.98		1.00	1.00	0.99		1.00	1.00	0.98
Flpb, ped/bikes		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00
Frt		1.00	1.00	0.85		1.00	1.00	0.85		1.00	1.00	0.85
Flt Protected		0.95	1.00	1.00		0.95	1.00	1.00		0.95	1.00	1.00
Satd. Flow (prot)		3433	5085	1559		3433	5085	1562		3433	3539	1547
Flt Permitted		0.95	1.00	1.00		0.95	1.00	1.00		0.95	1.00	1.00
Satd. Flow (perm)		3433	5085	1559		3433	5085	1562		3433	3539	1547
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	67	141	1271	100	7	267	1640	205	1	121	112	247
RTOR Reduction (vph)	0	0	0	38	0	0	0	56	0	0	0	221
Lane Group Flow (vph)	0	208	1271	62	0	274	1640	149	0	122	112	26
Confl. Peds. (#/hr)				2								6
Confl. Bikes (#/hr)				2				4				2
Turn Type	Prot	Prot		Perm	Prot	Prot		Perm	Prot	Prot		Perm
Protected Phases	1	1	6		5	5	2		3	3	8	
Permitted Phases				6				2				8
Actuated Green, G (s)		11.6	59.1	59.1		13.3	60.8	60.8		8.7	12.6	12.6
Effective Green, g (s)		11.6	59.1	59.1		13.3	60.8	60.8		8.7	12.6	12.6
Actuated g/C Ratio		0.10	0.49	0.49		0.11	0.51	0.51		0.07	0.10	0.10
Clearance Time (s)		6.7	5.7	5.7		6.7	5.7	5.7		6.3	5.3	5.3
Vehicle Extension (s)		2.0	2.0	2.0		2.0	2.0	2.0		2.0	2.0	2.0
Lane Grp Cap (vph)		332	2504	768		380	2576	791		249	372	162
v/s Ratio Prot		0.06	0.25			c0.08	c0.32			0.04	0.03	
v/s Ratio Perm				0.04				0.10				0.02
v/c Ratio		0.63	0.51	0.08		0.72	0.64	0.19		0.49	0.30	0.16
Uniform Delay, d1		52.1	20.6	16.1		51.6	21.6	16.1		53.5	49.6	48.9
Progression Factor		1.20	0.71	1.48		1.50	0.38	0.11		1.00	1.00	1.00
Incremental Delay, d2		2.5	0.7	0.2		4.2	0.9	0.4		0.6	0.2	0.2
Delay (s)		65.0	15.2	24.0		81.5	9.0	2.2		54.1	49.8	49.1
Level of Service		E	B	C		F	A	A		D	D	D
Approach Delay (s)			22.3				17.7				50.5	
Approach LOS			C				B				D	

Intersection Summary			
HCM Average Control Delay	26.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	75.7%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBU	SBL	SBT	SBR
Lane Configurations				
Volume (vph)	1	182	210	199
Ideal Flow (vphpl)	1900	1900	1900	1900
Total Lost time (s)		6.3	5.3	5.3
Lane Util. Factor		0.97	0.95	1.00
Frpb, ped/bikes		1.00	1.00	0.98
Flpb, ped/bikes		1.00	1.00	1.00
Frt		1.00	1.00	0.85
Flt Protected		0.95	1.00	1.00
Satd. Flow (prot)		3433	3539	1554
Flt Permitted		0.95	1.00	1.00
Satd. Flow (perm)		3433	3539	1554
Peak-hour factor, PHF	0.96	0.96	0.96	0.96
Adj. Flow (vph)	1	190	219	207
RTOR Reduction (vph)	0	0	0	176
Lane Group Flow (vph)	0	191	219	31
Confl. Peds. (#/hr)				6
Confl. Bikes (#/hr)				
Turn Type	Prot	Prot		Perm
Protected Phases	7	7	4	
Permitted Phases				4
Actuated Green, G (s)		11.0	14.9	14.9
Effective Green, g (s)		11.0	14.9	14.9
Actuated g/C Ratio		0.09	0.12	0.12
Clearance Time (s)		6.3	5.3	5.3
Vehicle Extension (s)		2.0	2.0	2.0
Lane Grp Cap (vph)		315	439	193
v/s Ratio Prot		c0.06	c0.06	
v/s Ratio Perm				0.02
v/c Ratio		0.61	0.50	0.16
Uniform Delay, d1		52.4	49.1	47.0
Progression Factor		1.00	1.00	1.00
Incremental Delay, d2		2.3	0.3	0.1
Delay (s)		54.7	49.4	47.1
Level of Service		D	D	D
Approach Delay (s)			50.3	
Approach LOS			D	

Intersection Summary

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Lane Configurations												
Volume (vph)	10	95	1447	27	3	140	1771	72	2	69	75	165
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.6	5.7	5.7		5.6	5.7			5.6	5.3	5.3
Lane Util. Factor		1.00	0.91	1.00		0.97	0.91			1.00	1.00	0.88
Frpb, ped/bikes		1.00	1.00	0.99		1.00	1.00			1.00	1.00	0.99
Flpb, ped/bikes		1.00	1.00	1.00		1.00	1.00			1.00	1.00	1.00
Frt		1.00	1.00	0.85		1.00	0.99			1.00	1.00	0.85
Flt Protected		0.95	1.00	1.00		0.95	1.00			0.95	1.00	1.00
Satd. Flow (prot)		1770	5085	1562		3433	5050			1770	1863	2750
Flt Permitted		0.95	1.00	1.00		0.95	1.00			0.95	1.00	1.00
Satd. Flow (perm)		1770	5085	1562		3433	5050			1770	1863	2750
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	10	98	1492	28	3	144	1826	74	2	71	77	170
RTOR Reduction (vph)	0	0	0	9	0	0	2	0	0	0	0	153
Lane Group Flow (vph)	0	108	1492	19	0	147	1898	0	0	73	77	17
Confl. Peds. (#/hr)								3				1
Confl. Bikes (#/hr)				4				2				
Turn Type	Prot	Prot		Perm	Prot	Prot			Prot	Prot		Perm
Protected Phases	1	1	6		5	5	2		3	3	8	
Permitted Phases				6								8
Actuated Green, G (s)		11.7	62.6	62.6		9.5	60.4			8.3	11.7	11.7
Effective Green, g (s)		11.7	62.6	62.6		9.5	60.4			8.3	11.7	11.7
Actuated g/C Ratio		0.10	0.52	0.52		0.08	0.50			0.07	0.10	0.10
Clearance Time (s)		5.6	5.7	5.7		5.6	5.7			5.6	5.3	5.3
Vehicle Extension (s)		2.0	2.0	2.0		2.0	2.0			2.0	2.0	2.0
Lane Grp Cap (vph)		173	2653	815		272	2542			122	182	268
v/s Ratio Prot		c0.06	0.29			0.04	c0.38			0.04	c0.04	
v/s Ratio Perm				0.01								0.01
v/c Ratio		0.62	0.56	0.02		0.54	0.75			0.60	0.42	0.06
Uniform Delay, d1		52.0	19.4	13.9		53.2	23.7			54.2	51.0	49.2
Progression Factor		1.03	0.88	0.53		1.47	0.37			1.00	1.00	1.00
Incremental Delay, d2		4.4	0.8	0.0		0.8	1.4			5.2	0.6	0.0
Delay (s)		58.0	17.9	7.4		79.0	10.2			59.4	51.6	49.2
Level of Service		E	B	A		E	B			E	D	D
Approach Delay (s)			20.4				15.1				52.1	
Approach LOS			C				B				D	

Intersection Summary			
HCM Average Control Delay	22.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	22.2
Intersection Capacity Utilization	72.6%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBL	SBT	SBR
Lane Configurations			
Volume (vph)	138	71	142
Ideal Flow (vphpl)	1900	1900	1900
Total Lost time (s)	5.6	5.3	
Lane Util. Factor	1.00	0.95	
Frpb, ped/bikes	1.00	0.99	
Flpb, ped/bikes	1.00	1.00	
Frt	1.00	0.90	
Flt Protected	0.95	1.00	
Satd. Flow (prot)	1770	3157	
Flt Permitted	0.95	1.00	
Satd. Flow (perm)	1770	3157	
Peak-hour factor, PHF	0.97	0.97	0.97
Adj. Flow (vph)	142	73	146
RTOR Reduction (vph)	0	125	0
Lane Group Flow (vph)	142	94	0
Confl. Peds. (#/hr)			1
Confl. Bikes (#/hr)			
Turn Type	Prot		
Protected Phases	7	4	
Permitted Phases			
Actuated Green, G (s)	14.0	17.4	
Effective Green, g (s)	14.0	17.4	
Actuated g/C Ratio	0.12	0.14	
Clearance Time (s)	5.6	5.3	
Vehicle Extension (s)	2.0	2.0	
Lane Grp Cap (vph)	207	458	
v/s Ratio Prot	c0.08	0.03	
v/s Ratio Perm			
v/c Ratio	0.69	0.21	
Uniform Delay, d1	50.9	45.2	
Progression Factor	1.00	1.00	
Incremental Delay, d2	7.3	0.1	
Delay (s)	58.2	45.3	
Level of Service	E	D	
Approach Delay (s)		50.4	
Approach LOS		D	

Intersection Summary

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL
Lane Configurations												
Volume (vph)	2	115	1510	68	47	176	1807	6	149	24	244	189
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.6	5.7			5.6	5.7		5.6	4.6		5.9
Lane Util. Factor		1.00	0.91			0.97	0.91		1.00	1.00		0.97
Frpb, ped/bikes		1.00	1.00			1.00	1.00		1.00	1.00		1.00
Flpb, ped/bikes		1.00	1.00			1.00	1.00		1.00	1.00		1.00
Frt		1.00	0.99			1.00	1.00		1.00	0.86		1.00
Flt Protected		0.95	1.00			0.95	1.00		0.95	1.00		0.95
Satd. Flow (prot)		1770	5044			3433	5082		1770	1608		3433
Flt Permitted		0.95	1.00			0.95	1.00		0.95	1.00		0.95
Satd. Flow (perm)		1770	5044			3433	5082		1770	1608		3433
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	2	120	1573	71	49	183	1882	6	155	25	254	197
RTOR Reduction (vph)	0	0	3	0	0	0	0	0	0	236	0	0
Lane Group Flow (vph)	0	122	1641	0	0	232	1888	0	155	43	0	197
Confl. Peds. (#/hr)				18				15				
Confl. Bikes (#/hr)				2				4				
Turn Type	Prot	Prot			Prot	Prot			Prot			Prot
Protected Phases	1	1	6		5	5	2		7	4		3
Permitted Phases												
Actuated Green, G (s)		12.6	59.5			12.5	59.4		14.8	8.7		17.5
Effective Green, g (s)		12.6	59.5			12.5	59.4		14.8	8.7		17.5
Actuated g/C Ratio		0.10	0.50			0.10	0.49		0.12	0.07		0.15
Clearance Time (s)		5.6	5.7			5.6	5.7		5.6	4.6		5.9
Vehicle Extension (s)		2.0	2.0			2.0	2.0		2.0	2.0		2.0
Lane Grp Cap (vph)		186	2501			358	2516		218	117		501
v/s Ratio Prot		c0.07	0.33			0.07	c0.37		c0.09	0.03		c0.06
v/s Ratio Perm												
v/c Ratio		0.66	0.66			0.65	0.75		0.71	0.37		0.39
Uniform Delay, d1		51.6	22.6			51.6	24.3		50.5	53.0		46.4
Progression Factor		1.08	0.82			1.18	0.47		1.00	1.00		1.00
Incremental Delay, d2		5.4	1.2			2.0	1.4		8.8	0.7		0.2
Delay (s)		61.2	19.8			62.8	12.9		59.3	53.8		46.6
Level of Service		E	B			E	B		E	D		D
Approach Delay (s)			22.6				18.4			55.7		
Approach LOS			C				B			E		

Intersection Summary			
HCM Average Control Delay	25.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.9
Intersection Capacity Utilization	84.6%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBT	SBR
Lane Configurations		
Volume (vph)	12	116
Ideal Flow (vphpl)	1900	1900
Total Lost time (s)	4.9	
Lane Util. Factor	1.00	
Frpb, ped/bikes	0.98	
Flpb, ped/bikes	1.00	
Frt	0.86	
Flt Protected	1.00	
Satd. Flow (prot)	1573	
Flt Permitted	1.00	
Satd. Flow (perm)	1573	
Peak-hour factor, PHF	0.96	0.96
Adj. Flow (vph)	12	121
RTOR Reduction (vph)	110	0
Lane Group Flow (vph)	23	0
Confl. Peds. (#/hr)		13
Confl. Bikes (#/hr)		
Turn Type		
Protected Phases	8	
Permitted Phases		
Actuated Green, G (s)	11.4	
Effective Green, g (s)	11.4	
Actuated g/C Ratio	0.10	
Clearance Time (s)	4.9	
Vehicle Extension (s)	2.0	
Lane Grp Cap (vph)	149	
v/s Ratio Prot	0.01	
v/s Ratio Perm		
v/c Ratio	0.16	
Uniform Delay, d1	49.9	
Progression Factor	1.00	
Incremental Delay, d2	0.2	
Delay (s)	50.1	
Level of Service	D	
Approach Delay (s)	48.0	
Approach LOS	D	

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	1814	233	94	1214	0	0	0	0	684	0	1015
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0		5.6	5.7					6.7	6.7	6.7
Lane Util. Factor		0.91		1.00	0.91					0.95	0.95	0.88
Frpb, ped/bikes		1.00		1.00	1.00					1.00	1.00	0.99
Flpb, ped/bikes		1.00		1.00	1.00					1.00	1.00	1.00
Frt		0.98		1.00	1.00					1.00	1.00	0.85
Flt Protected		1.00		0.95	1.00					0.95	0.95	1.00
Satd. Flow (prot)		4977		1770	5085					1681	1681	2745
Flt Permitted		1.00		0.95	1.00					0.95	0.95	1.00
Satd. Flow (perm)		4977		1770	5085					1681	1681	2745
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	0	1851	238	96	1239	0	0	0	0	698	0	1036
RTOR Reduction (vph)	0	11	0	0	0	0	0	0	0	0	0	72
Lane Group Flow (vph)	0	2078	0	96	1239	0	0	0	0	349	349	964
Confl. Peds. (#/hr)			5			7						3
Confl. Bikes (#/hr)			4			6						
Turn Type				Prot						Split		Perm
Protected Phases		2		1	6					4	4	
Permitted Phases												4
Actuated Green, G (s)		52.5		10.9	69.3					38.3	38.3	38.3
Effective Green, g (s)		52.5		10.9	69.3					38.3	38.3	38.3
Actuated g/C Ratio		0.44		0.09	0.58					0.32	0.32	0.32
Clearance Time (s)		6.0		5.6	5.7					6.7	6.7	6.7
Vehicle Extension (s)		2.0		2.0	2.0					1.0	1.0	1.0
Lane Grp Cap (vph)		2177		161	2937					537	537	876
v/s Ratio Prot		c0.42		c0.05	0.24					0.21	0.21	
v/s Ratio Perm												c0.35
v/c Ratio		0.95		0.60	0.42					0.65	0.65	1.10
Uniform Delay, d1		32.6		52.4	14.2					35.1	35.1	40.9
Progression Factor		0.50		0.41	1.41					1.00	1.00	1.00
Incremental Delay, d2		9.5		2.9	0.3					2.0	2.0	61.6
Delay (s)		25.7		24.4	20.2					37.1	37.1	102.5
Level of Service		C		C	C					D	D	F
Approach Delay (s)		25.7			20.5			0.0			76.2	
Approach LOS		C			C			A			E	

Intersection Summary			
HCM Average Control Delay	41.3	HCM Level of Service	D
HCM Volume to Capacity ratio	0.97		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	18.3
Intersection Capacity Utilization	80.8%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	792	1706	1308	507	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.6	6.0	5.7	5.7		
Lane Util. Factor	0.97	0.91	0.91	1.00		
Frt	1.00	1.00	1.00	0.85		
Flt Protected	0.95	1.00	1.00	1.00		
Satd. Flow (prot)	3433	5085	5085	1583		
Flt Permitted	0.95	1.00	1.00	1.00		
Satd. Flow (perm)	3433	5085	5085	1583		
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	852	1834	1406	545	0	0
RTOR Reduction (vph)	0	0	0	66	0	0
Lane Group Flow (vph)	852	1834	1406	479	0	0
Turn Type	Prot			Perm		
Protected Phases	1	6	2			
Permitted Phases				2		
Actuated Green, G (s)	59.4	120.0	49.3	49.3		
Effective Green, g (s)	59.4	120.0	49.3	49.3		
Actuated g/C Ratio	0.49	1.00	0.41	0.41		
Clearance Time (s)	5.6	6.0	5.7	5.7		
Vehicle Extension (s)	2.0	3.0	2.0	2.0		
Lane Grp Cap (vph)	1699	5085	2089	650		
v/s Ratio Prot	c0.25	0.36	0.28			
v/s Ratio Perm				c0.30		
v/c Ratio	0.50	0.36	0.67	0.74		
Uniform Delay, d1	20.4	0.0	28.8	29.9		
Progression Factor	0.70	1.00	0.80	0.74		
Incremental Delay, d2	0.0	0.1	1.4	5.8		
Delay (s)	14.2	0.1	24.4	27.9		
Level of Service	B	A	C	C		
Approach Delay (s)		4.6	25.4		0.0	
Approach LOS		A	C		A	

Intersection Summary			
HCM Average Control Delay	13.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	11.3
Intersection Capacity Utilization	80.8%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBU
Lane Configurations												
Volume (vph)	12	114	1030	477	6	55	1152	103	510	113	93	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.6	5.7	5.7		5.6	5.7	5.7	5.6	5.6		
Lane Util. Factor		1.00	0.95	1.00		1.00	0.91	1.00	0.91	0.91		
Frpb, ped/bikes		1.00	1.00	0.97		1.00	1.00	0.98	1.00	1.00		
Flpb, ped/bikes		1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00		
Frt		1.00	1.00	0.85		1.00	1.00	0.85	1.00	0.97		
Flt Protected		0.95	1.00	1.00		0.95	1.00	1.00	0.95	0.97		
Satd. Flow (prot)		1770	3539	1529		1770	5085	1547	1610	3186		
Flt Permitted		0.95	1.00	1.00		0.95	1.00	1.00	0.95	0.97		
Satd. Flow (perm)		1770	3539	1529		1770	5085	1547	1610	3186		
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	13	120	1084	502	6	58	1213	108	537	119	98	8
RTOR Reduction (vph)	0	0	0	234	0	0	0	49	0	18	0	0
Lane Group Flow (vph)	0	133	1084	268	0	64	1213	59	268	468	0	0
Confl. Peds. (#/hr)				4				7			6	
Confl. Bikes (#/hr)				4				2				
Turn Type	Prot	Prot		Perm	Prot	Prot		Perm	Split			Split
Protected Phases	1	1	6		5	5	2		3	3		4
Permitted Phases				6				2				
Actuated Green, G (s)		12.3	50.7	50.7		7.7	46.1	46.1	22.4	22.4		
Effective Green, g (s)		12.3	50.7	50.7		7.7	46.1	46.1	22.4	22.4		
Actuated g/C Ratio		0.10	0.42	0.42		0.06	0.38	0.38	0.19	0.19		
Clearance Time (s)		5.6	5.7	5.7		5.6	5.7	5.7	5.6	5.6		
Vehicle Extension (s)		2.0	3.9	3.9		2.0	3.9	3.9	2.0	2.0		
Lane Grp Cap (vph)		181	1495	646		114	1953	594	301	595		
v/s Ratio Prot		c0.08	c0.31			0.04	0.24		c0.17	0.15		
v/s Ratio Perm				0.17				0.04				
v/c Ratio		0.73	0.73	0.41		0.56	0.62	0.10	0.89	0.79		
Uniform Delay, d1		52.3	28.8	24.3		54.5	29.9	23.7	47.6	46.5		
Progression Factor		0.86	0.76	1.55		1.00	1.00	1.00	1.00	1.00		
Incremental Delay, d2		11.9	2.9	1.9		3.7	1.5	0.3	25.6	6.3		
Delay (s)		56.8	24.8	39.5		58.2	31.4	24.0	73.2	52.8		
Level of Service		E	C	D		E	C	C	E	D		
Approach Delay (s)			31.5				32.0			60.1		
Approach LOS			C				C			E		

Intersection Summary			
HCM Average Control Delay	39.2	HCM Level of Service	D
HCM Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	21.5
Intersection Capacity Utilization	77.4%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBL	SBT	SBR
Lane Configurations			
Volume (vph)	209	135	128
Ideal Flow (vphpl)	1900	1900	1900
Total Lost time (s)	4.6	4.6	4.6
Lane Util. Factor	0.95	0.95	1.00
Frpb, ped/bikes	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00
Frt	1.00	1.00	0.85
Flt Protected	0.95	0.99	1.00
Satd. Flow (prot)	1681	1748	1583
Flt Permitted	0.95	0.99	1.00
Satd. Flow (perm)	1681	1748	1583
Peak-hour factor, PHF	0.95	0.95	0.95
Adj. Flow (vph)	220	142	135
RTOR Reduction (vph)	0	0	115
Lane Group Flow (vph)	182	188	20
Confl. Peds. (#/hr)			
Confl. Bikes (#/hr)			
Turn Type	Split		Perm
Protected Phases	4	4	
Permitted Phases			4
Actuated Green, G (s)	17.7	17.7	17.7
Effective Green, g (s)	17.7	17.7	17.7
Actuated g/C Ratio	0.15	0.15	0.15
Clearance Time (s)	4.6	4.6	4.6
Vehicle Extension (s)	2.0	2.0	2.0
Lane Grp Cap (vph)	248	258	233
v/s Ratio Prot	c0.11	0.11	
v/s Ratio Perm			0.01
v/c Ratio	0.73	0.73	0.09
Uniform Delay, d1	48.9	48.9	44.2
Progression Factor	1.00	1.00	1.00
Incremental Delay, d2	9.3	8.4	0.1
Delay (s)	58.2	57.3	44.2
Level of Service	E	E	D
Approach Delay (s)		54.1	
Approach LOS		D	

Intersection Summary

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	274	9	0	398	586	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	282	9	0	410	604	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)		1				
Median type				TWLTL	TWLTL	
Median storage veh)				2	2	
Upstream signal (ft)					808	
pX, platoon unblocked	0.97	0.97	0.97			
vC, conflicting volume	809	604	604			
vC1, stage 1 conf vol	604					
vC2, stage 2 conf vol	205					
vCu, unblocked vol	785	573	573			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.3	2.2			
p0 queue free %	41	98	100			
cM capacity (veh/h)	479	447	962			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1
Volume Total	292	205	205	604
Volume Left	282	0	0	0
Volume Right	9	0	0	0
cSH	484	1700	1700	1700
Volume to Capacity	0.60	0.12	0.12	0.36
Queue Length 95th (ft)	98	0	0	0
Control Delay (s)	23.1	0.0	0.0	0.0
Lane LOS	C			
Approach Delay (s)	23.1	0.0		0.0
Approach LOS	C			

Intersection Summary			
Average Delay	5.2		
Intersection Capacity Utilization	52.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL
Lane Configurations												
Volume (vph)	72	48	105	64	64	52	14	82	683	60	20	49
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.6	4.6	4.6	5.6	4.6	4.6		5.6	5.3	5.3		5.6
Lane Util. Factor	1.00	1.00	1.00	0.97	1.00	1.00		1.00	0.95	1.00		1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.98		1.00	1.00	0.98		1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00		1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	1.00	0.85		1.00
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.95	1.00	1.00		0.95
Satd. Flow (prot)	1770	1863	1583	3433	1863	1559		1770	3539	1549		1770
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00		0.95	1.00	1.00		0.95
Satd. Flow (perm)	1770	1863	1583	3433	1863	1559		1770	3539	1549		1770
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	79	53	115	70	70	57	15	90	751	66	22	54
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	34	0	0
Lane Group Flow (vph)	79	53	115	70	70	57	0	105	751	32	0	76
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)	1					2		1		2		1
Turn Type	Prot		Perm	Prot		Perm	Prot	Prot		Perm	Prot	Prot
Protected Phases	3	8		7	4		1	1	6		5	5
Permitted Phases			8			4				6		
Actuated Green, G (s)	10.3	18.6	18.6	5.8	14.1	14.1		12.1	49.7	49.7		8.3
Effective Green, g (s)	10.3	18.6	18.6	5.8	14.1	14.1		12.1	49.7	49.7		8.3
Actuated g/C Ratio	0.10	0.18	0.18	0.06	0.14	0.14		0.12	0.48	0.48		0.08
Clearance Time (s)	5.6	4.6	4.6	5.6	4.6	4.6		5.6	5.3	5.3		5.6
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0		2.0
Lane Grp Cap (vph)	176	335	284	192	254	212		207	1699	744		142
v/s Ratio Prot	c0.04	0.03		0.02	0.04			c0.06	c0.21			0.04
v/s Ratio Perm			c0.07			0.04				0.02		
v/c Ratio	0.45	0.16	0.40	0.36	0.28	0.27		0.51	0.44	0.04		0.54
Uniform Delay, d1	43.9	35.8	37.6	47.1	40.1	40.1		42.9	17.8	14.3		45.7
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00		1.00
Incremental Delay, d2	0.7	0.1	0.3	0.4	0.2	0.2		0.7	0.1	0.0		1.9
Delay (s)	44.6	35.9	37.9	47.5	40.3	40.3		43.6	17.8	14.3		47.7
Level of Service	D	D	D	D	D	D		D	B	B		D
Approach Delay (s)		39.6			42.9				20.5			
Approach LOS		D			D				C			

Intersection Summary			
HCM Average Control Delay	27.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	103.5	Sum of lost time (s)	26.4
Intersection Capacity Utilization	63.9%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBT	SBR
Lane Configurations		
Volume (vph)	1055	63
Ideal Flow (vphpl)	1900	1900
Total Lost time (s)	5.3	
Lane Util. Factor	0.95	
Frpb, ped/bikes	1.00	
Flpb, ped/bikes	1.00	
Frt	0.99	
Flt Protected	1.00	
Satd. Flow (prot)	3504	
Flt Permitted	1.00	
Satd. Flow (perm)	3504	
Peak-hour factor, PHF	0.91	0.91
Adj. Flow (vph)	1159	69
RTOR Reduction (vph)	2	0
Lane Group Flow (vph)	1226	0
Confl. Peds. (#/hr)		2
Confl. Bikes (#/hr)		1
Turn Type		
Protected Phases	2	
Permitted Phases		
Actuated Green, G (s)	45.9	
Effective Green, g (s)	45.9	
Actuated g/C Ratio	0.44	
Clearance Time (s)	5.3	
Vehicle Extension (s)	2.0	
Lane Grp Cap (vph)	1554	
v/s Ratio Prot	c0.35	
v/s Ratio Perm		
v/c Ratio	0.79	
Uniform Delay, d1	24.7	
Progression Factor	1.00	
Incremental Delay, d2	2.5	
Delay (s)	27.2	
Level of Service	C	
Approach Delay (s)	28.4	
Approach LOS	C	

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	17	148	19	16	169	7	14	9	7	12	21	18
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	18	157	20	17	180	7	15	10	7	13	22	19

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total (vph)	18	178	17	187	32	54
Volume Left (vph)	18	0	17	0	15	13
Volume Right (vph)	0	20	0	7	7	19
Hadj (s)	0.53	-0.05	0.53	0.01	-0.01	-0.13
Departure Headway (s)	5.4	4.8	5.4	4.9	4.9	4.7
Degree Utilization, x	0.03	0.24	0.03	0.25	0.04	0.07
Capacity (veh/h)	649	724	643	718	673	693
Control Delay (s)	7.4	8.2	7.4	8.3	8.1	8.1
Approach Delay (s)	8.1		8.3		8.1	8.1
Approach LOS	A		A		A	A

Intersection Summary			
Delay	8.2		
HCM Level of Service	A		
Intersection Capacity Utilization	24.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Lane Configurations												
Volume (vph)	66	68	15	4	66	12	12	381	7	2	3	574
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.6	4.6	4.6	5.6	5.6	5.6	6.3	5.3			6.3	5.3
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95			1.00	0.95
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00			1.00	0.97
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00			0.95	1.00
Satd. Flow (prot)	1770	1863	1583	1770	1863	1583	1770	3529			1770	3444
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00			0.95	1.00
Satd. Flow (perm)	1770	1863	1583	1770	1863	1583	1770	3529			1770	3444
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	72	74	16	4	72	13	13	414	8	2	3	624
RTOR Reduction (vph)	0	0	11	0	0	11	0	1	0	0	0	11
Lane Group Flow (vph)	72	74	5	4	72	2	13	421	0	0	5	750
Turn Type	Prot		Perm	Prot		Perm	Prot			Prot	Prot	
Protected Phases	3	8		7	4		1	6		5	5	2
Permitted Phases			8			4						
Actuated Green, G (s)	6.7	19.7	19.7	0.6	12.6	12.6	0.7	25.9			0.6	25.8
Effective Green, g (s)	6.7	19.7	19.7	0.6	12.6	12.6	0.7	25.9			0.6	25.8
Actuated g/C Ratio	0.10	0.29	0.29	0.01	0.18	0.18	0.01	0.38			0.01	0.38
Clearance Time (s)	5.6	4.6	4.6	5.6	5.6	5.6	6.3	5.3			6.3	5.3
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0			2.0	2.0
Lane Grp Cap (vph)	173	535	455	15	342	291	18	1332			15	1295
v/s Ratio Prot	c0.04	0.04		0.00	c0.04		c0.01	0.12			0.00	c0.22
v/s Ratio Perm			0.00			0.00						
v/c Ratio	0.42	0.14	0.01	0.27	0.21	0.01	0.72	0.32			0.33	0.58
Uniform Delay, d1	29.1	18.1	17.5	33.8	23.8	22.9	33.9	15.1			33.8	17.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00
Incremental Delay, d2	0.6	0.0	0.0	3.5	0.1	0.0	77.2	0.1			4.7	0.4
Delay (s)	29.7	18.2	17.5	37.2	23.9	22.9	111.0	15.1			38.5	17.5
Level of Service	C	B	B	D	C	C	F	B			D	B
Approach Delay (s)		23.2			24.3			18.0				17.6
Approach LOS		C			C			B				B

Intersection Summary			
HCM Average Control Delay	18.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.46		
Actuated Cycle Length (s)	68.6	Sum of lost time (s)	22.8
Intersection Capacity Utilization	41.1%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBR
Lane Configurations	
Volume (vph)	126
Ideal Flow (vphpl)	1900
Total Lost time (s)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Peak-hour factor, PHF	0.92
Adj. Flow (vph)	137
RTOR Reduction (vph)	0
Lane Group Flow (vph)	0
Turn Type	
Protected Phases	
Permitted Phases	
Actuated Green, G (s)	
Effective Green, g (s)	
Actuated g/C Ratio	
Clearance Time (s)	
Vehicle Extension (s)	
Lane Grp Cap (vph)	
v/s Ratio Prot	
v/s Ratio Perm	
v/c Ratio	
Uniform Delay, d1	
Progression Factor	
Incremental Delay, d2	
Delay (s)	
Level of Service	
Approach Delay (s)	
Approach LOS	

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Lane Configurations												
Volume (vph)	91	0	12	0	0	0	20	220	0	0	0	177
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.6		5.6				5.6	4.6				4.6
Lane Util. Factor	1.00		1.00				1.00	0.95				0.95
Frt	1.00		0.85				1.00	1.00				0.96
Flt Protected	0.95		1.00				0.95	1.00				1.00
Satd. Flow (prot)	1770		1583				1770	3539				3402
Flt Permitted	0.95		1.00				0.95	1.00				1.00
Satd. Flow (perm)	1770		1583				1770	3539				3402
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	103	0	14	0	0	0	23	250	0	0	0	201
RTOR Reduction (vph)	0	0	10	0	0	0	0	0	0	0	0	18
Lane Group Flow (vph)	103	0	4	0	0	0	23	250	0	0	0	253
Turn Type	Prot		custom	Prot			Prot			Prot		
Protected Phases	3			7	4		1	6		5		2
Permitted Phases			8									
Actuated Green, G (s)	7.0		15.6				0.7	28.3				22.0
Effective Green, g (s)	7.0		15.6				0.7	28.3				22.0
Actuated g/C Ratio	0.13		0.29				0.01	0.52				0.41
Clearance Time (s)	5.6		5.6				5.6	4.6				4.6
Vehicle Extension (s)	2.0		2.0				2.0	2.0				2.0
Lane Grp Cap (vph)	229		456				23	1851				1383
v/s Ratio Prot	c0.06						c0.01	0.07				c0.07
v/s Ratio Perm			c0.00									
v/c Ratio	0.45		0.01				1.00	0.14				0.18
Uniform Delay, d1	21.8		13.7				26.7	6.6				10.3
Progression Factor	1.00		1.00				1.00	1.00				1.00
Incremental Delay, d2	0.5		0.0				187.7	0.0				0.0
Delay (s)	22.3		13.7				214.4	6.6				10.3
Level of Service	C		B				F	A				B
Approach Delay (s)		21.3			0.0			24.1				10.3
Approach LOS		C			A			C				B

Intersection Summary			
HCM Average Control Delay	18.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.21		
Actuated Cycle Length (s)	54.1	Sum of lost time (s)	15.8
Intersection Capacity Utilization	27.9%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBR
Lane Configurations	
Volume (vph)	62
Ideal Flow (vphpl)	1900
Total Lost time (s)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Peak-hour factor, PHF	0.88
Adj. Flow (vph)	70
RTOR Reduction (vph)	0
Lane Group Flow (vph)	0
Turn Type	
Protected Phases	
Permitted Phases	
Actuated Green, G (s)	
Effective Green, g (s)	
Actuated g/C Ratio	
Clearance Time (s)	
Vehicle Extension (s)	
Lane Grp Cap (vph)	
v/s Ratio Prot	
v/s Ratio Perm	
v/c Ratio	
Uniform Delay, d1	
Progression Factor	
Incremental Delay, d2	
Delay (s)	
Level of Service	
Approach Delay (s)	
Approach LOS	

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	45	2	4	19	2	103	6	252	18	96	440	57
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.6	4.6		4.6	4.6		5.3	5.3		5.3	5.3	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	0.90		1.00	0.85		1.00	0.99		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1676		1770	1588		1770	3503		1770	3478	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	1676		1770	1588		1770	3503		1770	3478	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	49	2	4	21	2	112	7	274	20	104	478	62
RTOR Reduction (vph)	0	3	0	0	95	0	0	3	0	0	5	0
Lane Group Flow (vph)	49	3	0	21	19	0	7	291	0	104	535	0
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases												
Actuated Green, G (s)	3.8	12.2		0.8	9.2		0.6	22.1		7.0	28.5	
Effective Green, g (s)	3.8	12.2		0.8	9.2		0.6	22.1		7.0	28.5	
Actuated g/C Ratio	0.06	0.20		0.01	0.15		0.01	0.36		0.11	0.46	
Clearance Time (s)	4.6	4.6		4.6	4.6		5.3	5.3		5.3	5.3	
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	109	330		23	236		17	1251		200	1601	
v/s Ratio Prot	c0.03	c0.00		0.01	c0.01		0.00	0.08		c0.06	c0.15	
v/s Ratio Perm												
v/c Ratio	0.45	0.01		0.91	0.08		0.41	0.23		0.52	0.33	
Uniform Delay, d1	28.0	20.0		30.5	22.7		30.5	14.0		25.9	10.6	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.1	0.0		145.7	0.1		5.8	0.0		1.1	0.0	
Delay (s)	29.1	20.0		176.3	22.8		36.3	14.0		27.0	10.7	
Level of Service	C	B		F	C		D	B		C	B	
Approach Delay (s)		28.1			46.6			14.5			13.3	
Approach LOS		C			D			B			B	

Intersection Summary			
HCM Average Control Delay	18.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.32		
Actuated Cycle Length (s)	61.9	Sum of lost time (s)	19.1
Intersection Capacity Utilization	40.0%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Volume (vph)	44	18	2	2	60	23	59	12	172	62	100	310
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.6	7.2			5.6	5.6	6.3	6.3	5.3	5.3	6.3	5.3
Lane Util. Factor	1.00	1.00			0.97	1.00	0.88	1.00	0.95	1.00	0.97	0.95
Frt	1.00	0.99			1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98
Flt Protected	0.95	1.00			0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	1837			3433	1863	2787	1770	3539	1583	3433	3462
Flt Permitted	0.95	1.00			0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1770	1837			3433	1863	2787	1770	3539	1583	3433	3462
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	50	20	2	2	68	26	67	14	195	70	114	352
RTOR Reduction (vph)	0	2	0	0	0	0	52	0	0	45	0	6
Lane Group Flow (vph)	50	20	0	0	70	26	15	14	195	25	114	406
Turn Type	Prot			Prot	Prot		pm+ov	Prot		Perm	Prot	
Protected Phases	3	8		7	7	4	5	1	6		5	2
Permitted Phases							4			6		
Actuated Green, G (s)	4.1	4.8			3.8	6.1	14.6	0.6	23.7	23.7	8.5	31.6
Effective Green, g (s)	4.1	4.8			3.8	6.1	14.6	0.6	23.7	23.7	8.5	31.6
Actuated g/C Ratio	0.06	0.07			0.06	0.09	0.22	0.01	0.36	0.36	0.13	0.48
Clearance Time (s)	5.6	7.2			5.6	5.6	6.3	6.3	5.3	5.3	6.3	5.3
Vehicle Extension (s)	2.0	2.0			2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	111	135			200	174	624	16	1286	575	448	1678
v/s Ratio Prot	c0.03	0.01			0.02	c0.01	0.00	0.01	0.06		c0.03	c0.12
v/s Ratio Perm							0.00			0.02		
v/c Ratio	0.45	0.15			0.35	0.15	0.02	0.88	0.15	0.04	0.25	0.24
Uniform Delay, d1	29.5	28.3			29.5	27.2	19.7	32.3	14.0	13.4	25.5	9.8
Progression Factor	1.00	1.00			1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.1	0.2			0.4	0.1	0.0	158.2	0.0	0.0	0.1	0.0
Delay (s)	30.5	28.5			29.9	27.3	19.7	190.5	14.0	13.4	25.6	9.8
Level of Service	C	C			C	C	B	F	B	B	C	A
Approach Delay (s)		29.9				25.3			22.7			13.3
Approach LOS		C				C			C			B

Intersection Summary			
HCM Average Control Delay	18.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.27		
Actuated Cycle Length (s)	65.2	Sum of lost time (s)	22.8
Intersection Capacity Utilization	39.0%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBR
Lane Configurations	
Volume (vph)	53
Ideal Flow (vphpl)	1900
Total Lost time (s)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Peak-hour factor, PHF	0.88
Adj. Flow (vph)	60
RTOR Reduction (vph)	0
Lane Group Flow (vph)	0
Turn Type	
Protected Phases	
Permitted Phases	
Actuated Green, G (s)	
Effective Green, g (s)	
Actuated g/C Ratio	
Clearance Time (s)	
Vehicle Extension (s)	
Lane Grp Cap (vph)	
v/s Ratio Prot	
v/s Ratio Perm	
v/c Ratio	
Uniform Delay, d1	
Progression Factor	
Incremental Delay, d2	
Delay (s)	
Level of Service	
Approach Delay (s)	
Approach LOS	

Intersection Summary

Movement	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL
Lane Configurations												
Volume (vph)	17	81	9	6	6	15	16	29	87	6	2	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.6	6.6	6.6	5.6	6.6	6.6	5.6	5.6	5.6		5.6
Lane Util. Factor		0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.95	1.00		0.97
Frpb, ped/bikes		1.00	1.00	0.99	1.00	1.00	1.00	1.00	1.00	0.98		1.00
Flpb, ped/bikes		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00
Frt		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85		1.00
Flt Protected		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00		0.95
Satd. Flow (prot)		3433	3539	1563	3433	3539	1583	3433	3539	1558		3433
Flt Permitted		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00		0.95
Satd. Flow (perm)		3433	3539	1563	3433	3539	1583	3433	3539	1558		3433
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	19	89	10	7	7	16	18	32	96	7	2	3
RTOR Reduction (vph)	0	0	0	4	0	0	12	0	0	6	0	0
Lane Group Flow (vph)	0	108	10	3	7	16	6	32	96	1	0	5
Confl. Peds. (#/hr)										2		
Confl. Bikes (#/hr)				2						2		1
Turn Type	Prot	Prot		Perm	Prot		Perm	Prot		Perm	Prot	Prot
Protected Phases	3	3	8		7	4		1	6		5	5
Permitted Phases				8			4			6		
Actuated Green, G (s)		5.9	25.4	25.4	0.4	19.9	19.9	0.5	7.7	7.7		0.4
Effective Green, g (s)		5.9	25.4	25.4	0.4	19.9	19.9	0.5	7.7	7.7		0.4
Actuated g/C Ratio		0.10	0.44	0.44	0.01	0.35	0.35	0.01	0.13	0.13		0.01
Clearance Time (s)		5.6	6.6	6.6	5.6	6.6	6.6	5.6	5.6	5.6		5.6
Vehicle Extension (s)		2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0		2.0
Lane Grp Cap (vph)		353	1569	693	24	1229	550	30	476	209		24
v/s Ratio Prot		c0.03	c0.00		0.00	c0.00		c0.01	c0.03			0.00
v/s Ratio Perm				0.00			0.00			0.00		
v/c Ratio		0.31	0.01	0.00	0.29	0.01	0.01	1.07	0.20	0.00		0.21
Uniform Delay, d1		23.8	8.9	8.9	28.3	12.3	12.3	28.4	22.1	21.5		28.3
Progression Factor		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00
Incremental Delay, d2		0.2	0.0	0.0	2.5	0.0	0.0	185.4	0.1	0.0		1.6
Delay (s)		24.0	8.9	8.9	30.8	12.3	12.3	213.8	22.1	21.5		29.9
Level of Service		C	A	A	C	B	B	F	C	C		C
Approach Delay (s)			21.9			15.4			67.5			
Approach LOS			C			B			E			

Intersection Summary			
HCM Average Control Delay	35.1	HCM Level of Service	D
HCM Volume to Capacity ratio	0.10		
Actuated Cycle Length (s)	57.3	Sum of lost time (s)	24.4
Intersection Capacity Utilization	34.3%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBT	SBR
Lane Configurations	↑↑	↱
Volume (vph)	57	65
Ideal Flow (vphpl)	1900	1900
Total Lost time (s)	4.6	4.6
Lane Util. Factor	0.95	1.00
Frpb, ped/bikes	1.00	0.99
Flpb, ped/bikes	1.00	1.00
Frt	1.00	0.85
Flt Protected	1.00	1.00
Satd. Flow (prot)	3539	1561
Flt Permitted	1.00	1.00
Satd. Flow (perm)	3539	1561
Peak-hour factor, PHF	0.91	0.91
Adj. Flow (vph)	63	71
RTOR Reduction (vph)	0	60
Lane Group Flow (vph)	63	11
Confl. Peds. (#/hr)		1
Confl. Bikes (#/hr)		1
Turn Type		Perm
Protected Phases	2	
Permitted Phases		2
Actuated Green, G (s)	8.6	8.6
Effective Green, g (s)	8.6	8.6
Actuated g/C Ratio	0.15	0.15
Clearance Time (s)	4.6	4.6
Vehicle Extension (s)	2.0	2.0
Lane Grp Cap (vph)	531	234
v/s Ratio Prot	0.02	
v/s Ratio Perm		0.01
v/c Ratio	0.12	0.05
Uniform Delay, d1	21.1	20.8
Progression Factor	1.00	1.00
Incremental Delay, d2	0.0	0.0
Delay (s)	21.1	20.9
Level of Service	C	C
Approach Delay (s)	21.3	
Approach LOS	C	

Intersection Summary

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Lane Configurations												
Volume (vph)	1	322	194	37	1	131	233	43	21	104	246	52
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.6	4.9	4.9		5.6	4.9	4.9		6.3	5.3	5.3
Lane Util. Factor		0.97	0.95	1.00		0.97	0.95	1.00		0.97	0.95	1.00
Frt		1.00	1.00	0.85		1.00	1.00	0.85		1.00	1.00	0.85
Flt Protected		0.95	1.00	1.00		0.95	1.00	1.00		0.95	1.00	1.00
Satd. Flow (prot)		3433	3539	1583		3433	3539	1583		3433	3539	1583
Flt Permitted		0.95	1.00	1.00		0.95	1.00	1.00		0.95	1.00	1.00
Satd. Flow (perm)		3433	3539	1583		3433	3539	1583		3433	3539	1583
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	1	346	209	40	1	141	251	46	23	112	265	56
RTOR Reduction (vph)	0	0	0	30	0	0	0	38	0	0	0	40
Lane Group Flow (vph)	0	347	209	10	0	142	251	8	0	135	265	16
Turn Type	Prot	Prot		Perm	Prot	Prot		Perm	Prot	Prot		Perm
Protected Phases	3	3	8		7	7	4		1	1	6	
Permitted Phases				8				4				6
Actuated Green, G (s)		13.7	19.1	19.1		8.7	14.1	14.1		8.5	22.7	22.7
Effective Green, g (s)		13.7	19.1	19.1		8.7	14.1	14.1		8.5	22.7	22.7
Actuated g/C Ratio		0.17	0.24	0.24		0.11	0.18	0.18		0.11	0.29	0.29
Clearance Time (s)		5.6	4.9	4.9		5.6	4.9	4.9		6.3	5.3	5.3
Vehicle Extension (s)		2.0	2.0	2.0		2.0	2.0	2.0		2.0	2.0	2.0
Lane Grp Cap (vph)		600	862	386		381	636	285		372	1025	458
v/s Ratio Prot		c0.10	c0.06			0.04	c0.07			c0.04	c0.07	
v/s Ratio Perm				0.01				0.01				0.01
v/c Ratio		0.58	0.24	0.03		0.37	0.39	0.03		0.36	0.26	0.04
Uniform Delay, d1		29.7	23.8	22.6		32.3	28.4	26.5		32.4	21.4	20.0
Progression Factor		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2		0.8	0.1	0.0		0.2	0.1	0.0		0.2	0.0	0.0
Delay (s)		30.5	23.9	22.6		32.5	28.5	26.5		32.7	21.4	20.0
Level of Service		C	C	C		C	C	C		C	C	C
Approach Delay (s)			27.7				29.6				24.6	
Approach LOS			C				C				C	

Intersection Summary			
HCM Average Control Delay	26.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	78.4	Sum of lost time (s)	32.3
Intersection Capacity Utilization	67.8%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBU	SBL	SBT	SBR
Lane Configurations				
Volume (vph)	14	68	402	474
Ideal Flow (vphpl)	1900	1900	1900	1900
Total Lost time (s)		6.3	5.3	5.3
Lane Util. Factor		0.97	0.95	1.00
Frt		1.00	1.00	0.85
Flt Protected		0.95	1.00	1.00
Satd. Flow (prot)		3433	3539	1583
Flt Permitted		0.95	1.00	1.00
Satd. Flow (perm)		3433	3539	1583
Peak-hour factor, PHF	0.93	0.93	0.93	0.93
Adj. Flow (vph)	15	73	432	510
RTOR Reduction (vph)	0	0	0	380
Lane Group Flow (vph)	0	88	432	130
Turn Type	Prot	Prot		Perm
Protected Phases	5	5	2	
Permitted Phases				2
Actuated Green, G (s)		5.8	20.0	20.0
Effective Green, g (s)		5.8	20.0	20.0
Actuated g/C Ratio		0.07	0.26	0.26
Clearance Time (s)		6.3	5.3	5.3
Vehicle Extension (s)		2.0	2.0	2.0
Lane Grp Cap (vph)		254	903	404
v/s Ratio Prot		0.03	c0.12	
v/s Ratio Perm				0.08
v/c Ratio		0.35	0.48	0.32
Uniform Delay, d1		34.5	24.8	23.7
Progression Factor		1.00	1.00	1.00
Incremental Delay, d2		0.3	0.1	0.2
Delay (s)		34.8	24.9	23.9
Level of Service		C	C	C
Approach Delay (s)			25.2	
Approach LOS			C	

Intersection Summary

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	204	66	124	45	16	265
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.6	4.6	4.6	5.3	5.3
Lane Util. Factor		1.00	1.00	1.00	1.00	1.00
Frt		1.00	1.00	0.85	1.00	0.85
Flt Protected		0.96	1.00	1.00	0.95	1.00
Satd. Flow (prot)		1795	1863	1583	1770	1583
Flt Permitted		0.96	1.00	1.00	0.95	1.00
Satd. Flow (perm)		1795	1863	1583	1770	1583
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	219	71	133	48	17	285
RTOR Reduction (vph)	0	0	0	38	0	231
Lane Group Flow (vph)	0	290	133	10	17	54
Turn Type	Split			Perm		Perm
Protected Phases	3	3	4		2	
Permitted Phases				4		2
Actuated Green, G (s)		13.5	9.6	9.6	9.0	9.0
Effective Green, g (s)		13.5	9.6	9.6	9.0	9.0
Actuated g/C Ratio		0.28	0.20	0.20	0.19	0.19
Clearance Time (s)		5.6	4.6	4.6	5.3	5.3
Vehicle Extension (s)		2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)		509	376	319	335	299
v/s Ratio Prot		c0.16	c0.07		0.01	
v/s Ratio Perm				0.01		c0.03
v/c Ratio		0.57	0.35	0.03	0.05	0.18
Uniform Delay, d1		14.6	16.3	15.3	15.8	16.2
Progression Factor		1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		0.9	0.2	0.0	0.0	0.1
Delay (s)		15.4	16.5	15.3	15.8	16.3
Level of Service		B	B	B	B	B
Approach Delay (s)		15.4	16.2		16.3	
Approach LOS		B	B		B	

Intersection Summary			
HCM Average Control Delay	16.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.40		
Actuated Cycle Length (s)	47.6	Sum of lost time (s)	15.5
Intersection Capacity Utilization	38.4%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	1	1	0	148	488	2
Sign Control		Stop	Stop		Free	
Grade		0%	0%		0%	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	1	1	0	170	561	2
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1123	1123	1124	0	0	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1123	1123	1124	0	0	
tC, single (s)	7.1	6.5	6.5	6.2	4.1	
tC, 2 stage (s)						
tF (s)	3.5	4.0	4.0	3.3	2.2	
p0 queue free %	99	99	100	84	65	
cM capacity (veh/h)	113	135	134	1085	1623	

Direction, Lane #	EB 1	EB 2	WB 1	SB 1	SB 2
Volume Total	2	1	170	374	189
Volume Left	1	0	0	374	187
Volume Right	0	0	170	0	2
cSH	118	135	1085	1623	1623
Volume to Capacity	0.01	0.01	0.16	0.35	0.35
Queue Length 95th (ft)	1	0	14	39	39
Control Delay (s)	36.0	31.9	8.9	8.4	8.3
Lane LOS	E	D	A	A	A
Approach Delay (s)	34.7		8.9	8.4	
Approach LOS	D		A		

Intersection Summary			
Average Delay	8.6		
Intersection Capacity Utilization	29.8%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	6	479	0	0	145	633	2	0	130	0	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	6	494	0	0	149	653	2	0	134	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)									17			
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	149			494			656	656	247	476	656	149
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	149			494			656	656	247	476	656	149
tC, single (s)	4.4			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.4			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			99	100	82	100	100	100
cM capacity (veh/h)	1326			1066			350	382	753	387	382	870

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1
Volume Total	6	247	247	149	326	326	136
Volume Left	6	0	0	0	0	0	2
Volume Right	0	0	0	0	326	326	134
cSH	1326	1700	1700	1700	1700	1700	765
Volume to Capacity	0.00	0.15	0.15	0.09	0.19	0.19	0.18
Queue Length 95th (ft)	0	0	0	0	0	0	16
Control Delay (s)	7.7	0.0	0.0	0.0	0.0	0.0	10.9
Lane LOS	A						B
Approach Delay (s)	0.1			0.0			10.9
Approach LOS							B

Intersection Summary			
Average Delay	1.1		
Intersection Capacity Utilization	38.8%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Lane Configurations												
Volume (vph)	2	152	801	213	4	51	580	207	58	317	293	97
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.6	6.8	6.8		5.6	7.2	7.2		5.6	7.2	7.2
Lane Util. Factor		0.97	0.91	0.88		0.97	0.91	1.00		0.97	0.91	1.00
Frpb, ped/bikes		1.00	1.00	0.98		1.00	1.00	0.98		1.00	1.00	0.97
Flpb, ped/bikes		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00
Frt		1.00	1.00	0.85		1.00	1.00	0.85		1.00	1.00	0.85
Flt Protected		0.95	1.00	1.00		0.95	1.00	1.00		0.95	1.00	1.00
Satd. Flow (prot)		3433	5085	2729		3433	5085	1552		3433	5085	1541
Flt Permitted		0.95	1.00	1.00		0.95	1.00	1.00		0.95	1.00	1.00
Satd. Flow (perm)		3433	5085	2729		3433	5085	1552		3433	5085	1541
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	2	165	871	232	4	55	630	225	63	345	318	105
RTOR Reduction (vph)	0	0	0	118	0	0	0	124	0	0	0	92
Lane Group Flow (vph)	0	167	871	114	0	59	630	101	0	408	318	13
Confl. Peds. (#/hr)								7				9
Confl. Bikes (#/hr)				1				1				4
Turn Type	Prot	Prot		Perm	Prot	Prot		Perm	Prot	Prot		Perm
Protected Phases	1	1	6		5	5	2		3	3	8	
Permitted Phases				6				2				8
Actuated Green, G (s)		10.2	59.2	59.2		5.5	54.1	54.1		18.7	15.4	15.4
Effective Green, g (s)		10.2	59.2	59.2		5.5	54.1	54.1		18.7	15.4	15.4
Actuated g/C Ratio		0.08	0.49	0.49		0.05	0.45	0.45		0.16	0.13	0.13
Clearance Time (s)		5.6	6.8	6.8		5.6	7.2	7.2		5.6	7.2	7.2
Vehicle Extension (s)		2.0	2.0	2.0		2.0	2.0	2.0		2.0	2.0	2.0
Lane Grp Cap (vph)		292	2509	1346		157	2292	700		535	653	198
v/s Ratio Prot		c0.05	c0.17			0.02	0.12			c0.12	c0.06	
v/s Ratio Perm				0.04				0.07				0.01
v/c Ratio		0.57	0.35	0.09		0.38	0.27	0.14		0.76	0.49	0.07
Uniform Delay, d1		52.8	18.6	16.1		55.6	20.7	19.4		48.5	48.6	46.0
Progression Factor		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2		1.7	0.4	0.1		0.6	0.3	0.4		5.7	0.2	0.1
Delay (s)		54.5	19.0	16.2		56.1	21.0	19.8		54.3	48.8	46.0
Level of Service		D	B	B		E	C	B		D	D	D
Approach Delay (s)			23.1				22.9				51.2	
Approach LOS			C				C				D	

Intersection Summary			
HCM Average Control Delay	35.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	25.2
Intersection Capacity Utilization	76.0%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBU	SBL	SBT	SBR
Lane Configurations				
Volume (vph)	5	292	181	137
Ideal Flow (vphpl)	1900	1900	1900	1900
Total Lost time (s)		5.6	6.3	6.3
Lane Util. Factor		0.97	0.91	1.00
Frpb, ped/bikes		1.00	1.00	0.97
Flpb, ped/bikes		1.00	1.00	1.00
Frt		1.00	1.00	0.85
Flt Protected		0.95	1.00	1.00
Satd. Flow (prot)		3433	5085	1544
Flt Permitted		0.95	1.00	1.00
Satd. Flow (perm)		3433	5085	1544
Peak-hour factor, PHF	0.92	0.92	0.92	0.92
Adj. Flow (vph)	5	317	197	149
RTOR Reduction (vph)	0	0	0	134
Lane Group Flow (vph)	0	322	197	15
Confl. Peds. (#/hr)				
Confl. Bikes (#/hr)				6
Turn Type	Prot	Prot		Perm
Protected Phases	7	7	4	
Permitted Phases				4
Actuated Green, G (s)		14.7	12.3	12.3
Effective Green, g (s)		14.7	12.3	12.3
Actuated g/C Ratio		0.12	0.10	0.10
Clearance Time (s)		5.6	6.3	6.3
Vehicle Extension (s)		2.0	2.0	2.0
Lane Grp Cap (vph)		421	521	158
v/s Ratio Prot		0.09	0.04	
v/s Ratio Perm				0.01
v/c Ratio		0.76	0.38	0.10
Uniform Delay, d1		51.0	50.3	48.8
Progression Factor		1.00	1.00	1.00
Incremental Delay, d2		7.3	0.2	0.1
Delay (s)		58.3	50.4	48.9
Level of Service		E	D	D
Approach Delay (s)			53.9	
Approach LOS			D	

Intersection Summary

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Lane Configurations												
Volume (vph)	19	300	1052	110	1	376	577	145	3	120	348	246
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.6	6.0	6.0		5.6	6.0	6.0		5.6	5.7	5.7
Lane Util. Factor		0.97	0.91	1.00		0.97	0.91	1.00		0.97	0.91	1.00
Frpb, ped/bikes		1.00	1.00	0.98		1.00	1.00	0.99		1.00	1.00	0.98
Flpb, ped/bikes		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00
Frt		1.00	1.00	0.85		1.00	1.00	0.85		1.00	1.00	0.85
Flt Protected		0.95	1.00	1.00		0.95	1.00	1.00		0.95	1.00	1.00
Satd. Flow (prot)		3433	5085	1556		3433	5085	1561		3433	5085	1557
Flt Permitted		0.95	1.00	1.00		0.95	1.00	1.00		0.95	1.00	1.00
Satd. Flow (perm)		3433	5085	1556		3433	5085	1561		3433	5085	1557
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	21	330	1156	121	1	413	634	159	3	132	382	270
RTOR Reduction (vph)	0	0	0	55	0	0	0	90	0	0	0	234
Lane Group Flow (vph)	0	351	1156	66	0	414	634	69	0	135	382	36
Confl. Peds. (#/hr)				3				2				1
Confl. Bikes (#/hr)				4								2
Turn Type	Prot	Prot		Perm	Prot	Prot		Perm	Prot	Prot		Perm
Protected Phases	1	1	6		5	5	2		3	3	8	
Permitted Phases				6				2				8
Actuated Green, G (s)		16.6	49.4	49.4		18.9	51.7	51.7		9.1	16.0	16.0
Effective Green, g (s)		16.6	49.4	49.4		18.9	51.7	51.7		9.1	16.0	16.0
Actuated g/C Ratio		0.14	0.41	0.41		0.16	0.43	0.43		0.08	0.13	0.13
Clearance Time (s)		5.6	6.0	6.0		5.6	6.0	6.0		5.6	5.7	5.7
Vehicle Extension (s)		2.0	2.0	2.0		2.0	2.0	2.0		2.0	2.0	2.0
Lane Grp Cap (vph)		475	2093	641		541	2191	673		260	678	208
v/s Ratio Prot		0.10	c0.23			c0.12	0.12			0.04	0.08	
v/s Ratio Perm				0.04				0.04				0.02
v/c Ratio		0.74	0.55	0.10		0.77	0.29	0.10		0.52	0.56	0.17
Uniform Delay, d1		49.6	26.9	21.7		48.4	22.2	20.3		53.3	48.7	46.1
Progression Factor		1.00	1.00	1.00		1.35	0.37	0.48		1.00	1.00	1.00
Incremental Delay, d2		5.1	1.1	0.3		5.5	0.3	0.3		0.7	0.6	0.1
Delay (s)		54.8	27.9	22.0		71.1	8.4	10.1		54.1	49.4	46.3
Level of Service		D	C	C		E	A	B		D	D	D
Approach Delay (s)			33.3				30.1				49.1	
Approach LOS			C				C				D	

Intersection Summary			
HCM Average Control Delay	38.9	HCM Level of Service	D
HCM Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	22.9
Intersection Capacity Utilization	81.6%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBU	SBL	SBT	SBR
Lane Configurations				
Volume (vph)	36	203	495	166
Ideal Flow (vphpl)	1900	1900	1900	1900
Total Lost time (s)		5.6	5.7	5.7
Lane Util. Factor		0.97	0.86	0.86
Frpb, ped/bikes		1.00	1.00	0.98
Flpb, ped/bikes		1.00	1.00	1.00
Frt		1.00	0.99	0.85
Flt Protected		0.95	1.00	1.00
Satd. Flow (prot)		3433	4775	1339
Flt Permitted		0.95	1.00	1.00
Satd. Flow (perm)		3433	4775	1339
Peak-hour factor, PHF	0.91	0.91	0.91	0.91
Adj. Flow (vph)	40	223	544	182
RTOR Reduction (vph)	0	0	3	134
Lane Group Flow (vph)	0	263	563	26
Confl. Peds. (#/hr)				2
Confl. Bikes (#/hr)				2
Turn Type	Prot	Prot		Perm
Protected Phases	7	7	4	
Permitted Phases				4
Actuated Green, G (s)		12.8	19.7	19.7
Effective Green, g (s)		12.8	19.7	19.7
Actuated g/C Ratio		0.11	0.16	0.16
Clearance Time (s)		5.6	5.7	5.7
Vehicle Extension (s)		2.0	2.0	2.0
Lane Grp Cap (vph)		366	784	220
v/s Ratio Prot		c0.08	c0.12	
v/s Ratio Perm				0.02
v/c Ratio		0.72	0.72	0.12
Uniform Delay, d1		51.9	47.5	42.8
Progression Factor		1.00	1.00	1.00
Incremental Delay, d2		5.5	2.6	0.1
Delay (s)		57.4	50.1	42.8
Level of Service		E	D	D
Approach Delay (s)			50.9	
Approach LOS			D	

Intersection Summary

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL
Lane Configurations												
Volume (vph)	2	9	1493	16	1	18	1091	70	13	7	23	72
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.7	6.7	6.7		5.6	6.7			5.6	5.6	5.6
Lane Util. Factor		1.00	0.91	1.00		1.00	0.91			1.00	1.00	0.95
Frpb, ped/bikes		1.00	1.00	0.98		1.00	1.00			1.00	0.99	1.00
Flpb, ped/bikes		1.00	1.00	1.00		1.00	1.00			1.00	1.00	1.00
Frt		1.00	1.00	0.85		1.00	0.99			1.00	0.85	1.00
Flt Protected		0.95	1.00	1.00		0.95	1.00			0.97	1.00	0.95
Satd. Flow (prot)		1770	5085	1549		1770	5029			1665	1563	1681
Flt Permitted		0.95	1.00	1.00		0.95	1.00			0.97	1.00	0.95
Satd. Flow (perm)		1770	5085	1549		1770	5029			1665	1563	1681
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	2	10	1678	18	1	20	1226	79	15	8	26	81
RTOR Reduction (vph)	0	0	0	4	0	0	3	0	0	0	25	0
Lane Group Flow (vph)	0	12	1678	14	0	21	1302	0	0	23	1	45
Confl. Peds. (#/hr)								5			1	
Confl. Bikes (#/hr)				3								
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	15%	2%	2%	2%
Turn Type	Prot	Prot		Perm	Prot	Prot			Split		Perm	Split
Protected Phases	1	1	6		5	5	2		3	3		4
Permitted Phases				6							3	
Actuated Green, G (s)		2.6	79.0	79.0		2.9	78.2			6.3	6.3	8.3
Effective Green, g (s)		2.6	79.0	79.0		2.9	78.2			6.3	6.3	8.3
Actuated g/C Ratio		0.02	0.66	0.66		0.02	0.65			0.05	0.05	0.07
Clearance Time (s)		6.7	6.7	6.7		5.6	6.7			5.6	5.6	5.6
Vehicle Extension (s)		2.0	3.0	3.0		2.0	3.0			2.0	2.0	2.0
Lane Grp Cap (vph)		38	3348	1020		43	3277			87	82	116
v/s Ratio Prot		0.01	c0.33			c0.01	0.26			c0.01		c0.03
v/s Ratio Perm				0.01							0.00	
v/c Ratio		0.32	0.50	0.01		0.49	0.40			0.26	0.02	0.39
Uniform Delay, d1		57.8	10.5	7.1		57.8	9.8			54.6	53.9	53.4
Progression Factor		0.67	1.69	1.44		1.32	0.33			1.00	1.00	1.00
Incremental Delay, d2		1.5	0.5	0.0		2.9	0.3			0.6	0.0	0.8
Delay (s)		40.4	18.1	10.2		79.0	3.6			55.2	53.9	54.2
Level of Service		D	B	B		E	A			E	D	D
Approach Delay (s)			18.2				4.7			54.5		
Approach LOS			B				A			D		

Intersection Summary			
HCM Average Control Delay	14.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.44		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.8
Intersection Capacity Utilization	55.1%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	SBT	SBR
Lane Configurations		
Volume (vph)	8	23
Ideal Flow (vphpl)	1900	1900
Total Lost time (s)	5.6	5.6
Lane Util. Factor	0.95	1.00
Frpb, ped/bikes	1.00	0.98
Flpb, ped/bikes	1.00	1.00
Frt	1.00	0.85
Flt Protected	0.96	1.00
Satd. Flow (prot)	1702	1559
Flt Permitted	0.96	1.00
Satd. Flow (perm)	1702	1559
Peak-hour factor, PHF	0.89	0.89
Adj. Flow (vph)	9	26
RTOR Reduction (vph)	0	24
Lane Group Flow (vph)	45	2
Confl. Peds. (#/hr)		3
Confl. Bikes (#/hr)		
Heavy Vehicles (%)	2%	2%
Turn Type		Perm
Protected Phases	4	
Permitted Phases		4
Actuated Green, G (s)	8.3	8.3
Effective Green, g (s)	8.3	8.3
Actuated g/C Ratio	0.07	0.07
Clearance Time (s)	5.6	5.6
Vehicle Extension (s)	2.0	2.0
Lane Grp Cap (vph)	118	108
v/s Ratio Prot	0.03	
v/s Ratio Perm		0.00
v/c Ratio	0.38	0.02
Uniform Delay, d1	53.4	52.0
Progression Factor	1.00	1.00
Incremental Delay, d2	0.8	0.0
Delay (s)	54.1	52.1
Level of Service	D	D
Approach Delay (s)	53.7	
Approach LOS	D	

Intersection Summary

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Lane Configurations												
Volume (vph)	79	187	1210	128	15	274	933	127	1	92	175	289
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.7	5.7	5.7		6.7	5.7	5.7		6.3	5.3	5.3
Lane Util. Factor		0.97	0.91	1.00		0.97	0.91	1.00		0.97	0.95	1.00
Frpb, ped/bikes		1.00	1.00	0.99		1.00	1.00	0.98		1.00	1.00	0.98
Flpb, ped/bikes		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00
Frt		1.00	1.00	0.85		1.00	1.00	0.85		1.00	1.00	0.85
Flt Protected		0.95	1.00	1.00		0.95	1.00	1.00		0.95	1.00	1.00
Satd. Flow (prot)		3433	5085	1563		3433	5085	1556		3433	3539	1553
Flt Permitted		0.95	1.00	1.00		0.95	1.00	1.00		0.95	1.00	1.00
Satd. Flow (perm)		3433	5085	1563		3433	5085	1556		3433	3539	1553
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	88	208	1344	142	17	304	1037	141	1	102	194	321
RTOR Reduction (vph)	0	0	0	53	0	0	0	65	0	0	0	219
Lane Group Flow (vph)	0	296	1344	89	0	321	1037	76	0	103	194	102
Confl. Peds. (#/hr)								4				
Confl. Bikes (#/hr)				2				1				4
Turn Type	Prot	Prot		Perm	Prot	Prot		Perm	Prot	Prot		Perm
Protected Phases	1	1	6		5	5	2		3	3	8	
Permitted Phases				6				2				8
Actuated Green, G (s)		13.7	56.5	56.5		14.2	57.0	57.0		8.0	14.4	14.4
Effective Green, g (s)		13.7	56.5	56.5		14.2	57.0	57.0		8.0	14.4	14.4
Actuated g/C Ratio		0.11	0.47	0.47		0.12	0.48	0.48		0.07	0.12	0.12
Clearance Time (s)		6.7	5.7	5.7		6.7	5.7	5.7		6.3	5.3	5.3
Vehicle Extension (s)		2.0	2.0	2.0		2.0	2.0	2.0		2.0	2.0	2.0
Lane Grp Cap (vph)		392	2394	736		406	2415	739		229	425	186
v/s Ratio Prot		0.09	c0.26			c0.09	0.20			0.03	0.05	
v/s Ratio Perm				0.06				0.05				c0.07
v/c Ratio		0.76	0.56	0.12		0.79	0.43	0.10		0.45	0.46	0.55
Uniform Delay, d1		51.5	22.8	17.8		51.5	20.8	17.4		53.9	49.2	49.7
Progression Factor		1.24	0.75	1.38		1.40	0.35	0.27		1.00	1.00	1.00
Incremental Delay, d2		6.6	0.9	0.3		8.6	0.5	0.3		0.5	0.3	1.8
Delay (s)		70.4	18.0	24.9		80.5	7.8	5.0		54.4	49.4	51.5
Level of Service		E	B	C		F	A	A		D	D	D
Approach Delay (s)			27.3				23.1				51.3	
Approach LOS			C				C				D	

Intersection Summary			
HCM Average Control Delay	31.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	29.3
Intersection Capacity Utilization	74.3%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBU	SBL	SBT	SBR
Lane Configurations				
Volume (vph)	7	161	157	118
Ideal Flow (vphpl)	1900	1900	1900	1900
Total Lost time (s)		6.3	5.3	5.3
Lane Util. Factor		0.97	0.95	1.00
Frpb, ped/bikes		1.00	1.00	0.98
Flpb, ped/bikes		1.00	1.00	1.00
Frt		1.00	1.00	0.85
Flt Protected		0.95	1.00	1.00
Satd. Flow (prot)		3433	3539	1548
Flt Permitted		0.95	1.00	1.00
Satd. Flow (perm)		3433	3539	1548
Peak-hour factor, PHF	0.90	0.90	0.90	0.90
Adj. Flow (vph)	8	179	174	131
RTOR Reduction (vph)	0	0	0	112
Lane Group Flow (vph)	0	187	174	19
Confl. Peds. (#/hr)				4
Confl. Bikes (#/hr)				4
Turn Type	Prot	Prot		Perm
Protected Phases	7	7	4	
Permitted Phases				4
Actuated Green, G (s)		10.9	17.3	17.3
Effective Green, g (s)		10.9	17.3	17.3
Actuated g/C Ratio		0.09	0.14	0.14
Clearance Time (s)		6.3	5.3	5.3
Vehicle Extension (s)		2.0	2.0	2.0
Lane Grp Cap (vph)		312	510	223
v/s Ratio Prot		c0.05	c0.05	
v/s Ratio Perm				0.01
v/c Ratio		0.60	0.34	0.08
Uniform Delay, d1		52.5	46.2	44.5
Progression Factor		1.00	1.00	1.00
Incremental Delay, d2		2.1	0.1	0.1
Delay (s)		54.5	46.4	44.5
Level of Service		D	D	D
Approach Delay (s)			49.0	
Approach LOS			D	

Intersection Summary

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL
Lane Configurations												
Volume (vph)	10	74	1583	16	8	122	1301	87	6	33	126	64
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.6	5.7	5.7		5.6	5.7		5.6	5.3	5.3	5.6
Lane Util. Factor		1.00	0.91	1.00		0.97	0.91		1.00	1.00	0.88	1.00
Frpb, ped/bikes		1.00	1.00	0.98		1.00	1.00		1.00	1.00	0.98	1.00
Flpb, ped/bikes		1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00
Frt		1.00	1.00	0.85		1.00	0.99		1.00	1.00	0.85	1.00
Flt Protected		0.95	1.00	1.00		0.95	1.00		0.95	1.00	1.00	0.95
Satd. Flow (prot)		1770	5085	1555		3433	5029		1770	1863	2737	1770
Flt Permitted		0.95	1.00	1.00		0.95	1.00		0.95	1.00	1.00	0.95
Satd. Flow (perm)		1770	5085	1555		3433	5029		1770	1863	2737	1770
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	11	78	1666	17	8	128	1369	92	6	35	133	67
RTOR Reduction (vph)	0	0	0	4	0	0	4	0	0	0	119	0
Lane Group Flow (vph)	0	89	1666	13	0	136	1457	0	6	35	14	67
Confl. Peds. (#/hr)				4				2			3	
Confl. Bikes (#/hr)				2				1			1	
Turn Type	Prot	Prot		Perm	Prot	Prot			Prot		Perm	Prot
Protected Phases	1	1	6		5	5	2		3	8		7
Permitted Phases				6							8	
Actuated Green, G (s)		10.4	68.5	68.5		9.1	67.2		1.2	12.3	12.3	7.9
Effective Green, g (s)		10.4	68.5	68.5		9.1	67.2		1.2	12.3	12.3	7.9
Actuated g/C Ratio		0.09	0.57	0.57		0.08	0.56		0.01	0.10	0.10	0.07
Clearance Time (s)		5.6	5.7	5.7		5.6	5.7		5.6	5.3	5.3	5.6
Vehicle Extension (s)		2.0	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0
Lane Grp Cap (vph)		153	2903	888		260	2816		18	191	281	117
v/s Ratio Prot		c0.05	c0.33			0.04	0.29		0.00	c0.02		c0.04
v/s Ratio Perm				0.01							0.00	
v/c Ratio		0.58	0.57	0.01		0.52	0.52		0.33	0.18	0.05	0.57
Uniform Delay, d1		52.7	16.4	11.1		53.4	16.4		59.0	49.3	48.6	54.4
Progression Factor		1.11	0.90	0.42		1.25	0.30		1.00	1.00	1.00	1.00
Incremental Delay, d2		3.1	0.7	0.0		0.7	0.6		3.9	0.2	0.0	4.2
Delay (s)		61.5	15.5	4.7		67.3	5.5		63.0	49.4	48.6	58.6
Level of Service		E	B	A		E	A		E	D	D	E
Approach Delay (s)			17.7				10.8			49.3		
Approach LOS			B				B			D		

Intersection Summary			
HCM Average Control Delay	17.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.5
Intersection Capacity Utilization	64.1%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBT	SBR
Lane Configurations	↑↱	
Volume (vph)	32	60
Ideal Flow (vphpl)	1900	1900
Total Lost time (s)	5.3	
Lane Util. Factor	0.95	
Frpb, ped/bikes	0.99	
Flpb, ped/bikes	1.00	
Frt	0.90	
Flt Protected	1.00	
Satd. Flow (prot)	3157	
Flt Permitted	1.00	
Satd. Flow (perm)	3157	
Peak-hour factor, PHF	0.95	0.95
Adj. Flow (vph)	34	63
RTOR Reduction (vph)	53	0
Lane Group Flow (vph)	44	0
Confl. Peds. (#/hr)		4
Confl. Bikes (#/hr)		1
Turn Type		
Protected Phases	4	
Permitted Phases		
Actuated Green, G (s)	19.0	
Effective Green, g (s)	19.0	
Actuated g/C Ratio	0.16	
Clearance Time (s)	5.3	
Vehicle Extension (s)	2.0	
Lane Grp Cap (vph)	500	
v/s Ratio Prot	0.01	
v/s Ratio Perm		
v/c Ratio	0.09	
Uniform Delay, d1	43.1	
Progression Factor	1.00	
Incremental Delay, d2	0.0	
Delay (s)	43.1	
Level of Service	D	
Approach Delay (s)	49.4	
Approach LOS	D	

Intersection Summary

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL
Lane Configurations												
Volume (vph)	5	126	1462	163	99	262	1322	6	131	32	242	168
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.6	5.7			5.6	5.7		5.6	4.6		5.9
Lane Util. Factor		1.00	0.91			0.97	0.91		1.00	1.00		0.97
Frpb, ped/bikes		1.00	1.00			1.00	1.00		1.00	0.99		1.00
Flpb, ped/bikes		1.00	1.00			1.00	1.00		1.00	1.00		1.00
Frt		1.00	0.98			1.00	1.00		1.00	0.87		1.00
Flt Protected		0.95	1.00			0.95	1.00		0.95	1.00		0.95
Satd. Flow (prot)		1770	4995			3433	5081		1770	1596		3433
Flt Permitted		0.95	1.00			0.95	1.00		0.95	1.00		0.95
Satd. Flow (perm)		1770	4995			3433	5081		1770	1596		3433
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	5	133	1539	172	104	276	1392	6	138	34	255	177
RTOR Reduction (vph)	0	0	9	0	0	0	1	0	0	175	0	0
Lane Group Flow (vph)	0	138	1702	0	0	380	1397	0	138	114	0	177
Confl. Peds. (#/hr)				11				6				
Confl. Bikes (#/hr)				1				2			1	
Turn Type	Prot	Prot			Prot	Prot			Prot			Prot
Protected Phases	1	1	6		5	5	2		7	4		3
Permitted Phases												
Actuated Green, G (s)		13.7	54.8			16.9	58.0		13.6	12.8		13.7
Effective Green, g (s)		13.7	54.8			16.9	58.0		13.6	12.8		13.7
Actuated g/C Ratio		0.11	0.46			0.14	0.48		0.11	0.11		0.11
Clearance Time (s)		5.6	5.7			5.6	5.7		5.6	4.6		5.9
Vehicle Extension (s)		2.0	2.0			2.0	2.0		2.0	2.0		2.0
Lane Grp Cap (vph)		202	2281			483	2456		201	170		392
v/s Ratio Prot		0.08	c0.34			c0.11	c0.28		c0.08	0.07		c0.05
v/s Ratio Perm												
v/c Ratio		0.68	0.75			0.79	0.57		0.69	0.67		0.45
Uniform Delay, d1		51.1	26.9			49.8	22.1		51.2	51.6		49.6
Progression Factor		1.42	0.44			0.99	0.95		1.00	1.00		1.00
Incremental Delay, d2		6.5	2.0			4.8	0.6		7.5	7.9		0.3
Delay (s)		78.9	13.7			54.2	21.7		58.7	59.4		49.9
Level of Service		E	B			D	C		E	E		D
Approach Delay (s)			18.6				28.6			59.2		
Approach LOS			B				C			E		

Intersection Summary			
HCM Average Control Delay	28.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	22.6
Intersection Capacity Utilization	84.1%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBT	SBR
Lane Configurations		
Volume (vph)	17	66
Ideal Flow (vphpl)	1900	1900
Total Lost time (s)	4.9	
Lane Util. Factor	1.00	
Frpb, ped/bikes	0.98	
Flpb, ped/bikes	1.00	
Frt	0.88	
Flt Protected	1.00	
Satd. Flow (prot)	1600	
Flt Permitted	1.00	
Satd. Flow (perm)	1600	
Peak-hour factor, PHF	0.95	0.95
Adj. Flow (vph)	18	69
RTOR Reduction (vph)	62	0
Lane Group Flow (vph)	25	0
Confl. Peds. (#/hr)		16
Confl. Bikes (#/hr)		2
Turn Type		
Protected Phases	8	
Permitted Phases		
Actuated Green, G (s)	12.9	
Effective Green, g (s)	12.9	
Actuated g/C Ratio	0.11	
Clearance Time (s)	4.9	
Vehicle Extension (s)	2.0	
Lane Grp Cap (vph)	172	
v/s Ratio Prot	0.02	
v/s Ratio Perm		
v/c Ratio	0.15	
Uniform Delay, d1	48.6	
Progression Factor	1.00	
Incremental Delay, d2	0.1	
Delay (s)	48.7	
Level of Service	D	
Approach Delay (s)	49.5	
Approach LOS	D	

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	1762	236	49	993	0	0	0	0	478	0	1019
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0		5.6	5.7					6.7	6.7	6.7
Lane Util. Factor		0.91		1.00	0.91					0.95	0.95	0.88
Frpb, ped/bikes		1.00		1.00	1.00					1.00	1.00	0.99
Flpb, ped/bikes		1.00		1.00	1.00					1.00	1.00	1.00
Frt		0.98		1.00	1.00					1.00	1.00	0.85
Flt Protected		1.00		0.95	1.00					0.95	0.95	1.00
Satd. Flow (prot)		4978		1736	5085					1681	1681	2748
Flt Permitted		1.00		0.95	1.00					0.95	0.95	1.00
Satd. Flow (perm)		4978		1736	5085					1681	1681	2748
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	1958	262	54	1103	0	0	0	0	531	0	1132
RTOR Reduction (vph)	0	11	0	0	0	0	0	0	0	0	0	102
Lane Group Flow (vph)	0	2209	0	54	1103	0	0	0	0	265	266	1030
Confl. Peds. (#/hr)			3			2						2
Confl. Bikes (#/hr)			1			2						
Heavy Vehicles (%)	2%	2%	2%	4%	2%	2%	2%	2%	2%	2%	2%	2%
Turn Type				Prot						Split		Perm
Protected Phases		2		1	6					4	4	
Permitted Phases												4
Actuated Green, G (s)		56.2		7.2	69.3					38.3	38.3	38.3
Effective Green, g (s)		56.2		7.2	69.3					38.3	38.3	38.3
Actuated g/C Ratio		0.47		0.06	0.58					0.32	0.32	0.32
Clearance Time (s)		6.0		5.6	5.7					6.7	6.7	6.7
Vehicle Extension (s)		2.0		2.0	2.0					1.0	1.0	1.0
Lane Grp Cap (vph)		2331		104	2937					537	537	877
v/s Ratio Prot		c0.44		0.03	c0.22					0.16	0.16	
v/s Ratio Perm												c0.37
v/c Ratio		0.95		0.52	0.38					0.49	0.50	1.17
Uniform Delay, d1		30.5		54.7	13.7					33.0	33.0	40.9
Progression Factor		0.67		0.38	1.20					1.00	1.00	1.00
Incremental Delay, d2		7.9		1.6	0.3					0.3	0.3	90.4
Delay (s)		28.3		22.2	16.8					33.3	33.3	131.3
Level of Service		C		C	B					C	C	F
Approach Delay (s)		28.3			17.0			0.0			100.0	
Approach LOS		C			B			A			F	

Intersection Summary			
HCM Average Control Delay	49.4	HCM Level of Service	D
HCM Volume to Capacity ratio	1.00		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	18.4
Intersection Capacity Utilization	72.2%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBU	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations							
Volume (vph)	6	944	1291	1038	462	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.6	6.0	5.7	5.7		
Lane Util. Factor		0.97	0.91	0.91	1.00		
Frpb, ped/bikes		1.00	1.00	1.00	0.98		
Flpb, ped/bikes		1.00	1.00	1.00	1.00		
Frt		1.00	1.00	1.00	0.85		
Flt Protected		0.95	1.00	1.00	1.00		
Satd. Flow (prot)		3433	5085	5085	1559		
Flt Permitted		0.95	1.00	1.00	1.00		
Satd. Flow (perm)		3433	5085	5085	1559		
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	6	1015	1388	1116	497	0	0
RTOR Reduction (vph)	0	0	0	0	42	0	0
Lane Group Flow (vph)	0	1021	1388	1116	455	0	0
Confl. Peds. (#/hr)					1		
Confl. Bikes (#/hr)					2		
Turn Type	Prot	Prot			Perm		
Protected Phases	1	1	6	2			
Permitted Phases					2		
Actuated Green, G (s)		59.4	120.0	49.3	49.3		
Effective Green, g (s)		59.4	120.0	49.3	49.3		
Actuated g/C Ratio		0.49	1.00	0.41	0.41		
Clearance Time (s)		5.6	6.0	5.7	5.7		
Vehicle Extension (s)		2.0	3.0	2.0	2.0		
Lane Grp Cap (vph)		1699	5085	2089	640		
v/s Ratio Prot		c0.30	0.27	0.22			
v/s Ratio Perm					c0.29		
v/c Ratio		0.60	0.27	0.53	0.71		
Uniform Delay, d1		21.8	0.0	26.7	29.4		
Progression Factor		0.51	1.00	1.07	1.09		
Incremental Delay, d2		0.2	0.1	0.9	6.0		
Delay (s)		11.3	0.1	29.5	38.0		
Level of Service		B	A	C	D		
Approach Delay (s)			4.8	32.1		0.0	
Approach LOS			A	C		A	

Intersection Summary			
HCM Average Control Delay	15.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	11.3
Intersection Capacity Utilization	72.2%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBU
Lane Configurations												
Volume (vph)	11	67	860	254	9	37	838	119	477	79	114	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.6	5.7	5.7		5.6	5.7	5.7	5.6	5.6		
Lane Util. Factor		1.00	0.95	1.00		1.00	0.91	1.00	0.91	0.91		
Frpb, ped/bikes		1.00	1.00	0.97		1.00	1.00	0.98	1.00	0.99		
Flpb, ped/bikes		1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00		
Frt		1.00	1.00	0.85		1.00	1.00	0.85	1.00	0.96		
Flt Protected		0.95	1.00	1.00		0.95	1.00	1.00	0.95	0.97		
Satd. Flow (prot)		1770	3539	1542		1770	5085	1558	1610	3150		
Flt Permitted		0.95	1.00	1.00		0.95	1.00	1.00	0.95	0.97		
Satd. Flow (perm)		1770	3539	1542		1770	5085	1558	1610	3150		
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	12	72	925	273	10	40	901	128	513	85	123	8
RTOR Reduction (vph)	0	0	0	135	0	0	0	68	0	29	0	0
Lane Group Flow (vph)	0	84	925	138	0	50	901	60	256	436	0	0
Confl. Peds. (#/hr)				2				2			4	
Confl. Bikes (#/hr)				1				3			4	
Turn Type	Prot	Prot		Perm	Prot	Prot		Perm	Split			Split
Protected Phases	1	1	6		5	5	2		3	3		4
Permitted Phases				6				2				
Actuated Green, G (s)		8.9	57.5	57.5		6.9	55.5	55.5	22.0	22.0		
Effective Green, g (s)		8.9	57.5	57.5		6.9	55.5	55.5	22.0	22.0		
Actuated g/C Ratio		0.07	0.48	0.48		0.06	0.46	0.46	0.18	0.18		
Clearance Time (s)		5.6	5.7	5.7		5.6	5.7	5.7	5.6	5.6		
Vehicle Extension (s)		2.0	3.9	3.9		2.0	3.9	3.9	2.0	2.0		
Lane Grp Cap (vph)		131	1696	739		102	2352	721	295	578		
v/s Ratio Prot		c0.05	c0.26			0.03	0.18		c0.16	0.14		
v/s Ratio Perm				0.09				0.04				
v/c Ratio		0.64	0.55	0.19		0.49	0.38	0.08	0.87	0.76		
Uniform Delay, d1		54.0	22.0	17.9		54.8	21.1	18.0	47.6	46.4		
Progression Factor		0.84	0.93	2.41		1.00	1.00	1.00	1.00	1.00		
Incremental Delay, d2		7.6	1.2	0.5		1.3	0.5	0.2	21.9	5.0		
Delay (s)		53.1	21.8	43.6		56.2	21.5	18.3	69.5	51.4		
Level of Service		D	C	D		E	C	B	E	D		
Approach Delay (s)			28.5				22.8			57.8		
Approach LOS			C				C			E		

Intersection Summary			
HCM Average Control Delay	35.4	HCM Level of Service	D
HCM Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	15.8
Intersection Capacity Utilization	65.8%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBL	SBT	SBR
Lane Configurations			
Volume (vph)	134	61	100
Ideal Flow (vphpl)	1900	1900	1900
Total Lost time (s)	4.6	4.6	4.6
Lane Util. Factor	0.95	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.99
Flpb, ped/bikes	1.00	1.00	1.00
Frt	1.00	1.00	0.85
Flt Protected	0.95	0.98	1.00
Satd. Flow (prot)	1681	1734	1561
Flt Permitted	0.95	0.98	1.00
Satd. Flow (perm)	1681	1734	1561
Peak-hour factor, PHF	0.93	0.93	0.93
Adj. Flow (vph)	144	66	108
RTOR Reduction (vph)	0	0	97
Lane Group Flow (vph)	107	111	11
Confl. Peds. (#/hr)			
Confl. Bikes (#/hr)			1
Turn Type	Split		Perm
Protected Phases	4	4	
Permitted Phases			4
Actuated Green, G (s)	12.1	12.1	12.1
Effective Green, g (s)	12.1	12.1	12.1
Actuated g/C Ratio	0.10	0.10	0.10
Clearance Time (s)	4.6	4.6	4.6
Vehicle Extension (s)	2.0	2.0	2.0
Lane Grp Cap (vph)	170	175	157
v/s Ratio Prot	0.06	c0.06	
v/s Ratio Perm			0.01
v/c Ratio	0.63	0.63	0.07
Uniform Delay, d1	51.8	51.8	48.9
Progression Factor	1.00	1.00	1.00
Incremental Delay, d2	5.2	5.4	0.1
Delay (s)	57.0	57.2	48.9
Level of Service	E	E	D
Approach Delay (s)		54.4	
Approach LOS		D	

Intersection Summary

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	264	22	0	377	334	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Hourly flow rate (vph)	290	24	0	414	367	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)		1				
Median type				TWLTL	TWLTL	
Median storage veh)				2	2	
Upstream signal (ft)					808	
pX, platoon unblocked						
vC, conflicting volume	574	367	367			
vC1, stage 1 conf vol	367					
vC2, stage 2 conf vol	207					
vCu, unblocked vol	574	367	367			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.3	2.2			
p0 queue free %	53	96	100			
cM capacity (veh/h)	614	630	1188			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1
Volume Total	314	207	207	367
Volume Left	290	0	0	0
Volume Right	24	0	0	0
cSH	640	1700	1700	1700
Volume to Capacity	0.49	0.12	0.12	0.22
Queue Length 95th (ft)	68	0	0	0
Control Delay (s)	15.9	0.0	0.0	0.0
Lane LOS	C			
Approach Delay (s)	15.9	0.0		0.0
Approach LOS	C			

Intersection Summary			
Average Delay	4.6		
Intersection Capacity Utilization	38.9%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL
Lane Configurations												
Volume (vph)	51	44	54	43	41	44	16	86	681	87	8	59
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.6	4.6	4.6	5.6	4.6	4.6		5.6	5.3	5.3		5.6
Lane Util. Factor	1.00	1.00	1.00	0.97	1.00	1.00		1.00	0.95	1.00		1.00
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00	0.98		1.00	1.00	0.97		1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00		1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	1.00	0.85		1.00
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.95	1.00	1.00		0.95
Satd. Flow (prot)	1770	1863	1560	3433	1863	1554		1770	3539	1528		1770
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00		0.95	1.00	1.00		0.95
Satd. Flow (perm)	1770	1863	1560	3433	1863	1554		1770	3539	1528		1770
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	57	49	60	48	46	49	18	96	757	97	9	66
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	57	0	0
Lane Group Flow (vph)	57	49	60	48	46	49	0	114	757	40	0	75
Confl. Peds. (#/hr)						4				8		
Confl. Bikes (#/hr)	1		2			2		1		3		1
Turn Type	Prot		Perm	Prot		Perm	Prot	Prot		Perm	Prot	Prot
Protected Phases	3	8		7	4		1	1	6		5	5
Permitted Phases			8			4				6		
Actuated Green, G (s)	6.0	12.2	12.2	3.3	9.5	9.5		10.9	30.7	30.7		6.7
Effective Green, g (s)	6.0	12.2	12.2	3.3	9.5	9.5		10.9	30.7	30.7		6.7
Actuated g/C Ratio	0.08	0.16	0.16	0.04	0.13	0.13		0.15	0.41	0.41		0.09
Clearance Time (s)	5.6	4.6	4.6	5.6	4.6	4.6		5.6	5.3	5.3		5.6
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0		2.0
Lane Grp Cap (vph)	144	307	257	153	239	200		261	1468	634		160
v/s Ratio Prot	c0.03	0.03		0.01	0.02			c0.06	c0.21			0.04
v/s Ratio Perm			c0.04			0.03				0.03		
v/c Ratio	0.40	0.16	0.23	0.31	0.19	0.24		0.44	0.52	0.06		0.47
Uniform Delay, d1	32.3	26.5	26.8	34.3	28.8	29.0		28.8	16.1	13.0		32.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00		1.00
Incremental Delay, d2	0.7	0.1	0.2	0.4	0.1	0.2		0.4	0.1	0.0		0.8
Delay (s)	32.9	26.6	27.0	34.7	29.0	29.3		29.2	16.2	13.0		32.8
Level of Service	C	C	C	C	C	C		C	B	B		C
Approach Delay (s)		28.9			31.0				17.4			
Approach LOS		C			C				B			

Intersection Summary			
HCM Average Control Delay	20.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	74.0	Sum of lost time (s)	26.4
Intersection Capacity Utilization	51.1%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBT	SBR
Lane Configurations	↑↱	
Volume (vph)	650	32
Ideal Flow (vphpl)	1900	1900
Total Lost time (s)	5.3	
Lane Util. Factor	0.95	
Frpb, ped/bikes	1.00	
Flpb, ped/bikes	1.00	
Frt	0.99	
Flt Protected	1.00	
Satd. Flow (prot)	3509	
Flt Permitted	1.00	
Satd. Flow (perm)	3509	
Peak-hour factor, PHF	0.90	0.90
Adj. Flow (vph)	722	36
RTOR Reduction (vph)	2	0
Lane Group Flow (vph)	756	0
Confl. Peds. (#/hr)		5
Confl. Bikes (#/hr)		3
Turn Type		
Protected Phases	2	
Permitted Phases		
Actuated Green, G (s)	26.5	
Effective Green, g (s)	26.5	
Actuated g/C Ratio	0.36	
Clearance Time (s)	5.3	
Vehicle Extension (s)	2.0	
Lane Grp Cap (vph)	1257	
v/s Ratio Prot	c0.22	
v/s Ratio Perm		
v/c Ratio	0.60	
Uniform Delay, d1	19.4	
Progression Factor	1.00	
Incremental Delay, d2	0.6	
Delay (s)	20.0	
Level of Service	B	
Approach Delay (s)	21.1	
Approach LOS	C	

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	12	173	6	11	104	9	12	14	26	6	10	10
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	14	199	7	13	120	10	14	16	30	7	11	11

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total (vph)	14	206	13	130	60	30
Volume Left (vph)	14	0	13	0	14	7
Volume Right (vph)	0	7	0	10	30	11
Hadj (s)	0.53	0.01	0.53	-0.02	-0.22	-0.15
Departure Headway (s)	5.4	4.8	5.4	4.9	4.6	4.7
Degree Utilization, x	0.02	0.28	0.02	0.18	0.08	0.04
Capacity (veh/h)	656	724	640	716	728	703
Control Delay (s)	7.3	8.5	7.3	7.7	7.9	7.9
Approach Delay (s)	8.4		7.7		7.9	7.9
Approach LOS	A		A		A	A

Intersection Summary			
Delay	8.1		
HCM Level of Service	A		
Intersection Capacity Utilization	20.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	105	110	2	1	42	3	2	451	11	2	481	77
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.6	4.6	4.6	5.6	5.6	5.6	6.3	5.3		6.3	5.3	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00		1.00	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1863	1583	1770	1863	1583	1770	3526		1770	3466	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	1863	1583	1770	1863	1583	1770	3526		1770	3466	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	111	116	2	1	44	3	2	475	12	2	506	81
RTOR Reduction (vph)	0	0	1	0	0	3	0	1	0	0	7	0
Lane Group Flow (vph)	111	116	1	1	44	0	2	486	0	2	580	0
Turn Type	Prot		Perm	Prot		Perm	Prot			Prot		
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases			8			4						
Actuated Green, G (s)	7.7	16.7	16.7	0.5	8.5	8.5	0.5	21.3		0.5	21.3	
Effective Green, g (s)	7.7	16.7	16.7	0.5	8.5	8.5	0.5	21.3		0.5	21.3	
Actuated g/C Ratio	0.13	0.27	0.27	0.01	0.14	0.14	0.01	0.35		0.01	0.35	
Clearance Time (s)	5.6	4.6	4.6	5.6	5.6	5.6	6.3	5.3		6.3	5.3	
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	224	512	435	15	260	221	15	1235		15	1214	
v/s Ratio Prot	c0.06	c0.06		0.00	0.02		c0.00	0.14		0.00	c0.17	
v/s Ratio Perm			0.00			0.00						
v/c Ratio	0.50	0.23	0.00	0.07	0.17	0.00	0.13	0.39		0.13	0.48	
Uniform Delay, d1	24.7	17.1	16.0	29.9	23.0	22.5	29.9	14.9		29.9	15.4	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.6	0.1	0.0	0.7	0.1	0.0	1.5	0.1		1.5	0.1	
Delay (s)	25.4	17.1	16.0	30.6	23.2	22.5	31.4	15.0		31.4	15.5	
Level of Service	C	B	B	C	C	C	C	B		C	B	
Approach Delay (s)		21.1			23.3			15.0			15.6	
Approach LOS		C			C			B			B	

Intersection Summary			
HCM Average Control Delay	16.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.38		
Actuated Cycle Length (s)	60.8	Sum of lost time (s)	17.2
Intersection Capacity Utilization	37.0%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Lane Configurations												
Volume (vph)	88	0	11	0	0	0	10	87	0	1	0	94
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.6		5.6				5.6	4.6		5.6		4.6
Lane Util. Factor	1.00		1.00				1.00	0.95		1.00		0.95
Frt	1.00		0.85				1.00	1.00		1.00		0.93
Flt Protected	0.95		1.00				0.95	1.00		0.95		1.00
Satd. Flow (prot)	1770		1583				1770	3539		1770		3289
Flt Permitted	0.95		1.00				0.95	1.00		0.95		1.00
Satd. Flow (perm)	1770		1583				1770	3539		1770		3289
Peak-hour factor, PHF	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78
Adj. Flow (vph)	113	0	14	0	0	0	13	112	0	1	0	121
RTOR Reduction (vph)	0	0	8	0	0	0	0	0	0	0	0	84
Lane Group Flow (vph)	113	0	6	0	0	0	13	112	0	1	0	145
Turn Type	Prot		custom	Prot			Prot			Prot		
Protected Phases	3			7	4		1	6		5		2
Permitted Phases			8									
Actuated Green, G (s)	9.3		17.4				0.5	9.7		0.4		9.6
Effective Green, g (s)	9.3		17.4				0.5	9.7		0.4		9.6
Actuated g/C Ratio	0.21		0.40				0.01	0.22		0.01		0.22
Clearance Time (s)	5.6		5.6				5.6	4.6		5.6		4.6
Vehicle Extension (s)	2.0		2.0				2.0	2.0		2.0		2.0
Lane Grp Cap (vph)	380		636				20	793		16		729
v/s Ratio Prot	c0.06						c0.01	0.03		0.00		c0.04
v/s Ratio Perm			c0.00									
v/c Ratio	0.30		0.01				0.65	0.14		0.06		0.20
Uniform Delay, d1	14.3		7.8				21.3	13.5		21.3		13.7
Progression Factor	1.00		1.00				1.00	1.00		1.00		1.00
Incremental Delay, d2	0.2		0.0				45.4	0.0		0.6		0.0
Delay (s)	14.4		7.8				66.7	13.5		21.9		13.8
Level of Service	B		A				E	B		C		B
Approach Delay (s)		13.7			0.0			19.0				13.8
Approach LOS		B			A			B				B

Intersection Summary			
HCM Average Control Delay	15.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.18		
Actuated Cycle Length (s)	43.3	Sum of lost time (s)	15.8
Intersection Capacity Utilization	20.4%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBR
Lane Configurations	
Volume (vph)	84
Ideal Flow (vphpl)	1900
Total Lost time (s)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Peak-hour factor, PHF	0.78
Adj. Flow (vph)	108
RTOR Reduction (vph)	0
Lane Group Flow (vph)	0
Turn Type	
Protected Phases	
Permitted Phases	
Actuated Green, G (s)	
Effective Green, g (s)	
Actuated g/C Ratio	
Clearance Time (s)	
Vehicle Extension (s)	
Lane Grp Cap (vph)	
v/s Ratio Prot	
v/s Ratio Perm	
v/c Ratio	
Uniform Delay, d1	
Progression Factor	
Incremental Delay, d2	
Delay (s)	
Level of Service	
Approach Delay (s)	
Approach LOS	

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	61	4	12	21	2	114	5	289	47	253	208	23
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.6	4.6		4.6	4.6		5.3	5.3		5.3	5.3	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	0.89		1.00	0.85		1.00	0.98		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1649		1770	1588		1770	3466		1770	3487	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	1649		1770	1588		1770	3466		1770	3487	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	64	4	13	22	2	120	5	304	49	266	219	24
RTOR Reduction (vph)	0	10	0	0	102	0	0	9	0	0	4	0
Lane Group Flow (vph)	64	7	0	22	20	0	5	344	0	266	239	0
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases												
Actuated Green, G (s)	6.3	17.5		0.9	12.1		0.7	18.7		23.9	41.9	
Effective Green, g (s)	6.3	17.5		0.9	12.1		0.7	18.7		23.9	41.9	
Actuated g/C Ratio	0.08	0.22		0.01	0.15		0.01	0.23		0.30	0.52	
Clearance Time (s)	4.6	4.6		4.6	4.6		5.3	5.3		5.3	5.3	
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	138	357		20	238		15	802		524	1808	
v/s Ratio Prot	c0.04	0.00		0.01	c0.01		0.00	c0.10		c0.15	0.07	
v/s Ratio Perm												
v/c Ratio	0.46	0.02		1.10	0.08		0.33	0.43		0.51	0.13	
Uniform Delay, d1	35.6	24.9		39.9	29.6		39.8	26.5		23.6	10.1	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.9	0.0		234.8	0.1		4.7	0.1		0.3	0.0	
Delay (s)	36.5	24.9		274.7	29.6		44.5	26.6		23.9	10.1	
Level of Service	D	C		F	C		D	C		C	B	
Approach Delay (s)		34.1			67.1			26.9			17.3	
Approach LOS		C			E			C			B	

Intersection Summary			
HCM Average Control Delay	28.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.39		
Actuated Cycle Length (s)	80.8	Sum of lost time (s)	19.8
Intersection Capacity Utilization	46.2%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Volume (vph)	49	10	8	5	30	8	43	6	249	56	67	152
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.6	7.2			5.6	5.6	6.3	6.3	5.3	5.3	6.3	5.3
Lane Util. Factor	1.00	1.00			0.97	1.00	0.88	1.00	0.95	1.00	0.97	0.95
Frpb, ped/bikes	1.00	0.99			1.00	1.00	0.99	1.00	1.00	0.98	1.00	1.00
Flpb, ped/bikes	1.00	1.00			1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.93			1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98
Flt Protected	0.95	1.00			0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	1727			3433	1863	2758	1770	3539	1557	3433	3460
Flt Permitted	0.95	1.00			0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1770	1727			3433	1863	2758	1770	3539	1557	3433	3460
Peak-hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	56	11	9	6	34	9	49	7	286	64	77	175
RTOR Reduction (vph)	0	9	0	0	0	0	40	0	0	37	0	5
Lane Group Flow (vph)	56	11	0	0	40	9	9	7	286	27	77	196
Confl. Peds. (#/hr)			2									
Confl. Bikes (#/hr)							2			9		
Turn Type	Prot			Prot	Prot		pm+ov	Prot		Perm	Prot	
Protected Phases	3	8		7	7	4	5	1	6		5	2
Permitted Phases							4			6		
Actuated Green, G (s)	2.5	3.3			2.2	4.6	10.9	0.5	25.7	25.7	6.3	31.5
Effective Green, g (s)	2.5	3.3			2.2	4.6	10.9	0.5	25.7	25.7	6.3	31.5
Actuated g/C Ratio	0.04	0.05			0.04	0.07	0.18	0.01	0.42	0.42	0.10	0.51
Clearance Time (s)	5.6	7.2			5.6	5.6	6.3	6.3	5.3	5.3	6.3	5.3
Vehicle Extension (s)	2.0	2.0			2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	71	92			122	138	486	14	1469	646	349	1761
v/s Ratio Prot	c0.03	c0.01			0.01	0.00	0.00	0.00	c0.08		c0.02	c0.06
v/s Ratio Perm							0.00			0.02		
v/c Ratio	0.79	0.12			0.33	0.07	0.02	0.50	0.19	0.04	0.22	0.11
Uniform Delay, d1	29.4	27.9			29.1	26.7	21.1	30.6	11.5	10.8	25.5	7.9
Progression Factor	1.00	1.00			1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	40.0	0.2			0.6	0.1	0.0	9.9	0.0	0.0	0.1	0.0
Delay (s)	69.4	28.1			29.7	26.7	21.1	40.4	11.5	10.8	25.7	7.9
Level of Service	E	C			C	C	C	D	B	B	C	A
Approach Delay (s)		58.6				25.1			12.0			12.8
Approach LOS		E				C			B			B

Intersection Summary			
HCM Average Control Delay	18.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.22		
Actuated Cycle Length (s)	61.9	Sum of lost time (s)	22.5
Intersection Capacity Utilization	37.7%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBR
Lane Configurations	
Volume (vph)	23
Ideal Flow (vphpl)	1900
Total Lost time (s)	
Lane Util. Factor	
Frpb, ped/bikes	
Flpb, ped/bikes	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Peak-hour factor, PHF	0.87
Adj. Flow (vph)	26
RTOR Reduction (vph)	0
Lane Group Flow (vph)	0
Confl. Peds. (#/hr)	2
Confl. Bikes (#/hr)	3
Turn Type	
Protected Phases	
Permitted Phases	
Actuated Green, G (s)	
Effective Green, g (s)	
Actuated g/C Ratio	
Clearance Time (s)	
Vehicle Extension (s)	
Lane Grp Cap (vph)	
v/s Ratio Prot	
v/s Ratio Perm	
v/c Ratio	
Uniform Delay, d1	
Progression Factor	
Incremental Delay, d2	
Delay (s)	
Level of Service	
Approach Delay (s)	
Approach LOS	

Intersection Summary

Movement	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Volume (vph)	8	65	12	5	2	9	2	7	20	1	3	22
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.6	6.6	6.6	5.6	6.6	6.6	5.6	5.6	5.6	5.6	4.6
Lane Util. Factor		0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.95
Frpb, ped/bikes		1.00	1.00	0.99	1.00	1.00	0.99	1.00	1.00	0.99	1.00	1.00
Flpb, ped/bikes		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00
Flt Protected		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Satd. Flow (prot)		3433	3539	1564	3433	3539	1561	3433	3539	1561	3433	3539
Flt Permitted		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Satd. Flow (perm)		3433	3539	1564	3433	3539	1561	3433	3539	1561	3433	3539
Peak-hour factor, PHF	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78
Adj. Flow (vph)	10	83	15	6	3	12	3	9	26	1	4	28
RTOR Reduction (vph)	0	0	0	3	0	0	2	0	0	1	0	0
Lane Group Flow (vph)	0	93	15	3	3	12	1	9	26	0	4	28
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)				1			4			1	1	
Turn Type	Prot	Prot		Perm	Prot		Perm	Prot		Perm	Prot	
Protected Phases	3	3	8		7	4		1	6		5	2
Permitted Phases				8			4			6		
Actuated Green, G (s)		3.9	24.5	24.5	0.4	21.0	21.0	0.4	6.6	6.6	0.4	7.6
Effective Green, g (s)		3.9	24.5	24.5	0.4	21.0	21.0	0.4	6.6	6.6	0.4	7.6
Actuated g/C Ratio		0.07	0.44	0.44	0.01	0.38	0.38	0.01	0.12	0.12	0.01	0.14
Clearance Time (s)		5.6	6.6	6.6	5.6	6.6	6.6	5.6	5.6	5.6	5.6	4.6
Vehicle Extension (s)		2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)		242	1568	693	25	1344	593	25	422	186	25	486
v/s Ratio Prot		c0.03	c0.00		0.00	0.00		c0.00	0.01		0.00	c0.01
v/s Ratio Perm				0.00			0.00			0.00		
v/c Ratio		0.38	0.01	0.00	0.12	0.01	0.00	0.36	0.06	0.00	0.16	0.06
Uniform Delay, d1		24.6	8.6	8.6	27.3	10.7	10.6	27.3	21.6	21.4	27.3	20.7
Progression Factor		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		0.4	0.0	0.0	0.8	0.0	0.0	3.2	0.0	0.0	1.1	0.0
Delay (s)		24.9	8.6	8.6	28.1	10.7	10.6	30.5	21.6	21.4	28.4	20.8
Level of Service		C	A	A	C	B	B	C	C	C	C	C
Approach Delay (s)			21.9			13.6			23.8			21.0
Approach LOS			C			B			C			C

Intersection Summary			
HCM Average Control Delay	21.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.07		
Actuated Cycle Length (s)	55.3	Sum of lost time (s)	22.4
Intersection Capacity Utilization	33.7%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBR
Lane Configurations	
Volume (vph)	65
Ideal Flow (vphpl)	1900
Total Lost time (s)	4.6
Lane Util. Factor	1.00
Frpb, ped/bikes	0.99
Flpb, ped/bikes	1.00
Frt	0.85
Flt Protected	1.00
Satd. Flow (prot)	1560
Flt Permitted	1.00
Satd. Flow (perm)	1560
Peak-hour factor, PHF	0.78
Adj. Flow (vph)	83
RTOR Reduction (vph)	72
Lane Group Flow (vph)	11
Confl. Peds. (#/hr)	3
Confl. Bikes (#/hr)	1
Turn Type	Perm
Protected Phases	
Permitted Phases	2
Actuated Green, G (s)	7.6
Effective Green, g (s)	7.6
Actuated g/C Ratio	0.14
Clearance Time (s)	4.6
Vehicle Extension (s)	2.0
Lane Grp Cap (vph)	214
v/s Ratio Prot	
v/s Ratio Perm	0.01
v/c Ratio	0.05
Uniform Delay, d1	20.7
Progression Factor	1.00
Incremental Delay, d2	0.0
Delay (s)	20.8
Level of Service	C
Approach Delay (s)	
Approach LOS	

Intersection Summary

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Lane Configurations												
Volume (vph)	1	366	292	75	1	55	114	35	45	119	301	71
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.6	4.9	4.9		5.6	4.9	4.9		6.3	5.3	5.3
Lane Util. Factor		0.97	0.95	1.00		0.97	0.95	1.00		0.97	0.95	1.00
Frpb, ped/bikes		1.00	1.00	0.98		1.00	1.00	0.98		1.00	1.00	0.98
Flpb, ped/bikes		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00
Frt		1.00	1.00	0.85		1.00	1.00	0.85		1.00	1.00	0.85
Flt Protected		0.95	1.00	1.00		0.95	1.00	1.00		0.95	1.00	1.00
Satd. Flow (prot)		3433	3539	1546		3433	3539	1548		3433	3539	1555
Flt Permitted		0.95	1.00	1.00		0.95	1.00	1.00		0.95	1.00	1.00
Satd. Flow (perm)		3433	3539	1546		3433	3539	1548		3433	3539	1555
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	1	416	332	85	1	62	130	40	51	135	342	81
RTOR Reduction (vph)	0	0	0	58	0	0	0	33	0	0	0	63
Lane Group Flow (vph)	0	417	332	27	0	63	130	7	0	186	342	18
Confl. Peds. (#/hr)				14				5				7
Confl. Bikes (#/hr)				4				6				1
Turn Type	Prot	Prot		Perm	Prot	Prot		Perm	Prot	Prot		Perm
Protected Phases	3	3	8		7	7	4		1	1	6	
Permitted Phases				8				4				6
Actuated Green, G (s)		16.4	24.2	24.2		5.3	13.1	13.1		9.9	16.9	16.9
Effective Green, g (s)		16.4	24.2	24.2		5.3	13.1	13.1		9.9	16.9	16.9
Actuated g/C Ratio		0.21	0.32	0.32		0.07	0.17	0.17		0.13	0.22	0.22
Clearance Time (s)		5.6	4.9	4.9		5.6	4.9	4.9		6.3	5.3	5.3
Vehicle Extension (s)		2.0	2.0	2.0		2.0	2.0	2.0		2.0	2.0	2.0
Lane Grp Cap (vph)		736	1120	489		238	606	265		444	782	344
v/s Ratio Prot		c0.12	c0.09			0.02	0.04			c0.05	c0.10	
v/s Ratio Perm				0.02				0.00				0.01
v/c Ratio		0.57	0.30	0.05		0.26	0.21	0.03		0.42	0.44	0.05
Uniform Delay, d1		26.9	19.7	18.2		33.8	27.3	26.4		30.7	25.7	23.5
Progression Factor		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2		0.6	0.1	0.0		0.2	0.1	0.0		0.2	0.1	0.0
Delay (s)		27.5	19.8	18.2		34.0	27.3	26.4		30.9	25.8	23.5
Level of Service		C	B	B		C	C	C		C	C	C
Approach Delay (s)			23.5				29.0				27.1	
Approach LOS			C				C				C	

Intersection Summary			
HCM Average Control Delay	26.1	HCM Level of Service	C
HCM Volume to Capacity ratio	0.39		
Actuated Cycle Length (s)	76.5	Sum of lost time (s)	11.9
Intersection Capacity Utilization	61.7%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBU	SBL	SBT	SBR
Lane Configurations				
Volume (vph)	12	87	291	288
Ideal Flow (vphpl)	1900	1900	1900	1900
Total Lost time (s)		6.3	5.3	5.3
Lane Util. Factor		0.97	0.95	1.00
Frpb, ped/bikes		1.00	1.00	0.98
Flpb, ped/bikes		1.00	1.00	1.00
Frt		1.00	1.00	0.85
Flt Protected		0.95	1.00	1.00
Satd. Flow (prot)		3433	3539	1555
Flt Permitted		0.95	1.00	1.00
Satd. Flow (perm)		3433	3539	1555
Peak-hour factor, PHF	0.88	0.88	0.88	0.88
Adj. Flow (vph)	14	99	331	327
RTOR Reduction (vph)	0	0	0	263
Lane Group Flow (vph)	0	113	331	64
Confl. Peds. (#/hr)				4
Confl. Bikes (#/hr)				3
Turn Type	Prot	Prot		Perm
Protected Phases	5	5	2	
Permitted Phases				2
Actuated Green, G (s)		8.0	15.0	15.0
Effective Green, g (s)		8.0	15.0	15.0
Actuated g/C Ratio		0.10	0.20	0.20
Clearance Time (s)		6.3	5.3	5.3
Vehicle Extension (s)		2.0	2.0	2.0
Lane Grp Cap (vph)		359	694	305
v/s Ratio Prot		0.03	0.09	
v/s Ratio Perm				0.04
v/c Ratio		0.31	0.48	0.21
Uniform Delay, d1		31.7	27.3	25.8
Progression Factor		1.00	1.00	1.00
Incremental Delay, d2		0.2	0.2	0.1
Delay (s)		31.9	27.5	25.9
Level of Service		C	C	C
Approach Delay (s)			27.5	
Approach LOS			C	

Intersection Summary

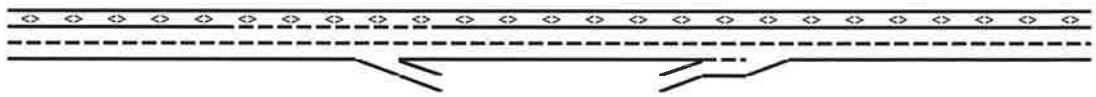
Movement	EBU	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations							
Volume (vph)	3	266	95	55	49	35	147
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)			5.6	4.6	4.6	5.3	5.3
Lane Util. Factor			1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes			1.00	1.00	0.98	1.00	0.98
Flpb, ped/bikes			1.00	1.00	1.00	1.00	1.00
Frt			1.00	1.00	0.85	1.00	0.85
Flt Protected			0.96	1.00	1.00	0.95	1.00
Satd. Flow (prot)			1796	1863	1545	1770	1559
Flt Permitted			0.96	1.00	1.00	0.95	1.00
Satd. Flow (perm)			1796	1863	1545	1770	1559
Peak-hour factor, PHF	0.81	0.81	0.81	0.81	0.81	0.81	0.81
Adj. Flow (vph)	4	328	117	68	60	43	181
RTOR Reduction (vph)	0	0	0	0	52	0	147
Lane Group Flow (vph)	0	0	449	68	8	43	34
Confl. Peds. (#/hr)					1		
Confl. Bikes (#/hr)					1		3
Turn Type	Split	Split			Perm		Perm
Protected Phases	3	3	3	4		2	
Permitted Phases					4		2
Actuated Green, G (s)			19.7	6.7	6.7	9.6	9.6
Effective Green, g (s)			19.7	6.7	6.7	9.6	9.6
Actuated g/C Ratio			0.38	0.13	0.13	0.19	0.19
Clearance Time (s)			5.6	4.6	4.6	5.3	5.3
Vehicle Extension (s)			2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)			687	242	201	330	291
v/s Ratio Prot			c0.25	c0.04		c0.02	
v/s Ratio Perm					0.01		0.02
v/c Ratio			0.65	0.28	0.04	0.13	0.12
Uniform Delay, d1			13.1	20.2	19.6	17.5	17.4
Progression Factor			1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2			1.7	0.2	0.0	0.1	0.1
Delay (s)			14.8	20.5	19.6	17.5	17.5
Level of Service			B	C	B	B	B
Approach Delay (s)			14.8	20.1		17.5	
Approach LOS			B	C		B	

Intersection Summary			
HCM Average Control Delay	16.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.44		
Actuated Cycle Length (s)	51.5	Sum of lost time (s)	15.5
Intersection Capacity Utilization	44.7%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Project: Elk Grove Civic Center — **Alternative:** Existing Plus Project

Freeway Corridor: State Route 99 NB — **Time Period:** Wkdy PM Peak Hour

Location	1	2	3	4	5



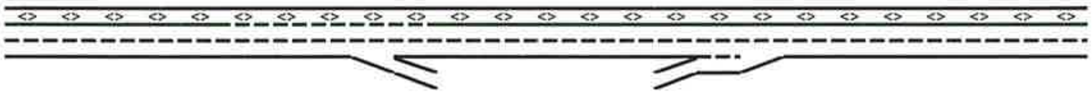
Key

<> Express Lane (HOV)

No Trucks

Name	SR 99 south of Elk Grove Blvd	East Stockton Loop Off-Ramp	E. Stockton Off to Elk Grove On	Elk Grove Blvd On-Ramp	SR 99 north of Elk Grove
Define Freeway Segment					
Type	Basic	Diverge	Basic	Merge	Basic
Length (ft)	1,050	1,500	2,550	1,500	180
Accel Length				1,200	
Decel Length		170			
Mainline Volume	2,176	2,176	1,893	1,893	3,192
On Ramp Volume				1,299	
Off Ramp Volume		283			
Express Lane Volume	653	653	568	568	958
EL On Ramp Volume					
EL Off Ramp Volume					
Calculate Flow Rate in General Purpose Lanes (GP)					
GP Volume (vph)	1,523	1,523	1,325	2,624	2,234
PHF	0.93	0.97	0.93	0.93	0.93
GP Lanes	2	2	2	2	2
Terrain	Level	Level	Level	Level	Level
Grade %	0.0%	0.0%	0.0%	0.0%	0.0%
Grade Length (mi)	0.00	0.00	0.00	0.00	0.00
Truck & Bus %	15.0%	5.0%	10.0%	5.0%	10.0%
RV %	0.0%	0.0%	0.0%	0.0%	0.0%
E_T	1.5	1.5	1.5	1.5	1.5
E_R	1.2	1.2	1.2	1.2	1.2
f_{HV}	0.930	0.976	0.952	0.976	0.952
f_P	1.00	1.00	1.00	1.00	1.00
GP Flow (pcph)	1,761	1,610	1,496	2,892	2,523
GP Flow (pcphpl)	880	805	748	1,446	1,261
Calculate Speed in General Purpose Lanes					
Lane Width (ft)	12	12	12	12	12
Shoulder Width	>6	>6	>6	>6	>6
TRD	1.8	1.8	1.8	1.8	1.8
f_{LW}	0.0	0.0	0.0	0.0	0.0
f_{LC}	0.0	0.0	0.0	0.0	0.0
Calc'd FFS	70.1	70.1	70.1	70.1	70.1
Measured FFS	70.0	70.0	70.0	70.0	70.0
FFS	70	70	70	70	70

Location	1	2	3	4	5



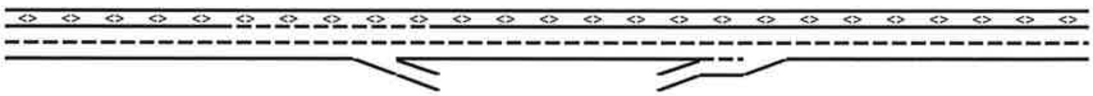
Key

<> Express Lane (HOV)

No Trucks

Name	SR 99 south of Elk Grove Blvd	East Stockton Loop Off-Ramp	E. Stockton Off to Elk Grove On	Elk Grove Blvd On-Ramp	SR 99 north of Elk Grove
Calculate Operations in General Purpose Lanes					
v/c ratio	0.37	0.34	0.31	0.60	0.53
Speed (mph)	70.0	70.0	70.0	69.3	70.0
Density (pcphpl)	12.6	11.5	10.7	20.9	18.0
LOS	B	B	A	C	C
Calculate Operations for Entering GP Lanes					
GP_{IN} Vol (pcph)				1,460	
GP_{IN} Cap (pcph)				4,800	
GP_{IN} v/c ratio				0.30	
Calculate Operations for Exiting GP Lanes					
GP_{OUT} Vol (pcph)		1,311			
GP_{OUT} Cap (pcph)		4,800			
GP_{OUT} v/c ratio		0.27			
Calculate On Ramp Flow Rate					
On Volume (vph)				1,299	
PHF				0.93	
Total Lanes				1	
Terrain				Level	
Grade %				0.0%	
Grade Length (mi)				0.00	
Truck & Bus %				5.0%	
RV %				0.0%	
E_T				1.5	
E_R				1.2	
f_{HV}				0.976	
f_P				1.00	
On Flow (pcph)				1,432	
On Flow (pcphpl)				1,432	
Calculate On Ramp Roadway Operations					
On Ramp Type				Right	
On Ramp Speed (mph)				45	
On Ramp Cap (pcph)				2,100	
On Ramp v/c ratio				0.68	

Location	1	2	3	4	



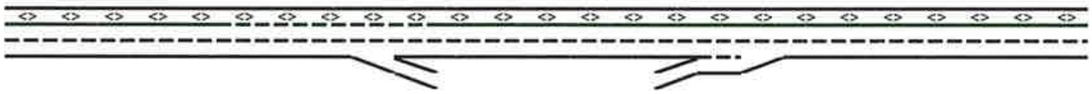
Key

<> Express Lane (HOV)

No Trucks

Name	SR 99 south of Elk Grove Blvd	East Stockton Loop Off-Ramp	E. Stockton Off to Elk Grove On	Elk Grove Blvd On-Ramp	SR 99 north of Elk Grove
Calculate Off Ramp Flow Rate					
Off Volume (vph)		283			
PHF		0.97			
Total Lanes		1			
Terrain		Level			
Grade %		0.0%			
Grade Length (mi)		0.00			
Truck & Bus %		5.0%			
RV %		0.0%			
E_T		1.5			
E_R		1.2			
f_{HV}		0.976			
f_P		1.00			
Off Flow (pcph)		299			
Off Flow (pcphpl)		299			
Calculate Off Ramp Roadway Operations					
Off Ramp Type		Right			
Off Ramp Speed		35			
Off Ramp Cap (pcph)		2,000			
Off Ramp v/c ratio		0.15			
Determine Adjacent Ramp for Three-Lane Mainline Segments with One-Lane Ramps					
Up Type					
Up Distance					
Up Flow (pcph)					
Down Type					
Down Distance					
Down Flow (pcph)					

Location	1	2	3	4	5



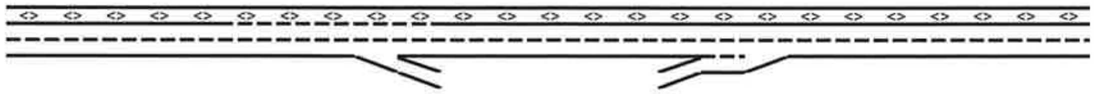
Key

<> Express Lane (HOV)

No Trucks

Name	SR 99 south of Elk Grove Blvd	East Stockton Loop Off-Ramp	E. Stockton Off to Elk Grove On	Elk Grove Blvd On-Ramp	SR 99 north of Elk Grove
Calculate Merge Influence Area Operations					
Effective v_P (pcph)				1,460	
Up Ramp L_{EQ}					
Down Ramp L_{EQ}					
P_{FM} (Eqn 13-3)				0.611	
P_{FM} (Eqn 13-4)					
P_{FM} (Eqn 13-5)					
P_{FM}				1.000	
v_{12} (pcph)				1,460	
v_3 (pcph)					
v_{34} (pcph)					
v_{12a} (pcph)				1,460	
v_{R12a} (pcph)				2,892	
Merge Speed Index				0.28	
Merge Area Speed				62.1	
Outer Lanes Volume					
Outer Lanes Speed					
Segment Speed				62.1	
Merge v/c ratio				0.63	
Merge Density				19.9	
Merge LOS				B	
Calculate Diverge Influence Area Operations					
Effective v_P (pcph)		1,610			
Up Ramp L_{EQ}					
Down Ramp L_{EQ}					
P_{FD} (Eqn 13-9)		0.706			
P_{FD} (Eqn 13-10)					
P_{FD} (Eqn 13-11)					
P_{FD}		1.000			
v_{12} (pcph)		1,610			
v_3 (pcph)					
v_{34} (pcph)					
v_{12a} (pcph)		1,610			
Diverge Speed Index		0.45			
Diverge Area Speed		57.3			
Outer Lanes Volume					
Outer Lanes Speed					
Segment Speed		57.3			
Diverge v/c ratio		0.37			
Diverge Density		16.6			
Diverge LOS		B			

Location	1			4	



Key

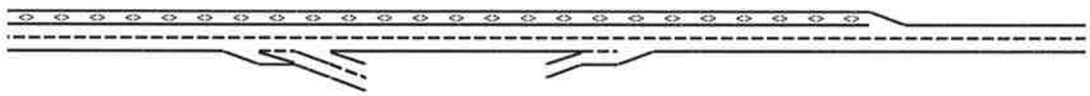
<> Express Lane (HOV)

No Trucks

Name	SR 99 south of Elk Grove Blvd	East Stockton Loop Off-Ramp	E. Stockton Off to Elk Grove On	Elk Grove Blvd On-Ramp	SR 99 north of Elk Grove
Summarize Segment Operations					
Segment v/c ratio	0.37	0.37	0.31	0.63	0.53
Segment Density	12.6	16.6	10.7	19.9	18.0
Segment LOS	B	B	A	B	C
Over Capacity					

Project:	**Elk Grove Civic Center**	**Alternative:**	**Existing Plus Project**
Freeway Corridor:	**State Route 99 SB**	**Time Period:**	**Wkdy PM Peak Hour**

Location	1	2	3	4	5	6



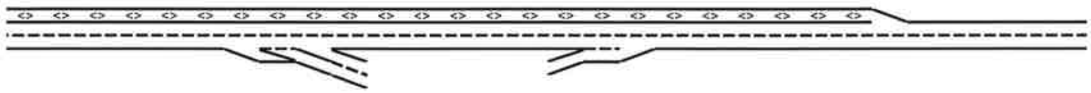
Key

<> Express Lane (HOV)

No Trucks

Name	SR 99 north of Elk Grove Blvd	Elk Grove Off-Ramp	Elk Grove Off-Ramp to On-Ramp	Elk Grove On-Ramp	SR 99 south of Elk Grove Blvd	SR 99 south of Elk Grove Blvd
Define Freeway Segment						
Type	Basic	Diverge	Basic	Merge	Basic	Basic
Length (ft)	250	1,500	2,250	1,500	400	8,050
Accel Length				300		
Decel Length		1,500				
Mainline Volume	3,684	3,684	1,985	1,985	2,312	2,312
On Ramp Volume				327		
Off Ramp Volume		1,699				
Express Lane Volume	1,105	1,105				
EL On Ramp Volume						
EL Off Ramp Volume						
Calculate Flow Rate in General Purpose Lanes (GP)						
GP Volume (vph)	2,579	2,579	1,985	2,312	2,312	2,312
PHF	0.95	0.98	0.95	0.98	0.95	0.95
GP Lanes	2	2	2	2	2	2
Terrain	Level	Level	Level	Level	Level	Level
Grade %	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Grade Length (mi)	0.00	0.00	0.00	0.00	0.00	0.00
Truck & Bus %	10.0%	5.0%	10.0%	5.0%	15.0%	15.0%
RV %	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
E_T	1.5	1.5	1.5	1.5	1.5	1.5
E_R	1.2	1.2	1.2	1.2	1.2	1.2
f_{HV}	0.952	0.976	0.952	0.976	0.930	0.930
f_P	1.00	1.00	1.00	1.00	1.00	1.00
GP Flow (pcph)	2,850	2,697	2,194	2,418	2,616	2,616
GP Flow (pcphpl)	1,425	1,349	1,097	1,209	1,308	1,308
Calculate Speed in General Purpose Lanes						
Lane Width (ft)	12	12	12	12	12	12
Shoulder Width	>6	>6	>6	>6	>6	>6
TRD	1.8	1.8	1.8	1.8	1.8	1.8
f_{LW}	0.0	0.0	0.0	0.0	0.0	0.0
f_{LC}	0.0	0.0	0.0	0.0	0.0	0.0
Calc'd FFS	70.1	70.1	70.1	70.1	70.1	70.1
Measured FFS	70.0	70.0	70.0	70.0	70.0	70.0
FFS	70	70	70	70	70	70

Location	1	[illegible]	3	4	[illegible]	[illegible]



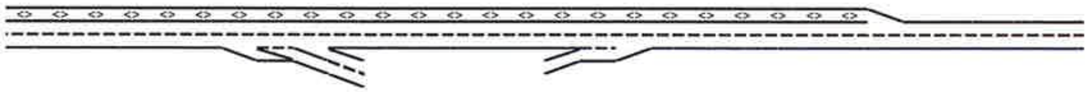
Key

<> Express Lane (HOV)

No Trucks

Name	SR 99 north of Elk Grove Blvd	Elk Grove Off-Ramp	Elk Grove Off-Ramp to On-Ramp	Elk Grove On-Ramp	SR 99 south of Elk Grove Blvd	SR 99 south of Elk Grove Blvd
Calculate Operations in General Purpose Lanes						
v/c ratio	0.59	0.56	0.46	0.50	0.55	0.55
Speed (mph)	69.4	69.7	70.0	70.0	69.9	69.9
Density (pcphpl)	20.5	19.3	15.7	17.3	18.7	18.7
LOS	C	C	B	B	C	C
Calculate Operations for Entering GP Lanes						
GP_{IN} Vol (pcph)				2,076		
GP_{IN} Cap (pcph)				4,800		
GP_{IN} v/c ratio				0.43		
Calculate Operations for Exiting GP Lanes						
GP_{OUT} Vol (pcph)		920				
GP_{OUT} Cap (pcph)		4,800				
GP_{OUT} v/c ratio		0.19				
Calculate On Ramp Flow Rate						
On Volume (vph)				327		
PHF				0.98		
Total Lanes				1		
Terrain				Level		
Grade %				0.0%		
Grade Length (mi)				0.00		
Truck & Bus %				5.0%		
RV %				0.0%		
E_T				1.5		
E_R				1.2		
f_{HV}				0.976		
f_P				1.00		
On Flow (pcph)				342		
On Flow (pcphpl)				342		
Calculate On Ramp Roadway Operations						
On Ramp Type				Right		
On Ramp Speed (mph)				60		
On Ramp Cap (pcph)				2,200		
On Ramp v/c ratio				0.16		

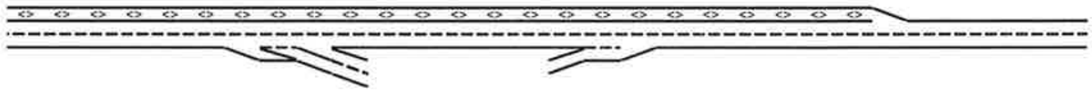
Location	1		3			6



Key
<> Express Lane (HOV)
No Trucks

Name	SR 99 north of Elk Grove Blvd	Elk Grove Off-Ramp	Elk Grove Off-Ramp to On-Ramp	Elk Grove On-Ramp	SR 99 south of Elk Grove Blvd	SR 99 south of Elk Grove Blvd
Calculate Off Ramp Flow Rate						
Off Volume (vph)		1,699				
PHF		0.98				
Total Lanes		2				
Terrain		Level				
Grade %		0.0%				
Grade Length (mi)		0.00				
Truck & Bus %		5.0%				
RV %		0.0%				
E_T		1.5				
E_R		1.2				
f_{HV}		0.976				
f_P		1.00				
Off Flow (pcph)		1,777				
Off Flow (pcphpl)		889				
Calculate Off Ramp Roadway Operations						
Off Ramp Type		Right				
Off Ramp Speed		35				
Off Ramp Cap (pcph)		4,000				
Off Ramp v/c ratio		0.44				
Determine Adjacent Ramp for Three-Lane Mainline Segments with One-Lane Ramps						
Up Type						
Up Distance						
Up Flow (pcph)						
Down Type						
Down Distance						
Down Flow (pcph)						

Location	1	2	3	4	5	6



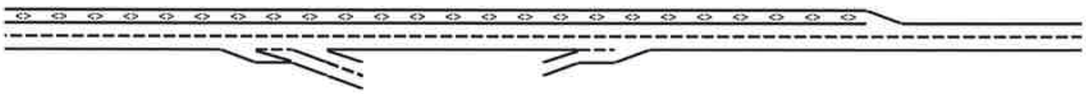
Key

<> Express Lane (HOV)

No Trucks

Name	SR 99 north of Elk Grove Blvd	Elk Grove Off-Ramp	Elk Grove Off-Ramp to On-Ramp	Elk Grove On-Ramp	SR 99 south of Elk Grove Blvd	SR 99 south of Elk Grove Blvd
Calculate Merge Influence Area Operations						
Effective v_P (pcph)				2,076		
Up Ramp L_{EQ}						
Down Ramp L_{EQ}						
P_{FM} (Eqn 13-3)				0.586		
P_{FM} (Eqn 13-4)						
P_{FM} (Eqn 13-5)						
P_{FM}				1.000		
v_{12} (pcph)				2,076		
v_3 (pcph)						
v_{34} (pcph)						
v_{12a} (pcph)				2,076		
v_{R12a} (pcph)				2,418		
Merge Speed Index				0.33		
Merge Area Speed				60.8		
Outer Lanes Volume						
Outer Lanes Speed						
Segment Speed				60.8		
Merge v/c ratio				0.53		
Merge Density				22.3		
Merge LOS				C		
Calculate Diverge Influence Area Operations						
Effective v_P (pcph)		2,697				
Up Ramp L_{EQ}						
Down Ramp L_{EQ}						
P_{FD} (Eqn 13-9)		0.611				
P_{FD} (Eqn 13-10)						
P_{FD} (Eqn 13-11)						
P_{FD}		1.000				
v_{12} (pcph)		2,697				
v_3 (pcph)						
v_{34} (pcph)						
v_{12a} (pcph)		2,697				
Diverge Speed Index		0.59				
Diverge Area Speed		53.5				
Outer Lanes Volume						
Outer Lanes Speed						
Segment Speed		53.5				
Diverge v/c ratio		0.61				
Diverge Density		13.9				
Diverge LOS		B				

Location	1	2	3	4	5	6



Key

<> Express Lane (HOV)

No Trucks

Name	SR 99 north of Elk Grove Blvd	Elk Grove Off-Ramp	Elk Grove Off-Ramp to On-Ramp	Elk Grove On-Ramp	SR 99 south of Elk Grove Blvd	SR 99 south of Elk Grove Blvd
Summarize Segment Operations						
Segment v/c ratio	0.59	0.61	0.46	0.53	0.55	0.55
Segment Density	20.5	13.9	15.7	22.3	18.7	18.7
Segment LOS	C	B	B	C	C	C
Over Capacity						

Project:	**Elk Grove Civic Center**		**Alternative:**	**Existing Plus Project**
Freeway Corridor:	**Interstate 5 NB**		**Time Period:**	**Wkdy PM Peak Hour**

Location	1	2	3	4	5

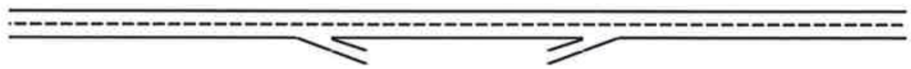
Key

<> Express Lane (HOV)

No Trucks

Name	I-5 south of Elk Grove Blvd	Elk Grove Blvd Off-Ramp	Elk Grove Off-Ramp to On-Ramp	Elk Grove On-Ramp	I-5 north of Elk Grove Blvd
Define Freeway Segment					
Type	Basic	Diverge	Basic	Merge	Basic
Length (ft)	6,900	1,500	3,100	1,500	500
Accel Length				750	
Decel Length		160			
Mainline Volume	1,958	1,958	1,733	1,733	2,274
On Ramp Volume				541	
Off Ramp Volume		225			
Express Lane Volume					
EL On Ramp Volume					
EL Off Ramp Volume					
Calculate Flow Rate in General Purpose Lanes (GP)					
GP Volume (vph)	1,958	1,958	1,733	2,274	2,274
PHF	0.89	0.97	0.89	0.97	0.89
GP Lanes	2	2	2	2	2
Terrain	Level	Level	Level	Level	Level
Grade %	0.0%	0.0%	0.0%	0.0%	0.0%
Grade Length (mi)	0.00	0.00	0.00	0.00	0.00
Truck & Bus %	18.0%	5.0%	18.0%	5.0%	18.0%
RV %	0.0%	0.0%	0.0%	0.0%	0.0%
E_T	1.5	1.5	1.5	1.5	1.5
E_R	1.2	1.2	1.2	1.2	1.2
f_{HV}	0.917	0.976	0.917	0.976	0.917
f_P	1.00	1.00	1.00	1.00	1.00
GP Flow (pcph)	2,398	2,069	2,122	2,403	2,785
GP Flow (pcphpl)	1,199	1,035	1,061	1,201	1,393
Calculate Speed in General Purpose Lanes					
Lane Width (ft)	12	12	12	12	12
Shoulder Width	>6	>6	>6	>6	>6
TRD	1.2	1.2	1.2	1.2	1.2
f_{LW}	0.0	0.0	0.0	0.0	0.0
f_{LC}	0.0	0.0	0.0	0.0	0.0
Calc'd FFS	71.7	71.7	71.7	71.7	71.7
Measured FFS	70.0	70.0	70.0	70.0	70.0
FFS	70	70	70	70	70
Calculate Operations in General Purpose Lanes					
v/c ratio	0.50	0.43	0.44	0.50	0.58
Speed (mph)	70.0	70.0	70.0	70.0	69.6
Density (pcphpl)	17.1	14.8	15.2	17.2	20.0
LOS	B	B	B	B	C
Calculate Operations for Entering GP Lanes					
GP_{IN} Vol (pcph)				1,831	
GP_{IN} Cap (pcph)				4,800	
GP_{IN} v/c ratio				0.38	
Calculate Operations for Exiting GP Lanes					
GP_{OUT} Vol (pcph)		1,831			
GP_{OUT} Cap (pcph)		4,800			
GP_{OUT} v/c ratio		0.38			

Location	1	2	3	[illegible]	[illegible]



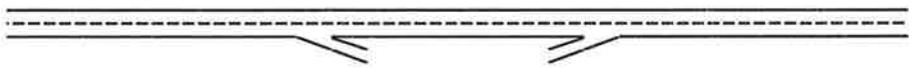
Key

<> Express Lane (HOV)

No Trucks

Name	I-5 south of Elk Grove B lvd	Elk Grove Blvd Off-Ramp	Elk Grove Off-Ramp to On-Ramp	Elk Grove On-Ramp	I-5 north of Elk Grove Blvd
Calculate On Ramp Flow Rate					
On Volume (vph)				541	
PHF				0.97	
Total Lanes				1	
Terrain				Level	
Grade %				0.0%	
Grade Length (mi)				0.00	
Truck & Bus %				5.0%	
RV %				0.0%	
E_T				1.5	
E_R				1.2	
f_{HV}				0.976	
f_P				1.00	
On Flow (pcph)				572	
On Flow (pcphpl)				572	
Calculate On Ramp Roadway Operations					
On Ramp Type				Right	
On Ramp Speed (mph)				45	
On Ramp Cap (pcph)				2,100	
On Ramp v/c ratio				0.27	

Location	1	2	3	4	5



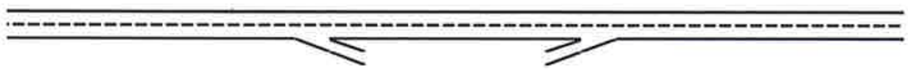
Key

<> Express Lane (HOV)

No Trucks

Name	I-5 south of Elk Grove B lvd	Elk Grove Blvd Off-Ramp	Elk Grove Off-Ramp to On-Ramp	Elk Grove On-Ramp	I-5 north of Elk Grove Blvd
Calculate Off Ramp Flow Rate					
Off Volume (vph)		225			
PHF		0.97			
Total Lanes		1			
Terrain		Level			
Grade %		0.0%			
Grade Length (mi)		0.00			
Truck & Bus %		5.0%			
RV %		0.0%			
E_T		1.5			
E_R		1.2			
f_{HV}		0.976			
f_P		1.00			
Off Flow (pcph)		238			
Off Flow (pcphpl)		238			
Calculate Off Ramp Roadway Operations					
Off Ramp Type		Right			
Off Ramp Speed		35			
Off Ramp Cap (pcph)		2,000			
Off Ramp v/c ratio		0.12			
Determine Adjacent Ramp for Three-Lane Mainline Segments with One-Lane Ramps					
Up Type					
Up Distance					
Up Flow (pcph)					
Down Type					
Down Distance					
Down Flow (pcph)					
Calculate Merge Influence Area Operations					
Effective v_P (pcph)				1,831	
Up Ramp L_{EQ}					
Down Ramp L_{EQ}					
P_{FM} (Eqn 13-3)				0.599	
P_{FM} (Eqn 13-4)					
P_{FM} (Eqn 13-5)					
P_{FM}				1.000	
v_{12} (pcph)				1,831	
v_3 (pcph)					
v_{34} (pcph)					
v_{12a} (pcph)				1,831	
v_{R12a} (pcph)				2,403	
Merge Speed Index				0.30	
Merge Area Speed				61.7	
Outer Lanes Volume					
Outer Lanes Speed					
Segment Speed				61.7	
Merge v/c ratio				0.52	
Merge Density				19.3	
Merge LOS				B	

Location	1	2	3	4	5



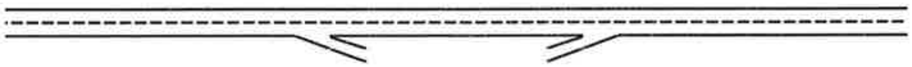
Key

<> Express Lane (HOV)

No Trucks

Name	I-5 south of Elk Grove B lvd	Elk Grove Blvd Off-Ramp	Elk Grove Off-Ramp to On-Ramp	Elk Grove On-Ramp	I-5 north of Elk Grove Blvd
Calculate Diverge Influence Area Operations					
Effective v_P (pcph)		2,069			
Up Ramp L_{EQ}					
Down Ramp L_{EQ}					
P_{FD} (Eqn 13-9)		0.697			
P_{FD} (Eqn 13-10)					
P_{FD} (Eqn 13-11)					
P_{FD}		1.000			
v_{12} (pcph)		2,069			
v_3 (pcph)					
v_{34} (pcph)					
v_{12a} (pcph)		2,069			
Diverge Speed Index		0.45			
Diverge Area Speed		57.4			
Outer Lanes Volume					
Outer Lanes Speed					
Segment Speed		57.4			
Diverge v/c ratio		0.47			
Diverge Density		20.6			
Diverge LOS		C			

Location	[illegible]	2	3	4	5



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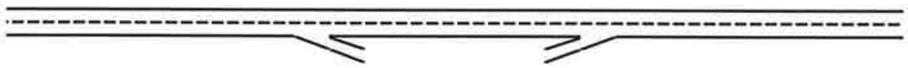
<> Express Lane (HOV)

No Trucks

Name	I-5 south of Elk Grove B lvd	Elk Grove Blvd Off-Ramp	Elk Grove Off-Ramp to On-Ramp	Elk Grove On-Ramp	I-5 north of Elk Grove Blvd
Summarize Segment Operations					
Segment v/c ratio	0.50	0.47	0.44	0.52	0.56
Segment Density	17.1	20.6	15.2	19.3	20.0
Segment LOS	B	C	B	B	C
Over Capacity					

Project:	**Elk Grove Civic Center**	**Alternative:**	**Existing Plus Project**
Freeway Corridor:	**Interstate 5 SB**	**Time Period:**	**Weekday PM Peak**



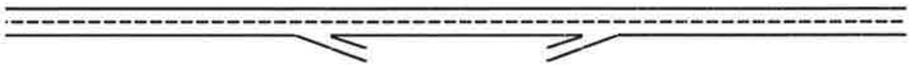
Key

<> Express Lane (HOV)

No Trucks

Location	1	2	3	4	5
Name	I-5 north of Elk Grove Blvd	Elk Grove Off-Ramp	Elk Grove Off-Ramp to On-Ramp	Elk Grove Loop On-Ramp	I-5 south of Elk Grove Blvd
Define Freeway Segment					
Type	Basic	Diverge	Basic	Merge	Basic
Length (ft)	2,500	1,500	1,450	1,500	7,750
Accel Length				750	
Decel Length		160			
Mainline Volume	3,496	3,496	2,062	2,062	2,169
On Ramp Volume				107	
Off Ramp Volume		1,434			
Express Lane Volume					
EL On Ramp Volume					
EL Off Ramp Volume					
Calculate Flow Rate in General Purpose Lanes (GP)					
GP Volume (vph)	3,496	3,496	2,062	2,169	2,169
PHF	0.94	0.95	0.94	0.95	0.94
GP Lanes	2	2	2	2	2
Terrain	Level	Level	Level	Level	Level
Grade %	0.0%	0.0%	0.0%	0.0%	0.0%
Grade Length (mi)	0.00	0.00	0.00	0.00	0.00
Truck & Bus %	18.0%	5.0%	18.0%	5.0%	18.0%
RV %	0.0%	0.0%	0.0%	0.0%	0.0%
E_T	1.5	1.5	1.5	1.5	1.5
E_R	1.2	1.2	1.2	1.2	1.2
f_{HV}	0.917	0.976	0.917	0.976	0.917
f_P	1.00	1.00	1.00	1.00	1.00
GP Flow (pcph)	4,054	3,772	2,391	2,340	2,515
GP Flow (pcphpl)	2,027	1,886	1,196	1,170	1,258
Calculate Speed in General Purpose Lanes					
Lane Width (ft)	12	12	12	12	12
Shoulder Width	>6	>6	>6	>6	>6
TRD	1.2	1.2	1.2	1.2	1.2
f_{LW}	0.0	0.0	0.0	0.0	0.0
f_{LC}	0.0	0.0	0.0	0.0	0.0
Calc'd FFS	71.7	71.7	71.7	71.7	71.7
Measured FFS	70.0	70.0	70.0	70.0	70.0
FFS	70	70	70	70	70
Calculate Operations in General Purpose Lanes					
v/c ratio	0.84	0.79	0.50	0.49	0.52
Speed (mph)	62.1	64.5	70.0	70.0	70.0
Density (pcphpl)	32.7	29.2	17.1	16.7	18.0
LOS	D	D	B	B	B
Calculate Operations for Entering GP Lanes					
GP_{IN} Vol (pcph)				2,225	
GP_{IN} Cap (pcph)				4,800	
GP_{IN} v/c ratio				0.46	
Calculate Operations for Exiting GP Lanes					
GP_{OUT} Vol (pcph)		2,225			
GP_{OUT} Cap (pcph)		4,800			
GP_{OUT} v/c ratio		0.46			

Location	1	2	3	[illegible]	5



Key

<> Express Lane (HOV)

No Trucks

Name	I-5 north of Elk Grove Blvd	Elk Grove Off-Ramp	Elk Grave Off-Ramp to On-Ramp	Elk Grove Loop On-Ramp	I-5 south of Elk Grove Blvd
Calculate On Ramp Flow Rate					
On Volume (vph)				107	
PHF				0.95	
Total Lanes				1	
Terrain				Level	
Grade %				0.0%	
Grade Length (mi)				0.00	
Truck & Bus %				5.0%	
RV %				0.0%	
E_T				1.5	
E_R				1.2	
f_{HV}				0.976	
f_P				1.00	
On Flow (pcph)				115	
On Flow (pcphpl)				115	
Calculate On Ramp Roadway Operations					
On Ramp Type				Right	
On Ramp Speed (mph)				45	
On Ramp Cap (pcph)				2,100	
On Ramp v/c ratio				0.05	

Location	1				5

Key

<> Express Lane (HOV)

No Trucks

Name	I-5 north of Elk Grove Blvd	Elk Grove Off-Ramp	Elk Grave Off-Ramp to On-Ramp	Elk Grove Loop On-Ramp	I-5 south of Elk Grove Blvd
Calculate Off Ramp Flow Rate					
Off Volume (vph)		1,434			
PHF		0.95			
Total Lanes		1			
Terrain		Level			
Grade %		0.0%			
Grade Length (mi)		0.00			
Truck & Bus %		5.0%			
RV %		0.0%			
E_T		1.5			
E_R		1.2			
f_{HV}		0.976			
f_P		1.00			
Off Flow (pcph)		1,547			
Off Flow (pcphpl)		1,547			
Calculate Off Ramp Roadway Operations					
Off Ramp Type		Right			
Off Ramp Speed		35			
Off Ramp Cap (pcph)		2,000			
Off Ramp v/c ratio		0.77			
Determine Adjacent Ramp for Three-Lane Mainline Segments with One-Lane Ramps					
Up Type					
Up Distance					
Up Flow (pcph)					
Down Type					
Down Distance					
Down Flow (pcph)					
Calculate Merge Influence Area Operations					
Effective v_P (pcph)				2,225	
Up Ramp L_{EQ}					
Down Ramp L_{EQ}					
P_{FM} (Eqn 13-3)				0.599	
P_{FM} (Eqn 13-4)					
P_{FM} (Eqn 13-5)					
P_{FM}				1.000	
v_{12} (pcph)				2,225	
v_3 (pcph)					
v_{34} (pcph)					
v_{12a} (pcph)				2,225	
v_{R12a} (pcph)				2,340	
Merge Speed Index				0.29	
Merge Area Speed				61.8	
Outer Lanes Volume					
Outer Lanes Speed					
Segment Speed				61.8	
Merge v/c ratio				0.51	
Merge Density				19.0	
Merge LOS				B	

Location	1	2	3	4	5

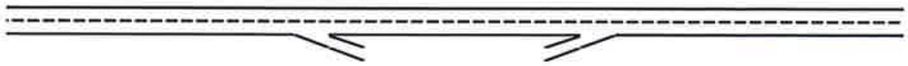
Key

<> Express Lane (HOV)

No Trucks

Name	I-5 north of Elk Grove Blvd	Elk Grove Off-Ramp	Elk Grove Off-Ramp to On-Ramp	Elk Grove Loop On-Ramp	I-5 south of Elk Grove Blvd
Calculate Diverge Influence Area Operations					
Effective v_P (pcph)		3,772			
Up Ramp L_{EQ}					
Down Ramp L_{EQ}					
P_{FD} (Eqn 13-9)		0.595			
P_{FD} (Eqn 13-10)					
P_{FD} (Eqn 13-11)					
P_{FD}		1.000			
v_{12} (pcph)		3,772			
v_3 (pcph)					
v_{34} (pcph)					
v_{12a} (pcph)		3,772			
Diverge Speed Index		0.57			
Diverge Area Speed		54.1			
Outer Lanes Volume					
Outer Lanes Speed					
Segment Speed		54.1			
Diverge v/c ratio		0.86			
Diverge Density		35.3			
Diverge LOS		E			

Location	1	2	3	4	



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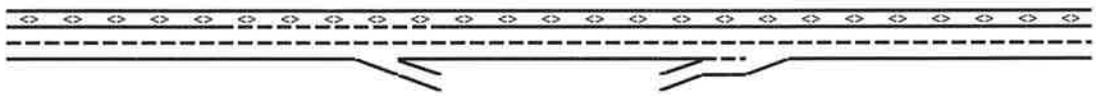
<> Express Lane (HOV)

No Trucks

Name	I-5 north of Elk Grove Blvd	Elk Grove Off-Ramp	Elk Grave Off-Ramp to On-Ramp	Elk Grove Loop On-Ramp	I-5 south of Elk Grove Blvd
Summarize Segment Operations					
Segment v/c ratio	0.84	0.86	0.50	0.51	0.52
Segment Density	32.7	35.3	17.1	19.0	18.0
Segment LOS	D	E	B	B	B
Over Capacity					

Project:	**Elk Grove Civic Center**		**Alternative:**	**Existing Plus Project**
Freeway Corridor:	**State Route 99 NB**		**Time Period:**	**Sat. AM Peak Hour**



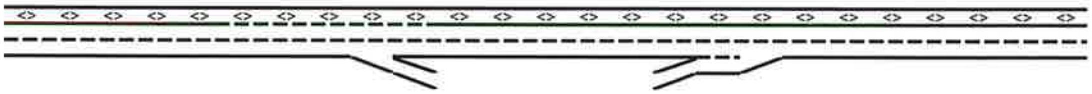
Key

<> Express Lane (HOV)

No Trucks

Location	1	2	3	4	5
Name	SR 99 south of Elk Grove Blvd	East Stockton Loop Off-Ramp	E. Stockton Off to Elk Grove On	Elk Grove Blvd On-Ramp	SR 99 north of Elk Grove
Define Freeway Segment					
Type	Basic	Diverge	Basic	Merge	Basic
Length (ft)	1,050	1,500	2,550	1,500	180
Accel Length				1,200	
Decel Length		170			
Mainline Volume	2,013	2,013	1,727	1,727	3,133
On Ramp Volume				1,406	
Off Ramp Volume		286			
Express Lane Volume	604	604	518	518	940
EL On Ramp Volume					
EL Off Ramp Volume					
Calculate Flow Rate in General Purpose Lanes (GP)					
GP Volume (vph)	1,409	1,409	1,209	2,615	2,193
PHF	0.92	0.91	0.92	0.93	0.92
GP Lanes	2	2	2	2	2
Terrain	Level	Level	Level	Level	Level
Grade %	0.0%	0.0%	0.0%	0.0%	0.0%
Grade Length (mi)	0.00	0.00	0.00	0.00	0.00
Truck & Bus %	15.0%	5.0%	10.0%	5.0%	10.0%
RV %	0.0%	0.0%	0.0%	0.0%	0.0%
E_T	1.5	1.5	1.5	1.5	1.5
E_R	1.2	1.2	1.2	1.2	1.2
f_{HV}	0.930	0.976	0.952	0.976	0.952
f_P	1.00	1.00	1.00	1.00	1.00
GP Flow (pcph)	1,647	1,587	1,380	2,882	2,503
GP Flow (pcphpl)	823	794	690	1,441	1,251
Calculate Speed in General Purpose Lanes					
Lane Width (ft)	12	12	12	12	12
Shoulder Width	>6	>6	>6	>6	>6
TRD	1.8	1.8	1.8	1.8	1.8
f_{LW}	0.0	0.0	0.0	0.0	0.0
f_{LC}	0.0	0.0	0.0	0.0	0.0
Calc'd FFS	70.1	70.1	70.1	70.1	70.1
Measured FFS	70.0	70.0	70.0	70.0	70.0
FFS	70	70	70	70	70

Location	1	2	3		



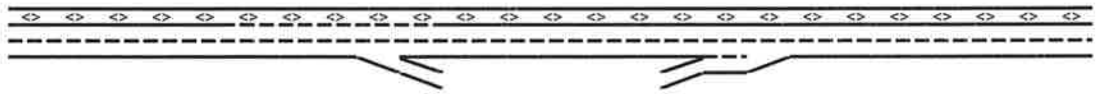
Key

<> Express Lane (HOV)

No Trucks

Name	SR 99 south of Elk Grove Blvd	East Stockton Loop Off-Ramp	E. Stockton Off to Elk Grove On	Elk Grove Blvd On-Ramp	SR 99 north of Elk Grove
Calculate Operations in General Purpose Lanes					
v/c ratio	0.34	0.33	0.29	0.60	0.52
Speed (mph)	70.0	70.0	70.0	69.3	70.0
Density (pcphpl)	11.8	11.3	9.9	20.8	17.9
LOS	B	B	A	C	B
Calculate Operations for Entering GP Lanes					
GP_{IN} Vol (pcph)				1,332	
GP_{IN} Cap (pcph)				4,800	
GP_{IN} v/c ratio				0.28	
Calculate Operations for Exiting GP Lanes					
GP_{OUT} Vol (pcph)		1,265			
GP_{OUT} Cap (pcph)		4,800			
GP_{OUT} v/c ratio		0.26			
Calculate On Ramp Flow Rate					
On Volume (vph)				1,406	
PHF				0.93	
Total Lanes				1	
Terrain				Level	
Grade %				0.0%	
Grade Length (mi)				0.00	
Truck & Bus %				5.0%	
RV %				0.0%	
E_T				1.5	
E_R				1.2	
f_{HV}				0.976	
f_P				1.00	
On Flow (pcph)				1,550	
On Flow (pcphpl)				1,550	
Calculate On Ramp Roadway Operations					
On Ramp Type				Right	
On Ramp Speed (mph)				45	
On Ramp Cap (pcph)				2,100	
On Ramp v/c ratio				0.74	

Location	1	[illegible]	[illegible]	[illegible]	[illegible]



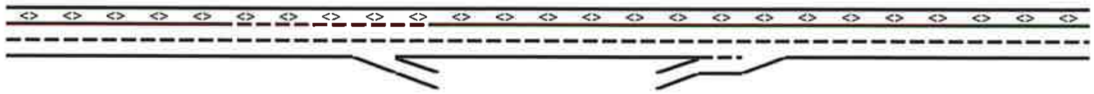
Key

<> Express Lane (HOV)

No Trucks

Name	SR 99 south of Elk Grove Blvd	East Stockton Loop Off-Ramp	E. Stockton Off to Elk Grove On	Elk Grove Blvd On-Ramp	SR 99 north of Elk Grove
Calculate Off Ramp Flow Rate					
Off Volume (vph)		286			
PHF		0.91			
Total Lanes		1			
Terrain		Level			
Grade %		0.0%			
Grade Length (mi)		0.00			
Truck & Bus %		5.0%			
RV %		0.0%			
E_T		1.5			
E_R		1.2			
f_{HV}		0.976			
f_P		1.00			
Off Flow (pcph)		322			
Off Flow (pcphpl)		322			
Calculate Off Ramp Roadway Operations					
Off Ramp Type		Right			
Off Ramp Speed		35			
Off Ramp Cap (pcph)		2,000			
Off Ramp v/c ratio		0.16			
Determine Adjacent Ramp for Three-Lane Mainline Segments with One-Lane Ramps					
Up Type					
Up Distance					
Up Flow (pcph)					
Down Type					
Down Distance					
Down Flow (pcph)					

Location	1	2	3	4	5



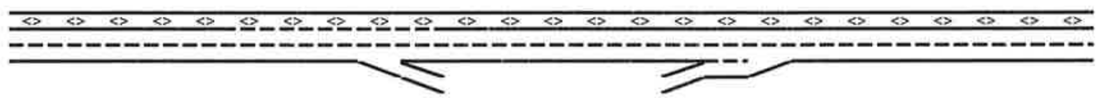
Key

<> Express Lane (HOV)

No Trucks

Name	SR 99 south of Elk Grove Blvd	East Stockton Loop Off-Ramp	E. Stockton Off to Elk Grove On	Elk Grove Blvd On-Ramp	SR 99 north of Elk Grove
Calculate Merge Influence Area Operations					
Effective v_P (pcph)				1,332	
Up Ramp L_{EQ}					
Down Ramp L_{EQ}					
P_{FM} (Eqn 13-3)				0.611	
P_{FM} (Eqn 13-4)					
P_{FM} (Eqn 13-5)					
P_{FM}				1.000	
v_{12} (pcph)				1,332	
v_3 (pcph)					
v_{34} (pcph)					
v_{12a} (pcph)				1,332	
v_{R12a} (pcph)				2,882	
Merge Speed Index				0.28	
Merge Area Speed				62.1	
Outer Lanes Volume					
Outer Lanes Speed					
Segment Speed				62.1	
Merge v/c ratio				0.63	
Merge Density				19.7	
Merge LOS				B	
Calculate Diverge Influence Area Operations					
Effective v_P (pcph)		1,587			
Up Ramp L_{EQ}					
Down Ramp L_{EQ}					
P_{FD} (Eqn 13-9)		0.706			
P_{FD} (Eqn 13-10)					
P_{FD} (Eqn 13-11)					
P_{FD}		1.000			
v_{12} (pcph)		1,587			
v_3 (pcph)					
v_{34} (pcph)					
v_{12a} (pcph)		1,587			
Diverge Speed Index		0.46			
Diverge Area Speed		57.2			
Outer Lanes Volume					
Outer Lanes Speed					
Segment Speed		57.2			
Diverge v/c ratio		0.36			
Diverge Density		16.4			
Diverge LOS		B			

Location	1	2	3	4	5



Key

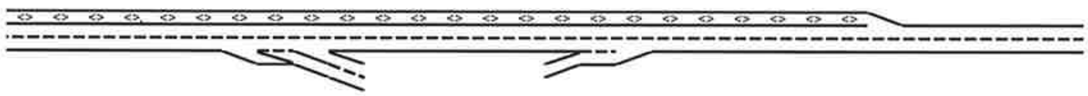
<> Express Lane (HOV)

No Trucks

Name	SR 99 south of Elk Grove Blvd	East Stockton Loop Off-Ramp	E. Stockton Off to Elk Grove On	Elk Grove Blvd On-Ramp	SR 99 north of Elk Grove
Summarize Segment Operations					
Segment v/c ratio	0.34	0.36	0.29	0.63	0.52
Segment Density	11.8	16.4	9.9	19.7	17.9
Segment LOS	B	B	A	B	B
Over Capacity					

Project:	**Elk Grove Civic Center**	**Alternative:**	**Existing Plus Project**
Freeway Corridor:	**State Route 99 SB**	**Time Period:**	**Sat. AM Peak Hour**

Location	1	2	3	4	5	6



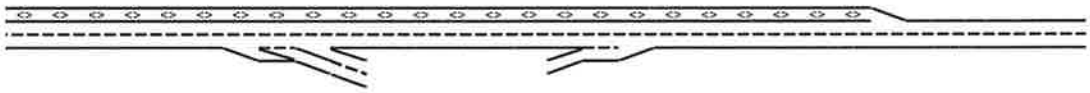
Key

<> Express Lane (HOV)

No Trucks

Name	SR 99 north of Elk Grove Blvd	Elk Grove Off-Ramp	Elk Grove Off-Ramp to On-Ramp	Elk Grove On-Ramp	SR 99 south of Elk Grove Blvd	SR 99 south of Elk Grove Blvd
Define Freeway Segment						
Type	Basic	Diverge	Basic	Merge	Basic	Basic
Length (ft)	250	1,500	2,250	1,500	400	8,050
Accel Length				300		
Decel Length		1,500				
Mainline Volume	3,001	3,001	1,504	1,504	1,789	1,789
On Ramp Volume				285		
Off Ramp Volume		1,497				
Express Lane Volume	900	900				
EL On Ramp Volume						
EL Off Ramp Volume						
Calculate Flow Rate in General Purpose Lanes (GP)						
GP Volume (vph)	2,101	2,101	1,504	1,789	1,789	1,789
PHF	0.92	0.9	0.92	0.9	0.92	0.92
GP Lanes	2	2	2	2	2	2
Terrain	Level	Level	Level	Level	Level	Level
Grade %	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Grade Length (mi)	0.00	0.00	0.00	0.00	0.00	0.00
Truck & Bus %	10.0%	5.0%	10.0%	5.0%	15.0%	15.0%
RV %	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
E_T	1.5	1.5	1.5	1.5	1.5	1.5
E_R	1.2	1.2	1.2	1.2	1.2	1.2
f_{HV}	0.952	0.976	0.952	0.976	0.930	0.930
f_P	1.00	1.00	1.00	1.00	1.00	1.00
GP Flow (pcph)	2,398	2,392	1,717	2,037	2,090	2,090
GP Flow (pcphpl)	1,199	1,196	858	1,019	1,045	1,045
Calculate Speed in General Purpose Lanes						
Lane Width (ft)	12	12	12	12	12	12
Shoulder Width	>6	>6	>6	>6	>6	>6
TRD	1.8	1.8	1.8	1.8	1.8	1.8
f_{LW}	0.0	0.0	0.0	0.0	0.0	0.0
f_{LC}	0.0	0.0	0.0	0.0	0.0	0.0
Calc'd FFS	70.1	70.1	70.1	70.1	70.1	70.1
Measured FFS	70.0	70.0	70.0	70.0	70.0	70.0
FFS	70	70	70	70	70	70

Location	1		3	4		



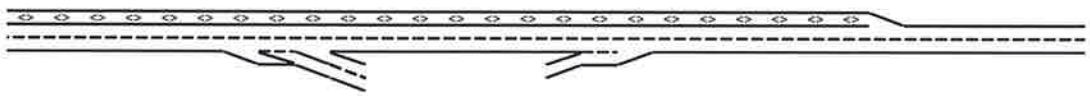
Key

<> Express Lane (HOV)

No Trucks

Name	SR 99 north of Elk Grove Blvd	Elk Grove Off-Ramp	Elk Grove Off-Ramp to On-Ramp	Elk Grove On-Ramp	SR 99 south of Elk Grove Blvd	SR 99 south of Elk Grove Blvd
Calculate Operations in General Purpose Lanes						
v/c ratio	0.50	0.50	0.36	0.42	0.44	0.44
Speed (mph)	70.0	70.0	70.0	70.0	70.0	70.0
Density (pcphpl)	17.1	17.1	12.3	14.6	14.9	14.9
LOS	B	B	B	B	B	B
Calculate Operations for Entering GP Lanes						
GP_{IN} Vol (pcph)				1,713		
GP_{IN} Cap (pcph)				4,800		
GP_{IN} v/c ratio				0.36		
Calculate Operations for Exiting GP Lanes						
GP_{OUT} Vol (pcph)		688				
GP_{OUT} Cap (pcph)		4,800				
GP_{OUT} v/c ratio		0.14				
Calculate On Ramp Flow Rate						
On Volume (vph)				285		
PHF				0.9		
Total Lanes				1		
Terrain				Level		
Grade %				0.0%		
Grade Length (mi)				0.00		
Truck & Bus %				5.0%		
RV %				0.0%		
E_T				1.5		
E_R				1.2		
f_{HV}				0.976		
f_P				1.00		
On Flow (pcph)				325		
On Flow (pcphpl)				325		
Calculate On Ramp Roadway Operations						
On Ramp Type				Right		
On Ramp Speed (mph)				60		
On Ramp Cap (pcph)				2,200		
On Ramp v/c ratio				0.15		

Location	1		3			



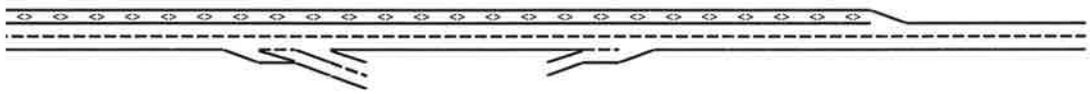
Key

<> Express Lane (HOV)

No Trucks

Name	SR 99 north of Elk Grove Blvd	Elk Grove Off-Ramp	Elk Grove Off-Ramp to On-Ramp	Elk Grove On-Ramp	SR 99 south of Elk Grove Blvd	SR 99 south of Elk Grove Blvd
Calculate Off Ramp Flow Rate						
Off Volume (vph)		1,497				
PHF		0.9				
Total Lanes		2				
Terrain		Level				
Grade %		0.0%				
Grade Length (mi)		0.00				
Truck & Bus %		5.0%				
RV %		0.0%				
E_T		1.5				
E_R		1.2				
f_{HV}		0.976				
f_P		1.00				
Off Flow (pcph)		1,705				
Off Flow (pcphpl)		852				
Calculate Off Ramp Roadway Operations						
Off Ramp Type		Right				
Off Ramp Speed		35				
Off Ramp Cap (pcph)		4,000				
Off Ramp v/c ratio		0.43				
Determine Adjacent Ramp for Three-Lane Mainline Segments with One-Lane Ramps						
Up Type						
Up Distance						
Up Flow (pcph)						
Down Type						
Down Distance						
Down Flow (pcph)						

Location	1	2	3	4	5	6



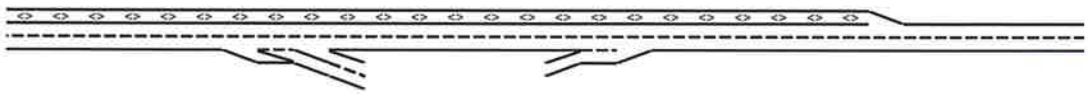
Key

<> Express Lane (HOV)

No Trucks

Name	SR 99 north of Elk Grove Blvd	Elk Grove Off-Ramp	Elk Grove Off-Ramp to On-Ramp	Elk Grove On-Ramp	SR 99 south of Elk Grove Blvd	SR 99 south of Elk Grove Blvd
Calculate Merge Influence Area Operations						
Effective v_P (pcph)				1,713		
Up Ramp L_{EQ}						
Down Ramp L_{EQ}						
P_{FM} (Eqn 13-3)				0.586		
P_{FM} (Eqn 13-4)						
P_{FM} (Eqn 13-5)						
P_{FM}				1.000		
v_{12} (pcph)				1,713		
v_3 (pcph)						
v_{34} (pcph)						
v_{12a} (pcph)				1,713		
v_{R12a} (pcph)				2,037		
Merge Speed Index				0.31		
Merge Area Speed				61.2		
Outer Lanes Volume						
Outer Lanes Speed						
Segment Speed				61.2		
Merge v/c ratio				0.44		
Merge Density				19.3		
Merge LOS				B		
Calculate Diverge Influence Area Operations						
Effective v_P (pcph)		2,392				
Up Ramp L_{EQ}						
Down Ramp L_{EQ}						
P_{FD} (Eqn 13-9)		0.622				
P_{FD} (Eqn 13-10)						
P_{FD} (Eqn 13-11)						
P_{FD}		1.000				
v_{12} (pcph)		2,392				
v_3 (pcph)						
v_{34} (pcph)						
v_{12a} (pcph)		2,392				
Diverge Speed Index		0.58				
Diverge Area Speed		53.7				
Outer Lanes Volume						
Outer Lanes Speed						
Segment Speed		53.7				
Diverge v/c ratio		0.54				
Diverge Density		11.3				
Diverge LOS		B				

Location	1	2	3	4	5	6



Key

<> Express Lane (HOV)

No Trucks

Name	SR 99 north of Elk Grove Blvd	Elk Grove Off-Ramp	Elk Grove Off-Ramp to On-Ramp	Elk Grove On-Ramp	SR 99 south of Elk Grove Blvd	SR 99 south of Elk Grove Blvd
Summarize Segment Operations						
Segment v/c ratio	0.50	0.54	0.36	0.44	0.44	0.44
Segment Density	17.1	11.3	12.3	19.3	14.9	14.9
Segment LOS	B	B	B	B	B	B
Over Capacity						

Project:	**Elk Grove Civic Center**		**Alternative:**	**Existing Plus Project**
Freeway Corridor:	**Interstate 5 NB**		**Time Period:**	**Sat. AM Peak Hour**

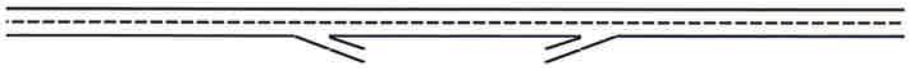
Key

<> Express Lane (HOV)

No Trucks

Location	1	2	3	4	5
Name	I-5 south of Elk Grove B lvd	Elk Grove Blvd Off-Ramp	Elk Grove Off-Ramp to On-Ramp	Elk Grove On-Ramp	I-5 north of Elk Grove Blvd
Define Freeway Segment					
Type	Basic	Diverge	Basic	Merge	Basic
Length (ft)	6,900	1,500	3,100	1,500	500
Accel Length				750	
Decel Length		160			
Mainline Volume	1,641	1,641	1,509	1,509	2,148
On Ramp Volume				639	
Off Ramp Volume		132			
Express Lane Volume					
EL On Ramp Volume					
EL Off Ramp Volume					
Calculate Flow Rate in General Purpose Lanes (GP)					
GP Volume (vph)	1,641	1,641	1,509	2,148	2,148
PHF	0.92	0.97	0.92	0.97	0.92
GP Lanes	2	2	2	2	2
Terrain	Level	Level	Level	Level	Level
Grade %	0.0%	0.0%	0.0%	0.0%	0.0%
Grade Length (mi)	0.00	0.00	0.00	0.00	0.00
Truck & Bus %	18.0%	5.0%	18.0%	5.0%	18.0%
RV %	0.0%	0.0%	0.0%	0.0%	0.0%
E_T	1.5	1.5	1.5	1.5	1.5
E_R	1.2	1.2	1.2	1.2	1.2
f_{HV}	0.917	0.976	0.917	0.976	0.917
f_P	1.00	1.00	1.00	1.00	1.00
GP Flow (pcph)	1,944	1,734	1,788	2,270	2,545
GP Flow (pcphpl)	972	867	894	1,135	1,272
Calculate Speed in General Purpose Lanes					
Lane Width (ft)	12	12	12	12	12
Shoulder Width	>6	>6	>6	>6	>6
TRD	1.2	1.2	1.2	1.2	1.2
f_{LW}	0.0	0.0	0.0	0.0	0.0
f_{LC}	0.0	0.0	0.0	0.0	0.0
Calc'd FFS	71.7	71.7	71.7	71.7	71.7
Measured FFS	70.0	70.0	70.0	70.0	70.0
FFS	70	70	70	70	70
Calculate Operations in General Purpose Lanes					
v/c ratio	0.41	0.36	0.37	0.47	0.53
Speed (mph)	70.0	70.0	70.0	70.0	69.9
Density (pcphpl)	13.9	12.4	12.8	16.2	18.2
LOS	B	B	B	B	C
Calculate Operations for Entering GP Lanes					
GP_{IN} Vol (pcph)				1,595	
GP_{IN} Cap (pcph)				4,800	
GP_{IN} v/c ratio				0.33	
Calculate Operations for Exiting GP Lanes					
GP_{OUT} Vol (pcph)		1,595			
GP_{OUT} Cap (pcph)		4,800			
GP_{OUT} v/c ratio		0.33			

Location	1	2	3	4	5



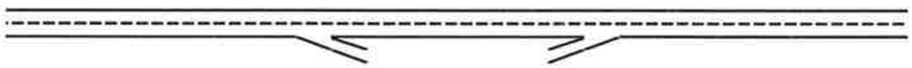
Key

<> Express Lane (HOV)

No Trucks

Name	I-5 south of Elk Grove B lvd	Elk Grove Blvd Off-Ramp	Elk Grove Off-Ramp to On-Ramp	Elk Grove On-Ramp	I-5 north of Elk Grove Blvd
Calculate On Ramp Flow Rate					
On Volume (vph)				639	
PHF				0.97	
Total Lanes				1	
Terrain				Level	
Grade %				0.0%	
Grade Length (mi)				0.00	
Truck & Bus %				5.0%	
RV %				0.0%	
E_T				1.5	
E_R				1.2	
f_{HV}				0.976	
f_P				1.00	
On Flow (pcph)				675	
On Flow (pcphpl)				675	
Calculate On Ramp Roadway Operations					
On Ramp Type				Right	
On Ramp Speed (mph)				45	
On Ramp Cap (pcph)				2,100	
On Ramp v/c ratio				0.32	

Location	1	2	3	4	5



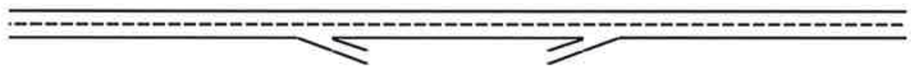
Key

<> Express Lane (HOV)

No Trucks

Name	I-5 south of Elk Grove B lvd	Elk Grove Blvd Off-Ramp	Elk Grove Off-Ramp to On-Ramp	Elk Grove On-Ramp	I-5 north of Elk Grove Blvd
Calculate Off Ramp Flow Rate					
Off Volume (vph)		132			
PHF		0.97			
Total Lanes		1			
Terrain		Level			
Grade %		0.0%			
Grade Length (mi)		0.00			
Truck & Bus %		5.0%			
RV %		0.0%			
E_T		1.5			
E_R		1.2			
f_{HV}		0.976			
f_P		1.00			
Off Flow (pcph)		139			
Off Flow (pcphpl)		139			
Calculate Off Ramp Roadway Operations					
Off Ramp Type		Right			
Off Ramp Speed		35			
Off Ramp Cap (pcph)		2,000			
Off Ramp v/c ratio		0.07			
Determine Adjacent Ramp for Three-Lane Mainline Segments with One-Lane Ramps					
Up Type					
Up Distance					
Up Flow (pcph)					
Down Type					
Down Distance					
Down Flow (pcph)					
Calculate Merge Influence Area Operations					
Effective v_P (pcph)				1,595	
Up Ramp L_{EQ}					
Down Ramp L_{EQ}					
P_{FM} (Eqn 13-3)				0.599	
P_{FM} (Eqn 13-4)					
P_{FM} (Eqn 13-5)					
P_{FM}				1.000	
v_{12} (pcph)				1,595	
v_3 (pcph)					
v_{34} (pcph)					
v_{12a} (pcph)				1,595	
v_{R12a} (pcph)				2,270	
Merge Speed Index				0.29	
Merge Area Speed				61.8	
Outer Lanes Volume					
Outer Lanes Speed					
Segment Speed				61.8	
Merge v/c ratio				0.49	
Merge Density				18.2	
Merge LOS				B	

Location	1	2	3	4	5



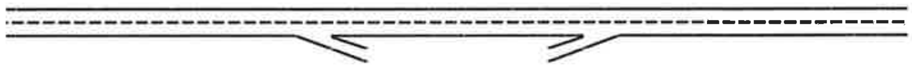
Key

<> Express Lane (HOV)

No Trucks

Name	I-5 south of Elk Grove B lvd	Elk Grove Blvd Off-Ramp	Elk Grove Off-Ramp to On-Ramp	Elk Grove On-Ramp	I-5 north of Elk Grove Blvd
Calculate Diverge Influence Area Operations					
Effective v_p (pcph)		1,734			
Up Ramp L_{EQ}					
Down Ramp L_{EQ}					
P_{FD} (Eqn 13-9)		0.710			
P_{FD} (Eqn 13-10)					
P_{FD} (Eqn 13-11)					
P_{FD}		1.000			
v_{12} (pcph)		1,734			
v_3 (pcph)					
v_{34} (pcph)					
v_{12a} (pcph)		1,734			
Diverge Speed Index		0.44			
Diverge Area Speed		57.7			
Outer Lanes Volume					
Outer Lanes Speed					
Segment Speed		57.7			
Diverge v/c ratio		0.39			
Diverge Density		17.7			
Diverge LOS		B			

Location	[illegible]	2	[illegible]	[illegible]	[illegible]



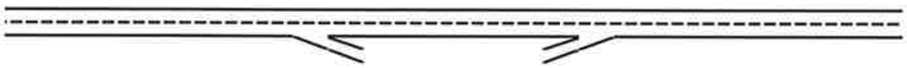
Key

<> Express Lane (HOV)

No Trucks

Name	I-5 south of Elk Grove B lvd	Elk Grove Blvd Off-Ramp	Elk Grove Off-Ramp to On-Ramp	Elk Grove On-Ramp	I-5 north of Elk Grove Blvd
Summarize Segment Operations					
Segment v/c ratio	0.41	0.39	0.37	0.49	0.53
Segment Density	13.9	17.7	12.8	18.2	18.2
Segment LOS	B	B	B	B	C
Over Capacity					

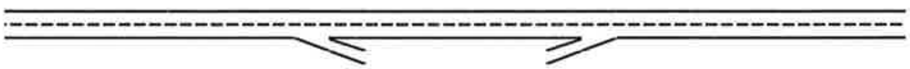
Project:	**Elk Grove Civic Center**		**Alternative:**	**Existing Plus Project**
Freeway Corridor:	**Interstate 5 SB**		**Time Period:**	**Sat. AM Peak Hour**



Key
<> Express Lane (HOV)
No Trucks

Location	1	2	3	4	5
Name	I-5 north of Elk Grove Blvd	Elk Grove Off-Ramp	Elk Grove Off-Ramp to On-Ramp	Elk Grove Loop On-Ramp	I-5 south of Elk Grove Blvd
Define Freeway Segment					
Type	Basic	Diverge	Basic	Merge	Basic
Length (ft)	2,500	1,500	1,450	1,500	7,750
Accel Length				750	
Decel Length		160			
Mainline Volume	1,821	1,821	1,331	1,331	1,480
On Ramp Volume				149	
Off Ramp Volume		490			
Express Lane Volume					
EL On Ramp Volume					
EL Off Ramp Volume					
Calculate Flow Rate in General Purpose Lanes (GP)					
GP Volume (vph)	1,821	1,821	1,331	1,480	1,480
PHF	0.92	0.87	0.92	0.87	0.92
GP Lanes	2	2	2	2	2
Terrain	Level	Level	Level	Level	Level
Grade %	0.0%	0.0%	0.0%	0.0%	0.0%
Grade Length (mi)	0.00	0.00	0.00	0.00	0.00
Truck & Bus %	18.0%	5.0%	18.0%	5.0%	18.0%
RV %	0.0%	0.0%	0.0%	0.0%	0.0%
E_T	1.5	1.5	1.5	1.5	1.5
E_R	1.2	1.2	1.2	1.2	1.2
f_{HV}	0.917	0.976	0.917	0.976	0.917
f_P	1.00	1.00	1.00	1.00	1.00
GP Flow (pcph)	2,157	2,145	1,577	1,744	1,753
GP Flow (pcphpl)	1,079	1,073	788	872	877
Calculate Speed in General Purpose Lanes					
Lane Width (ft)	12	12	12	12	12
Shoulder Width	>6	>6	>6	>6	>6
TRD	1.2	1.2	1.2	1.2	1.2
f_{LW}	0.0	0.0	0.0	0.0	0.0
f_{LC}	0.0	0.0	0.0	0.0	0.0
Calc'd FFS	71.7	71.7	71.7	71.7	71.7
Measured FFS	70.0	70.0	70.0	70.0	70.0
FFS	70	70	70	70	70
Calculate Operations in General Purpose Lanes					
v/c ratio	0.45	0.45	0.33	0.36	0.37
Speed (mph)	70.0	70.0	70.0	70.0	70.0
Density (pcphpl)	15.4	15.3	11.3	12.5	12.5
LOS	B	B	B	B	B
Calculate Operations for Entering GP Lanes					
GP_{IN} Vol (pcph)				1,568	
GP_{IN} Cap (pcph)				4,800	
GP_{IN} v/c ratio				0.33	
Calculate Operations for Exiting GP Lanes					
GP_{OUT} Vol (pcph)		1,568			
GP_{OUT} Cap (pcph)		4,800			
GP_{OUT} v/c ratio		0.33			

Location	1				5



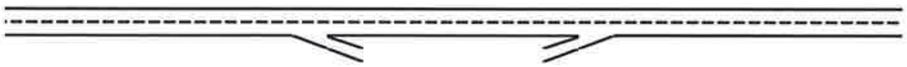
Key

<> Express Lane (HOV)

No Trucks

Name	I-5 north of Elk Grove Blvd	Elk Grove Off-Ramp	Elk Grove Off-Ramp to On-Ramp	Elk Grove Loop On-Ramp	I-5 south of Elk Grove Blvd
Calculate On Ramp Flow Rate					
On Volume (vph)				149	
PHF				0.87	
Total Lanes				1	
Terrain				Level	
Grade %				0.0%	
Grade Length (mi)				0.00	
Truck & Bus %				5.0%	
RV %				0.0%	
E_T				1.5	
E_R				1.2	
f_{HV}				0.976	
f_P				1.00	
On Flow (pcph)				176	
On Flow (pcphpl)				176	
Calculate On Ramp Roadway Operations					
On Ramp Type				Right	
On Ramp Speed (mph)				45	
On Ramp Cap (pcph)				2,100	
On Ramp v/c ratio				0.08	

Location	1	2	3	4	5



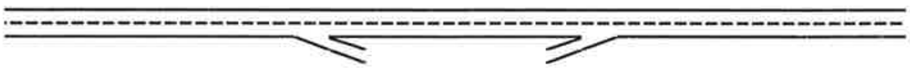
Key

<> Express Lane (HOV)

No Trucks

Name	I-5 north of Elk Grove Blvd	Elk Grove Off-Ramp	Elk Grave Off-Ramp to On-Ramp	Elk Grove Loop On-Ramp	I-5 south of Elk Grove Blvd
Calculate Off Ramp Flow Rate					
Off Volume (vph)		490			
PHF		0.87			
Total Lanes		1			
Terrain		Level			
Grade %		0.0%			
Grade Length (mi)		0.00			
Truck & Bus %		5.0%			
RV %		0.0%			
E_T		1.5			
E_R		1.2			
f_{HV}		0.976			
f_P		1.00			
Off Flow (pcph)		577			
Off Flow (pcphpl)		577			
Calculate Off Ramp Roadway Operations					
Off Ramp Type		Right			
Off Ramp Speed		35			
Off Ramp Cap (pcph)		2,000			
Off Ramp v/c ratio		0.29			
Determine Adjacent Ramp for Three-Lane Mainline Segments with One-Lane Ramps					
Up Type					
Up Distance					
Up Flow (pcph)					
Down Type					
Down Distance					
Down Flow (pcph)					
Calculate Merge Influence Area Operations					
Effective v_P (pcph)				1,568	
Up Ramp L_{EQ}					
Down Ramp L_{EQ}					
P_{FM} (Eqn 13-3)				0.599	
P_{FM} (Eqn 13-4)					
P_{FM} (Eqn 13-5)					
P_{FM}				1.000	
v_{12} (pcph)				1,568	
v_3 (pcph)					
v_{34} (pcph)					
v_{12a} (pcph)				1,568	
v_{R12a} (pcph)				1,744	
Merge Speed Index				0.28	
Merge Area Speed				62.3	
Outer Lanes Volume					
Outer Lanes Speed					
Segment Speed				62.3	
Merge v/c ratio				0.38	
Merge Density				14.3	
Merge LOS				B	

Location			3	4	5



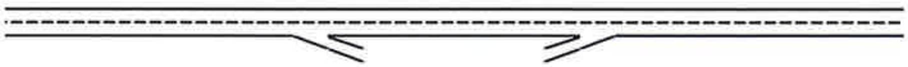
Key

<> Express Lane (HOV)

No Trucks

Name	I-5 north of Elk Grove Blvd	Elk Grove Off-Ramp	Elk Grove Off-Ramp to On-Ramp	Elk Grove Loop On-Ramp	I-5 south of Elk Grove Blvd
Calculate Diverge Influence Area Operations					
Effective v_P (pcph)		2,145			
Up Ramp L_{EQ}					
Down Ramp L_{EQ}					
P_{FD} (Eqn 13-9)		0.680			
P_{FD} (Eqn 13-10)					
P_{FD} (Eqn 13-11)					
P_{FD}		1.000			
v_{12} (pcph)		2,145			
v_3 (pcph)					
v_{34} (pcph)					
v_{12a} (pcph)		2,145			
Diverge Speed Index		0.48			
Diverge Area Speed		56.6			
Outer Lanes Volume					
Outer Lanes Speed					
Segment Speed		56.6			
Diverge v/c ratio		0.49			
Diverge Density		21.3			
Diverge LOS		C			

Location	1	2	3	4	



Key

<> Express Lane (HOV)

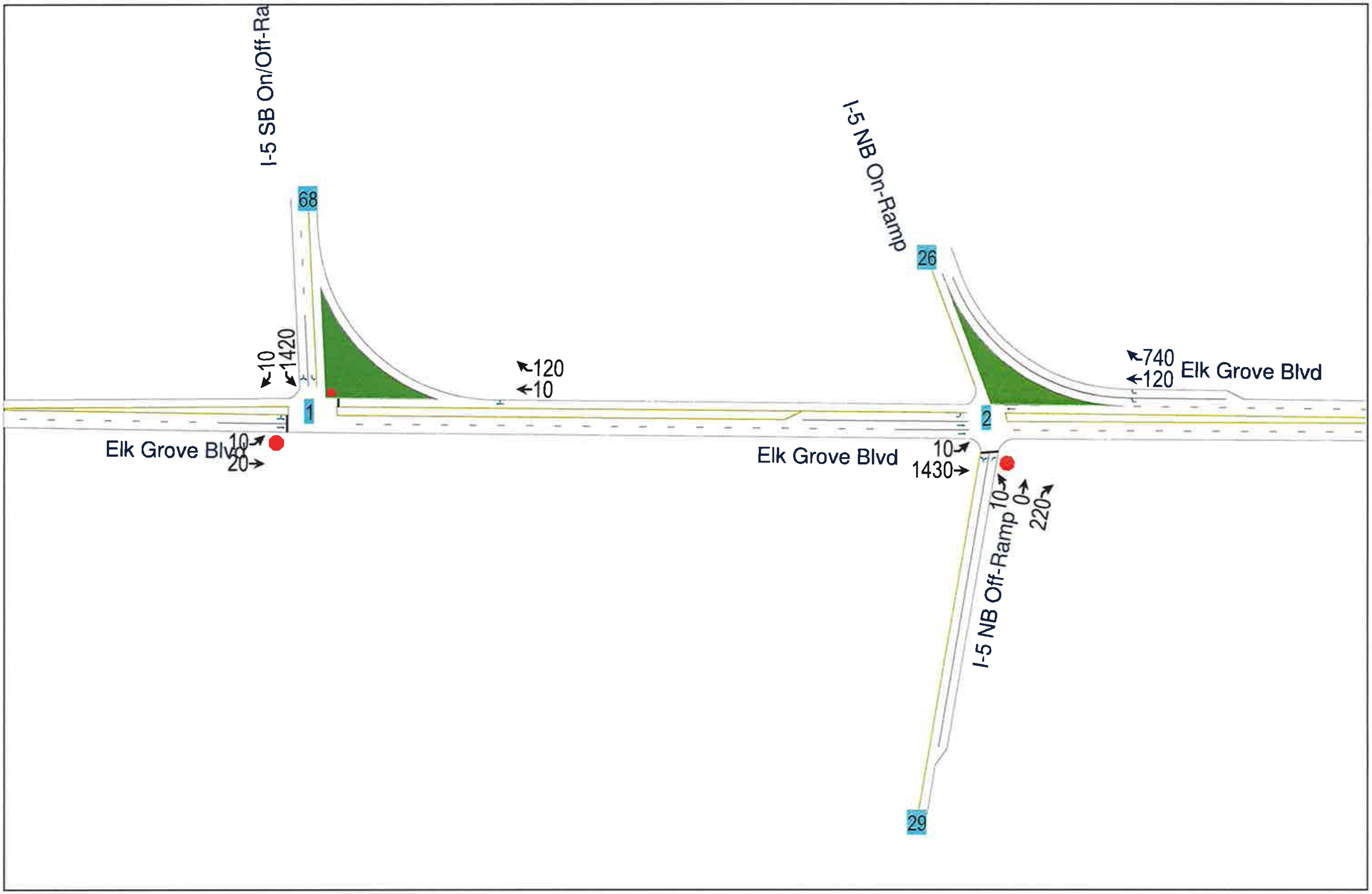
No Trucks

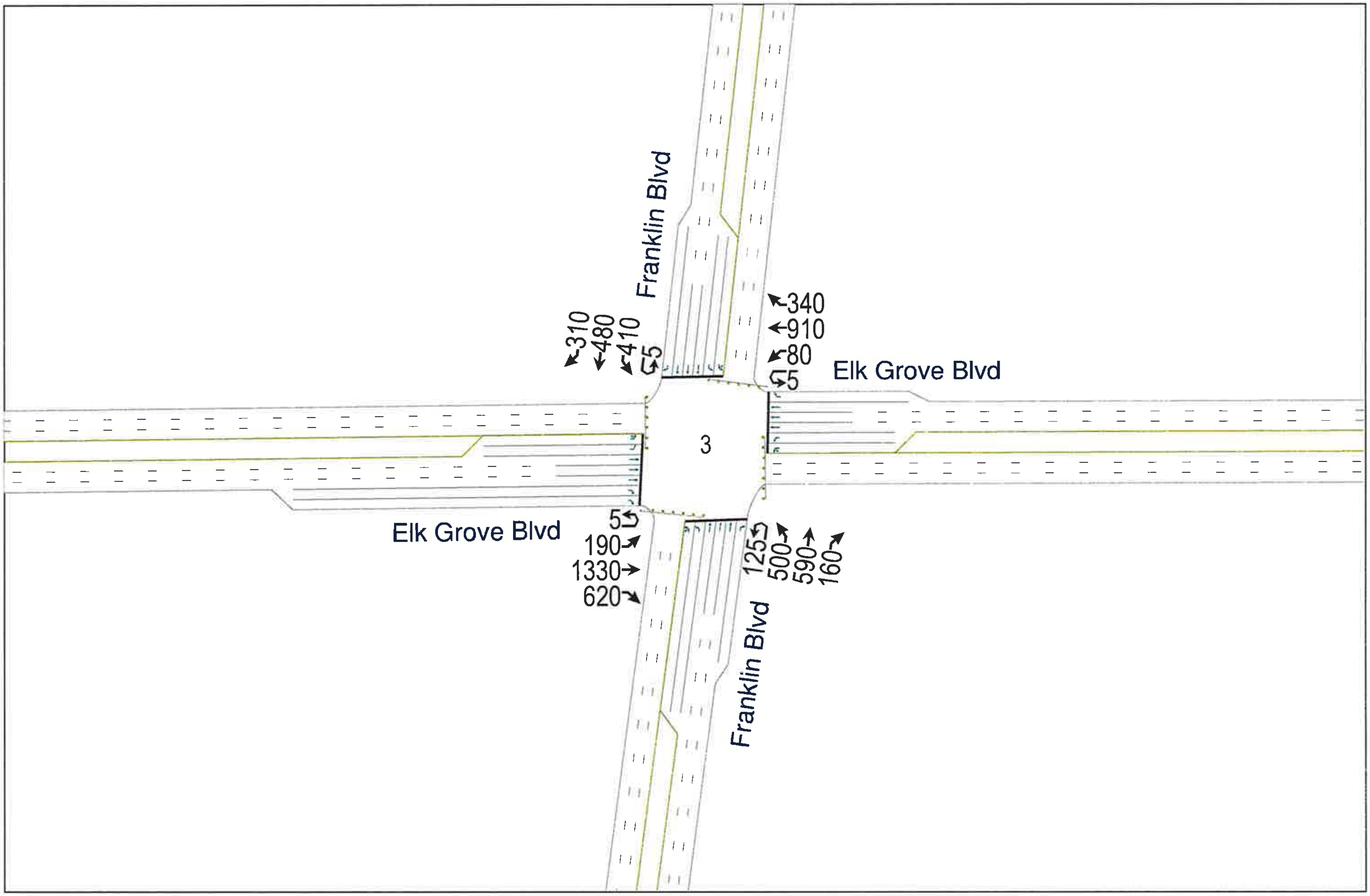
Name	I-5 north of Elk Grove Blvd	Elk Grove Off-Ramp	Elk Grave Off-Ramp to On-Ramp	Elk Grove Loop On-Ramp	I-5 south of Elk Grove Blvd
Summarize Segment Operations					
Segment v/c ratio	0.45	0.49	0.33	0.38	0.37
Segment Density	15.4	21.3	11.3	14.3	12.5
Segment LOS	B	C	B	B	B
Over Capacity					

APPENDIX C: CUMULATIVE CONDITIONS

Elk Grove Civic Center Aquatics Complex

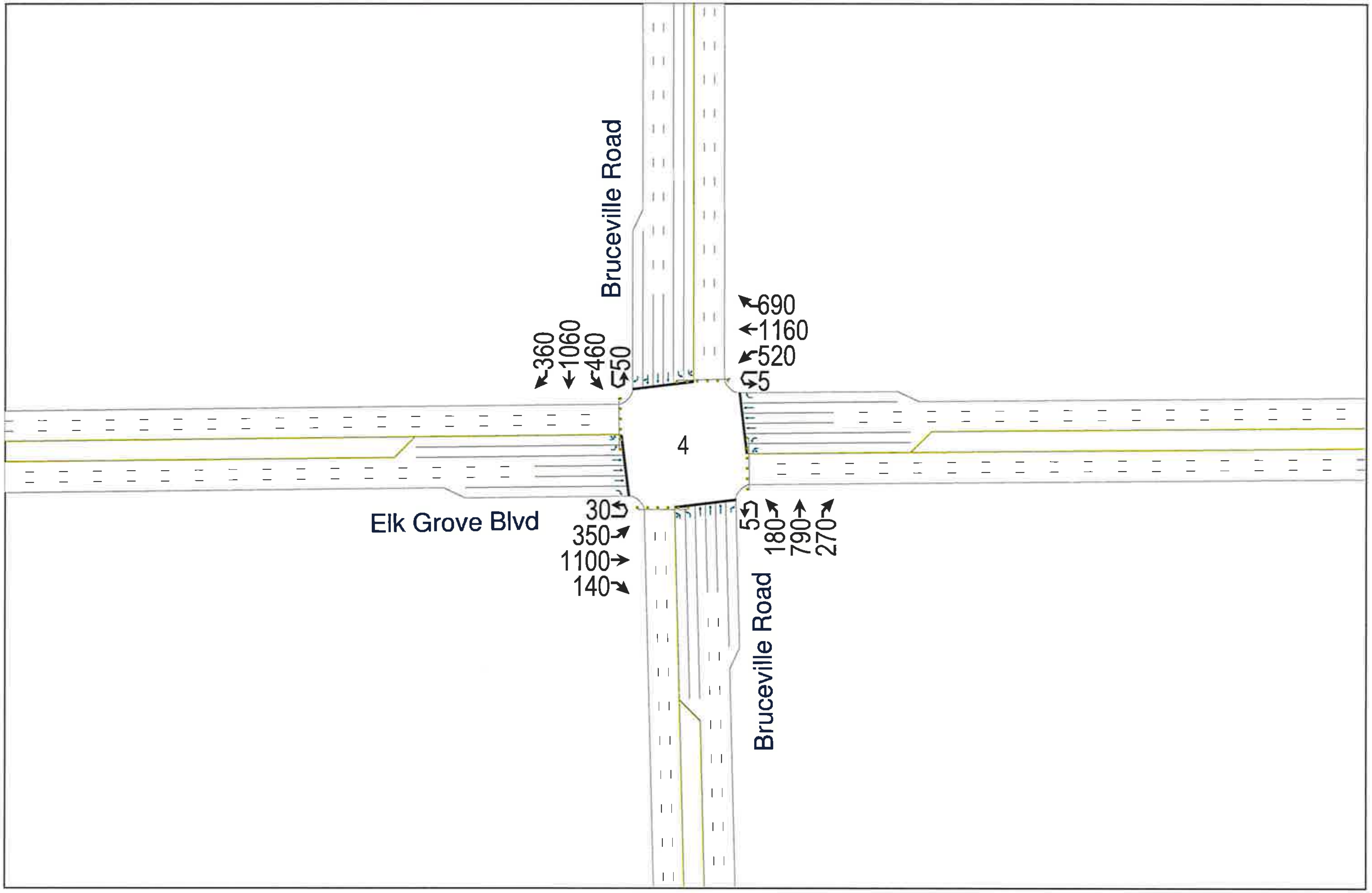
Cumulative Weekday No Project Conditions
PM Peak Hour

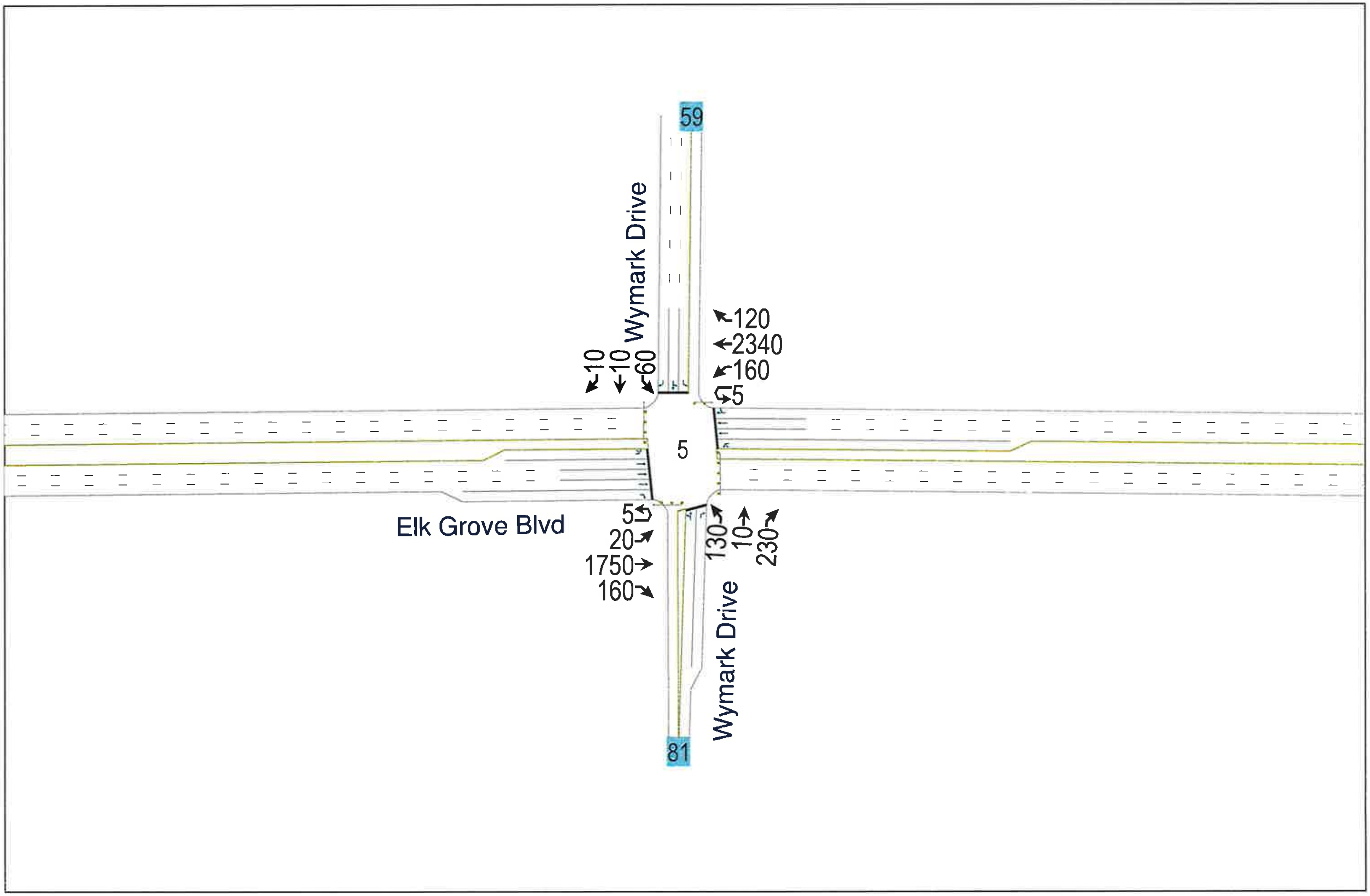


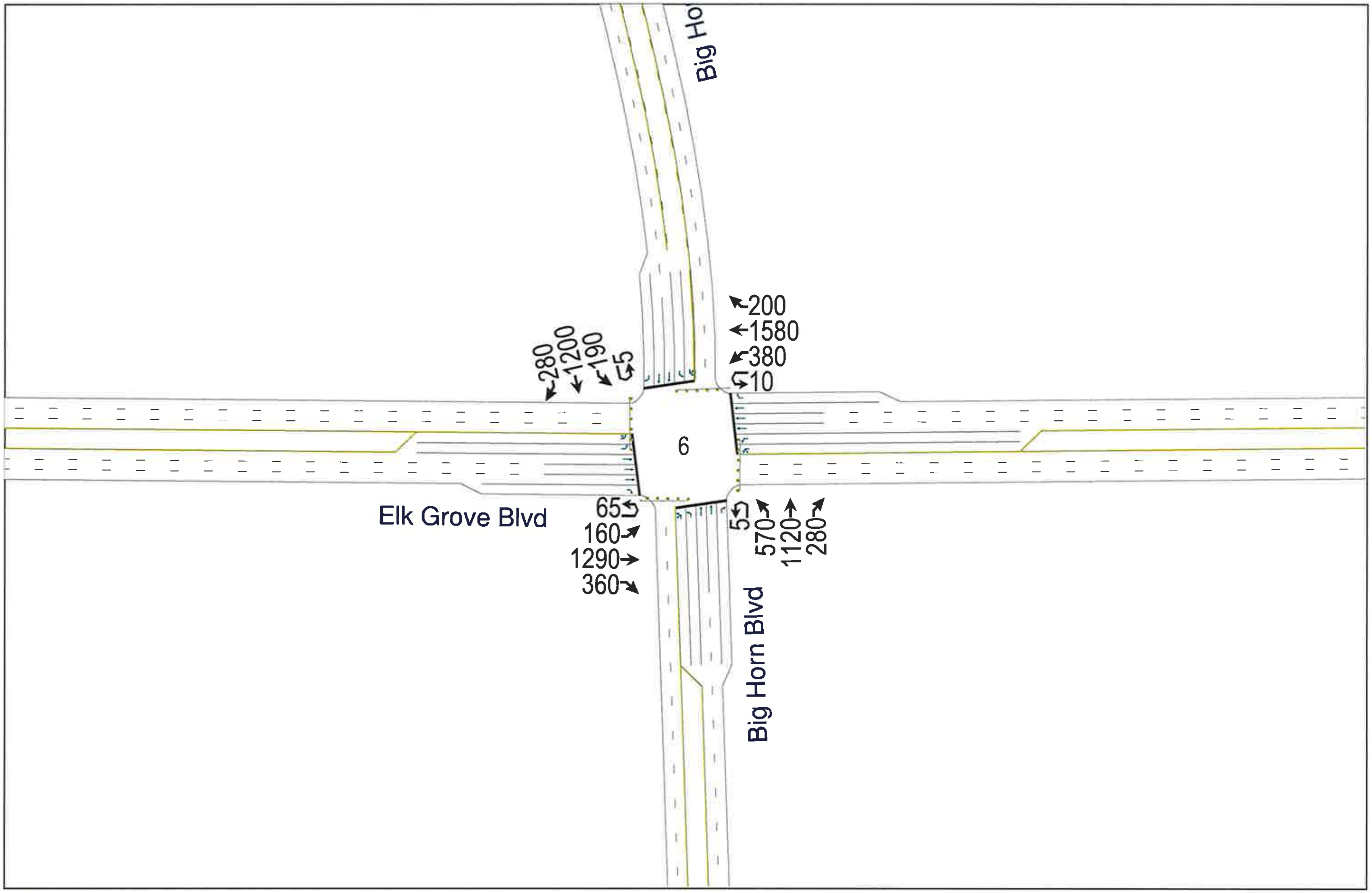

Franklin Blvd
310
480
410
5
340
910
80
5
Elk Grove Blvd
3
Elk Grove Blvd
5
190
1330
620
125
500
590
160
Franklin Blvd

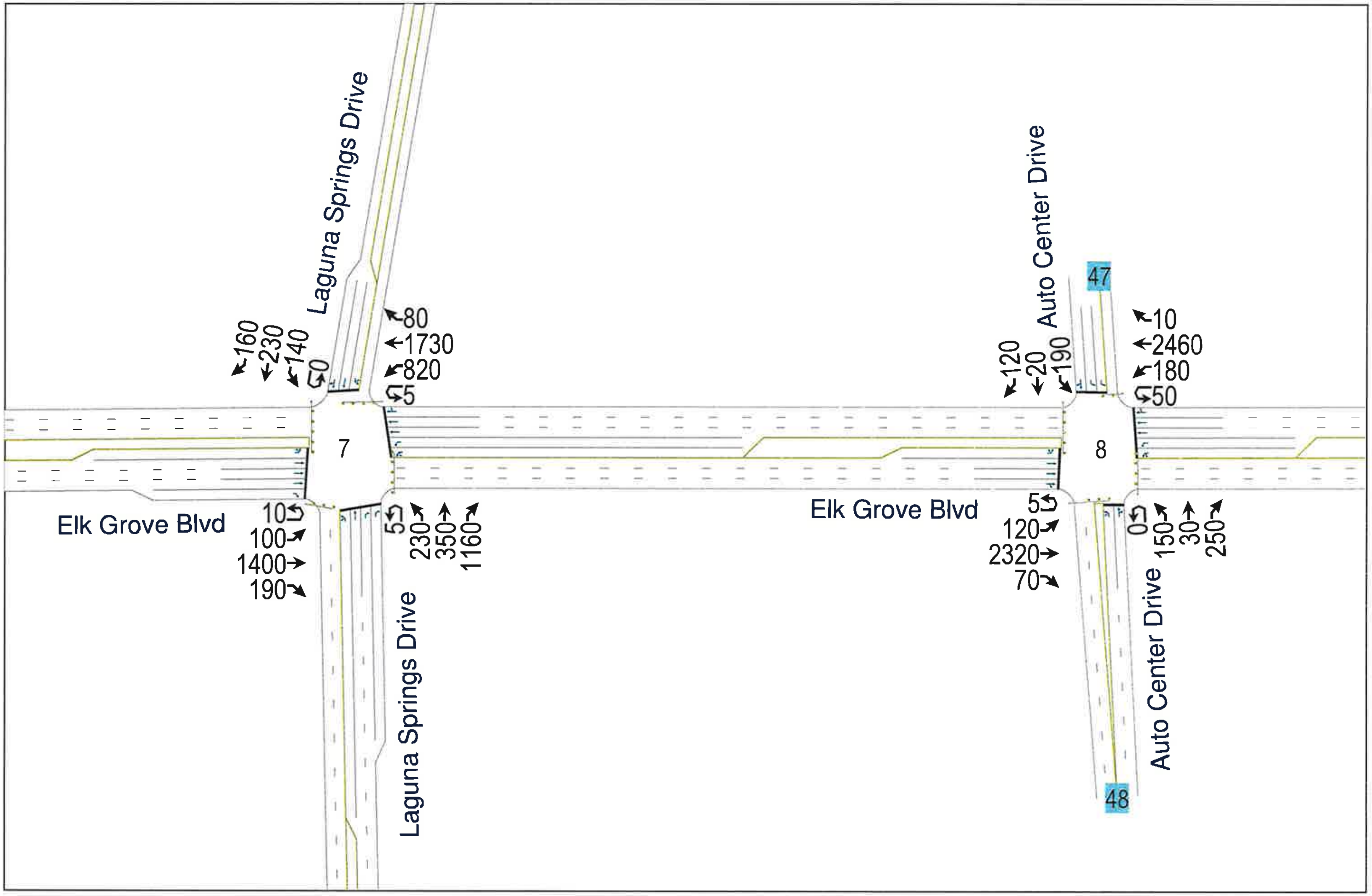
Elk Grove Civic Center Aquatics Complex

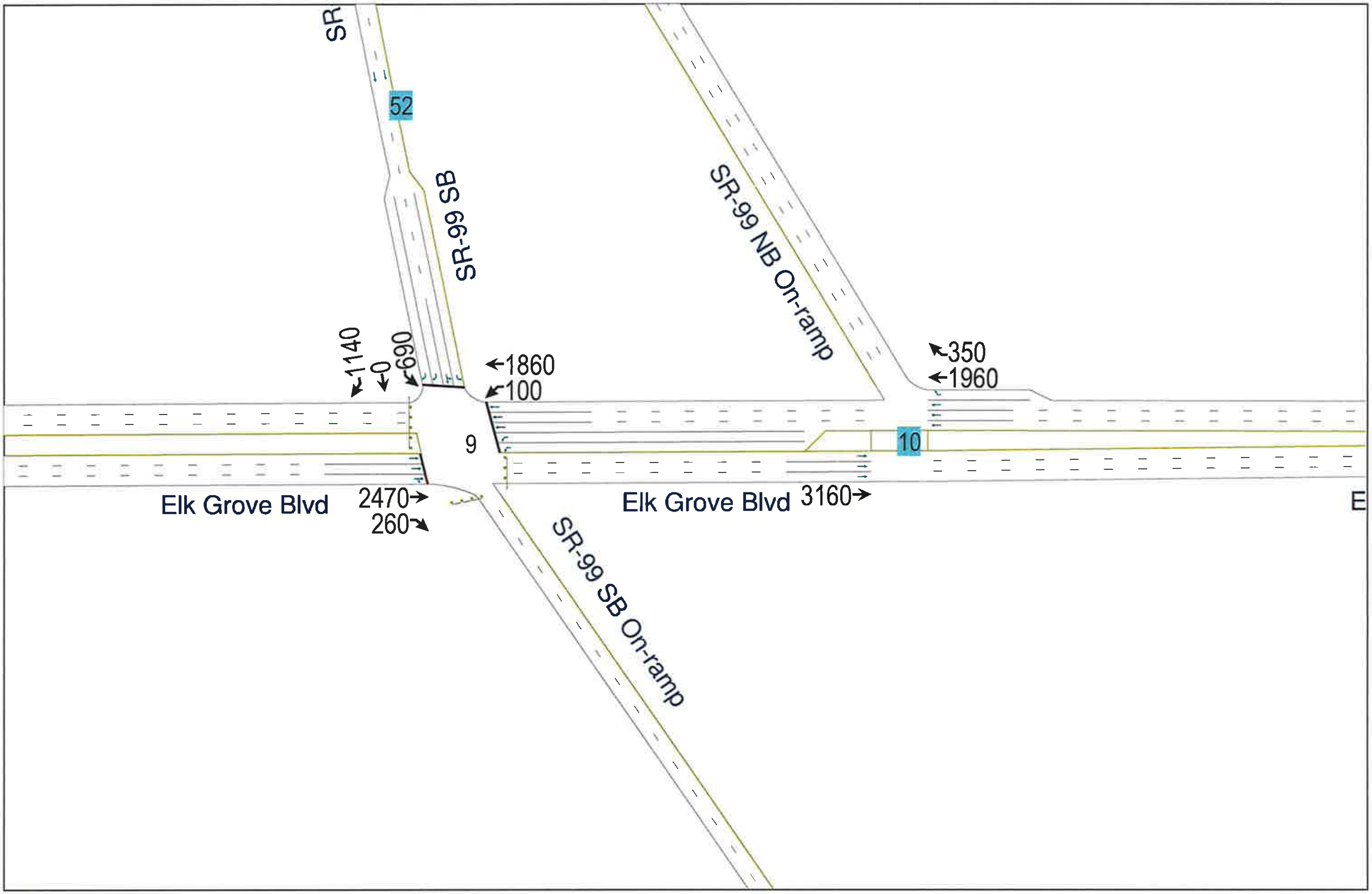
Cumulative Weekday No Project Conditions
PM Peak Hour

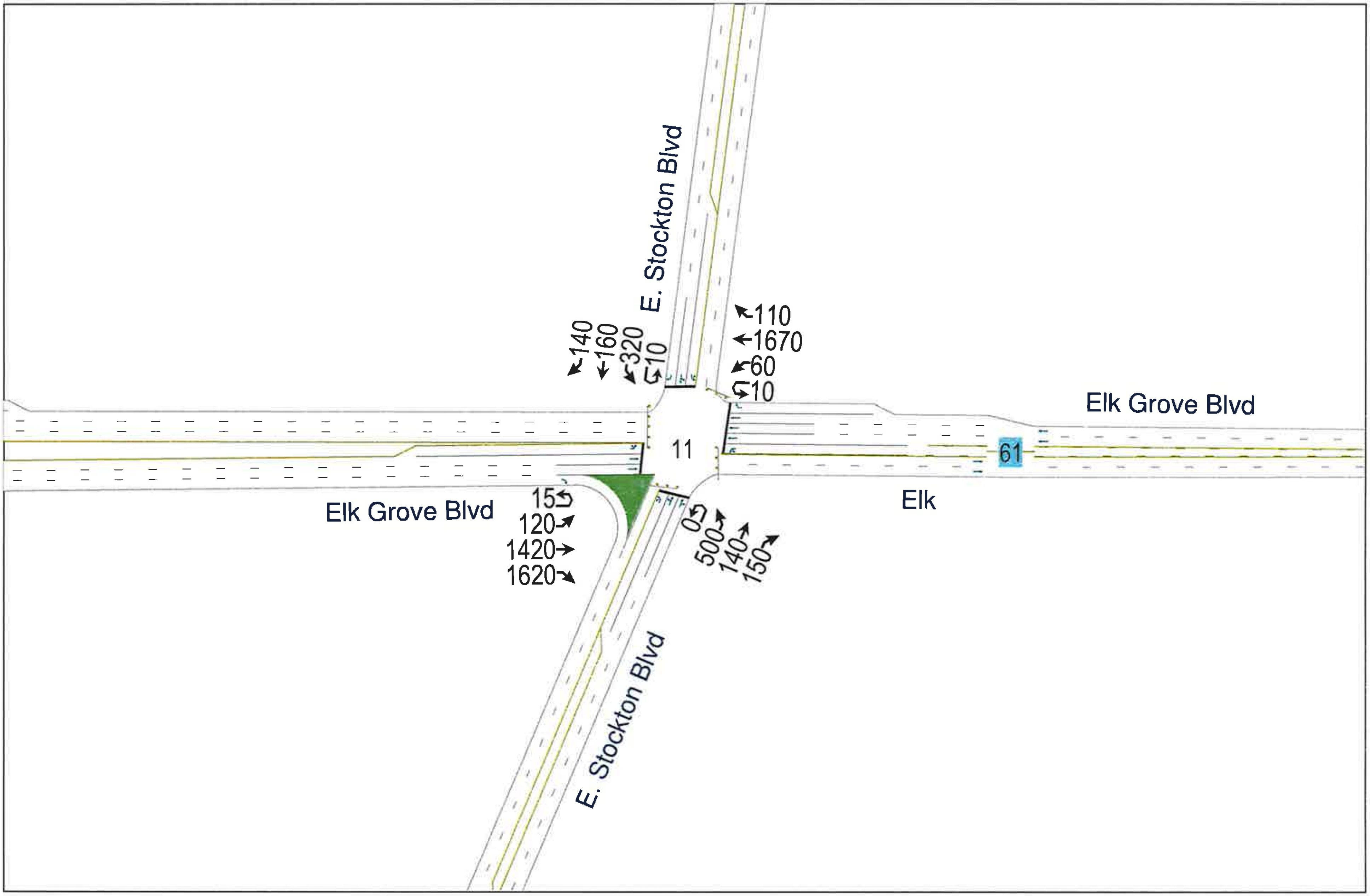


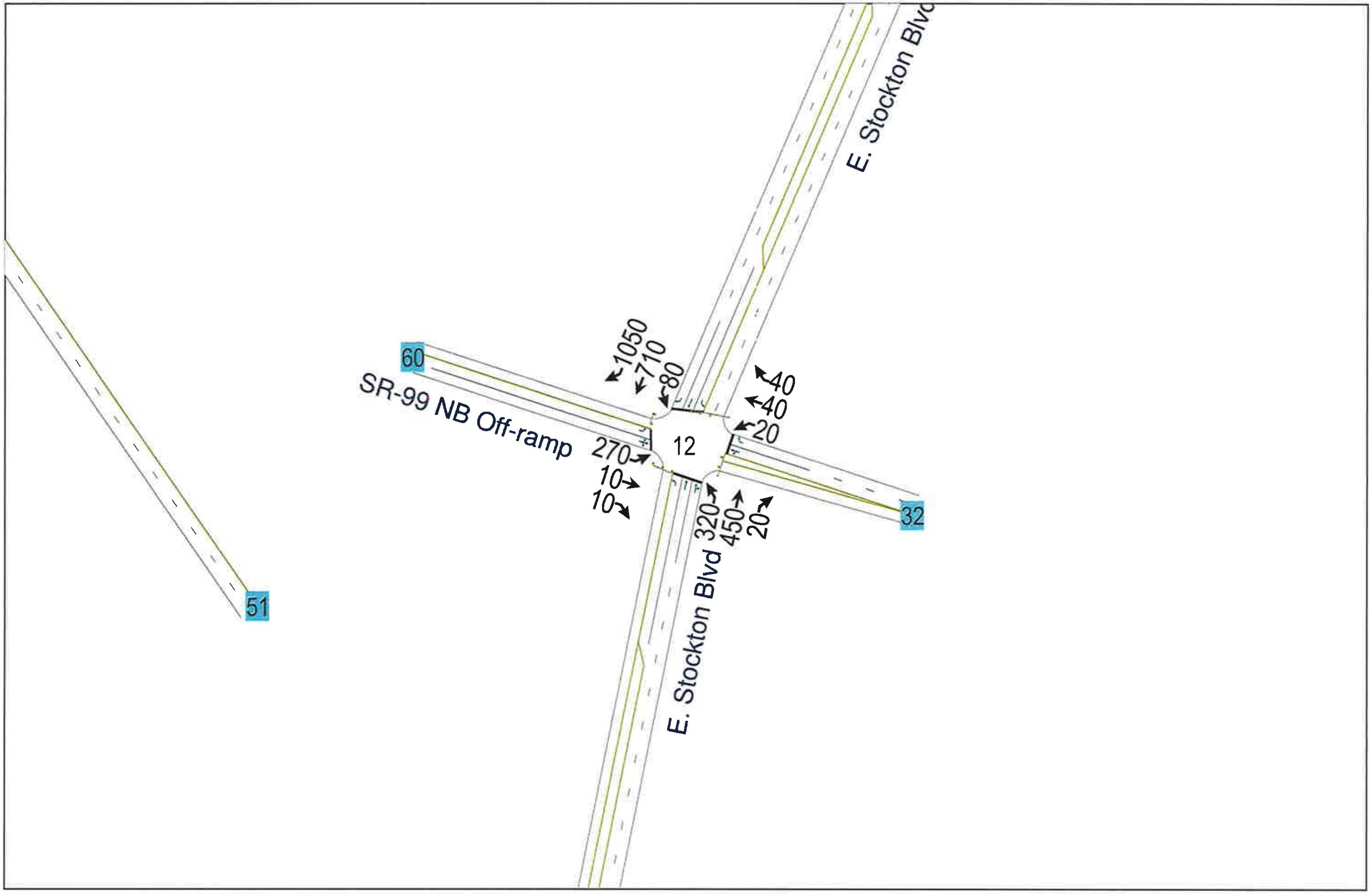

59
Wymark Drive
10
10
60
120
2340
160
5
5
Elk Grove Blvd
5
20
1750
160
130
10
230
Wymark Drive
81

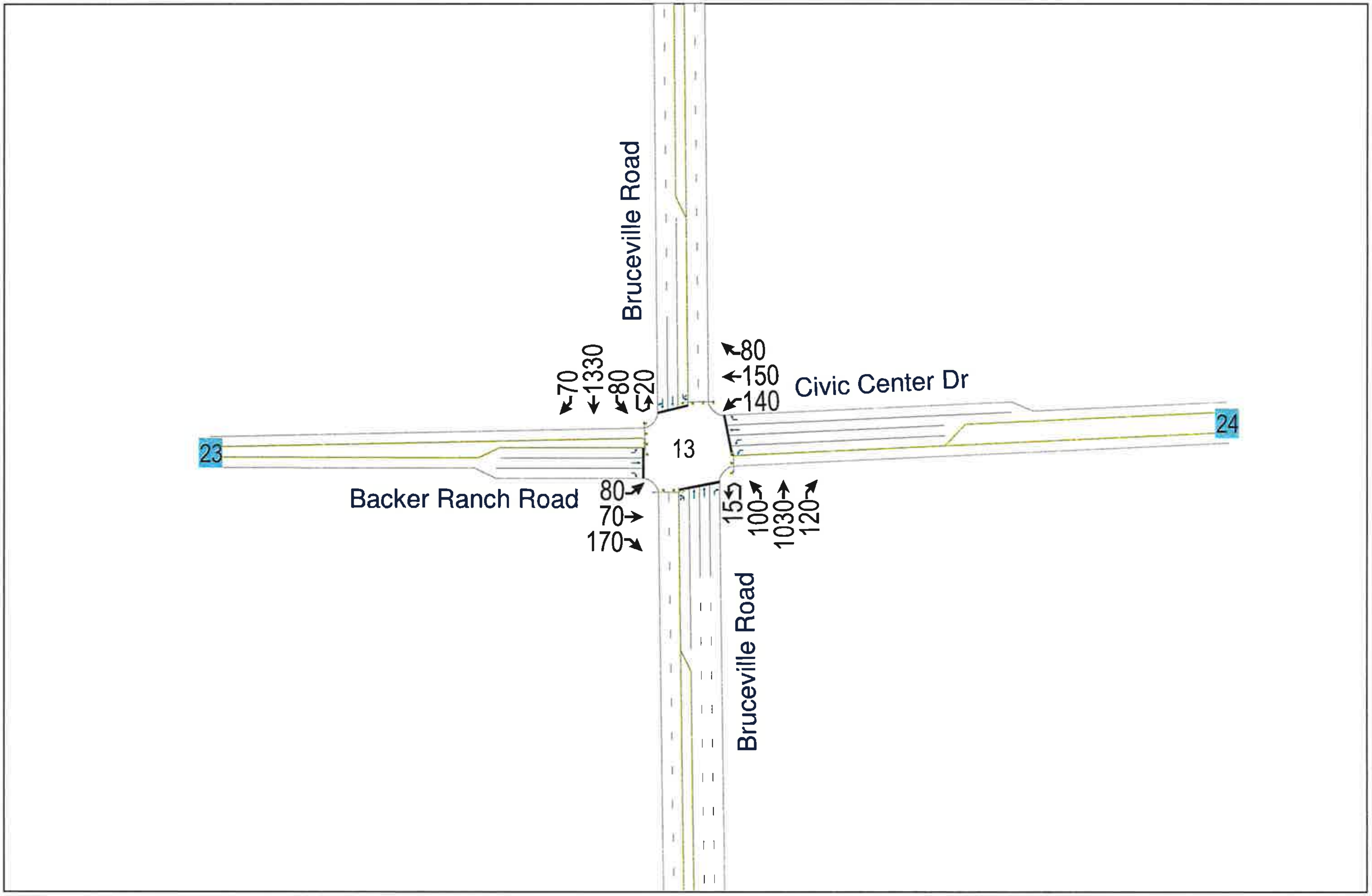

Big Ho
200
1580
380
10
280
1200
190
5
6
Elk Grove Blvd
65
160
1290
360
5
570
1120
280
Big Horn Blvd

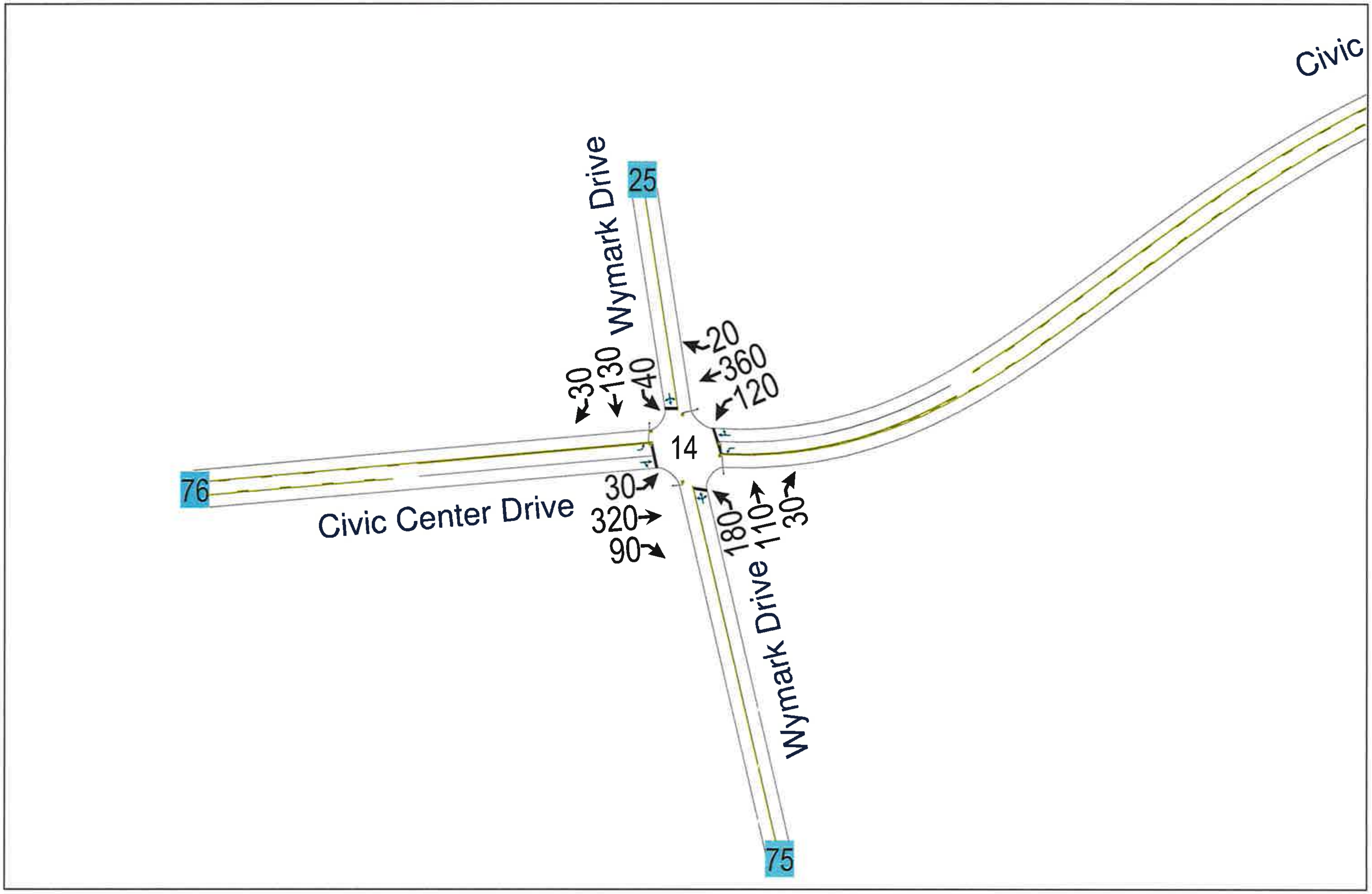

Laguna Springs Drive
80
1730
820
5
160
230
140
0
7
Elk Grove Blvd
10
100
1400
190
5
230
350
1160
Laguna Springs Drive
Auto Center Drive
47
10
2460
180
50
120
20
190
8
Elk Grove Blvd
5
120
2320
70
0
150
30
250
Auto Center Drive
48

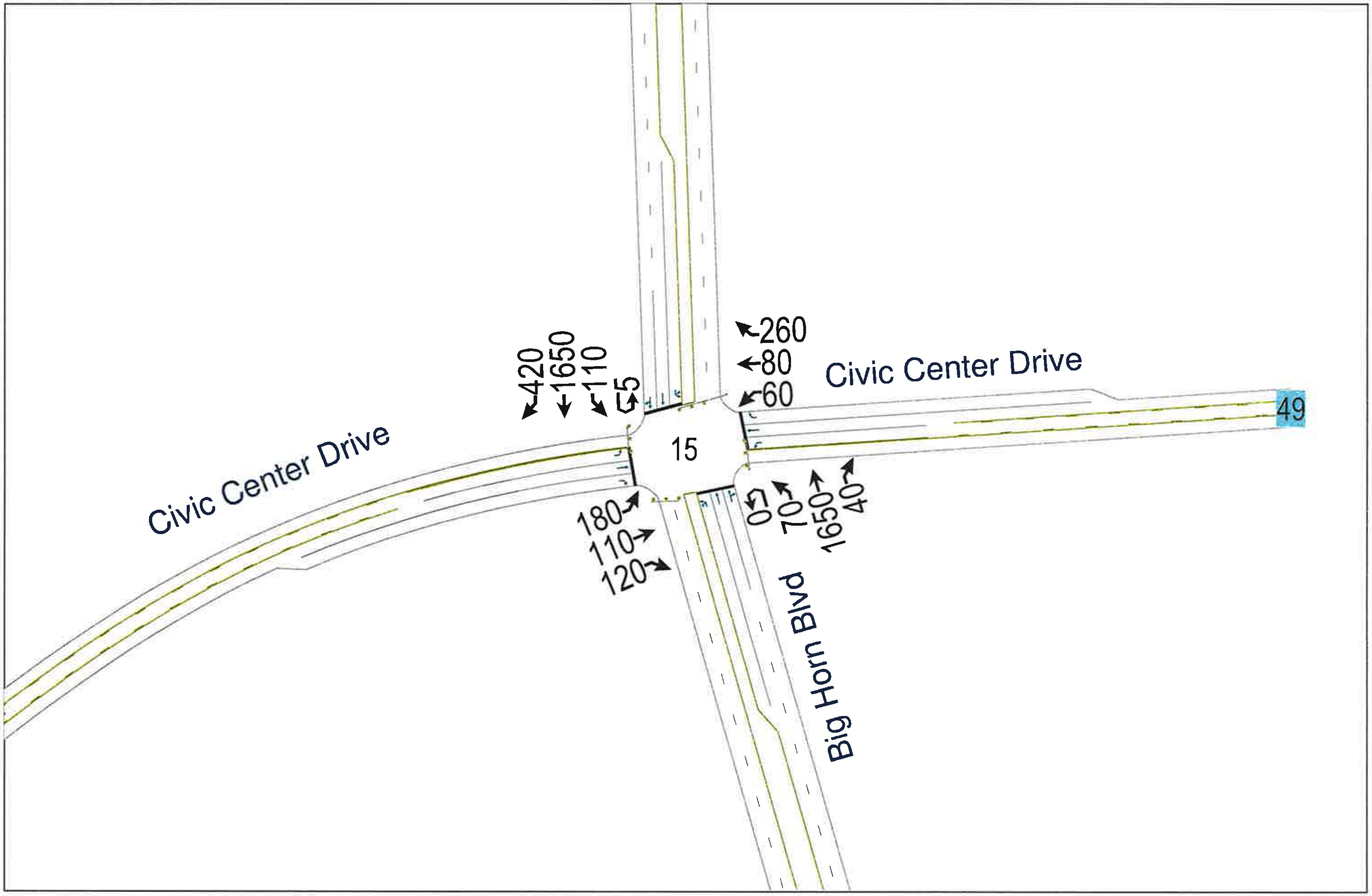

SR
52
SR-99 SB
SR-99 NB On-ramp
1140
0
690
1860
100
9
350
1960
10
Elk Grove Blvd
2470
260
Elk Grove Blvd
3160
E
SR-99 SB On-ramp

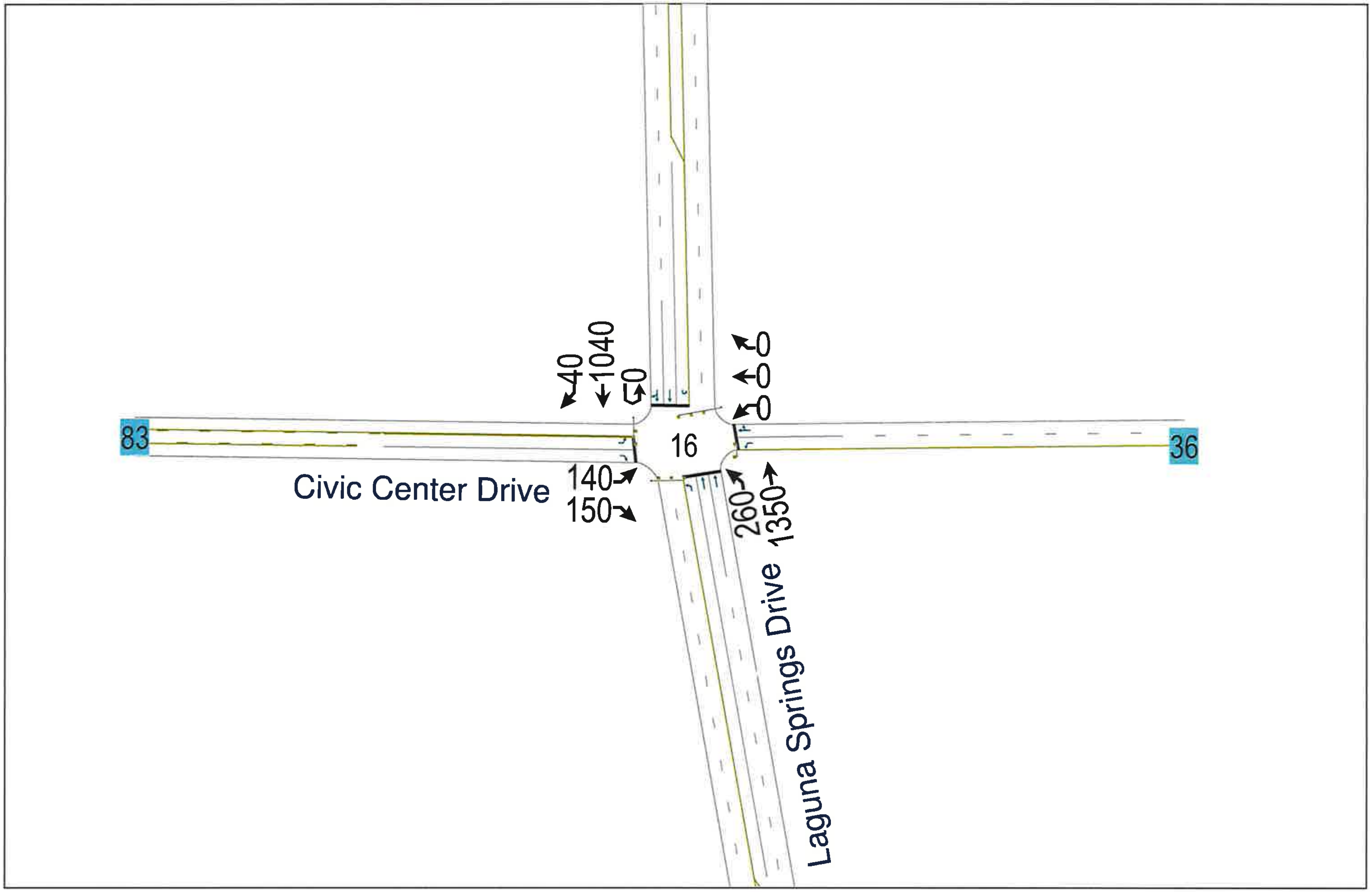

E. Stockton Blvd
110
1670
60
10
140
160
320
10
Elk Grove Blvd
61
11
Elk
Elk Grove Blvd
15
120
1420
1620
0
500
140
150
E. Stockton Blvd

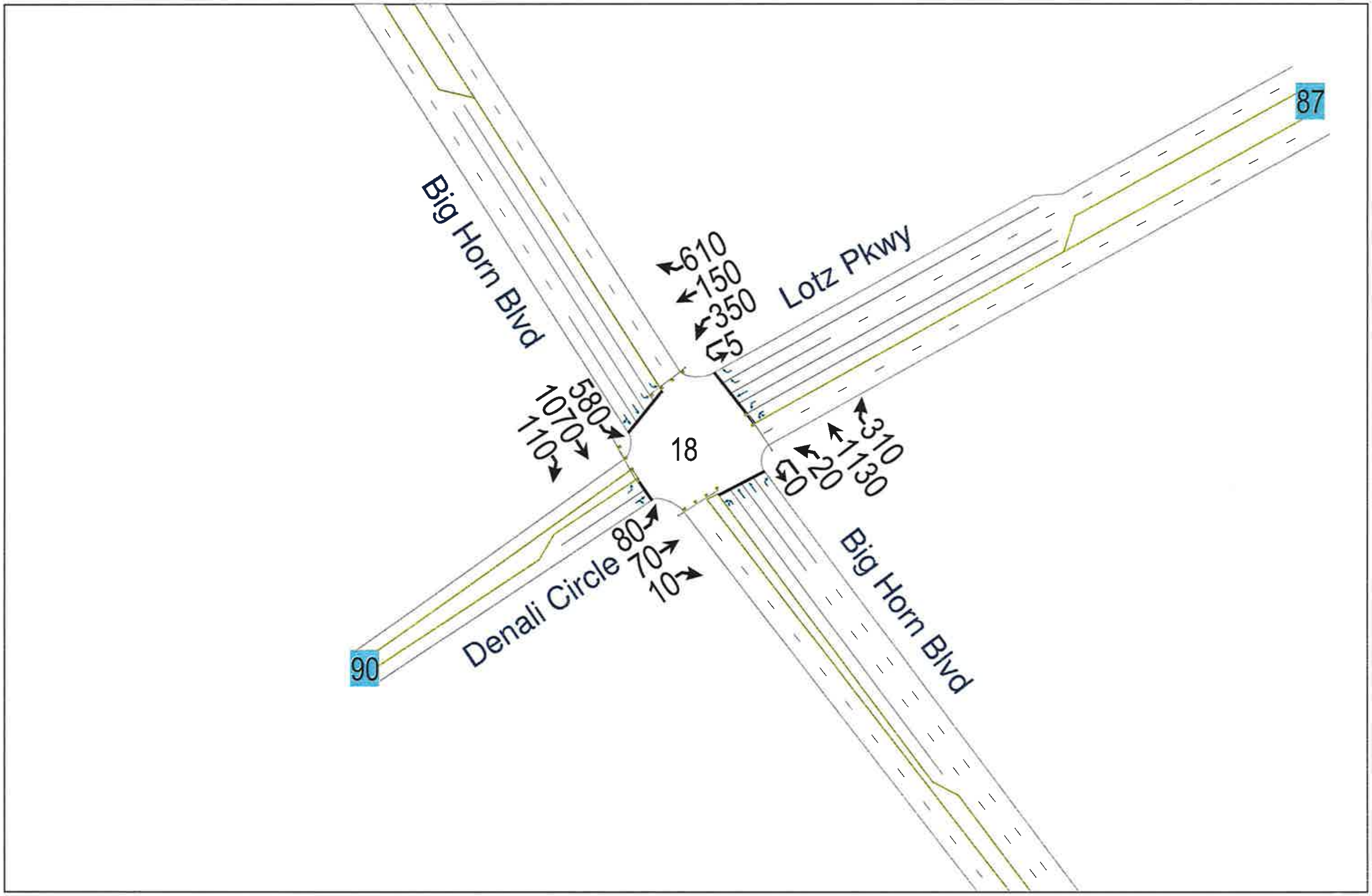

E. Stockton Blvd
SR-99 NB Off-ramp
60
1050
710
80
40
40
20
12
270
10
10
320
450
20
32
51
E. Stockton Blvd

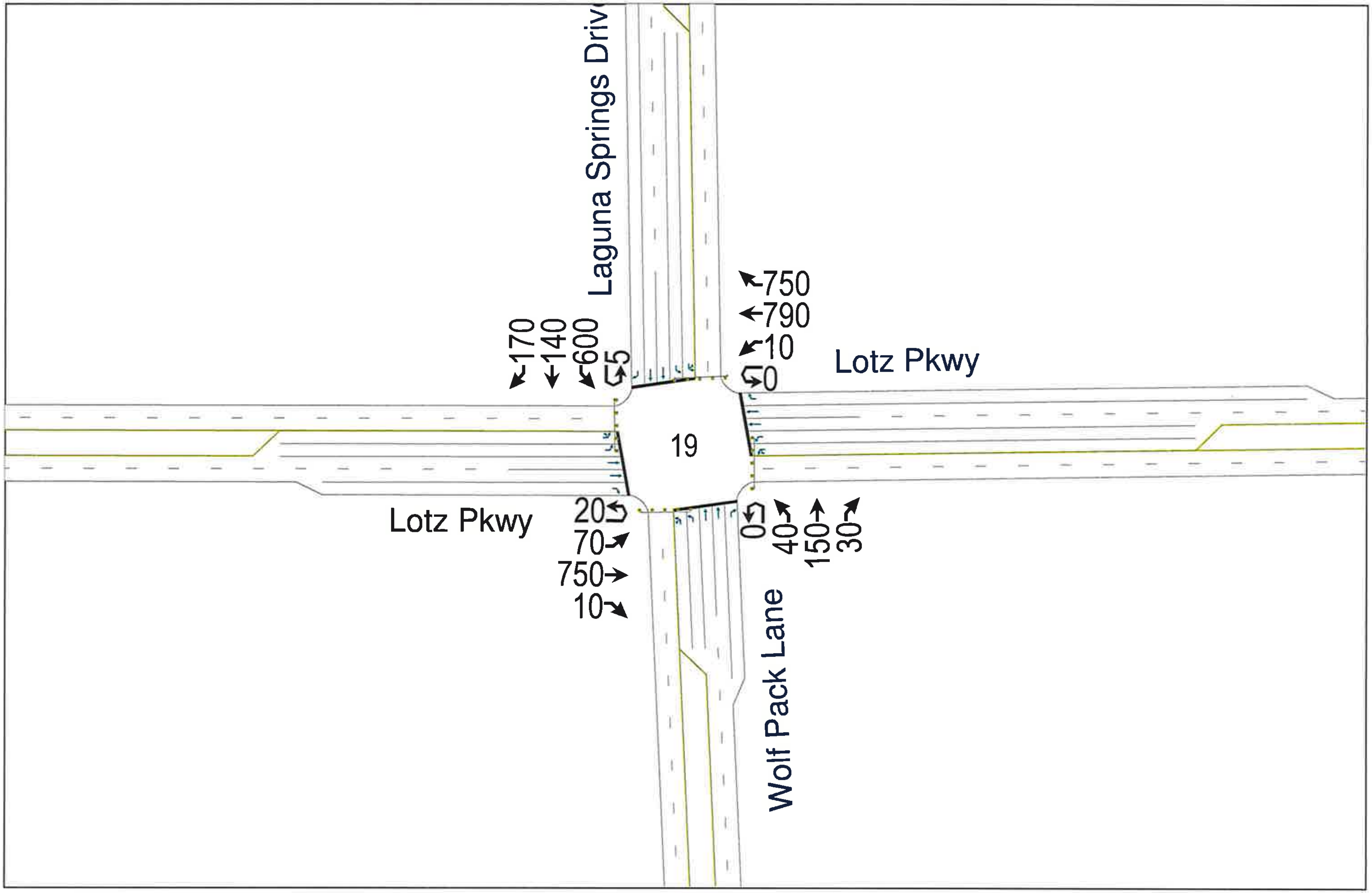

Bruceville Road
70
1330
80
20
80
150
140
Civic Center Dr
13
23
24
Backer Ranch Road
80
70
170
15
100
1030
120
Bruceville Road

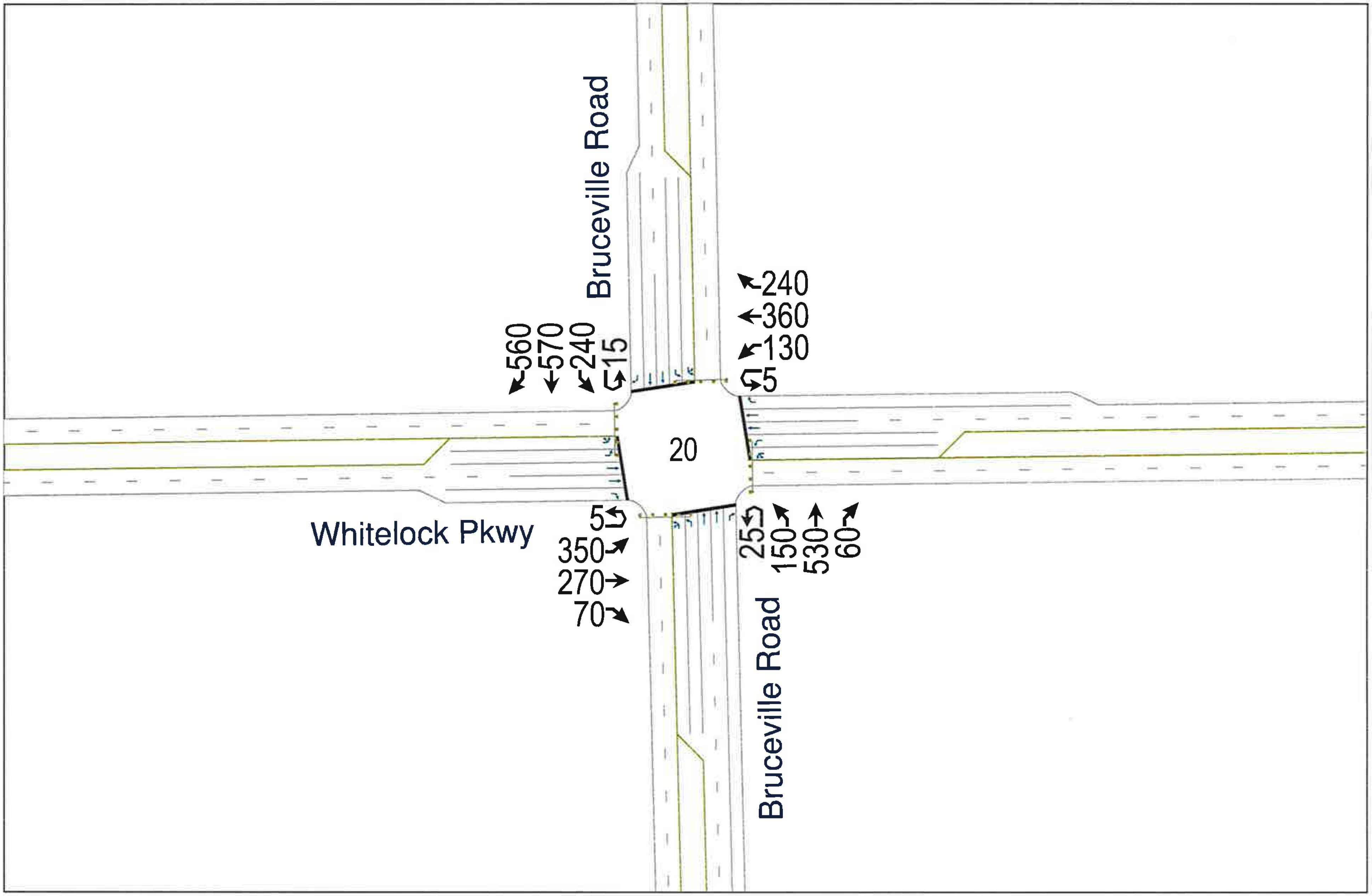

Civic
Wymark Drive
25
20
360
120
30
130
40
14
76
Civic Center Drive
30
320
90
180
110
30
Wymark Drive
75

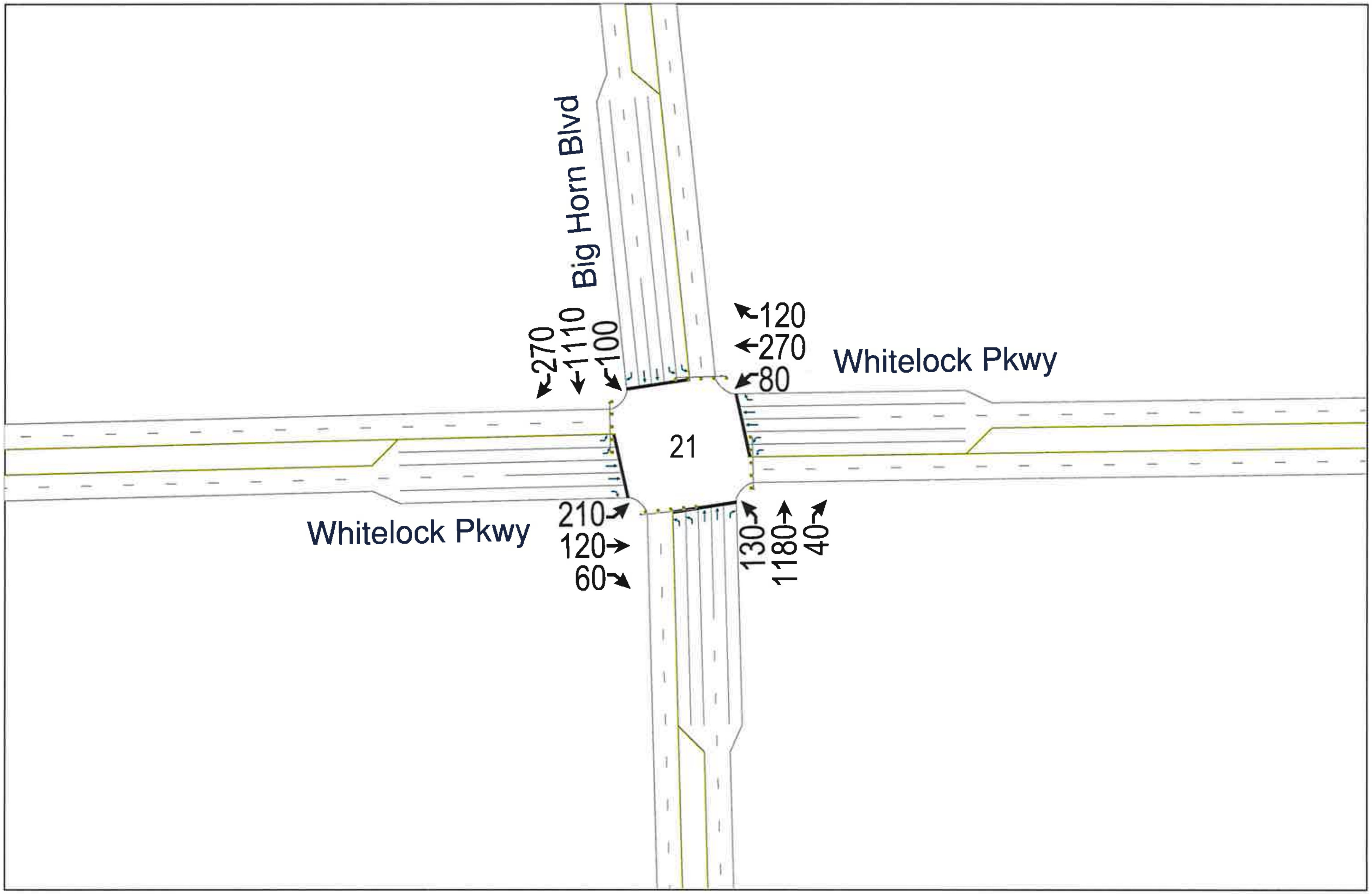

Civic Center Drive
Civic Center Drive
Big Horn Blvd
15
49
260
80
60
420
1650
110
5
180
110
120
0
70
1650
40

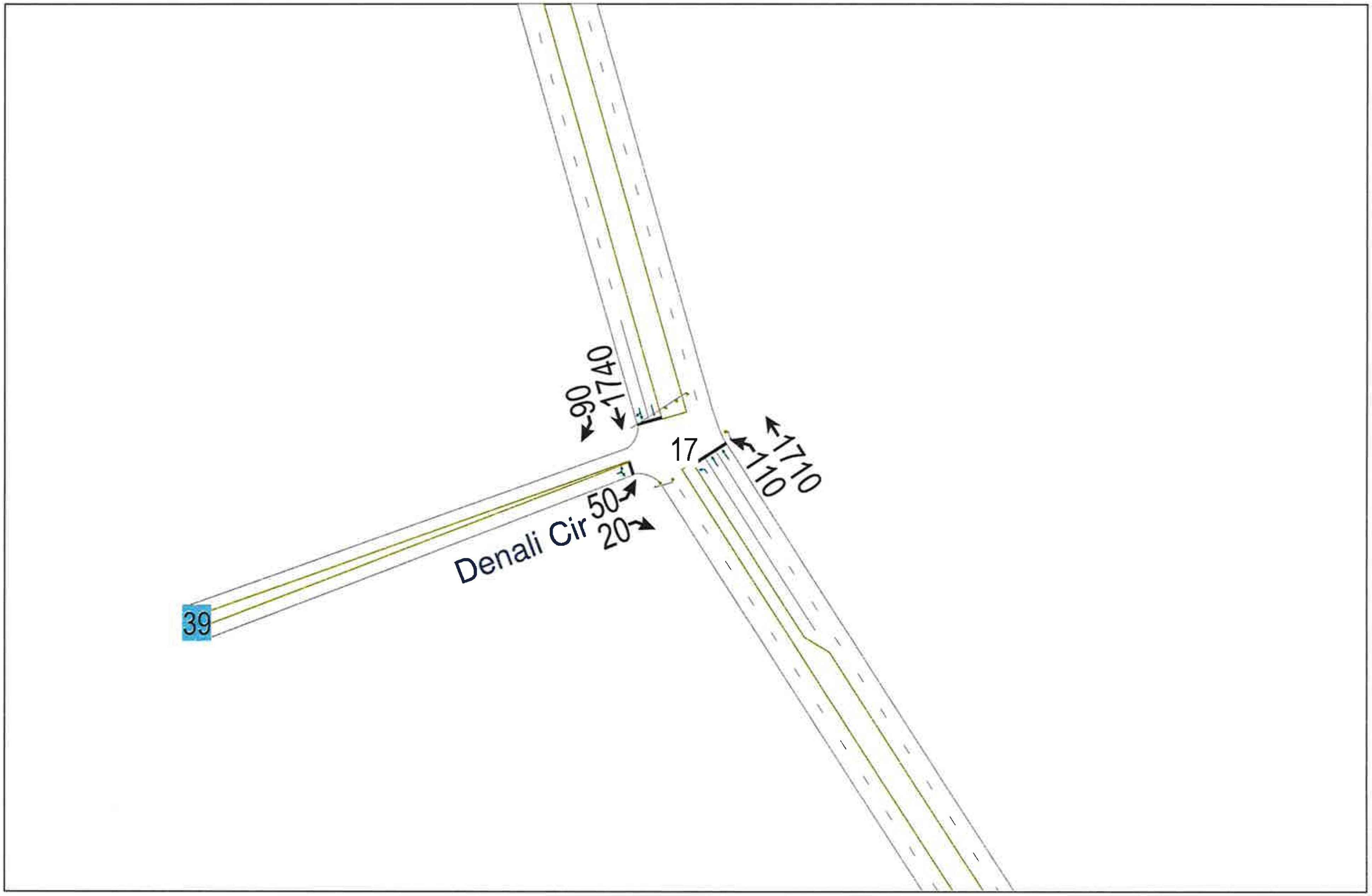

16
83
36
Civic Center Drive
Laguna Springs Drive
40
1040
0
0
0
0
140
150
260
1350


Big Horn Blvd
610
150
350
5
Lotz Pkwy
87
580
1070
110
18
310
1130
20
0
80
70
10
Denali Circle
90
Big Horn Blvd


Laguna Springs Driv
170
140
600
5
750
790
10
0
Lotz Pkwy
19
Lotz Pkwy
20
70
750
10
0
40
150
30
Wolf Pack Lane

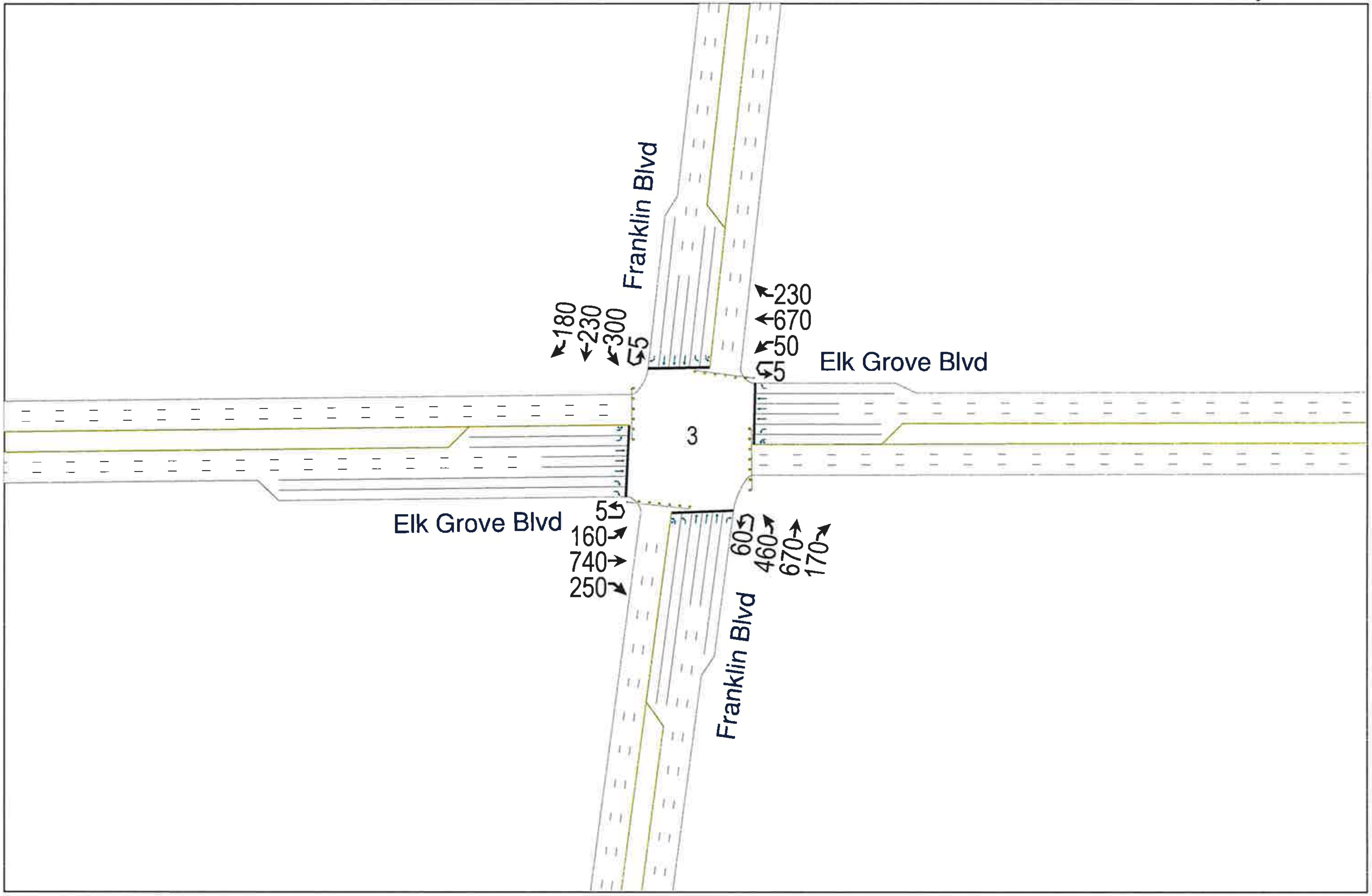

Bruceville Road
560
570
240
15
240
360
130
5
20
Whitelock Pkwy
5
350
270
70
25
150
530
60
Bruceville Road

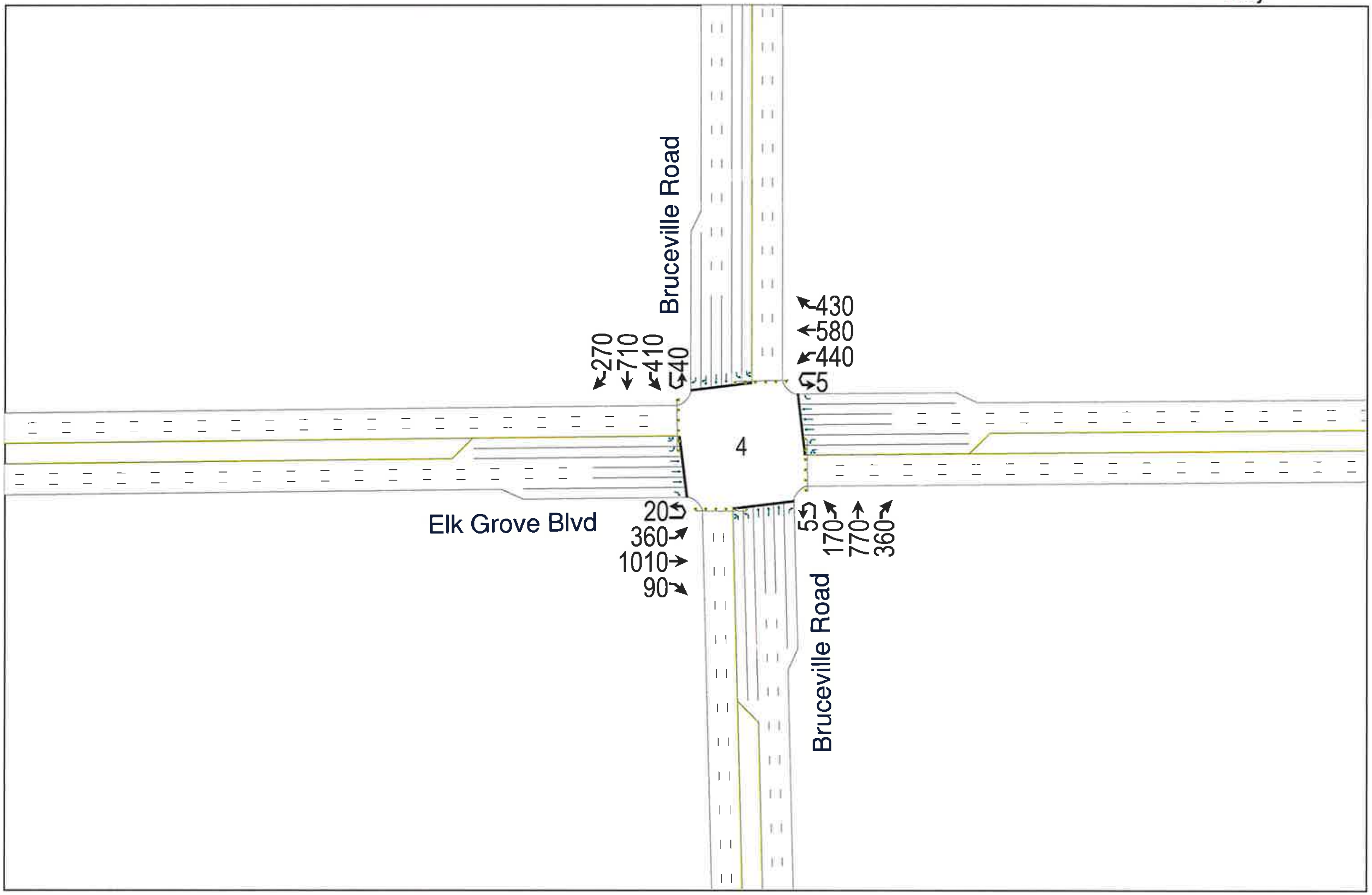

Big Horn Blvd
Whitelock Pkwy
Whitelock Pkwy
21
270
1110
100
120
270
80
210
120
60
130
1180
40

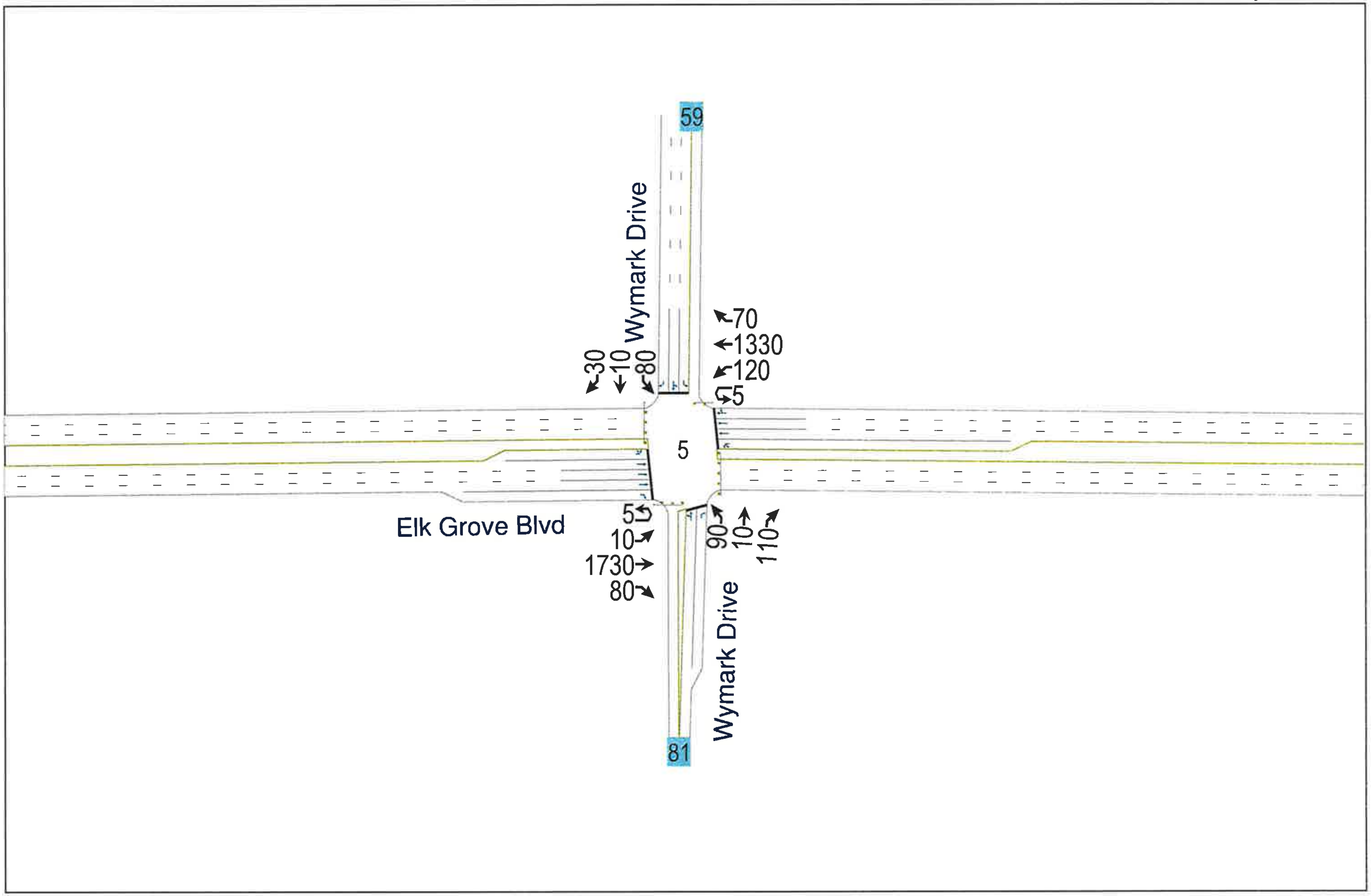

1740
90
17
110
1710
50
20
Denali Cir
39

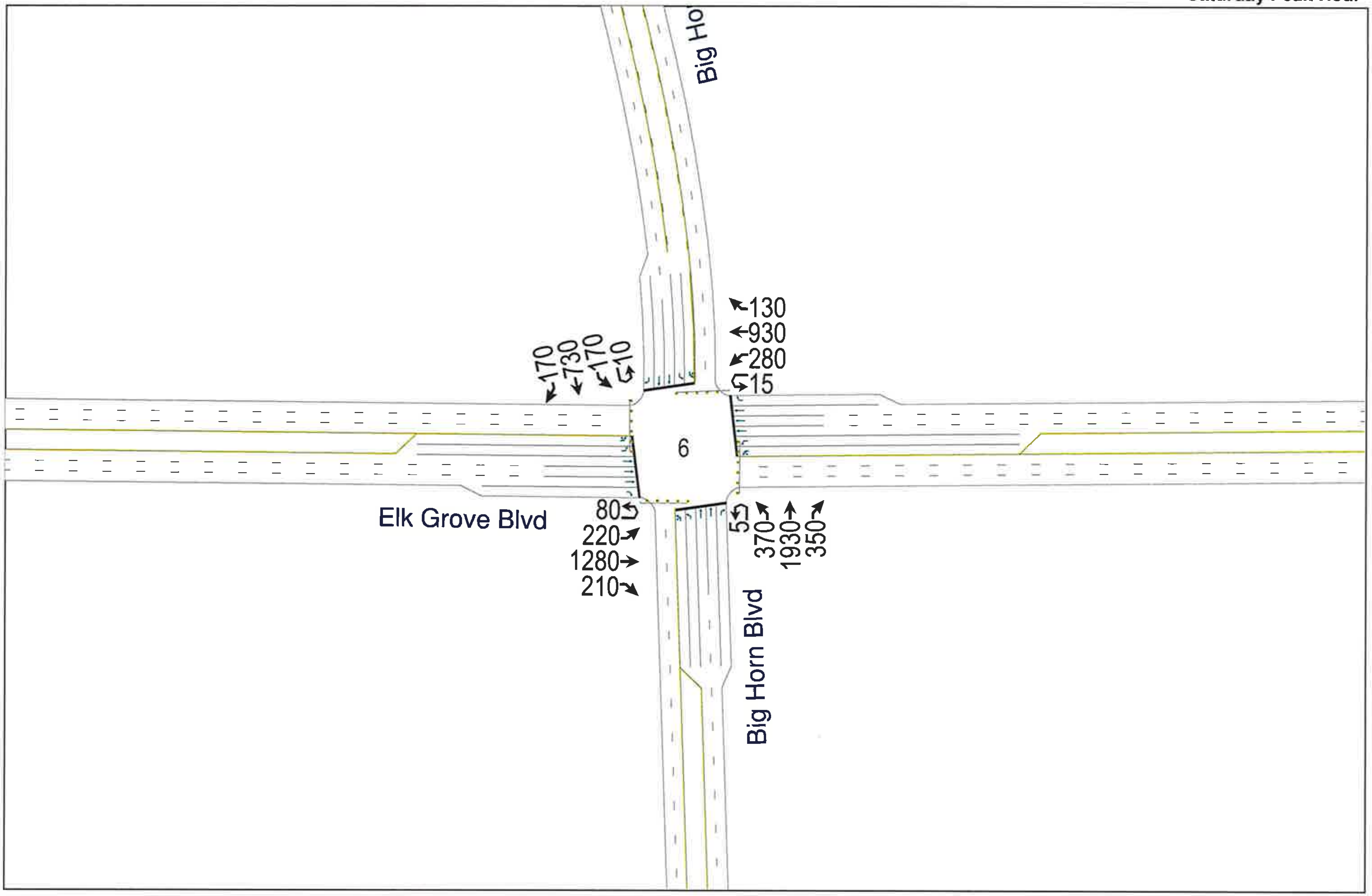
Elk Grove Civic Center Aquatics Complex

Cumulative Saturday No Project Conditions
Saturday Peak Hour


Franklin Blvd
180
230
300
5
230
670
50
5
Elk Grove Blvd
3
5
160
740
250
Elk Grove Blvd
60
460
670
170
Franklin Blvd

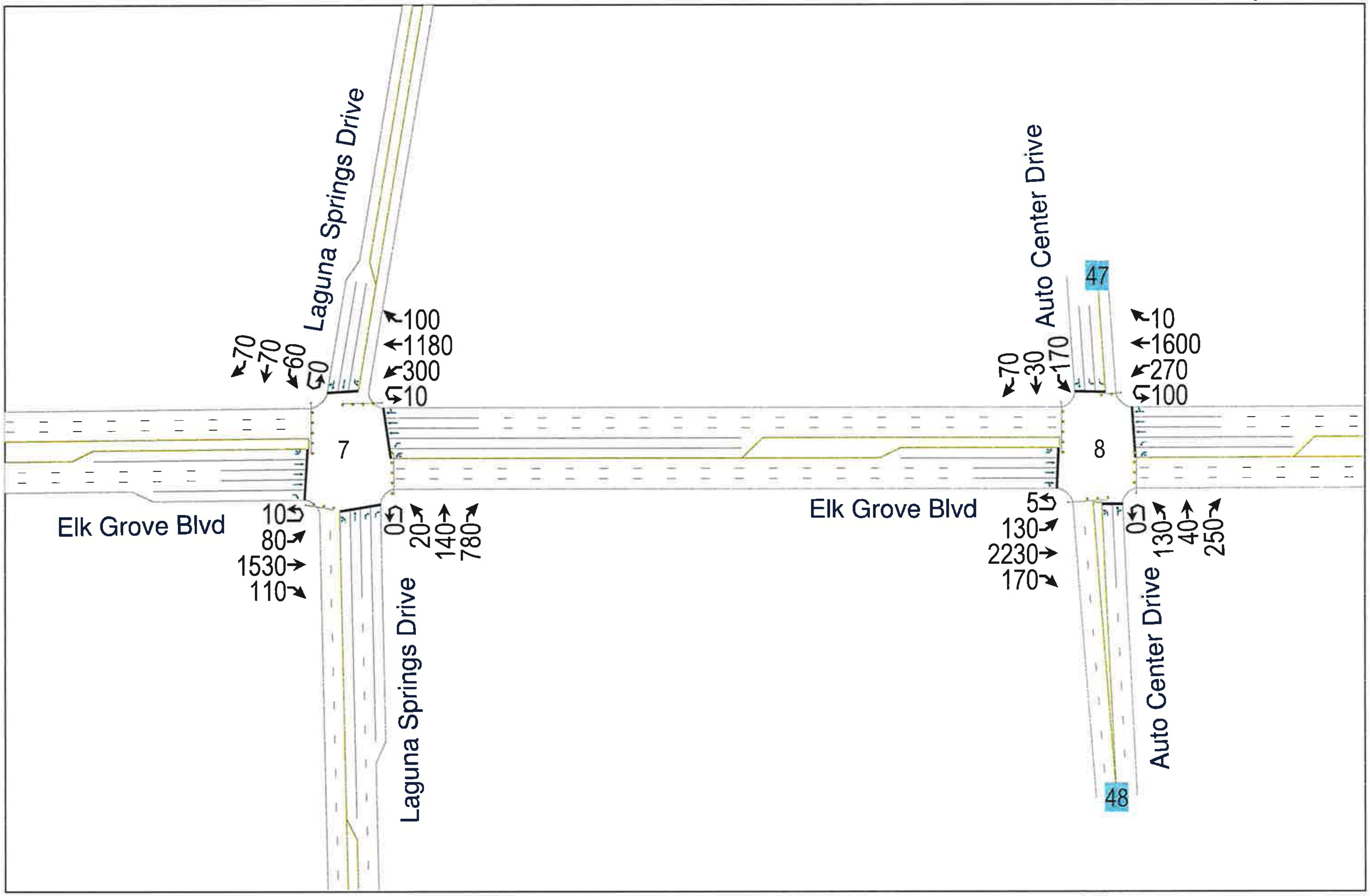

Bruceville Road
270
710
410
40
430
580
440
5
4
Elk Grove Blvd
20
360
1010
90
5
170
770
360
Bruceville Road

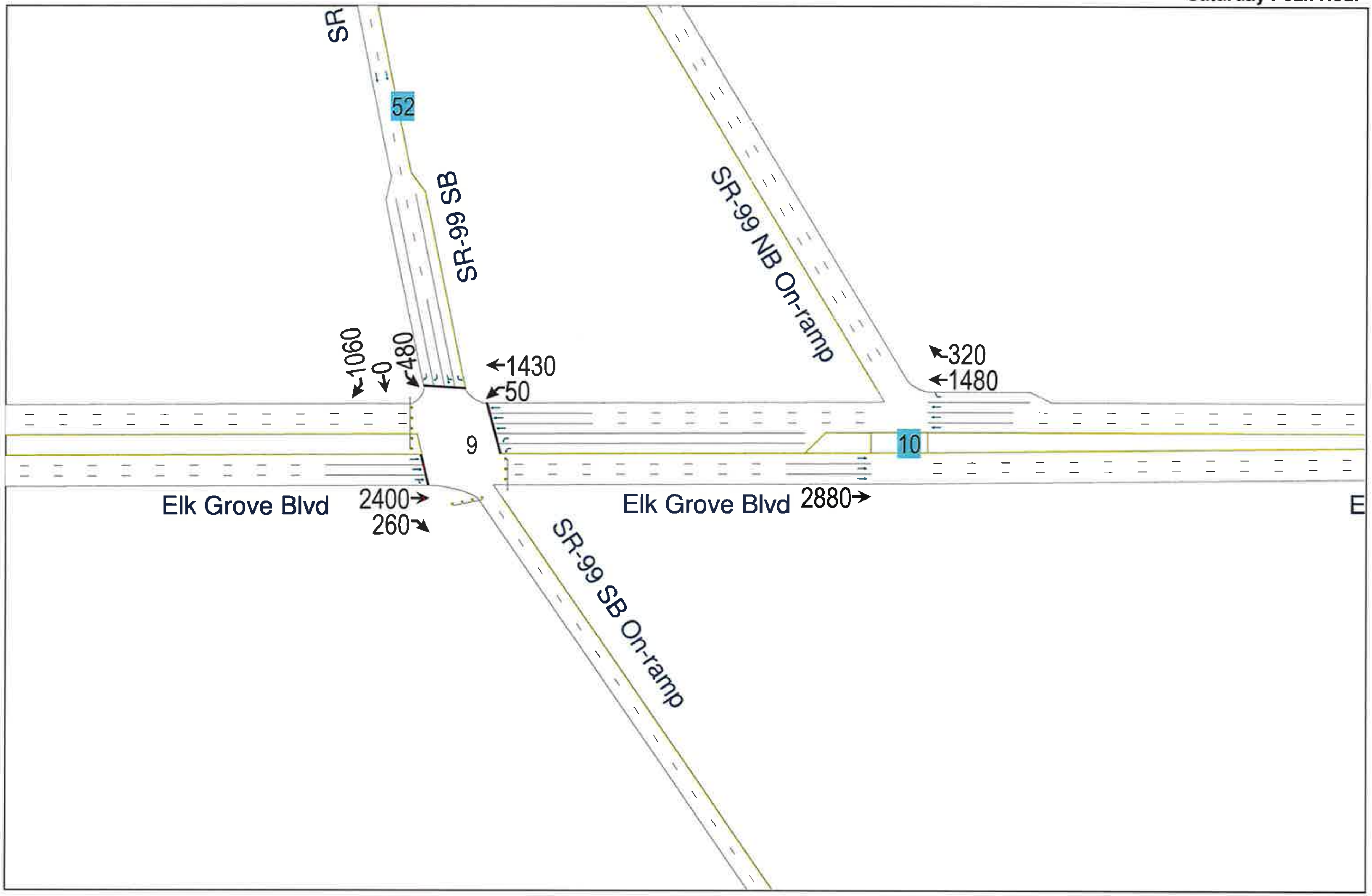

59
Wymark Drive
30
10
80
70
1330
120
5
5
Elk Grove Blvd
5
10
1730
80
90
10
110
Wymark Drive
81

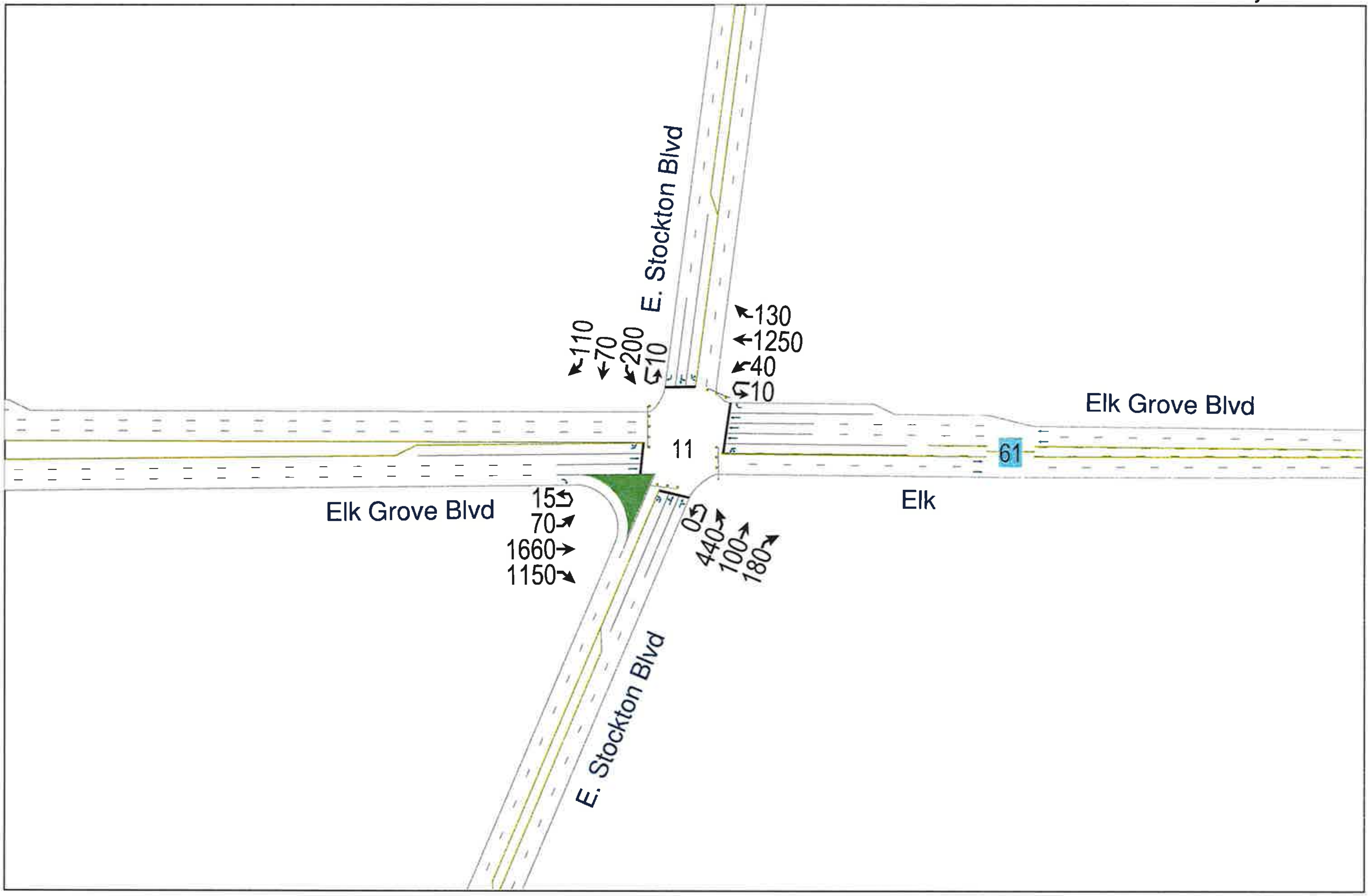

Big Ho
130
930
280
15
170
730
170
10
6
Elk Grove Blvd
80
220
1280
210
5
370
1930
350
Big Horn Blvd

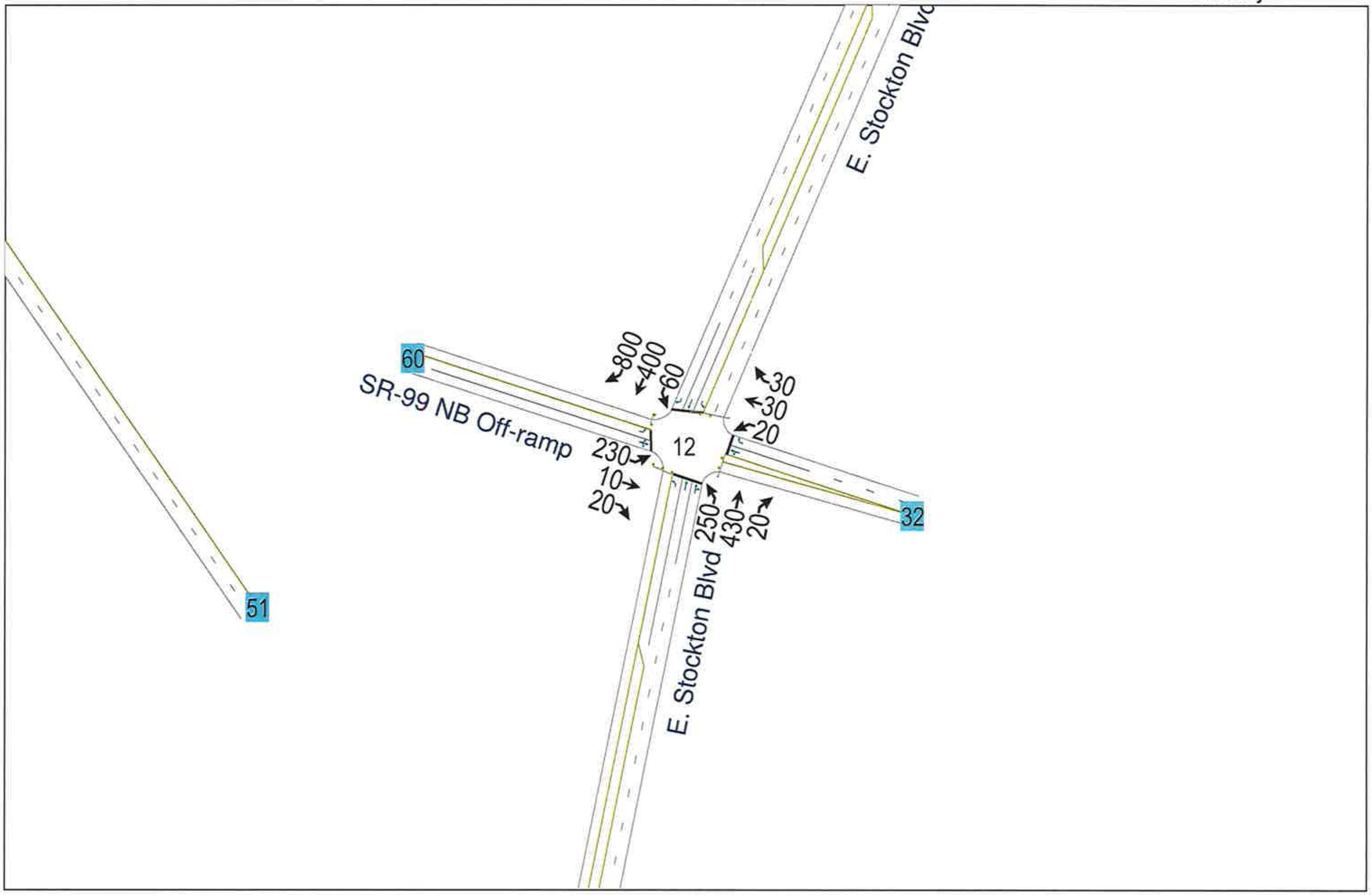
Elk Grove Civic Center Aquatics Complex

Cumulative Saturday No Project Conditions
Saturday Peak Hour




SR
52
SR-99 SB
SR-99 NB On-ramp
1060
0
480
1430
50
9
320
1480
10
2400
260
Elk Grove Blvd
Elk Grove Blvd
2880
SR-99 SB On-ramp
E


E. Stockton Blvd
110
70
200
10
130
1250
40
10
Elk Grove Blvd
11
61
Elk Grove Blvd
15
70
1660
1150
0
440
100
180
Elk
E. Stockton Blvd


E. Stockton Blvd
SR-99 NB Off-ramp
E. Stockton Blvd
60
51
32
12
800
400
60
30
30
20
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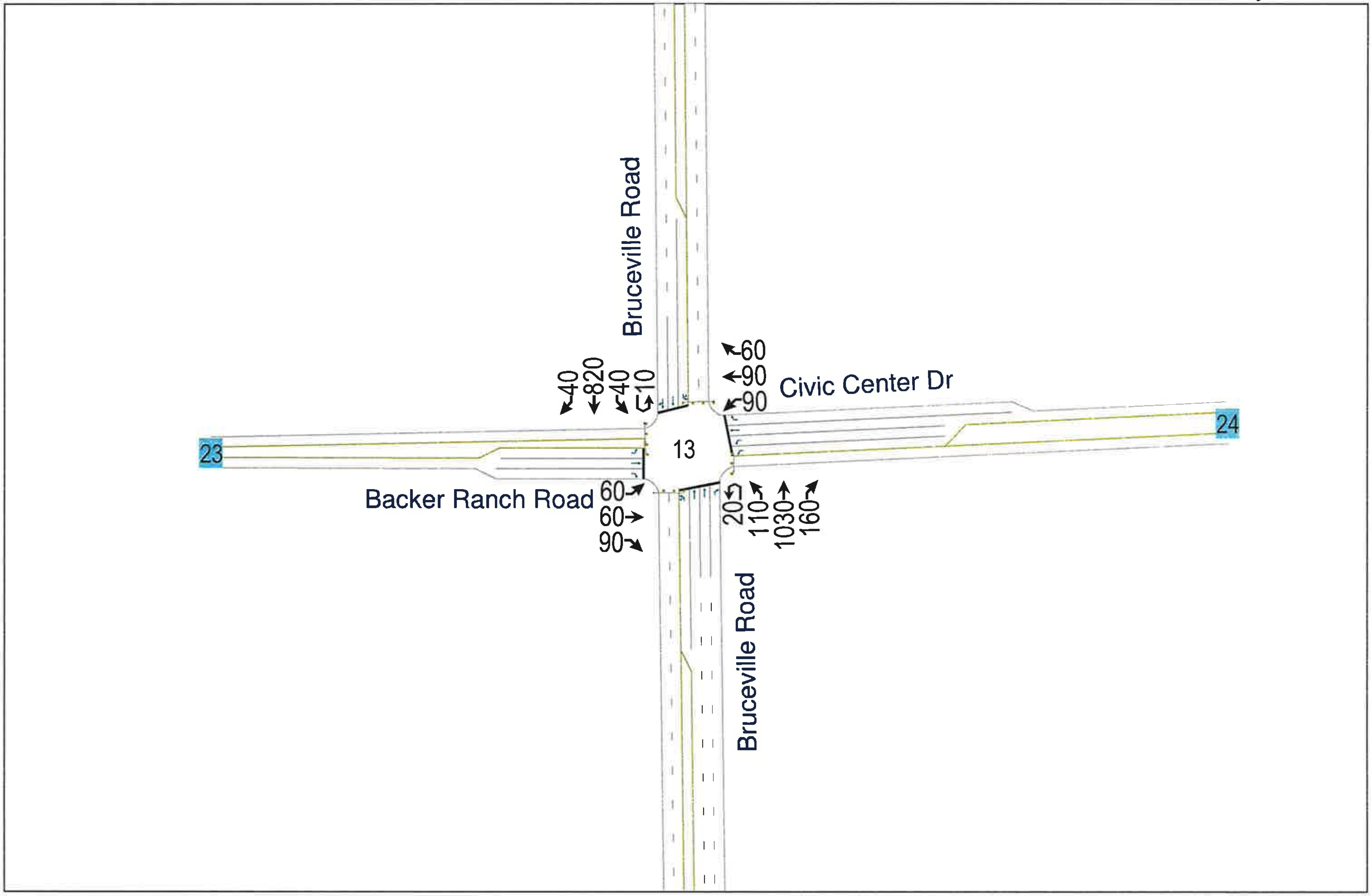
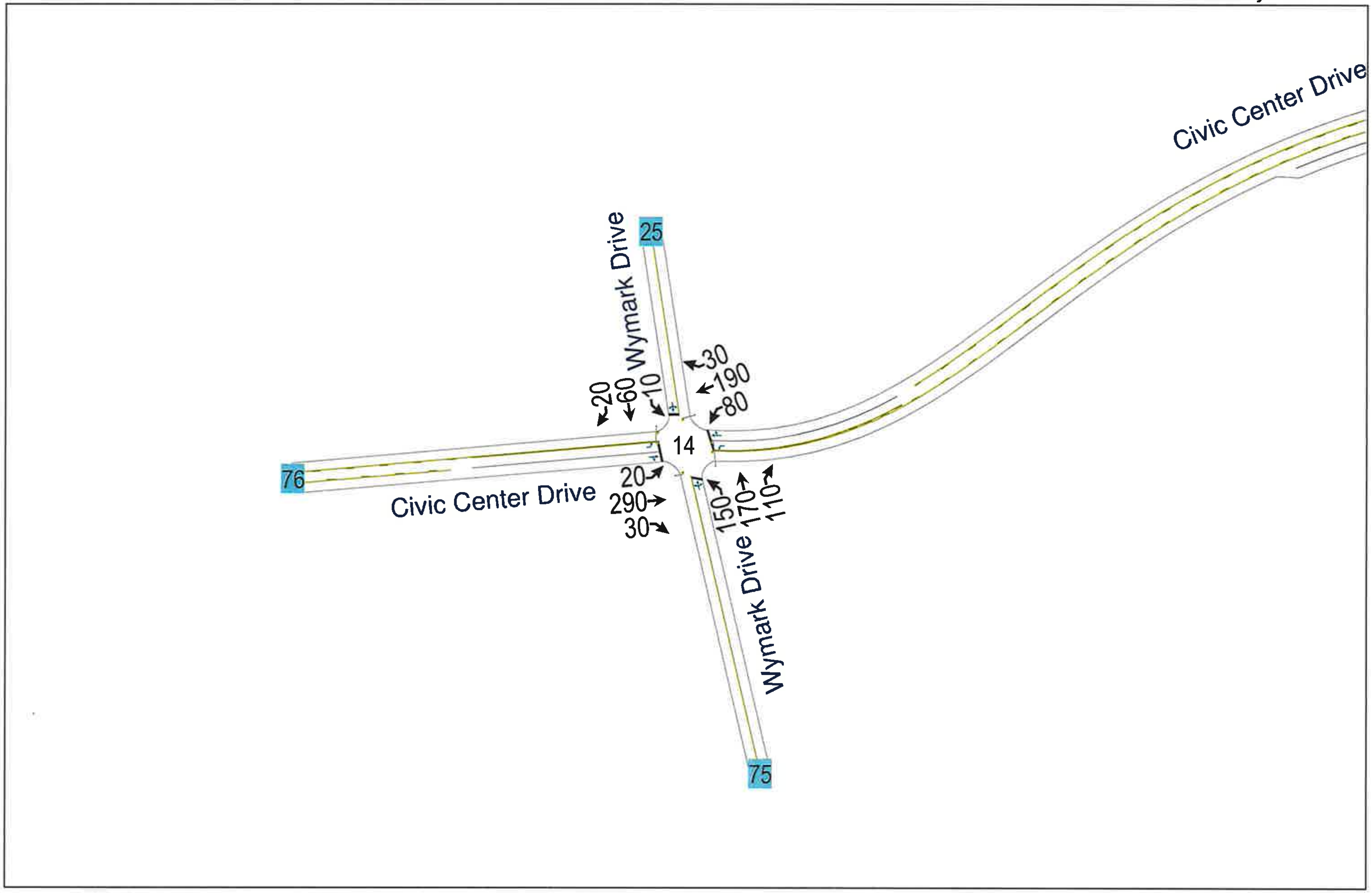
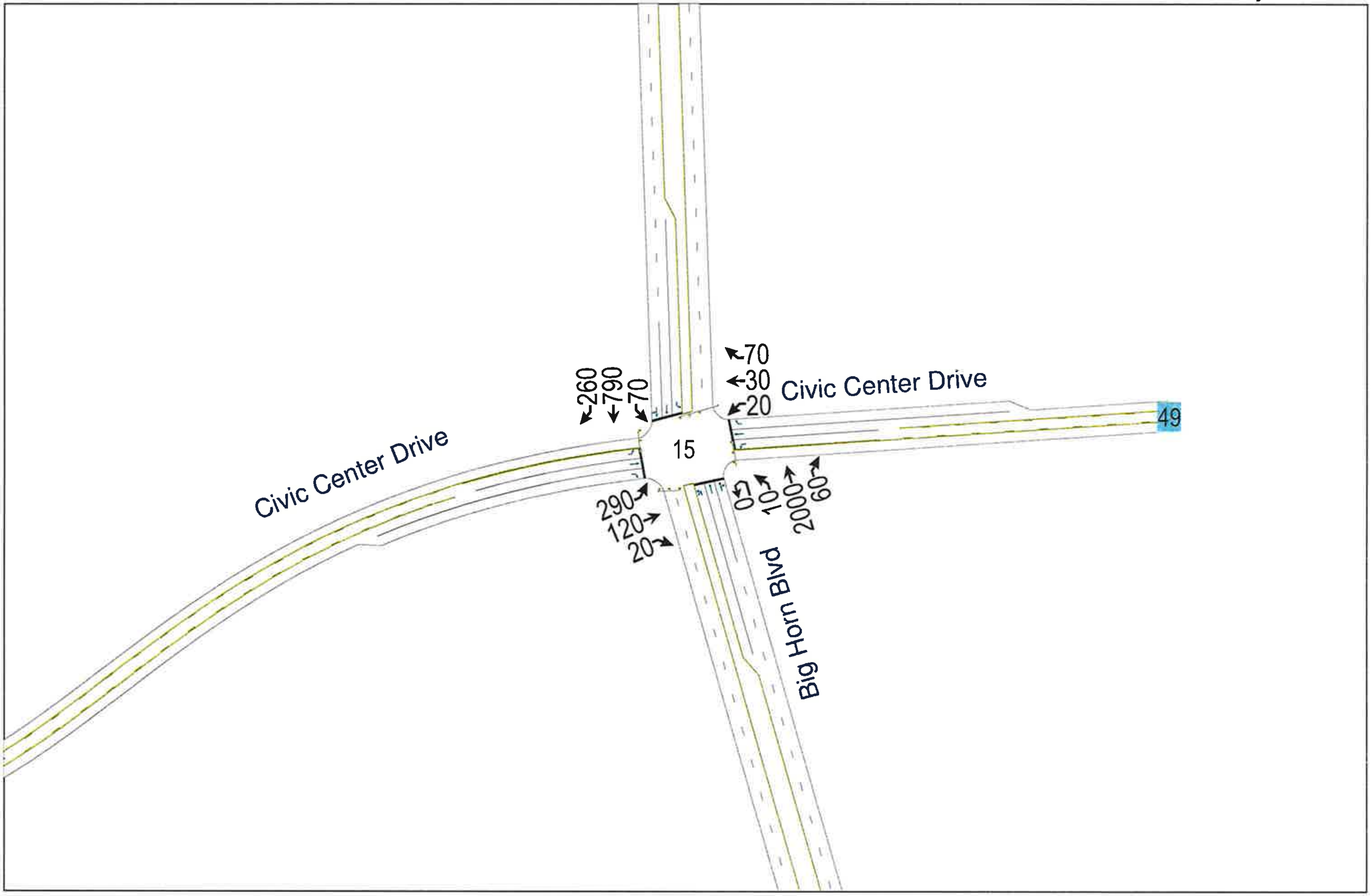
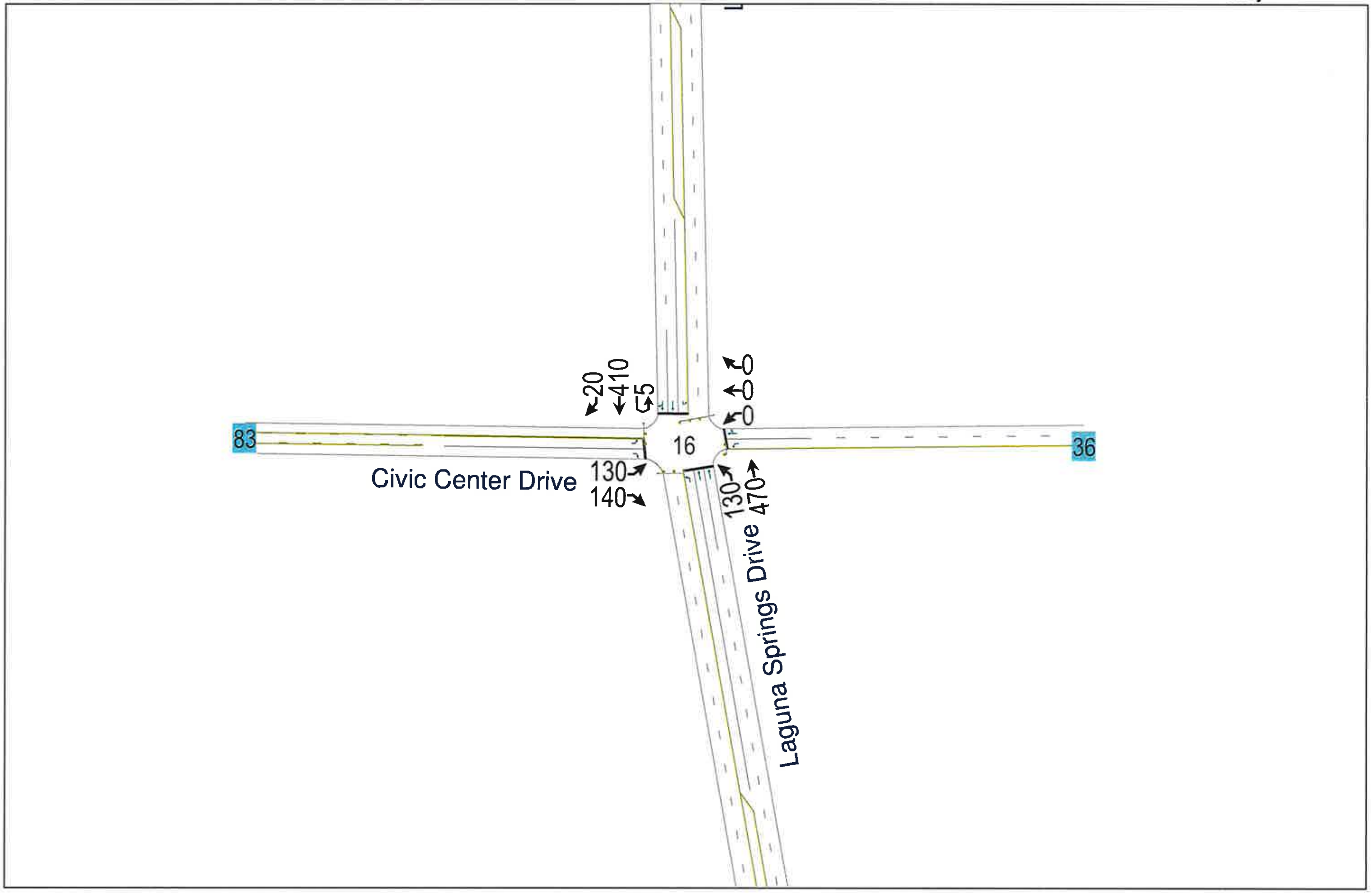
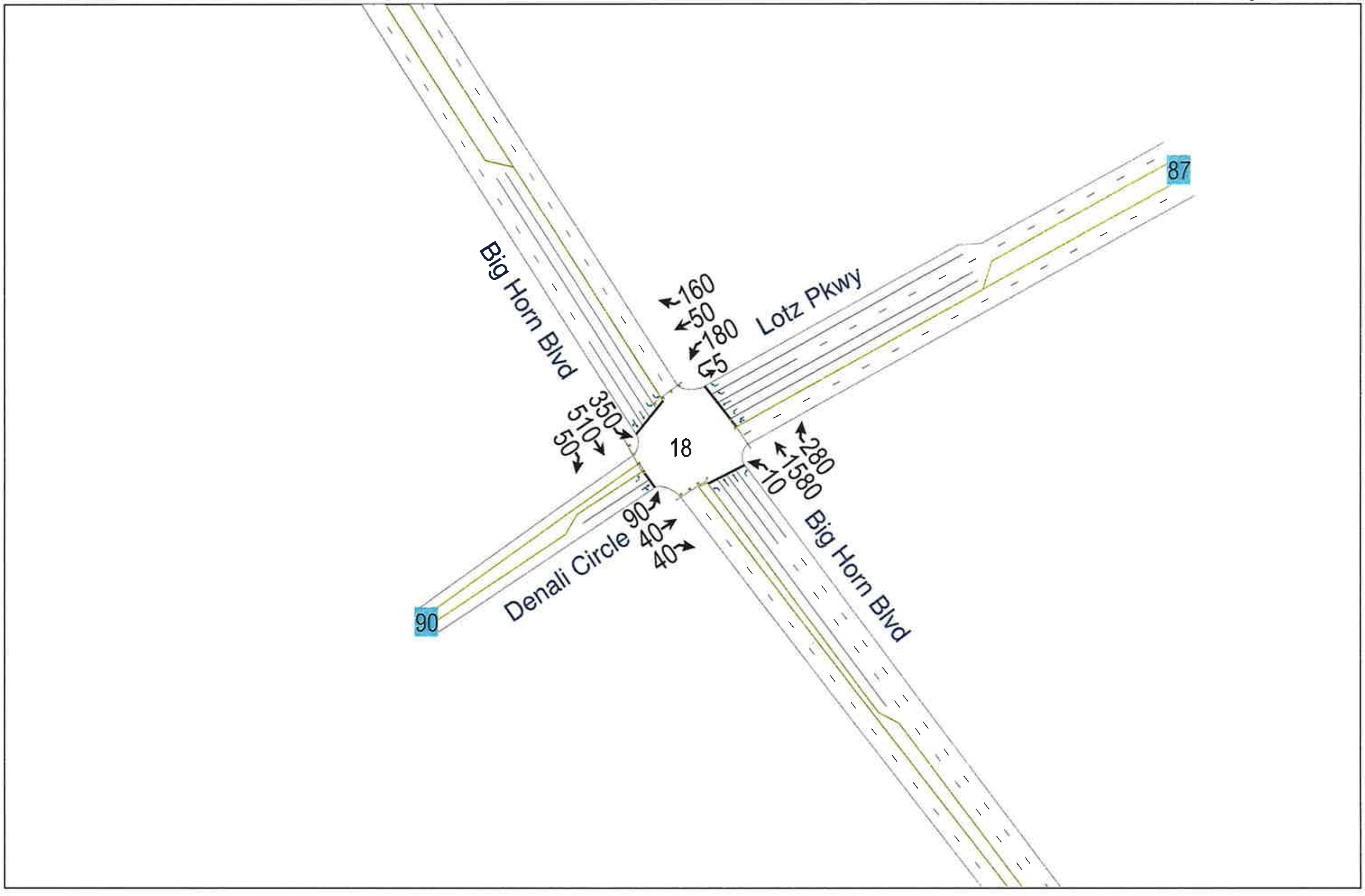
10
20
250
430
20


Bruceville Road
40
820
40
10
60
90
90
Civic Center Dr
23
24
13
Backer Ranch Road
60
60
90
20
110
1030
160
Bruceville Road


Civic Center Drive
Wymark Drive
25
30
190
80
20
60
10
14
76
20
290
30
Civic Center Drive
150
170
110
Wymark Drive
75

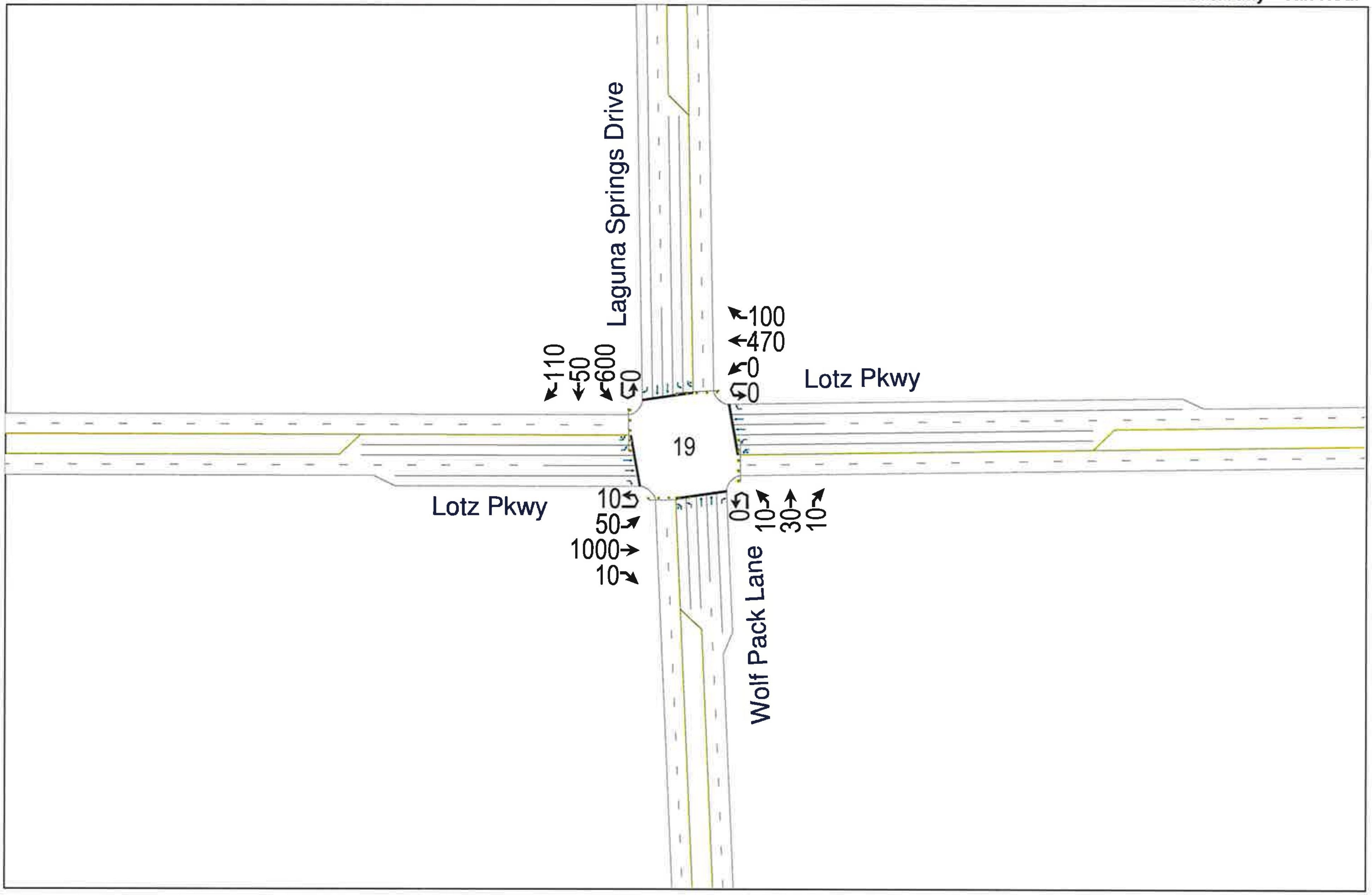

Civic Center Drive
Civic Center Drive
Big Horn Blvd
15
49
260
790
70
70
30
20
290
120
20
0
10
2000
60

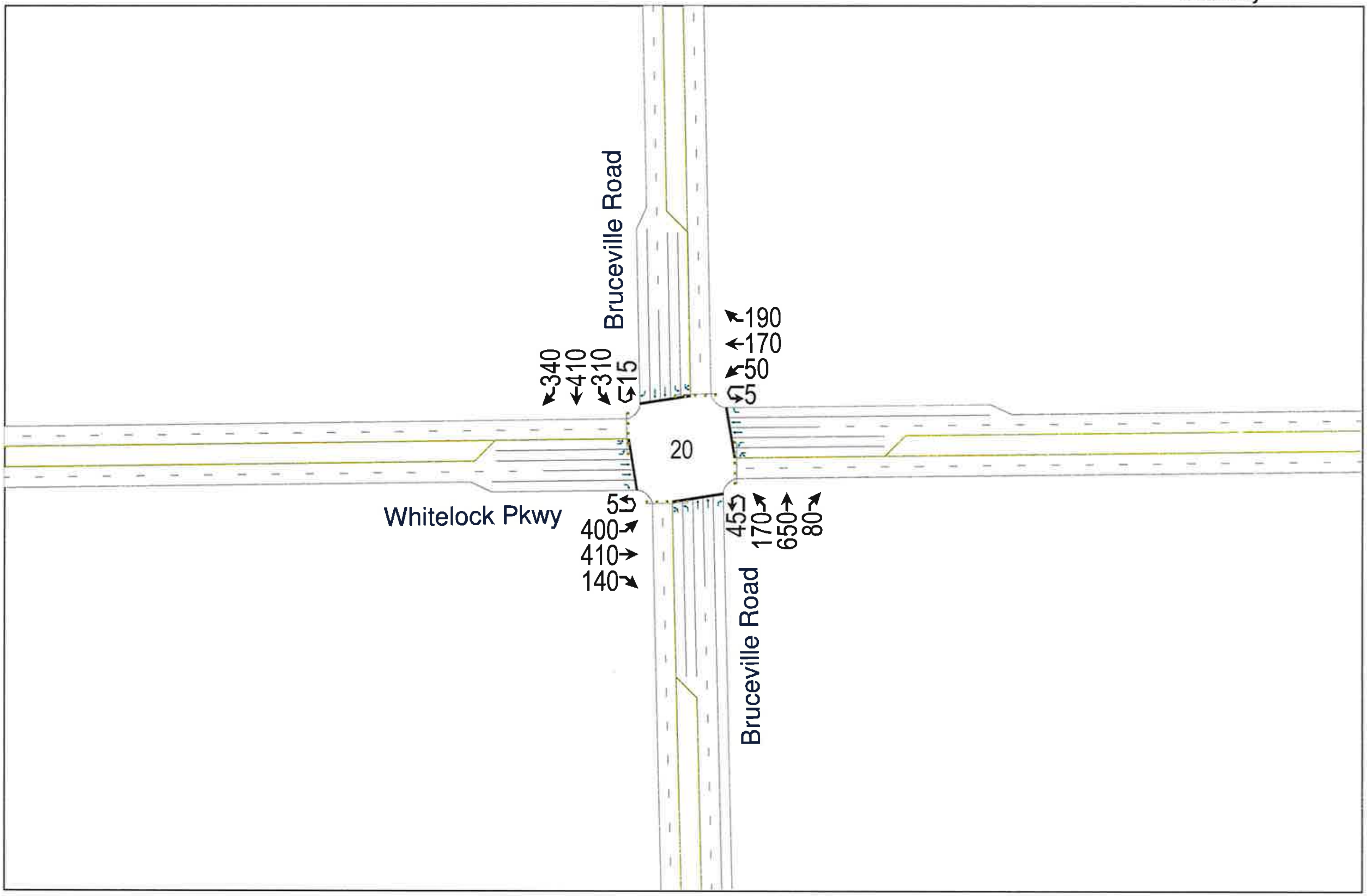

20
410
5
0
0
0
83
16
36
Civic Center Drive
130
140
130
470
Laguna Springs Drive

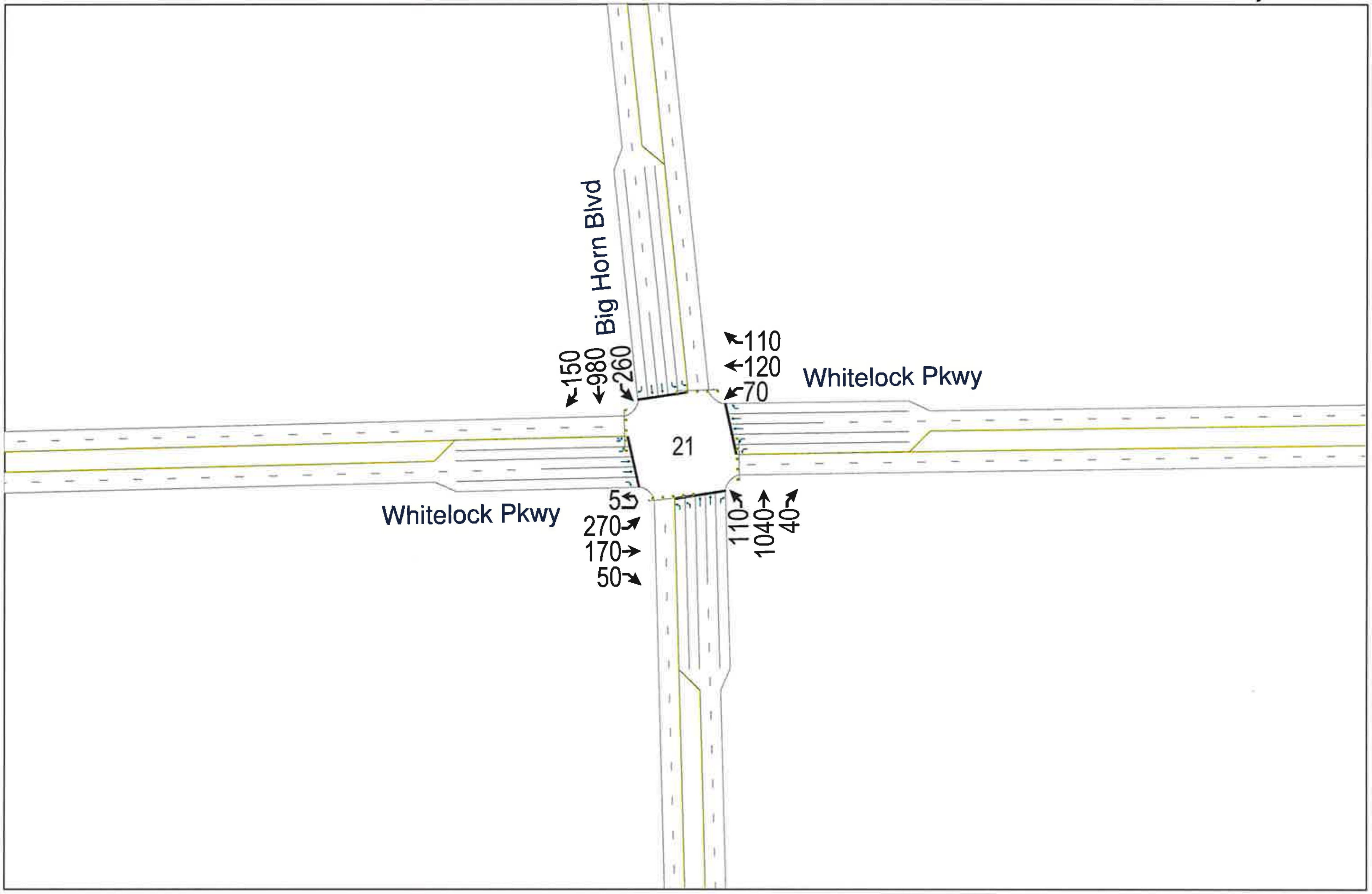

Big Horn Blvd
Lotz Pkwy
Denali Circle
Big Horn Blvd
160
50
180
5
350
510
50
18
280
1580
10
90
40
40
87
90

Elk Grove Civic Center Aquatics Complex

Cumulative Saturday No Project Conditions
Saturday Peak Hour

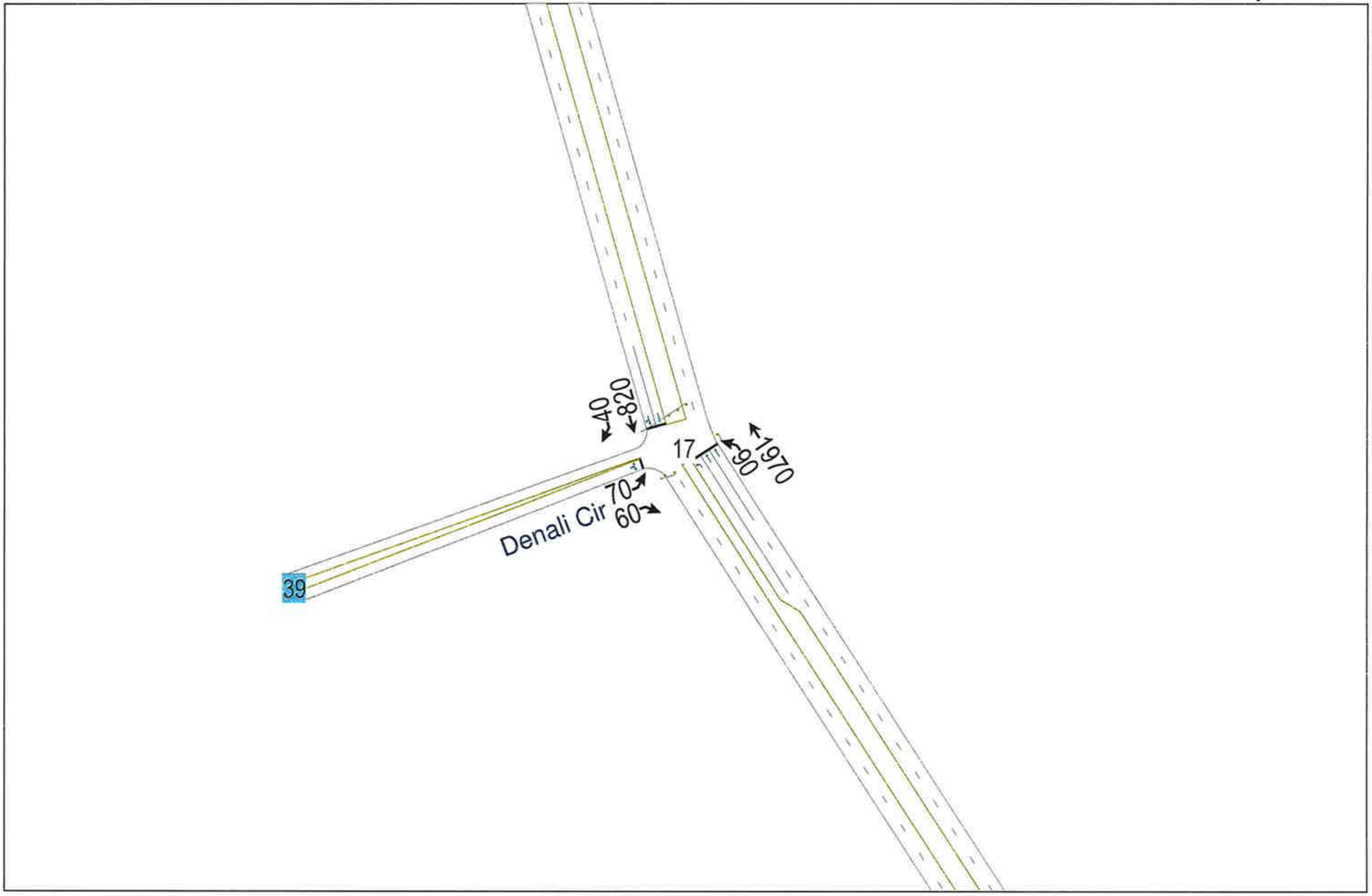



Bruceville Road
340
410
310
15
190
170
50
5
20
Whitelock Pkwy
5
400
410
140
45
170
650
80
Bruceville Road


Big Horn Blvd
150
980
260
110
120
70
Whitelock Pkwy
21
Whitelock Pkwy
5
270
170
50
110
1040
40

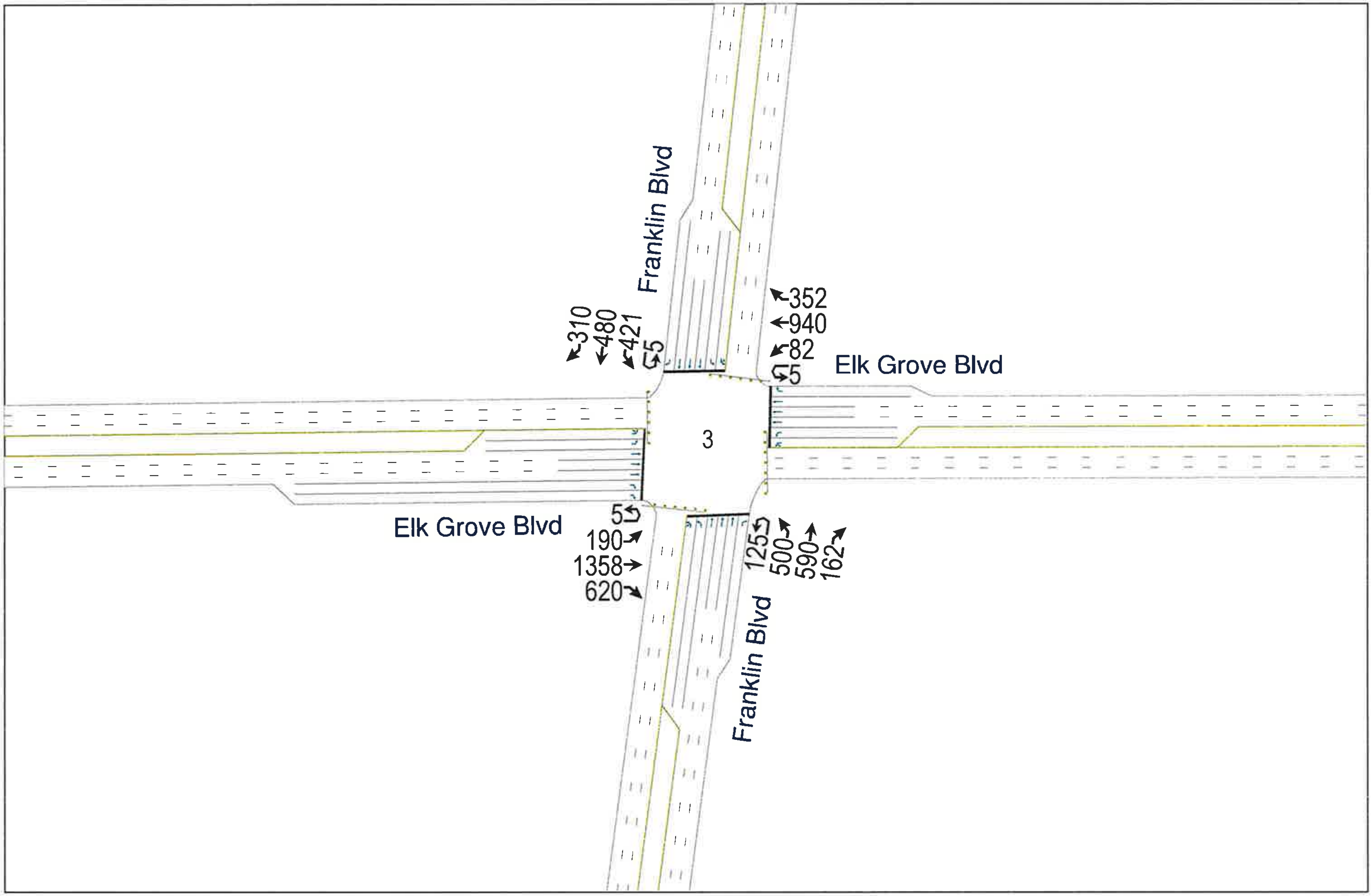
Elk Grove Civic Center Aquatics Complex

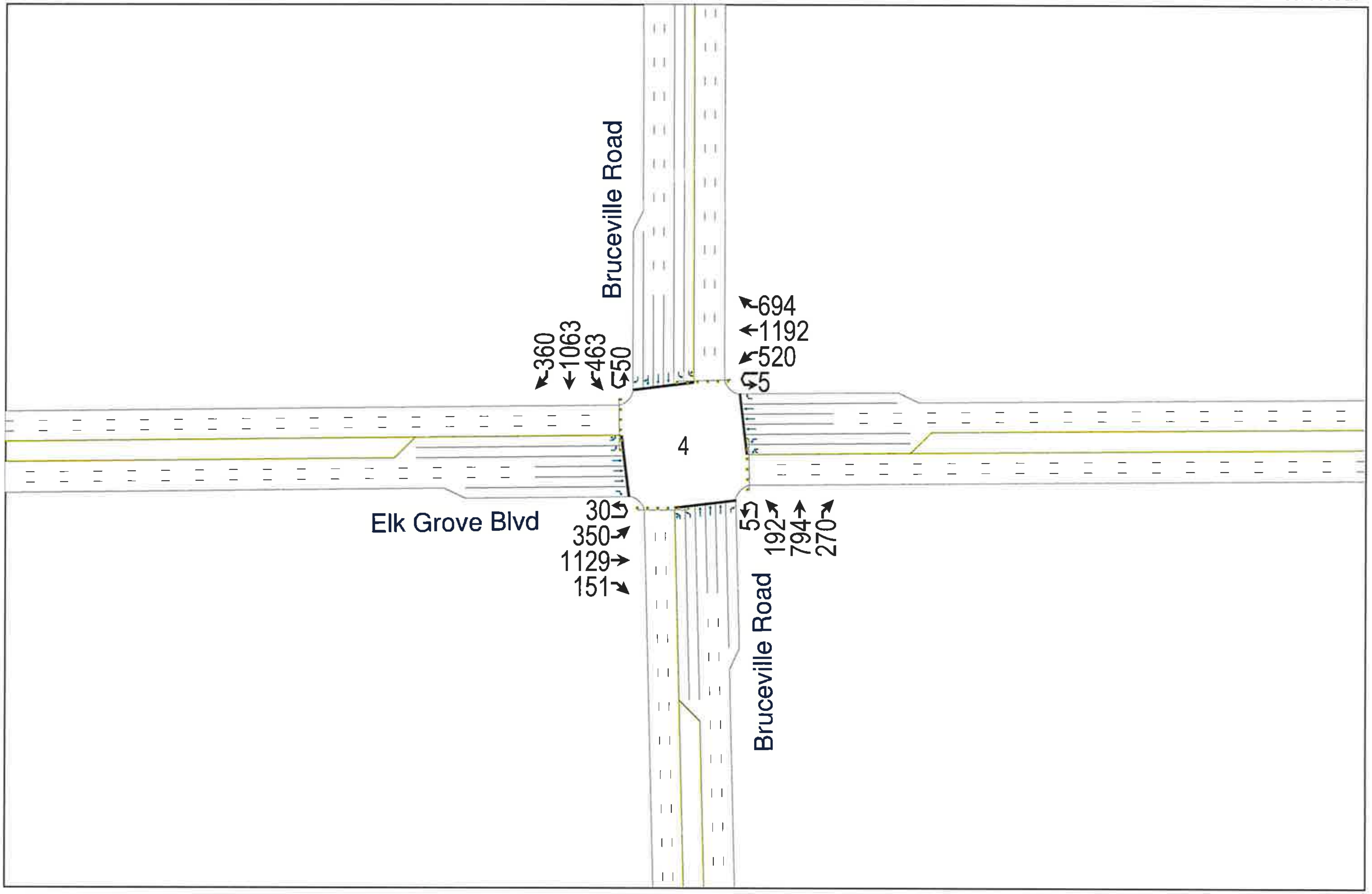
Cumulative Saturday No Project Conditions
Saturday Peak Hour

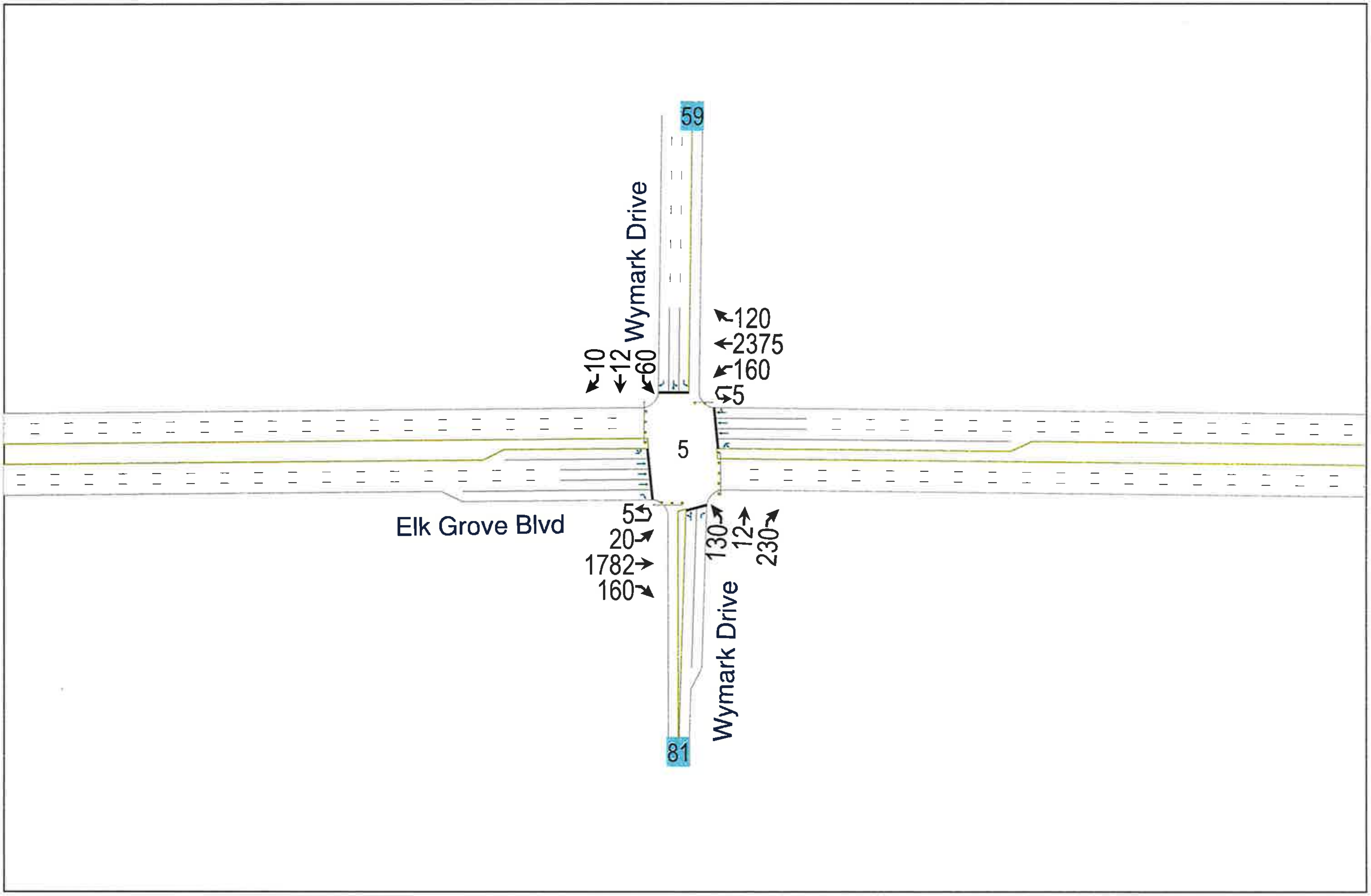


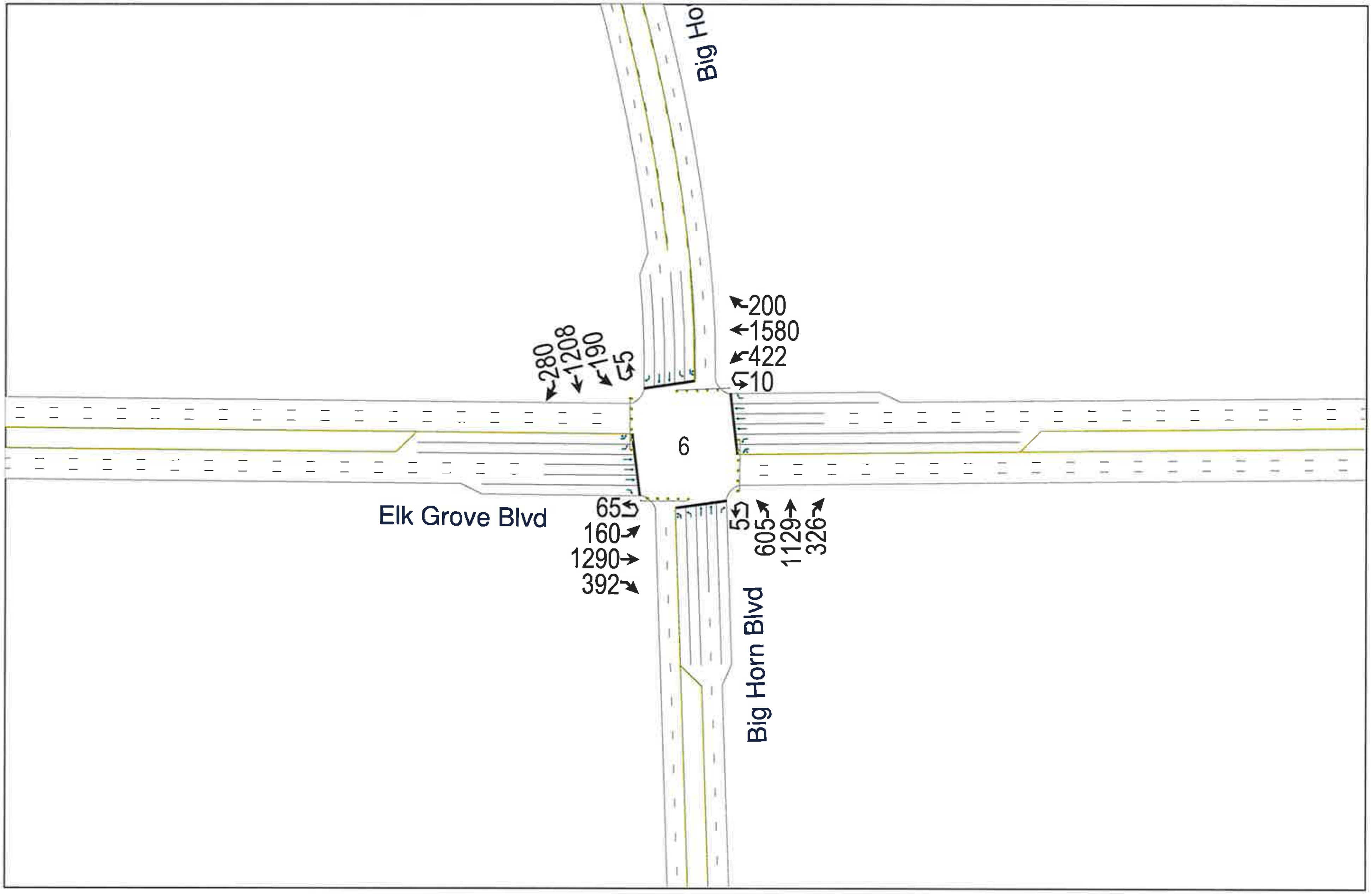
Elk Grove Civic Center Aquatics Complex

Cumulative Weekday Plus Project Conditions
PM Peak Hour


Franklin Blvd
310
480
421
5
352
940
82
5
Elk Grove Blvd
3
Elk Grove Blvd
5
190
1358
620
125
500
590
162
Franklin Blvd

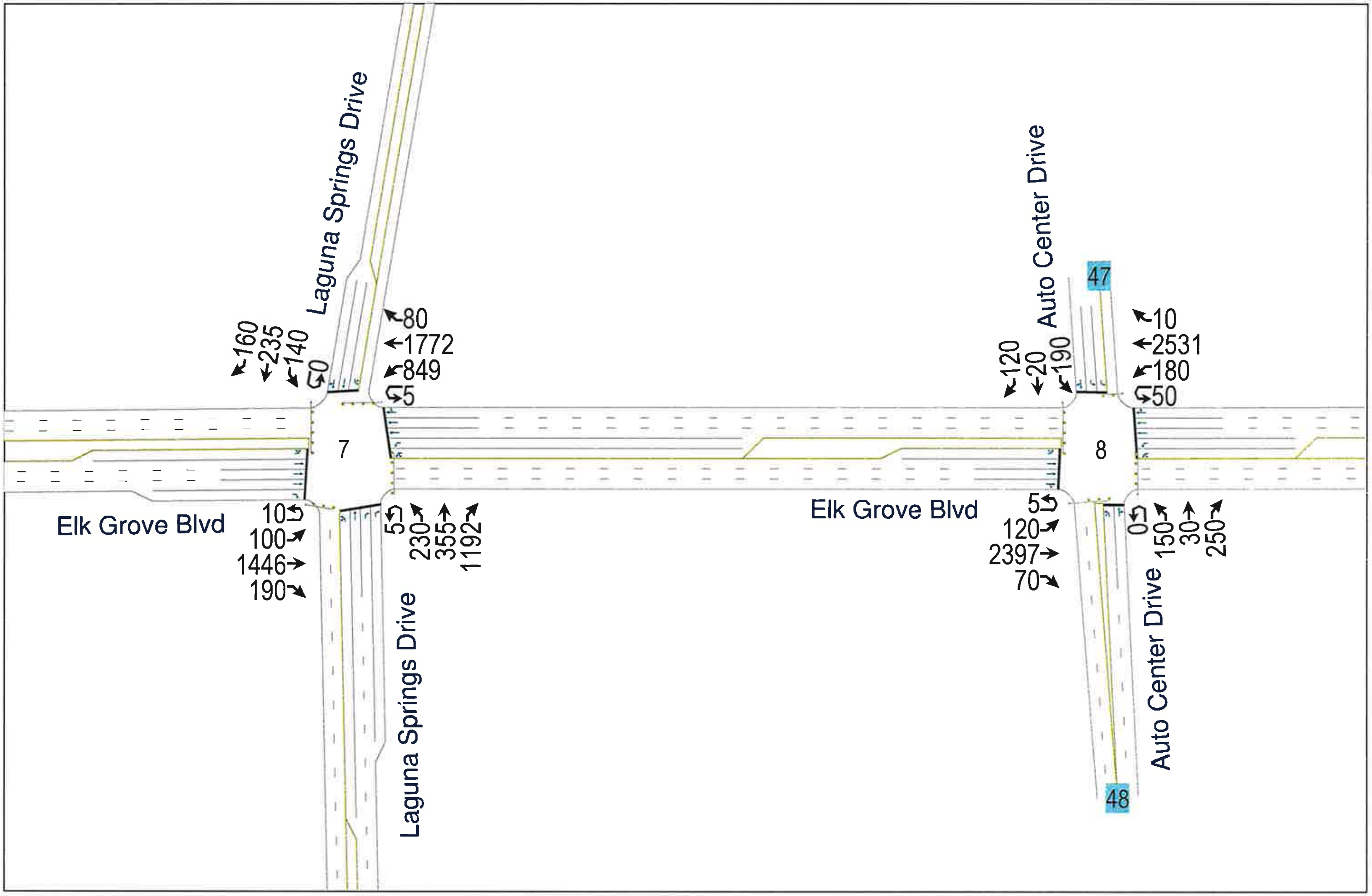

Bruceville Road
360
1063
463
50
694
1192
520
5
4
Elk Grove Blvd
30
350
1129
151
5
192
794
270
Bruceville Road

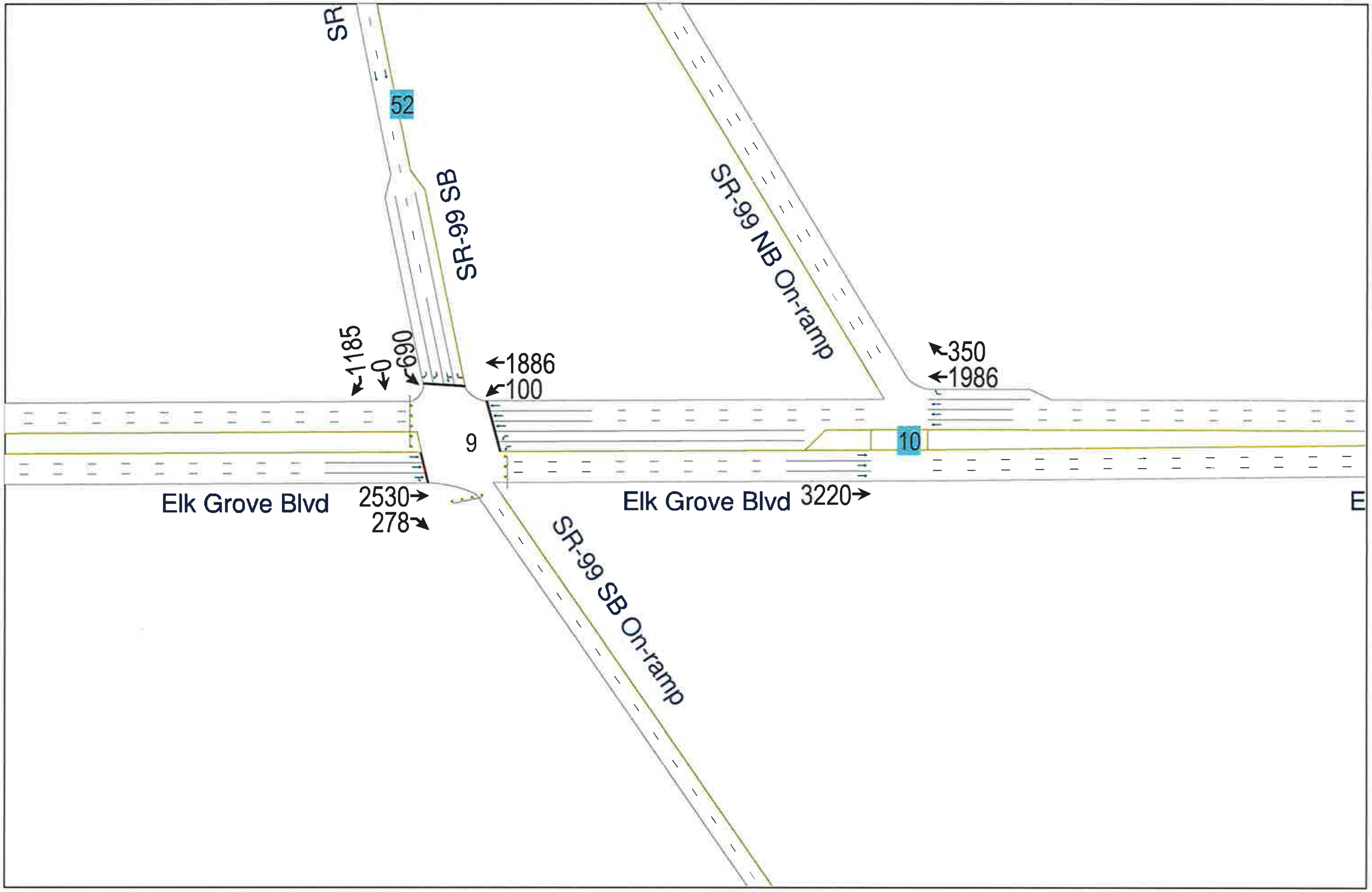

59
Wymark Drive
10
12
60
120
2375
160
5
5
Elk Grove Blvd
5
20
1782
160
130
12
230
Wymark Drive
81

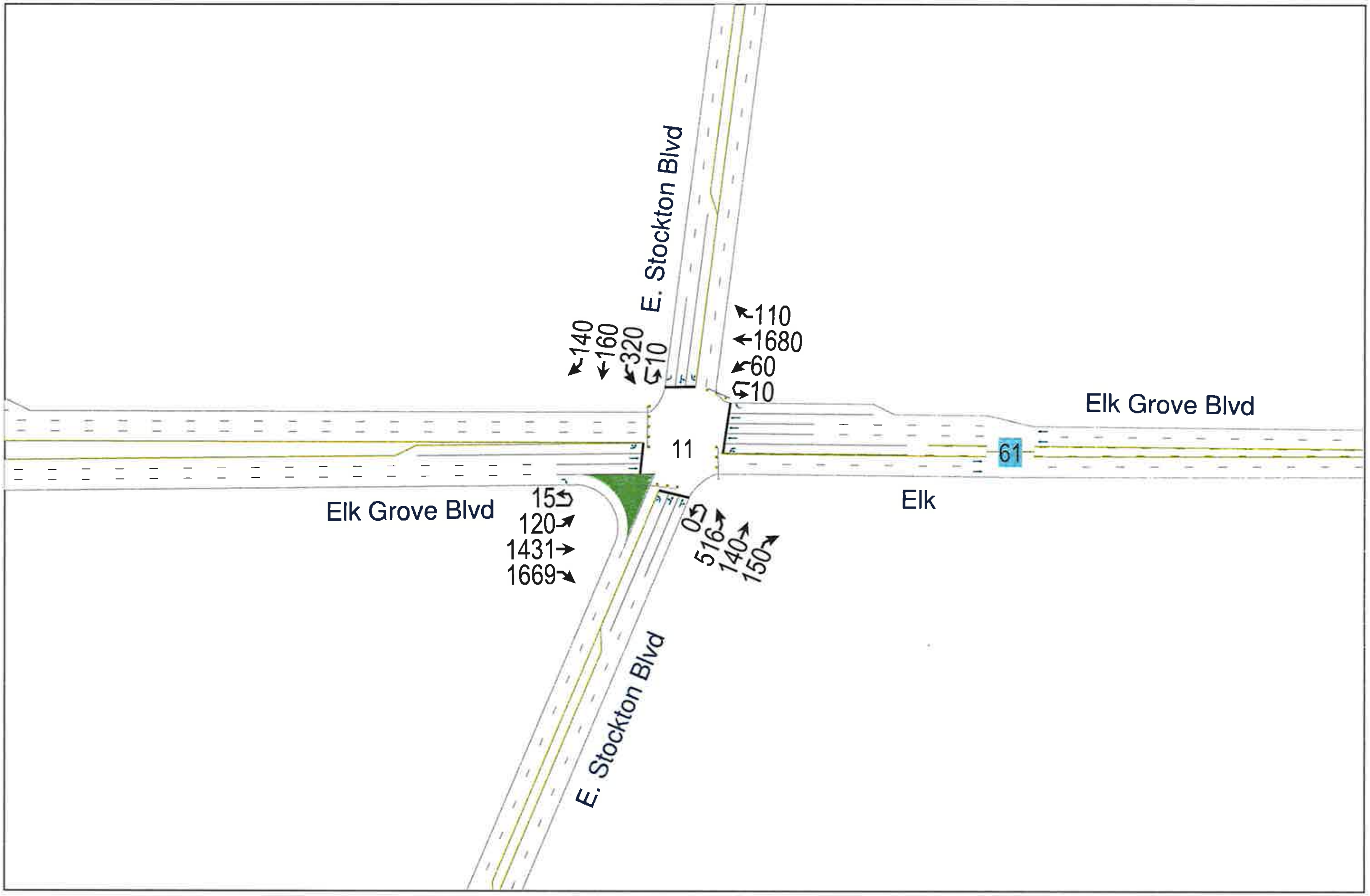

Big Ho
200
1580
422
10
280
1208
190
5
6
Elk Grove Blvd
65
160
1290
392
5
605
1129
326
Big Horn Blvd

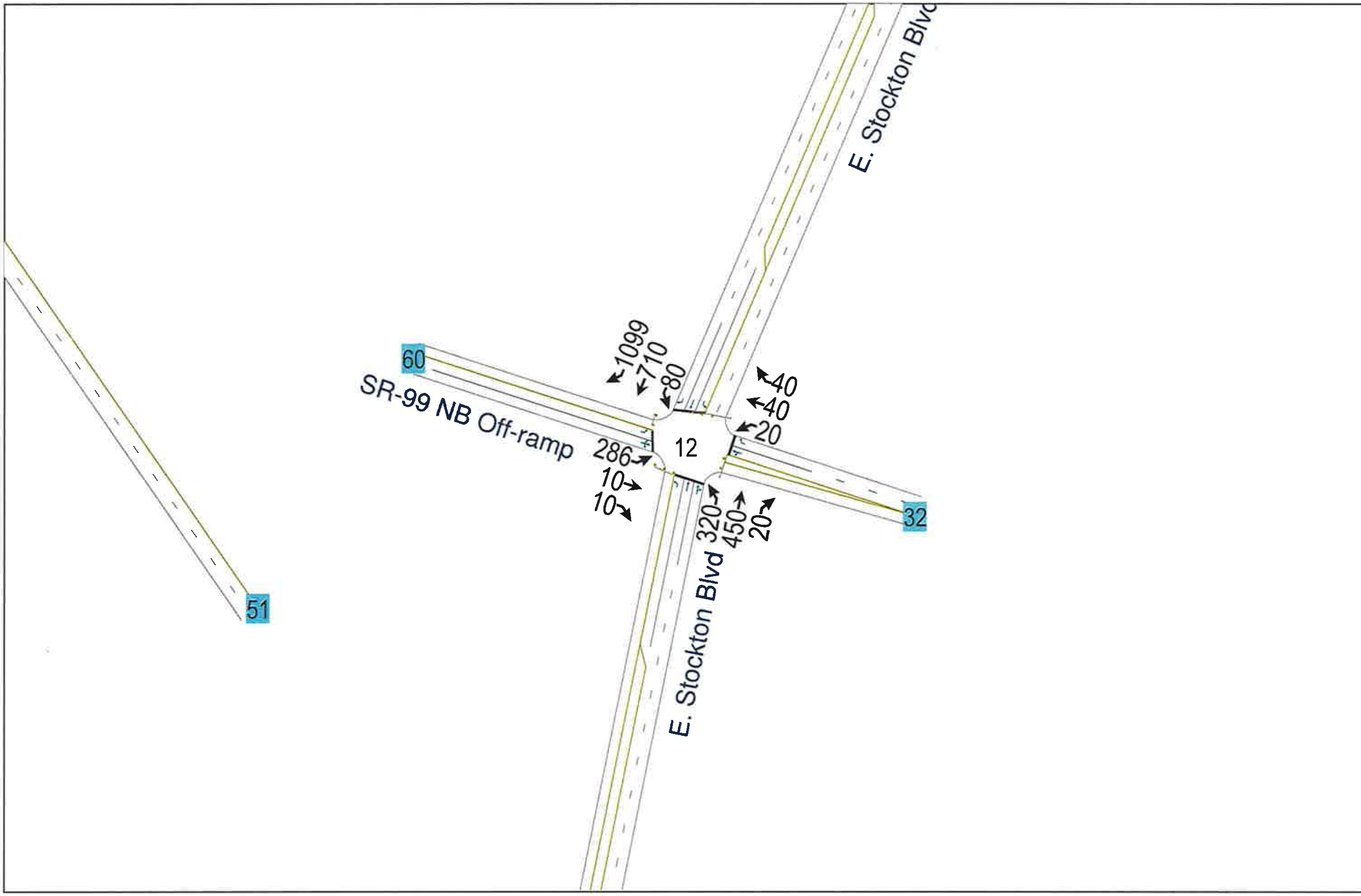
Elk Grove Civic Center Aquatics Complex

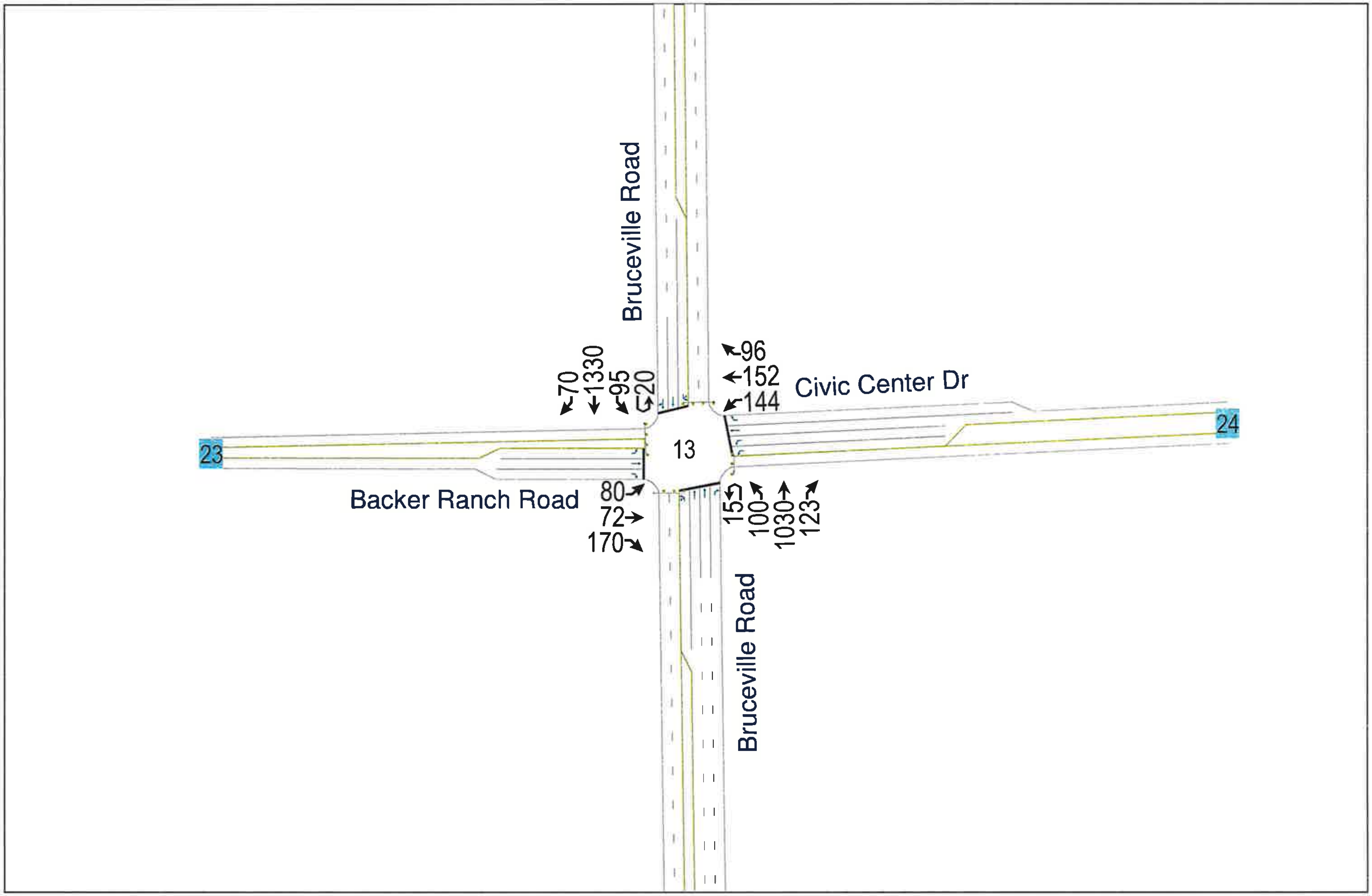
Cumulative Weekday Plus Project Conditions
PM Peak Hour

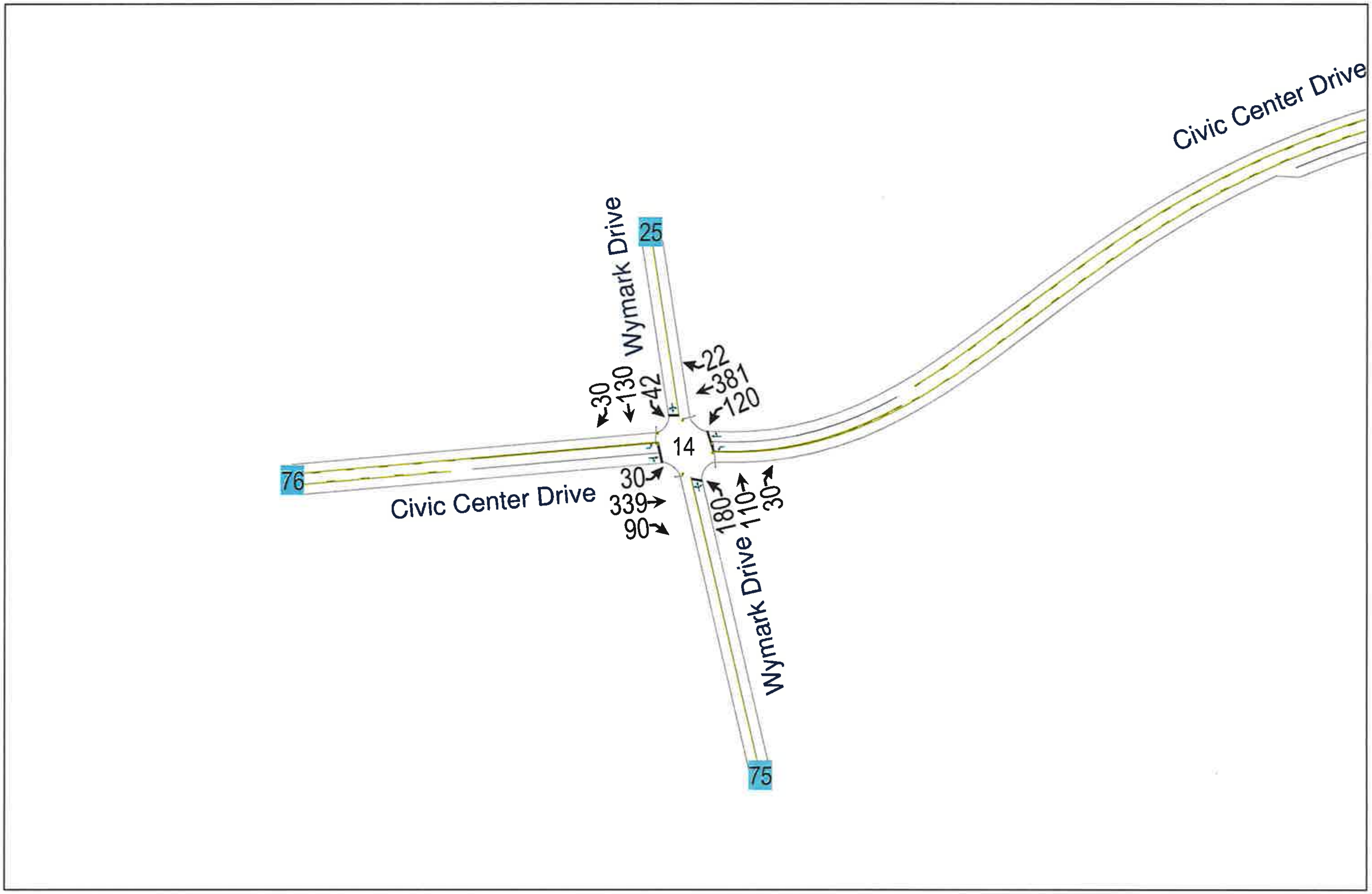


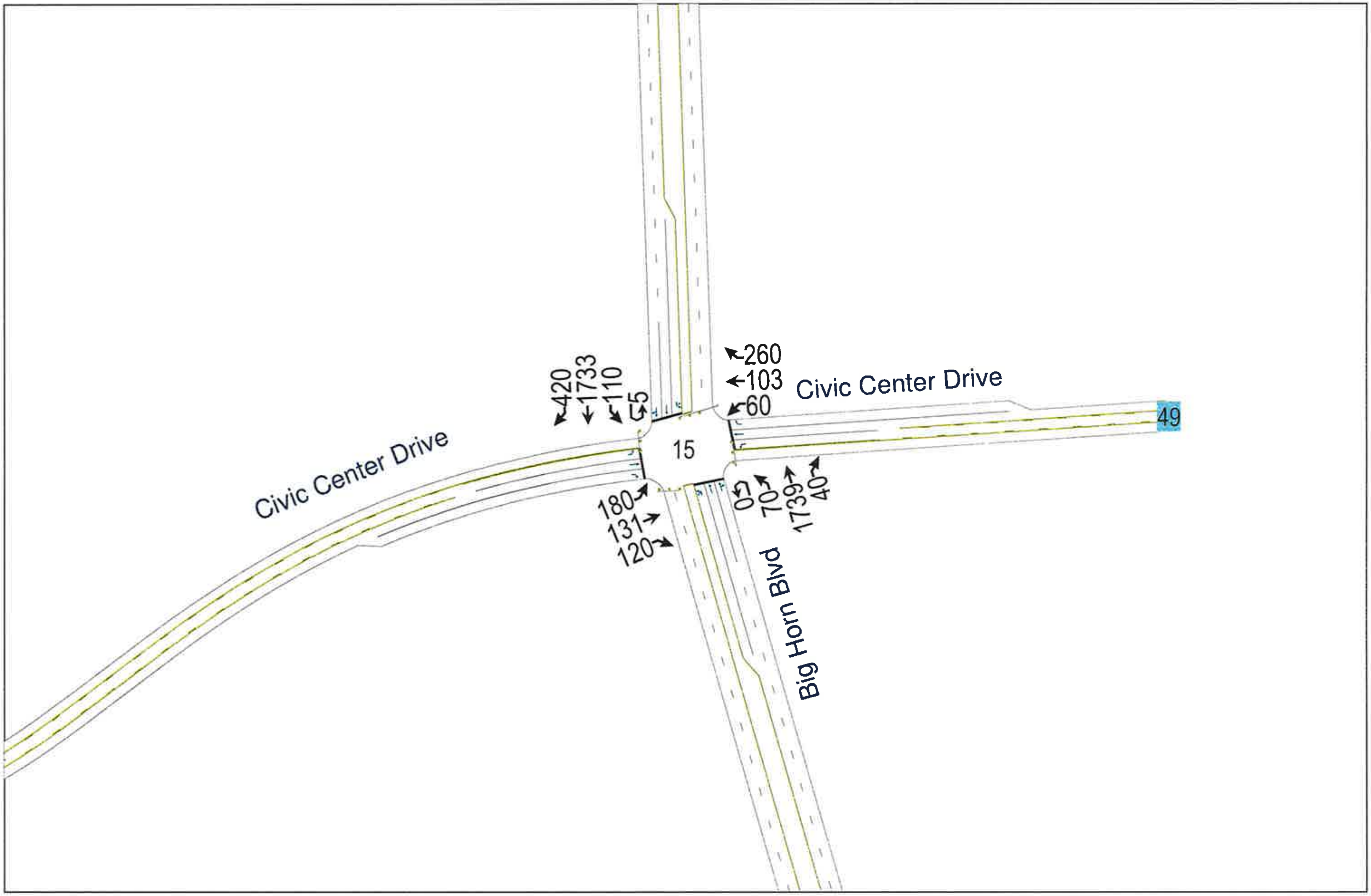

SR
52
SR-99 SB
SR-99 NB On-ramp
1185
0
690
1886
100
350
1986
9
10
Elk Grove Blvd
2530
278
Elk Grove Blvd
3220
E
SR-99 SB On-ramp

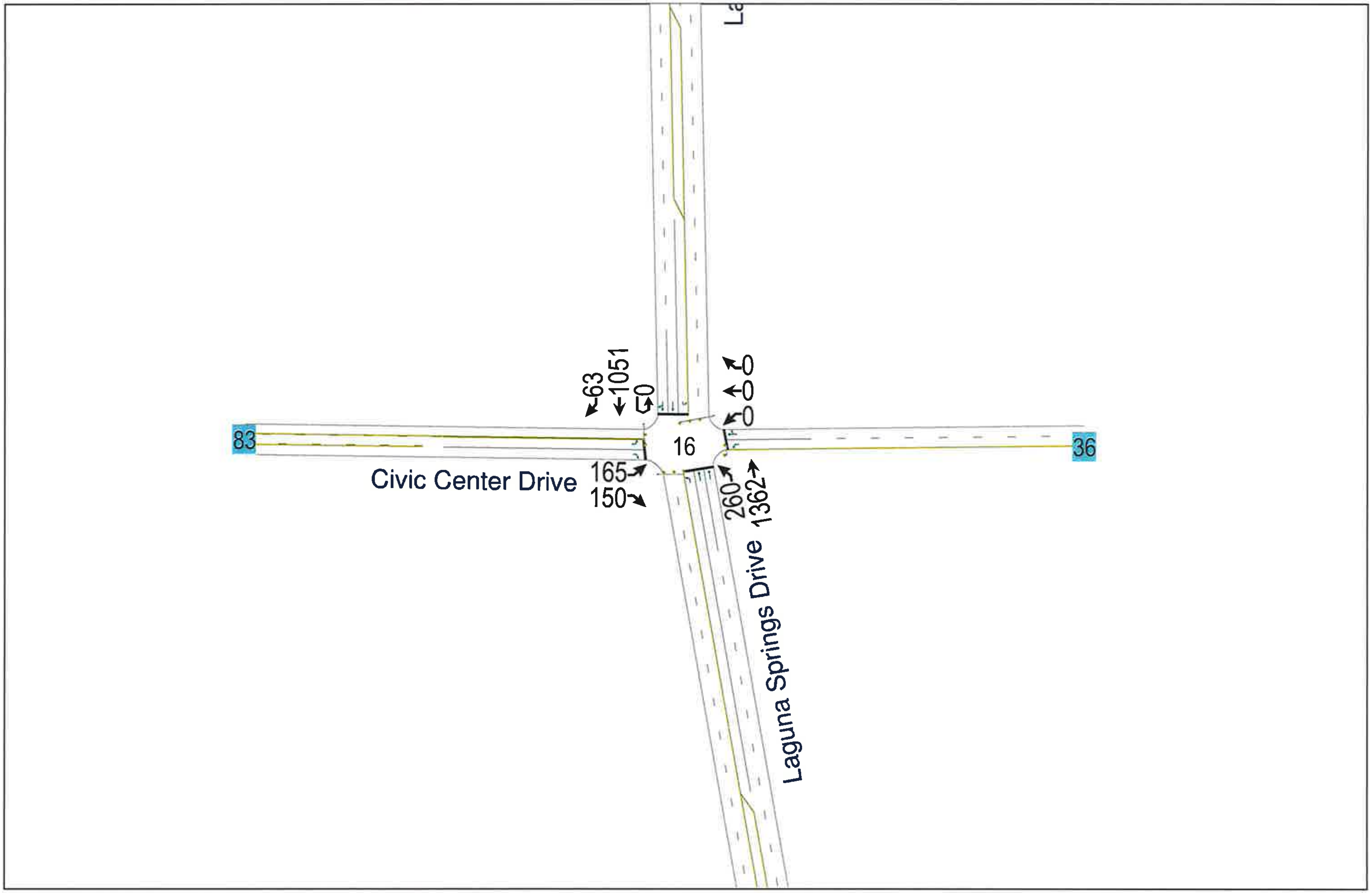

E. Stockton Blvd
110
1680
60
10
140
160
320
10
Elk Grove Blvd
61
11
15
120
1431
1669
Elk Grove Blvd
0
516
140
150
Elk
E. Stockton Blvd

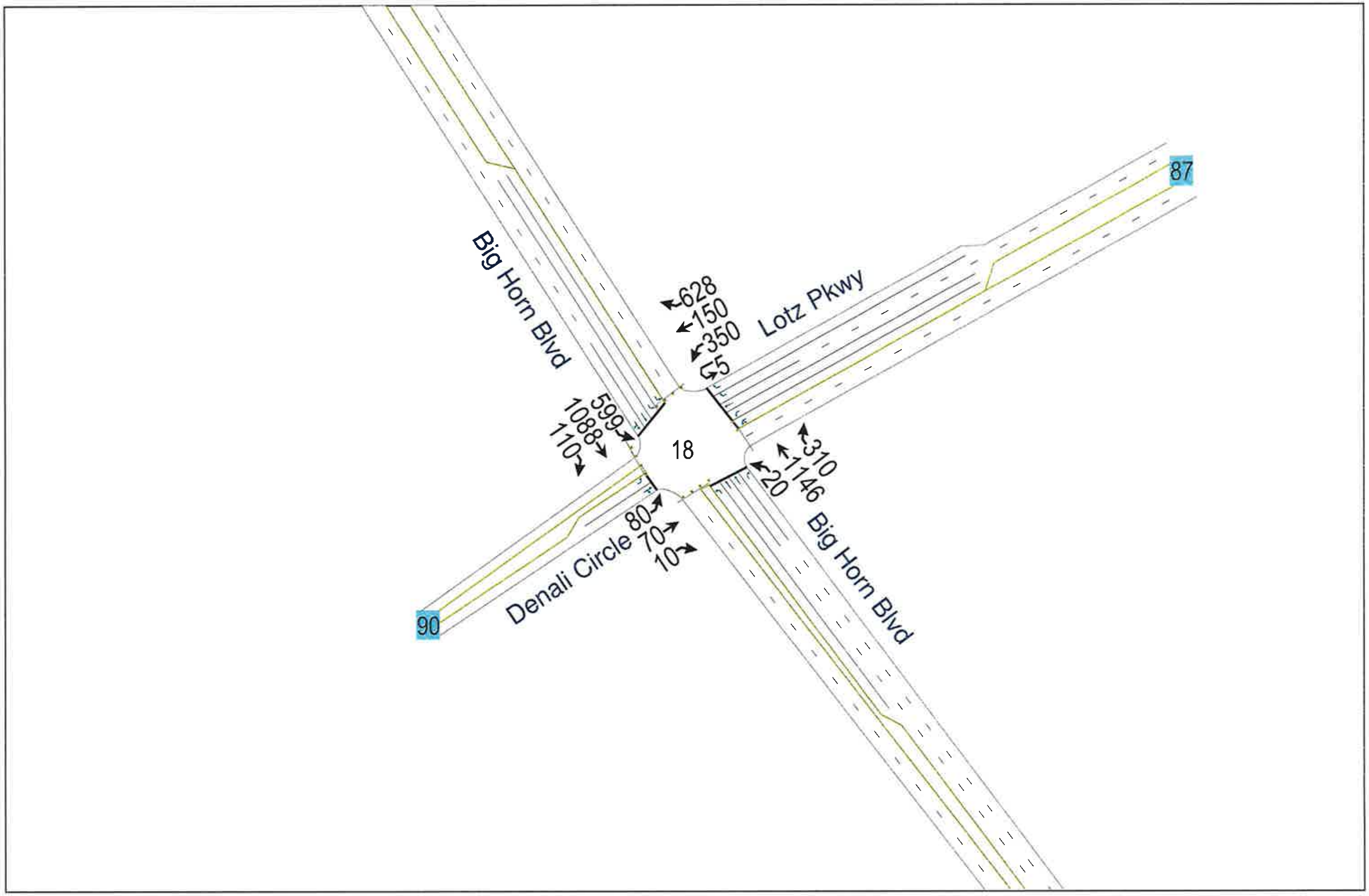

E. Stockton Blvd
60
SR-99 NB Off-ramp
1099
710
80
40
40
20
12
286
10
10
320
450
20
32
51
E. Stockton Blvd

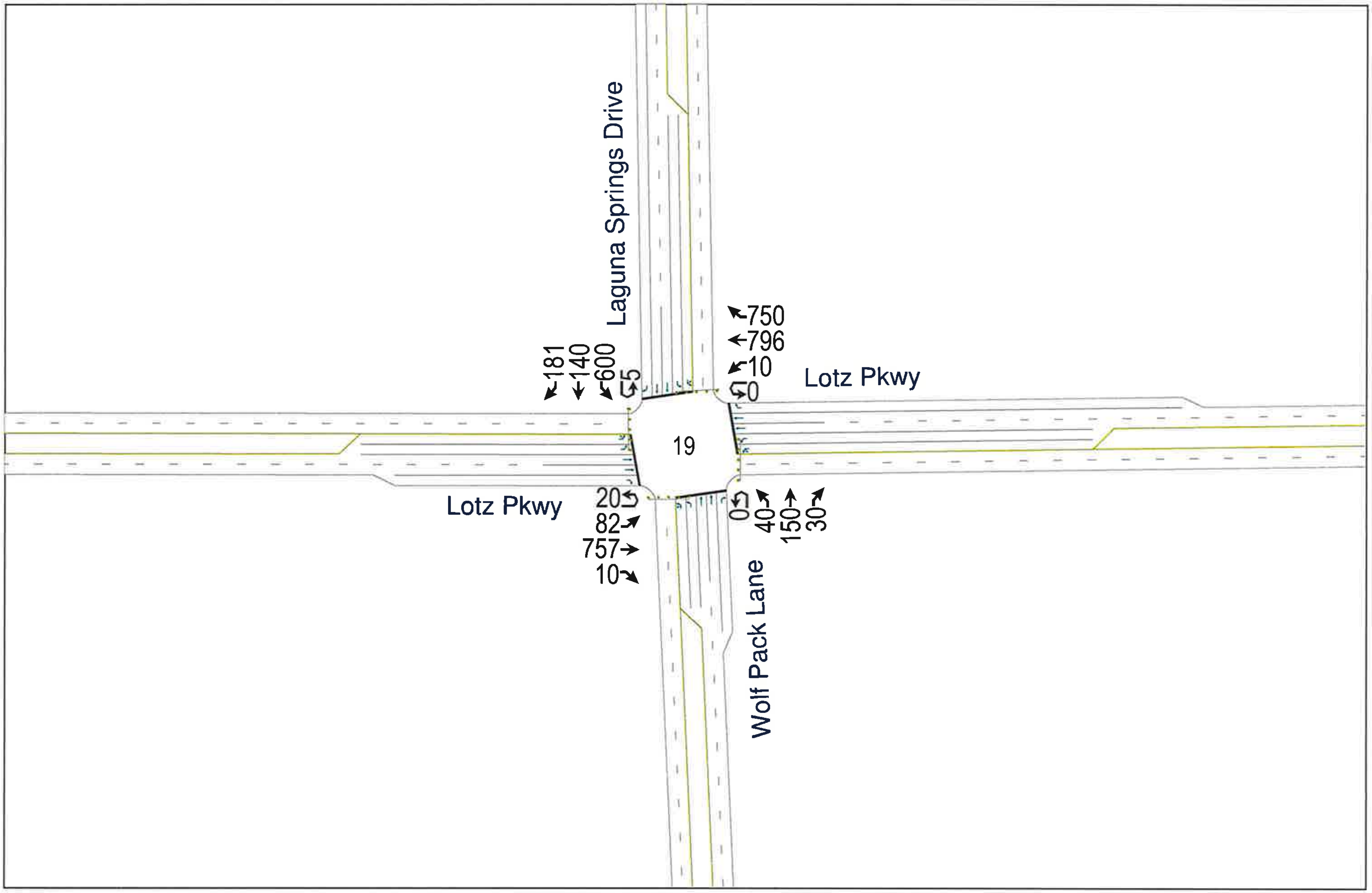

Bruceville Road
Civic Center Dr
Backer Ranch Road
Bruceville Road
13
23
24
70
1330
95
20
96
152
144
80
72
170
15
100
1030
123

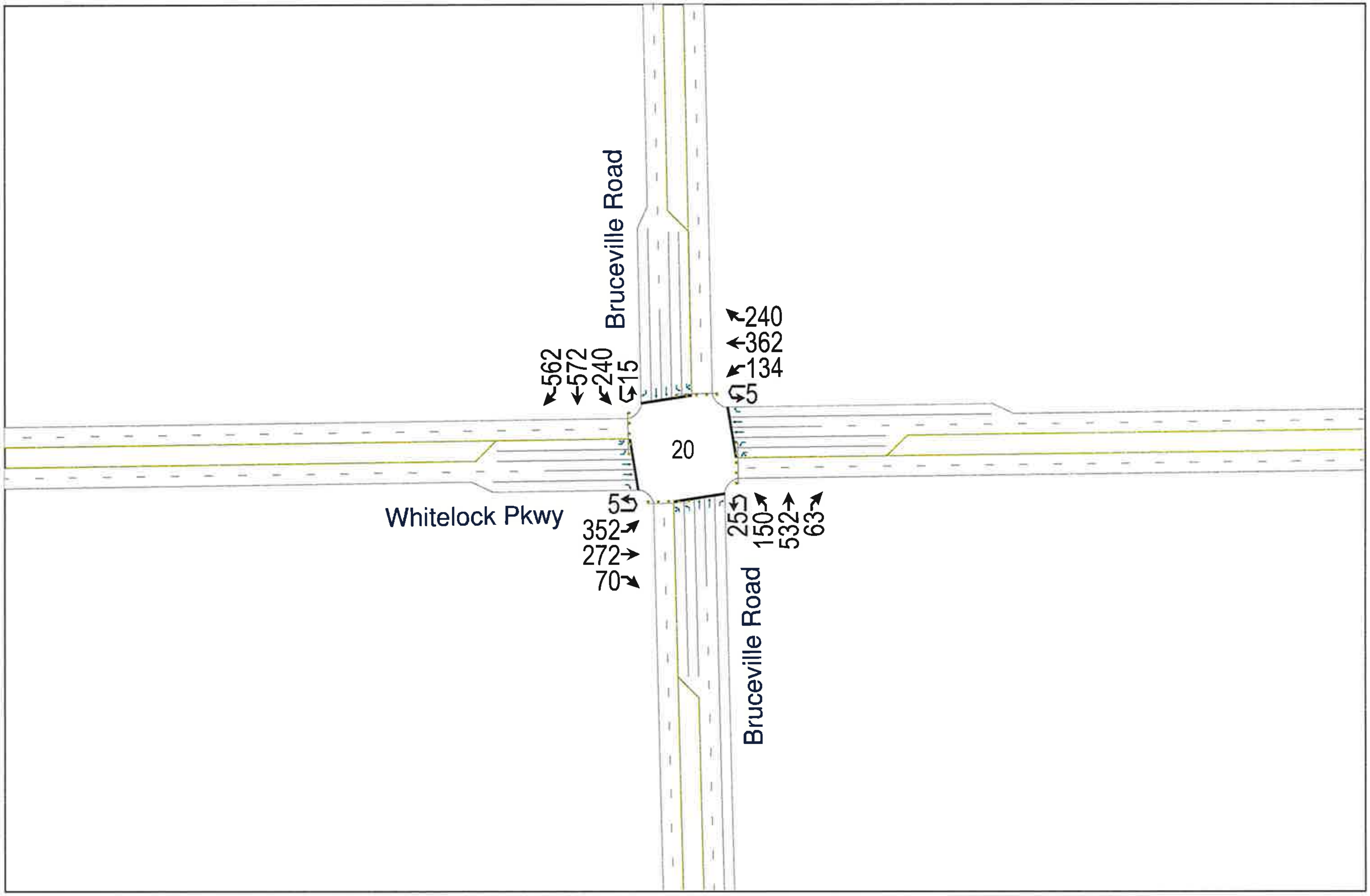

Civic Center Drive
Wymark Drive
25
22
381
120
30
130
42
14
76
Civic Center Drive
30
339
90
180
110
30
Wymark Drive
75


420
1733
110
5
260
103
60
Civic Center Drive
15
49
Civic Center Drive
180
131
120
0
70
1739
40
Big Horn Blvd


La
63
1051
0
0
0
0
83
16
36
Civic Center Drive
165
150
260
1362
Laguna Springs Drive

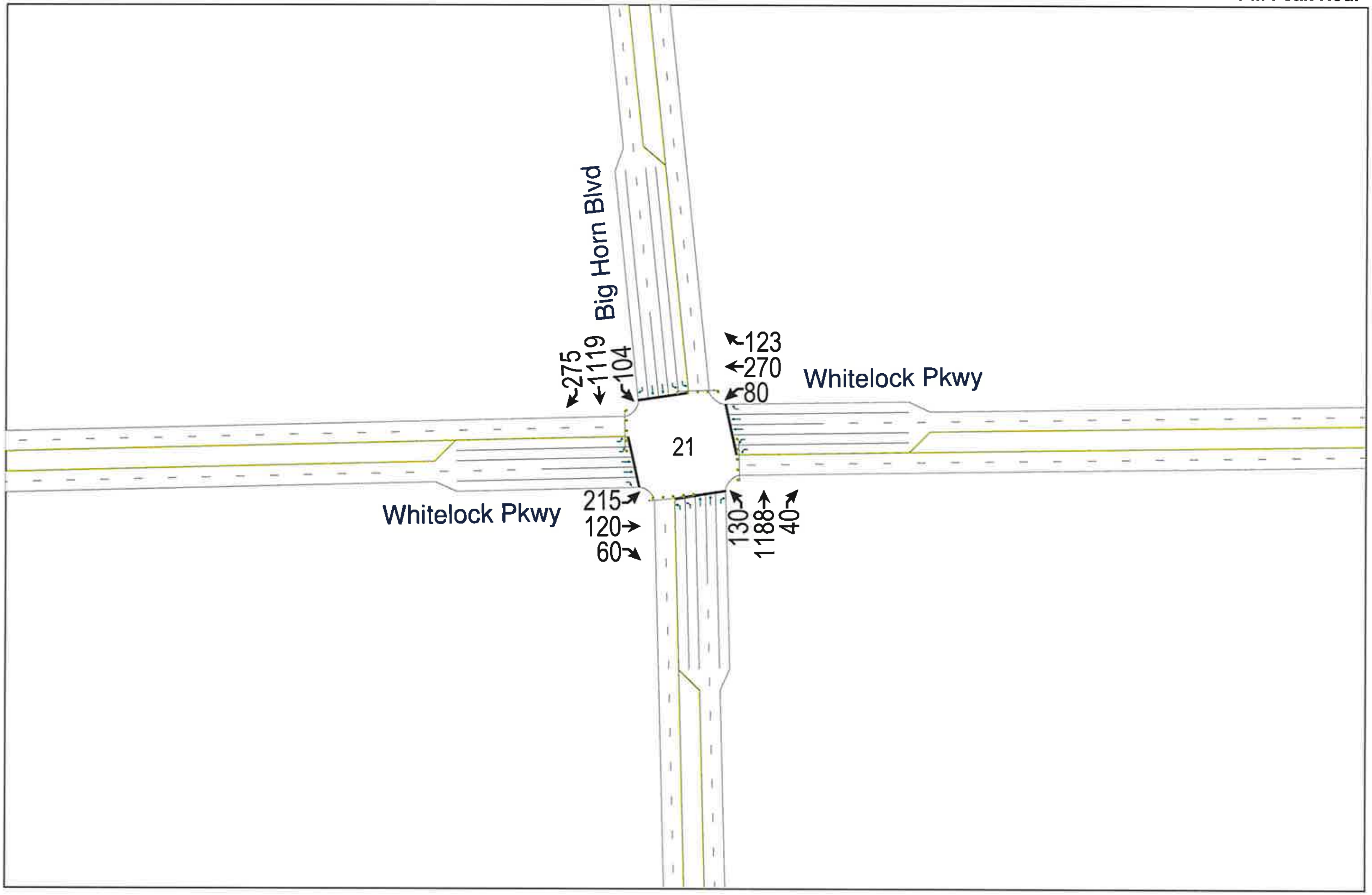

Big Horn Blvd
Lotz Pkwy
628
150
350
5
599
1088
110
18
310
1146
20
80
70
10
Denali Circle
Big Horn Blvd
87
90

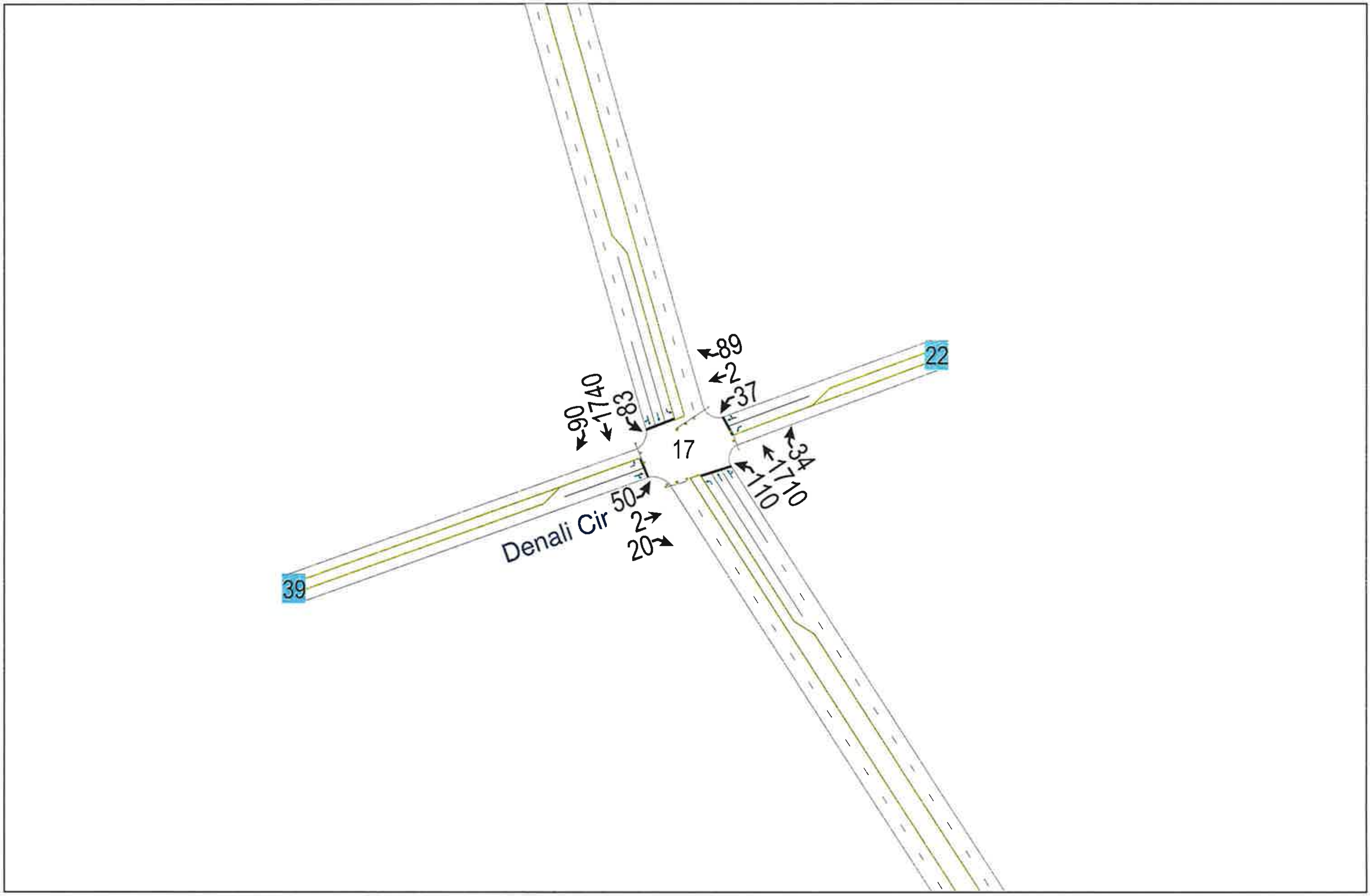

Laguna Springs Drive
181
140
600
5
750
796
10
0
Lotz Pkwy
19
Lotz Pkwy
20
82
757
10
0
40
150
30
Wolf Pack Lane

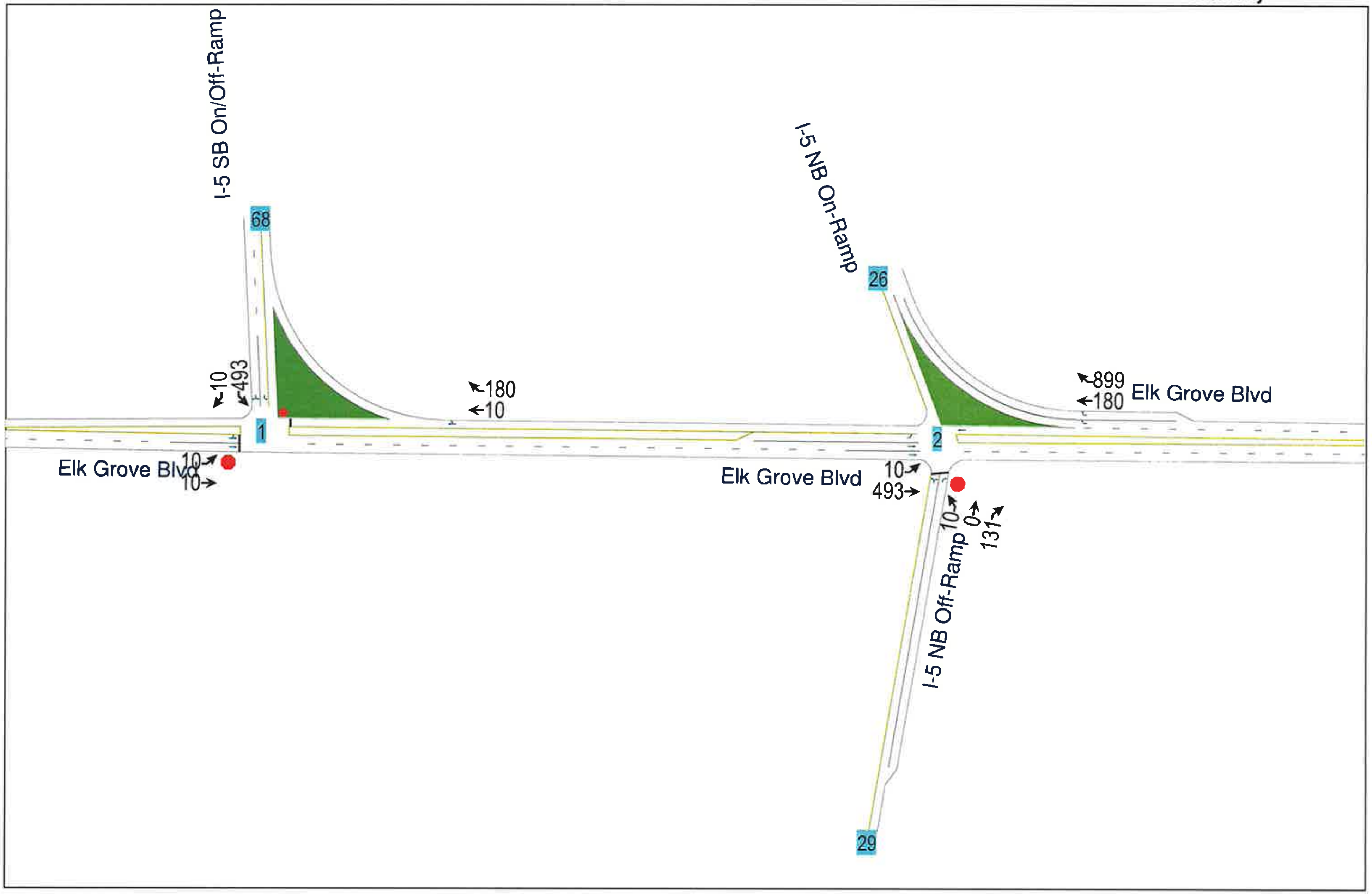

Bruceville Road
562
572
240
15
240
362
134
5
20
Whitelock Pkwy
5
352
272
70
25
150
532
63
Bruceville Road

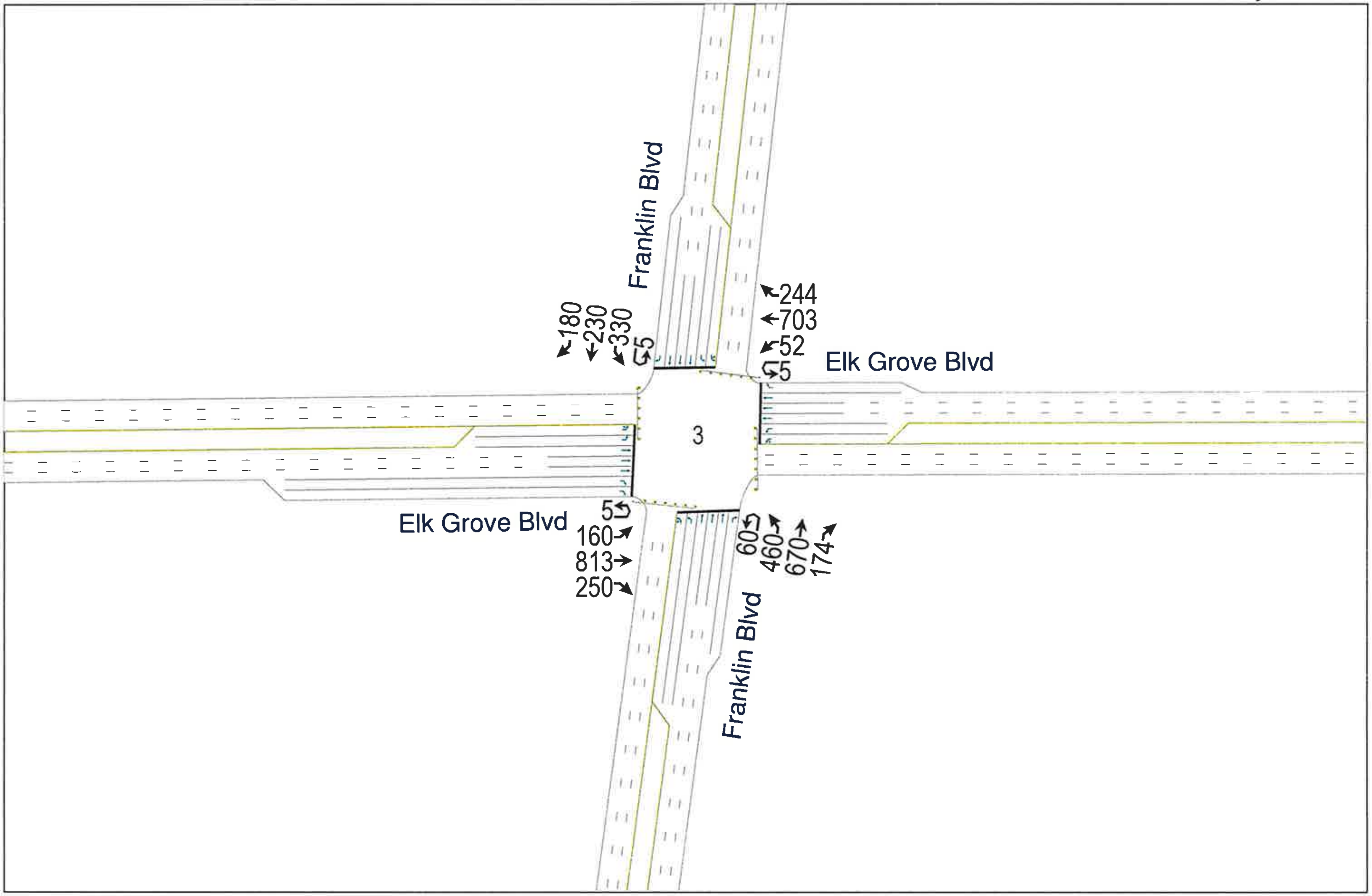
Elk Grove Civic Center Aquatics Complex

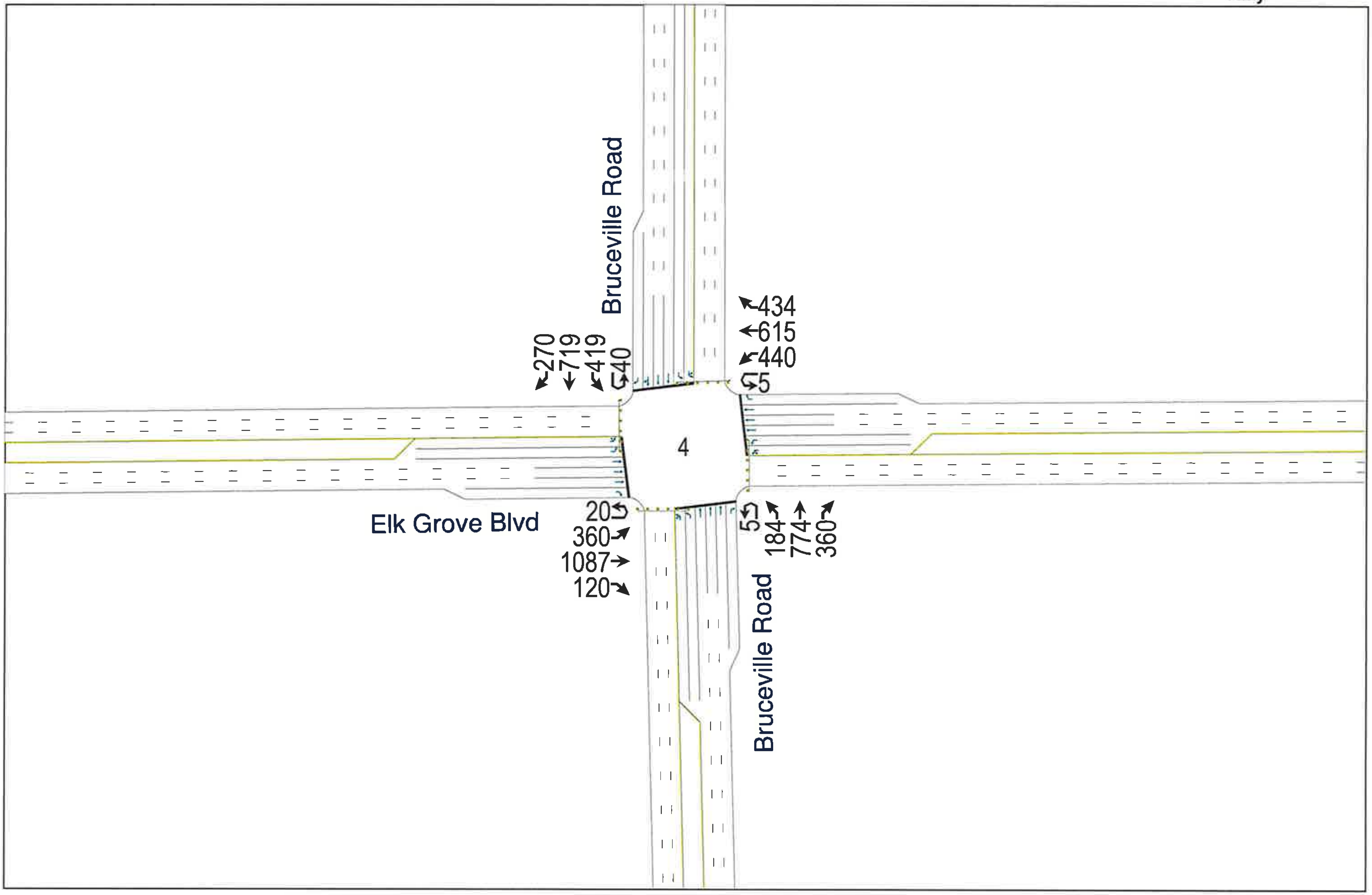
Cumulative Weekday Plus Project Conditions
PM Peak Hour

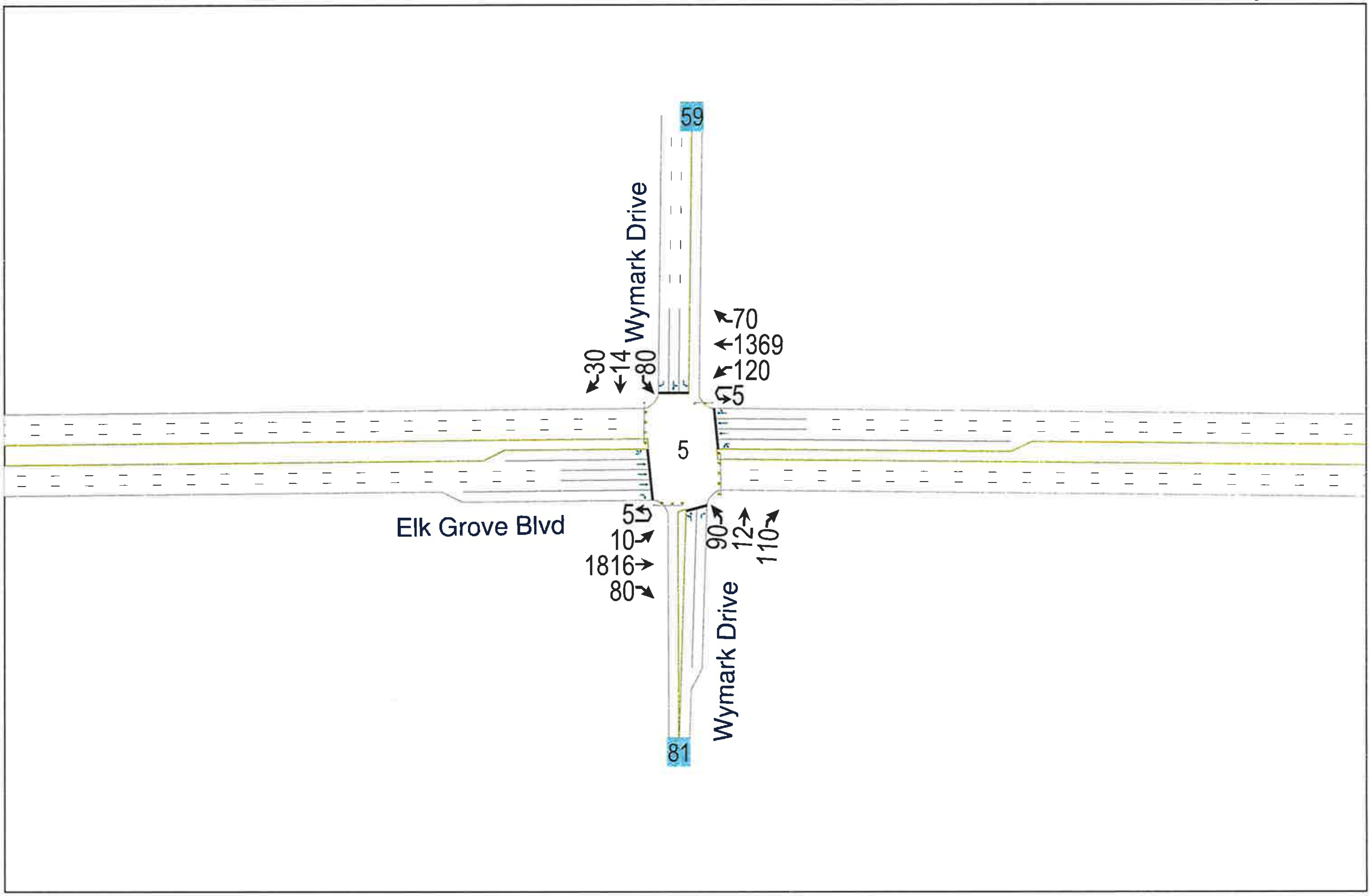


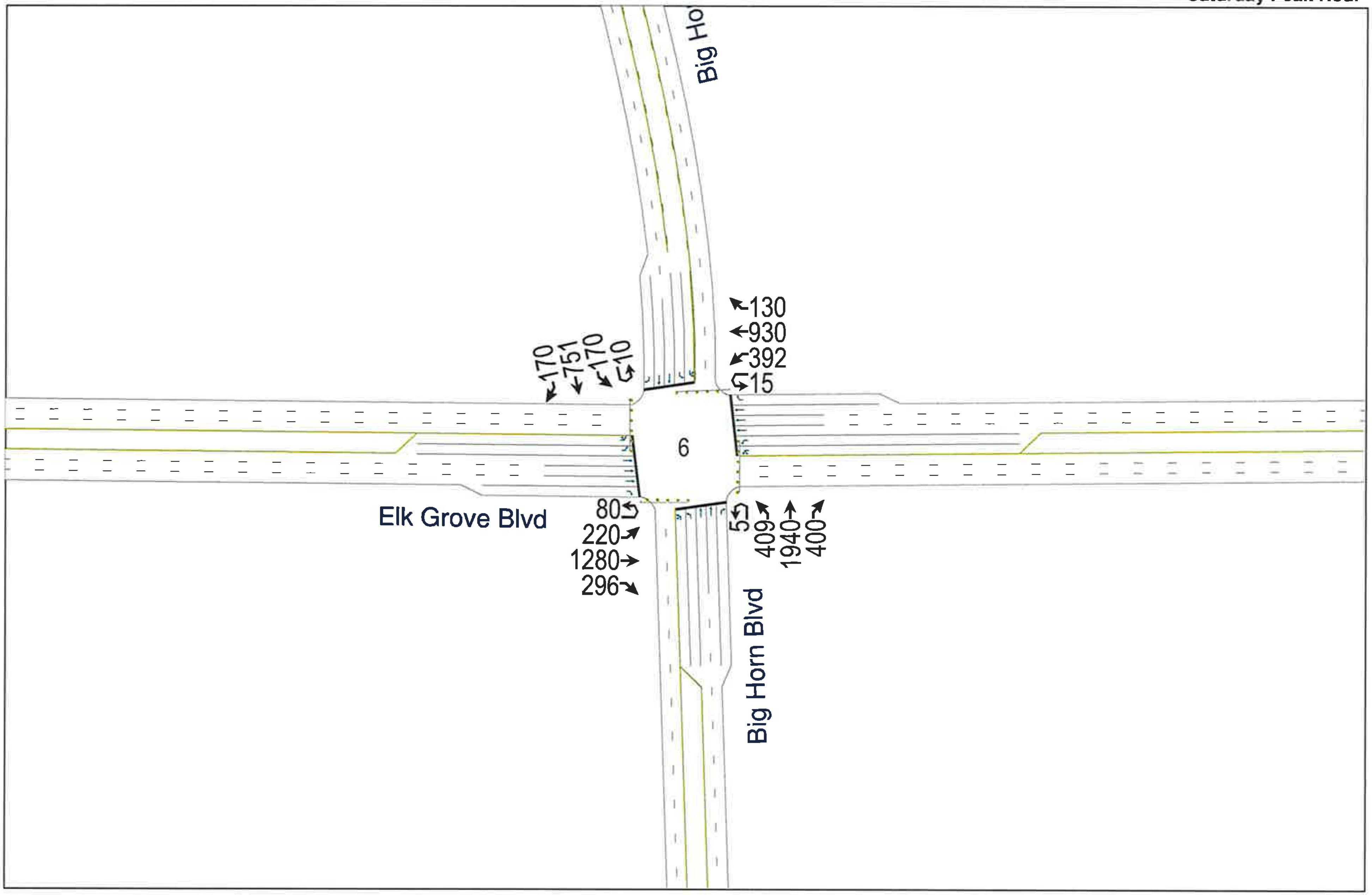

89
2
37
90
1740
83
17
34
1710
110
50
2
20
Denali Cir
22
39


I-5 SB On/Off-Ramp
68
10
493
1
180
10
Elk Grove Blvd
10
10
I-5 NB On-Ramp
26
899
180
Elk Grove Blvd
2
Elk Grove Blvd
10
493
10
0
131
I-5 NB Off-Ramp
29


Franklin Blvd
180
230
330
5
244
703
52
5
Elk Grove Blvd
3
5
Elk Grove Blvd
160
813
250
60
460
670
174
Franklin Blvd

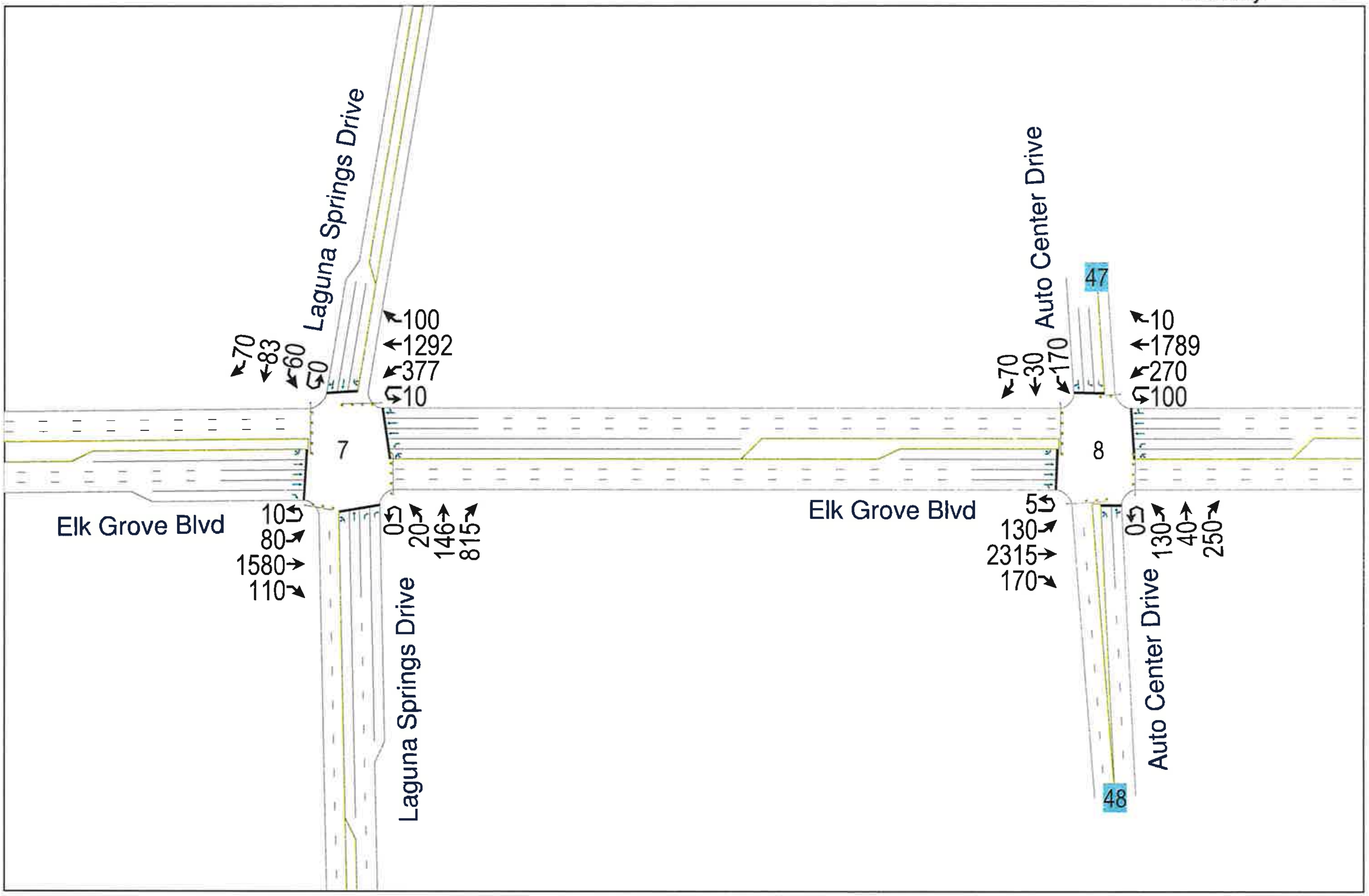

Bruceville Road
270
719
419
40
434
615
440
5
4
Elk Grove Blvd
20
360
1087
120
5
184
774
360
Bruceville Road

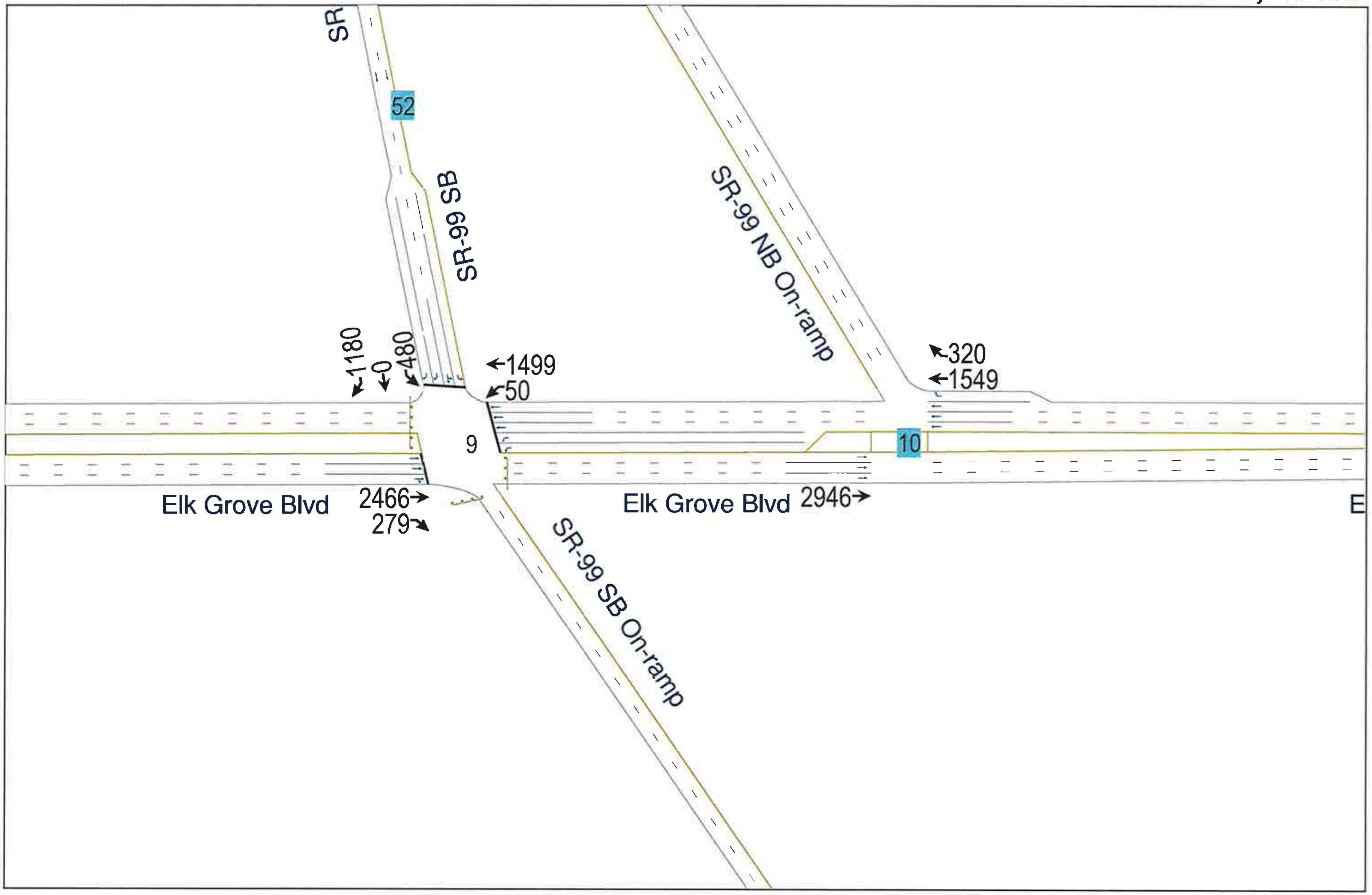

59
Wymark Drive
30
14
80
70
1369
120
5
5
Elk Grove Blvd
5
10
1816
80
90
12
110
Wymark Drive
81

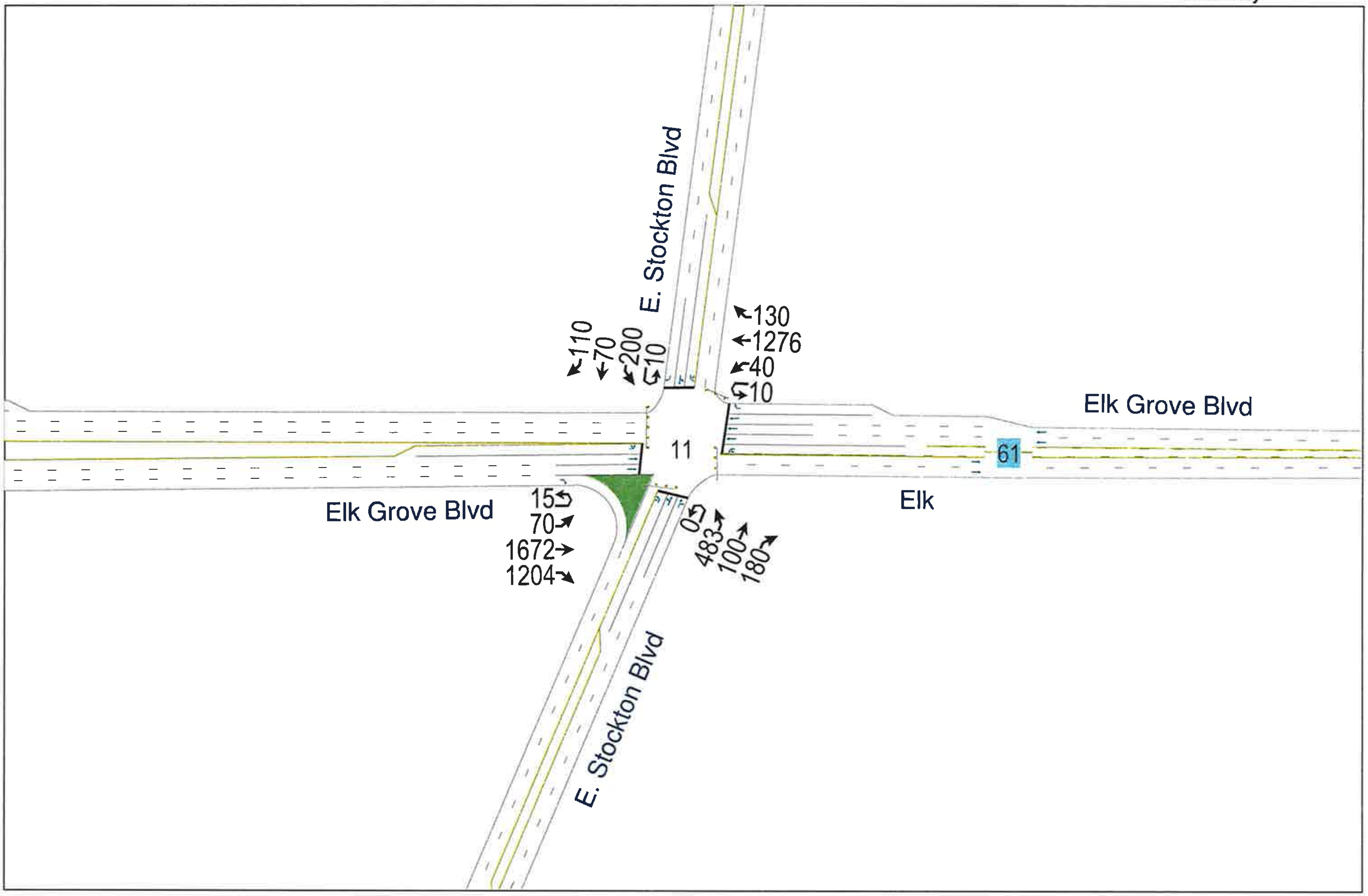

Big Ho
130
930
392
15
170
751
170
10
6
Elk Grove Blvd
80
220
1280
296
5
409
1940
400
Big Horn Blvd

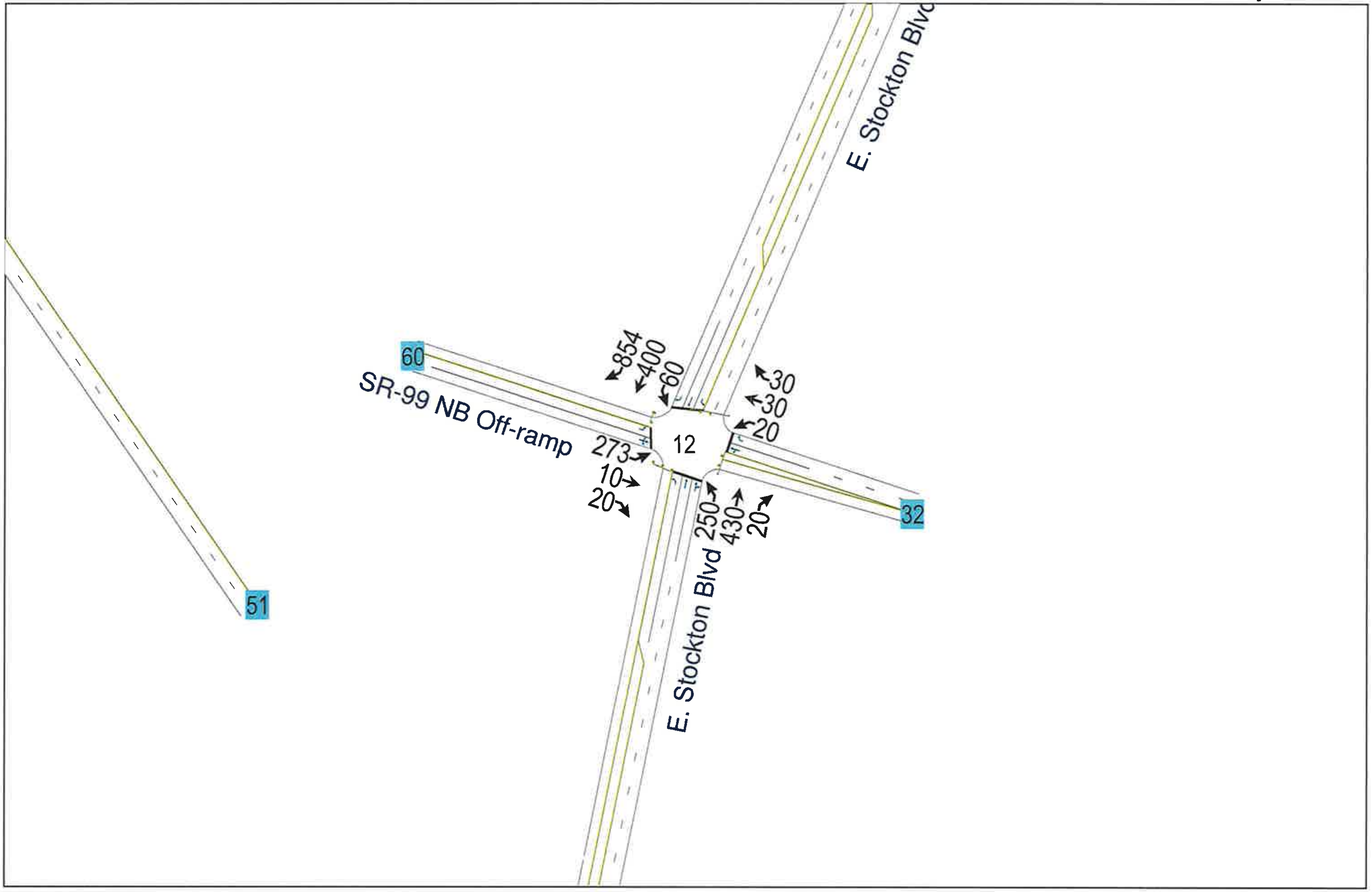
Elk Grove Civic Center Aquatics Complex

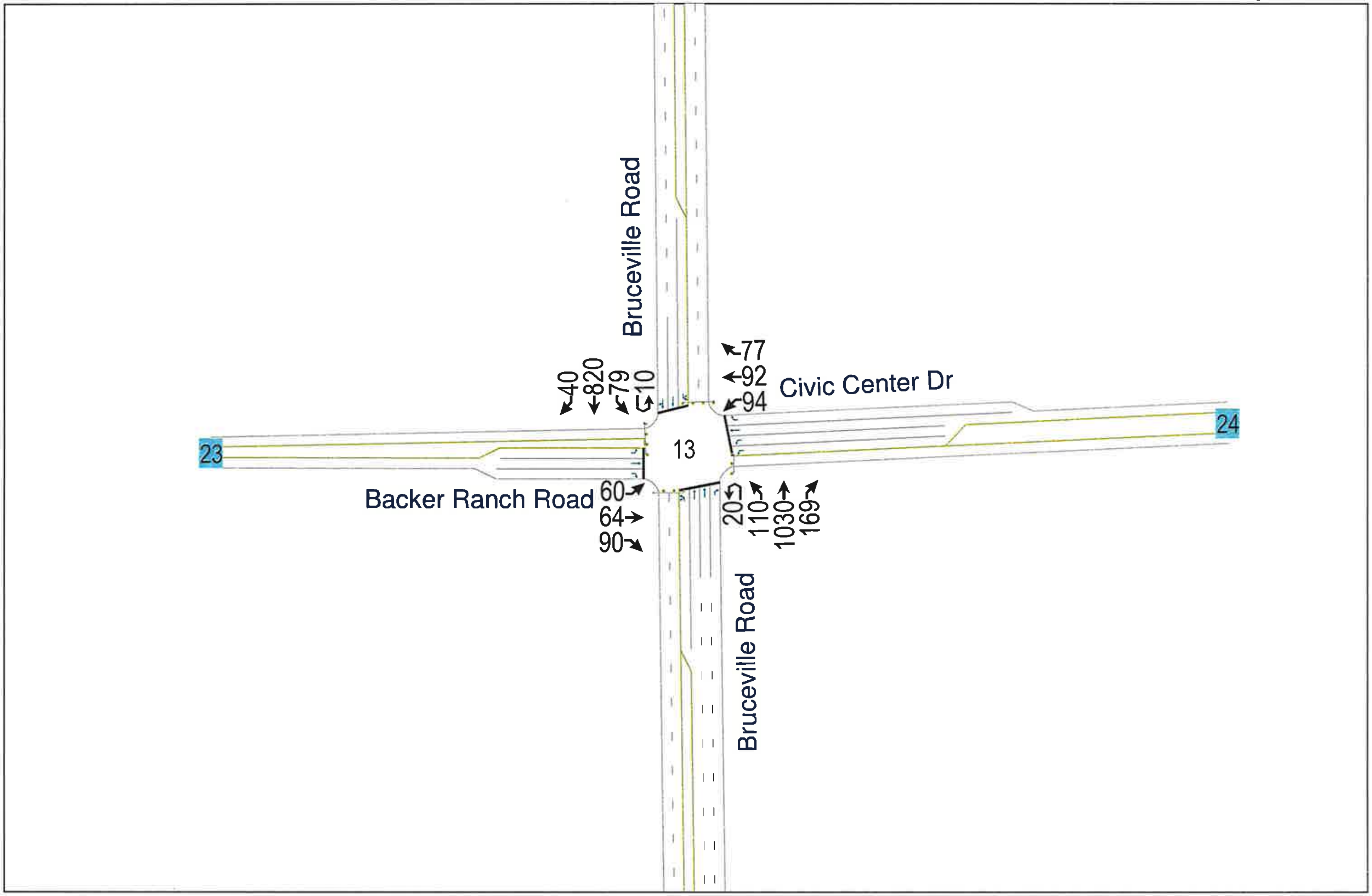
Cumulative Saturday Plus Project Conditions
Saturday Peak Hour

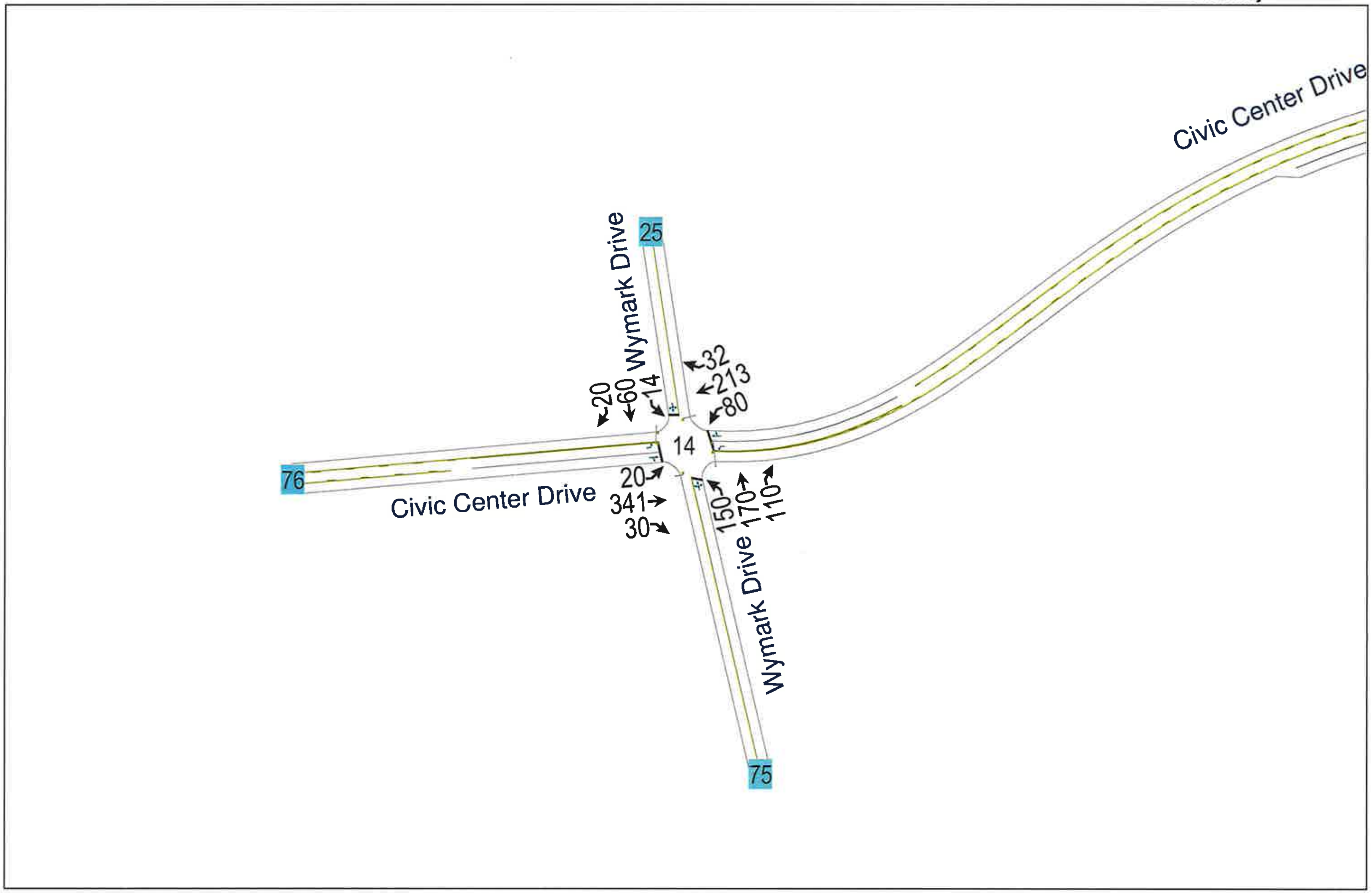


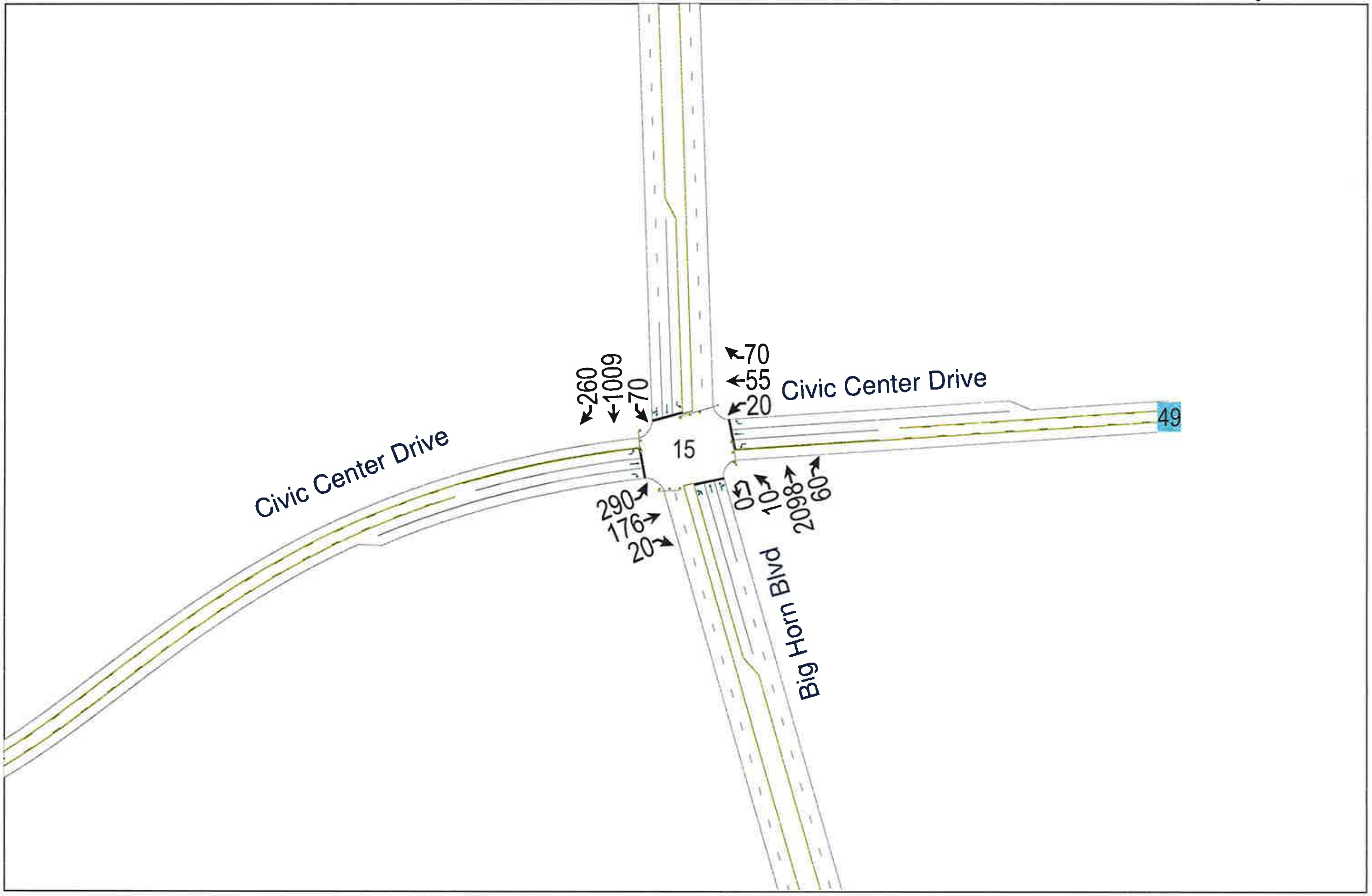

SR
52
SR-99 SB
SR-99 NB On-ramp
1180
0
480
1499
50
9
320
1549
10
2466
279
Elk Grove Blvd
Elk Grove Blvd
2946
SR-99 SB On-ramp
E

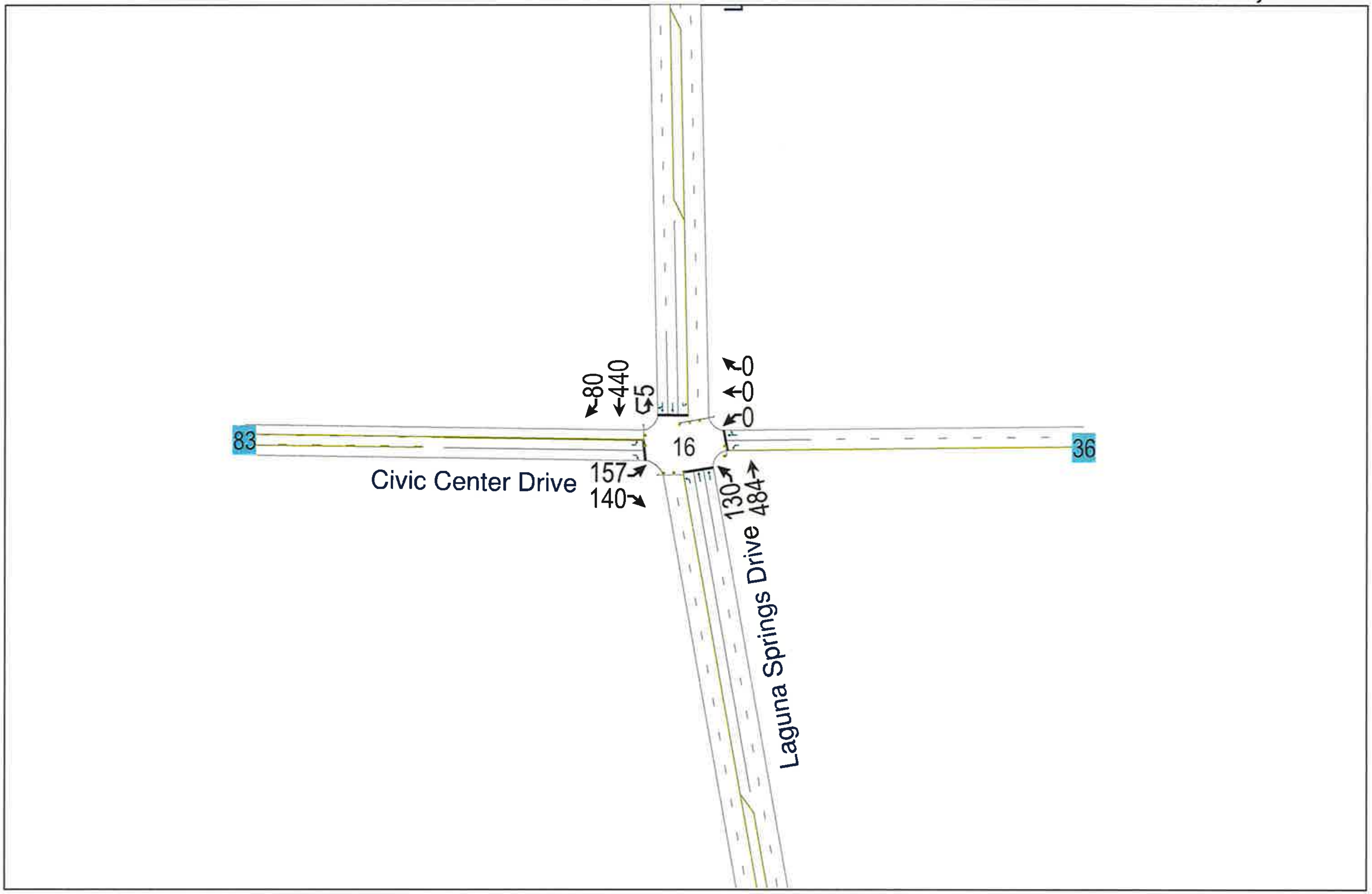

E. Stockton Blvd
130
1276
40
10
110
70
200
10
Elk Grove Blvd
61
11
Elk Grove Blvd
15
70
1672
1204
Elk
0
483
100
180
E. Stockton Blvd

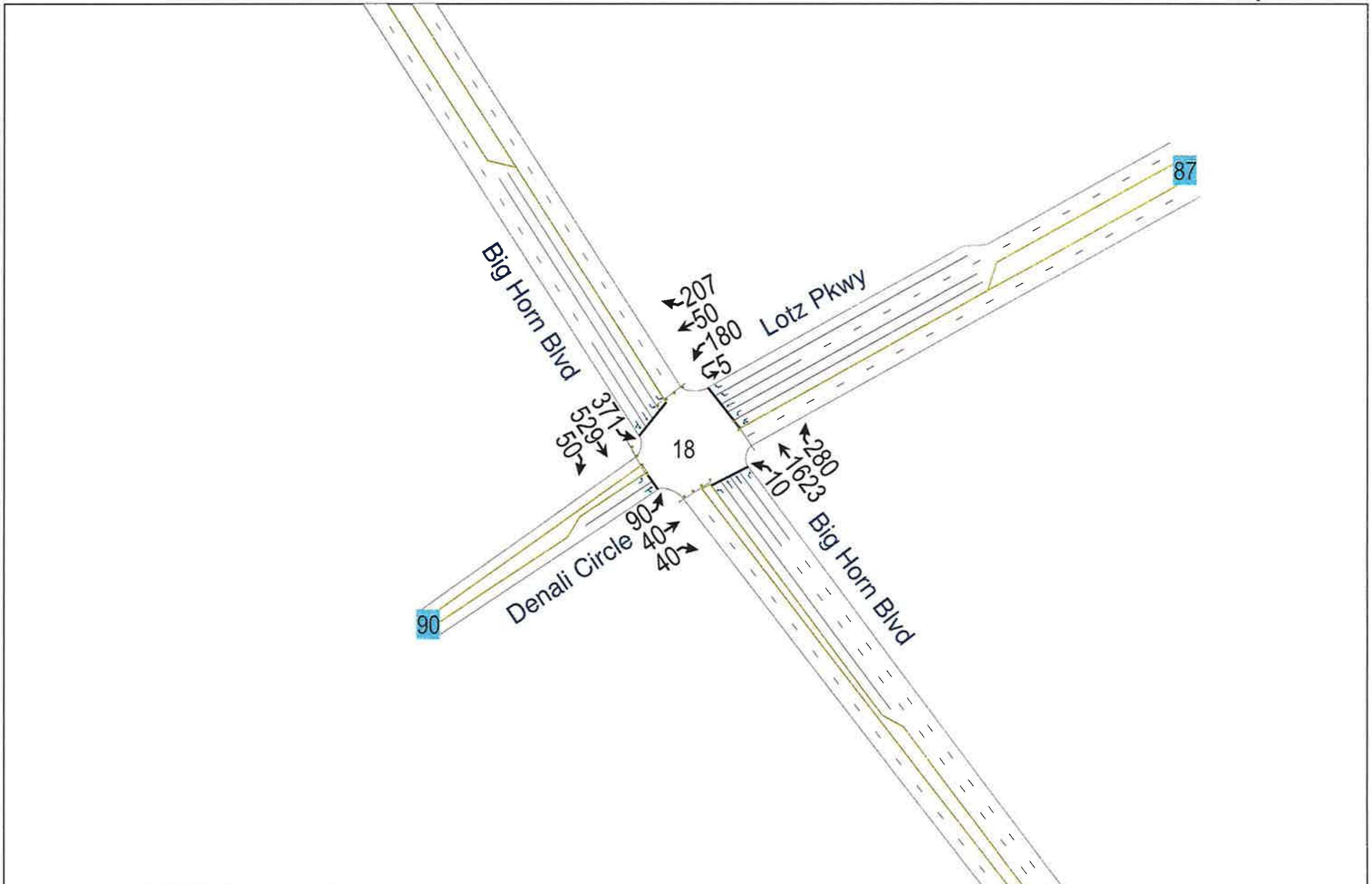

E. Stockton Blvd
854
400
60
30
30
20
60
SR-99 NB Off-ramp
12
273
10
20
250
430
20
32
51
E. Stockton Blvd

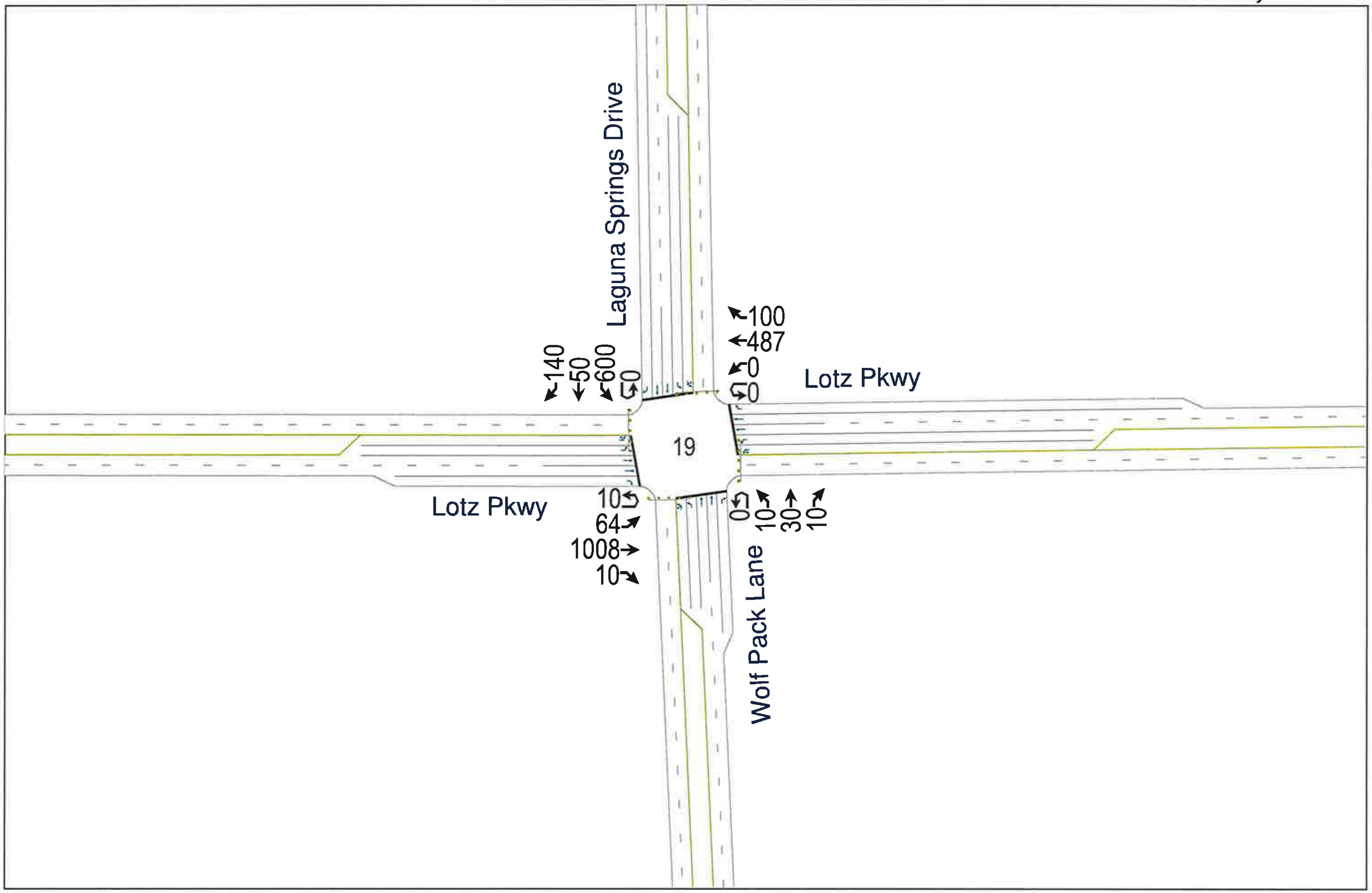

Bruceville Road
Civic Center Dr
Backer Ranch Road
Bruceville Road
13
23
24
40
820
79
10
77
92
94
60
64
90
20
110
1030
169

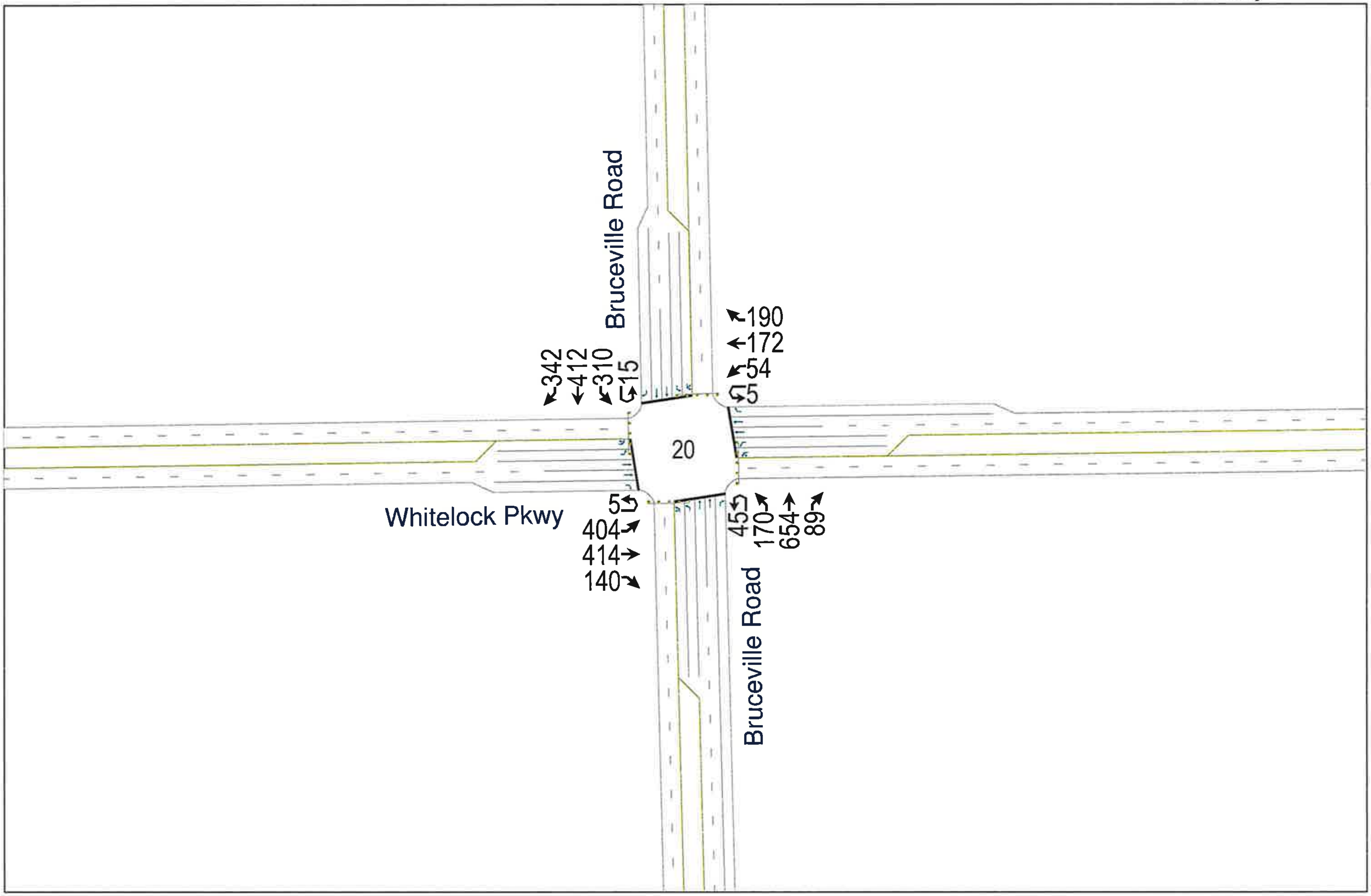

Civic Center Drive
25
Wymark Drive
32
213
80
20
60
14
14
76
20
341
30
150
170
110
Civic Center Drive
Wymark Drive
75

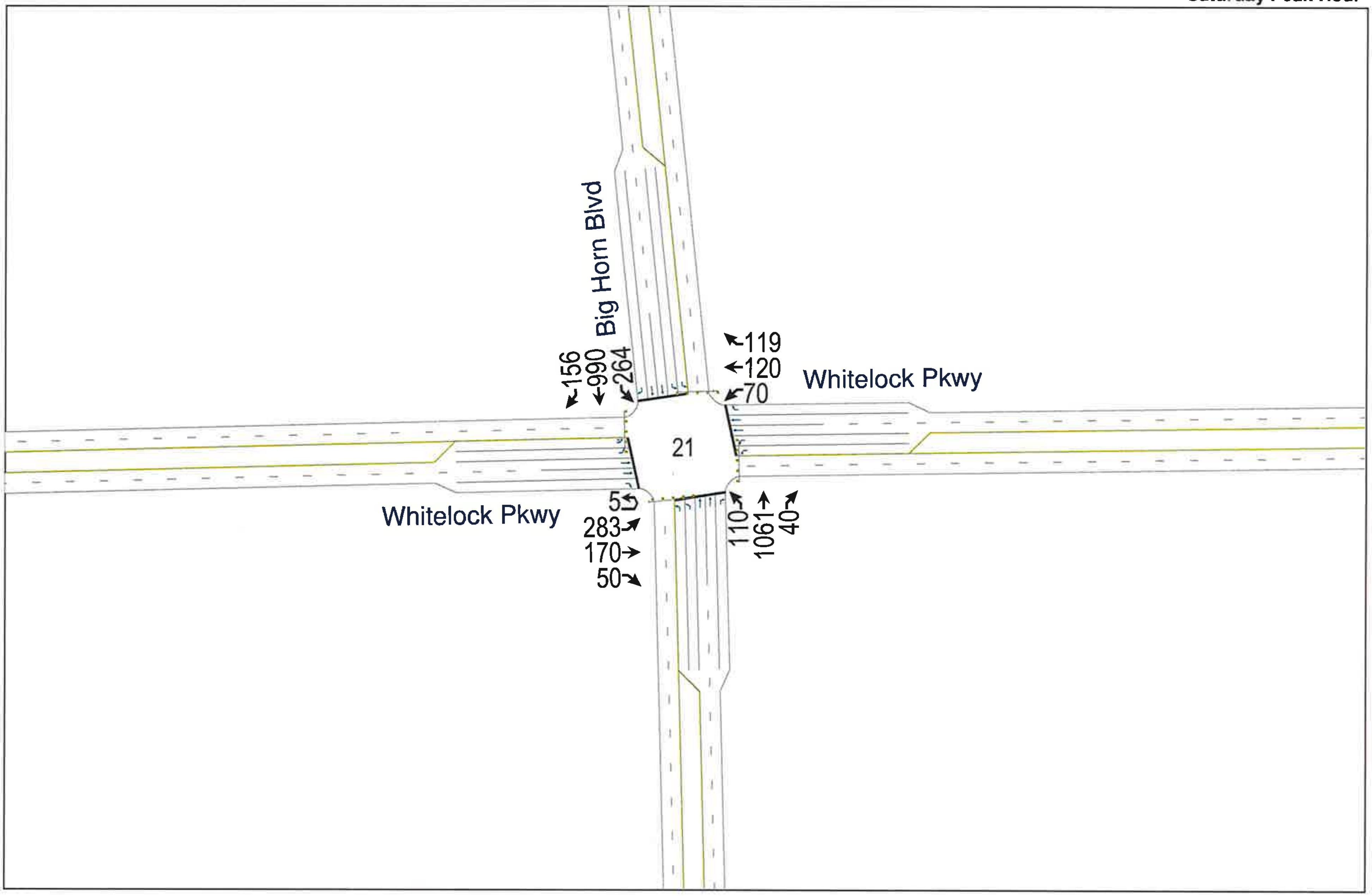

260
1009
70
70
55
20
Civic Center Drive
49
15
Civic Center Drive
290
176
20
0
10
2098
60
Big Horn Blvd


80
440
5
0
0
0
83
16
36
157
140
Civic Center Drive
130
484
Laguna Springs Drive

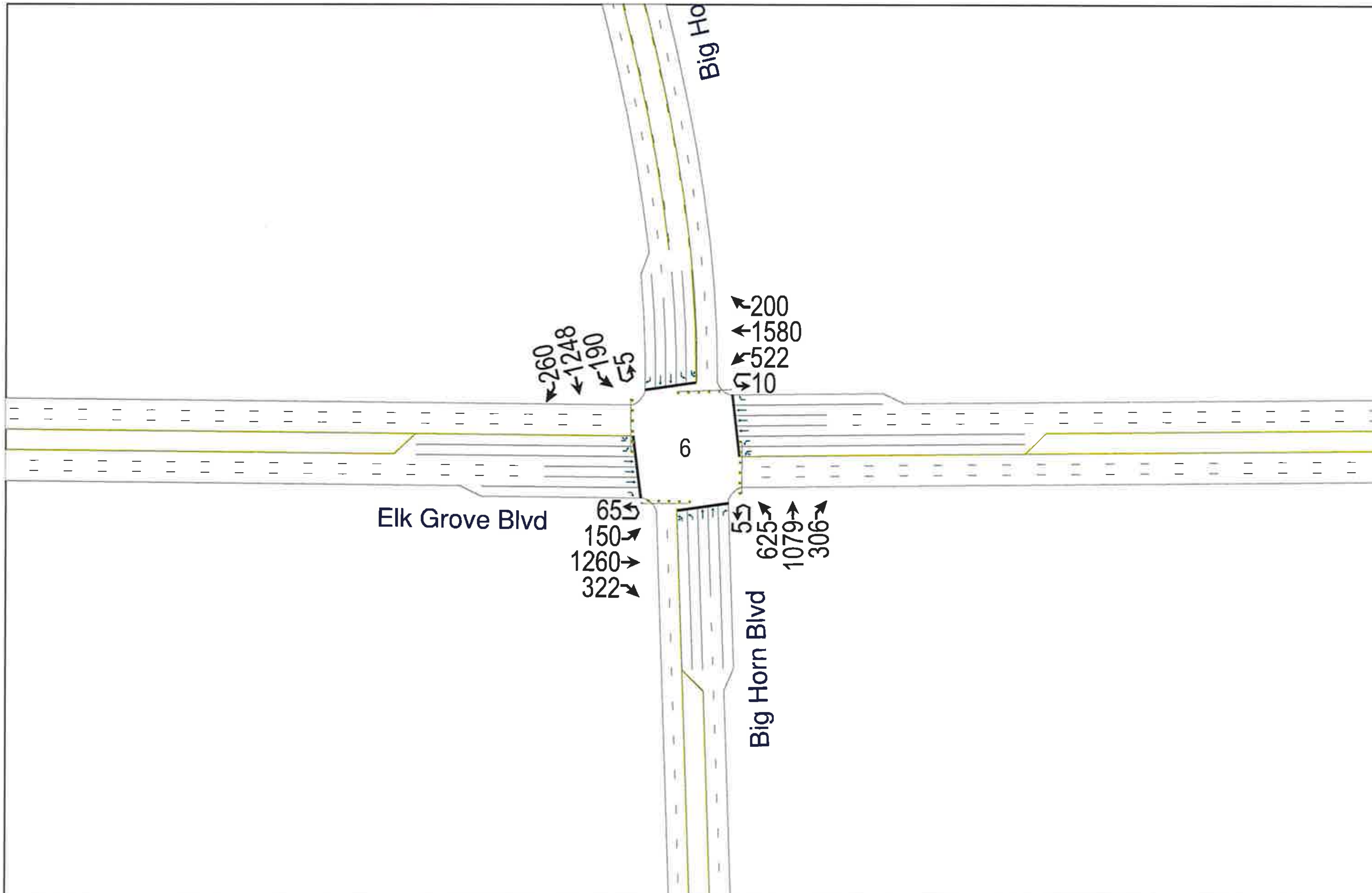

Big Horn Blvd
Lotz Pkwy
87
207
50
180
5
371
529
50
18
280
1623
10
90
40
40
Denali Circle
Big Horn Blvd
90

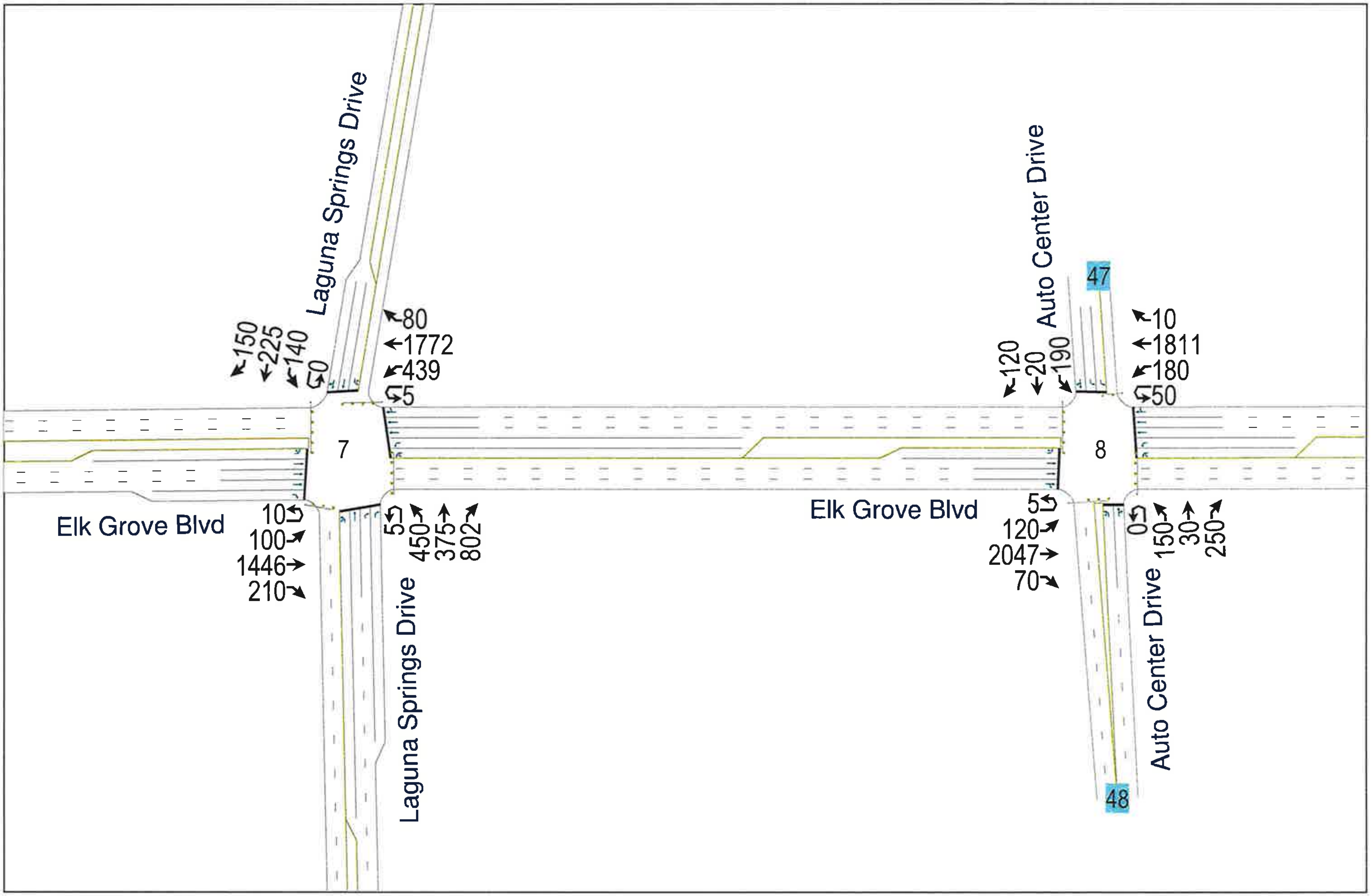

Laguna Springs Drive
140
50
600
0
100
487
0
0
Lotz Pkwy
19
Lotz Pkwy
10
64
1008
10
0
10
30
10
Wolf Pack Lane

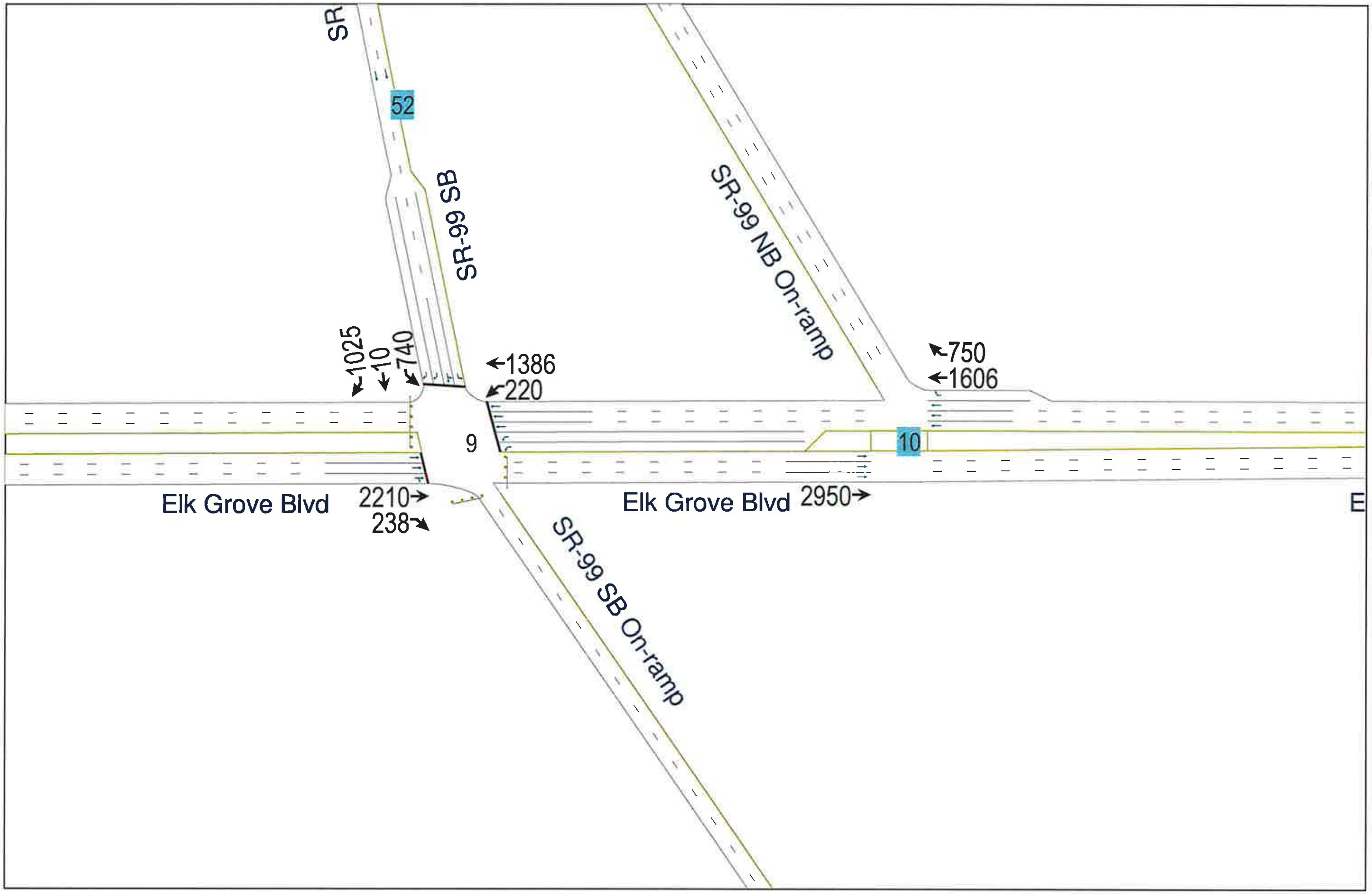

Bruceville Road
Bruceville Road
Whitelock Pkwy
20
190
172
54
5
342
412
310
15
5
404
414
140
45
170
654
89


Big Horn Blvd
156
990
264
119
120
70
Whitelock Pkwy
21
Whitelock Pkwy
5
283
170
50
110
1061
40

With Whitelock Parkway Interchange


Big Ho
200
1580
522
10
260
1248
190
5
6
Elk Grove Blvd
65
150
1260
322
5
625
1079
306
Big Horn Blvd


Laguna Springs Drive
Elk Grove Blvd
7
150
225
140
0
80
1772
439
5
10
100
1446
210
5
450
375
802
Laguna Springs Drive
Auto Center Drive
47
120
20
190
10
1811
180
50
8
Elk Grove Blvd
5
120
2047
70
0
150
30
250
Auto Center Drive
48


SR
52
SR-99 SB
SR-99 NB On-ramp
1025
10
740
1386
220
750
1606
9
10
Elk Grove Blvd
2210
238
Elk Grove Blvd
2950
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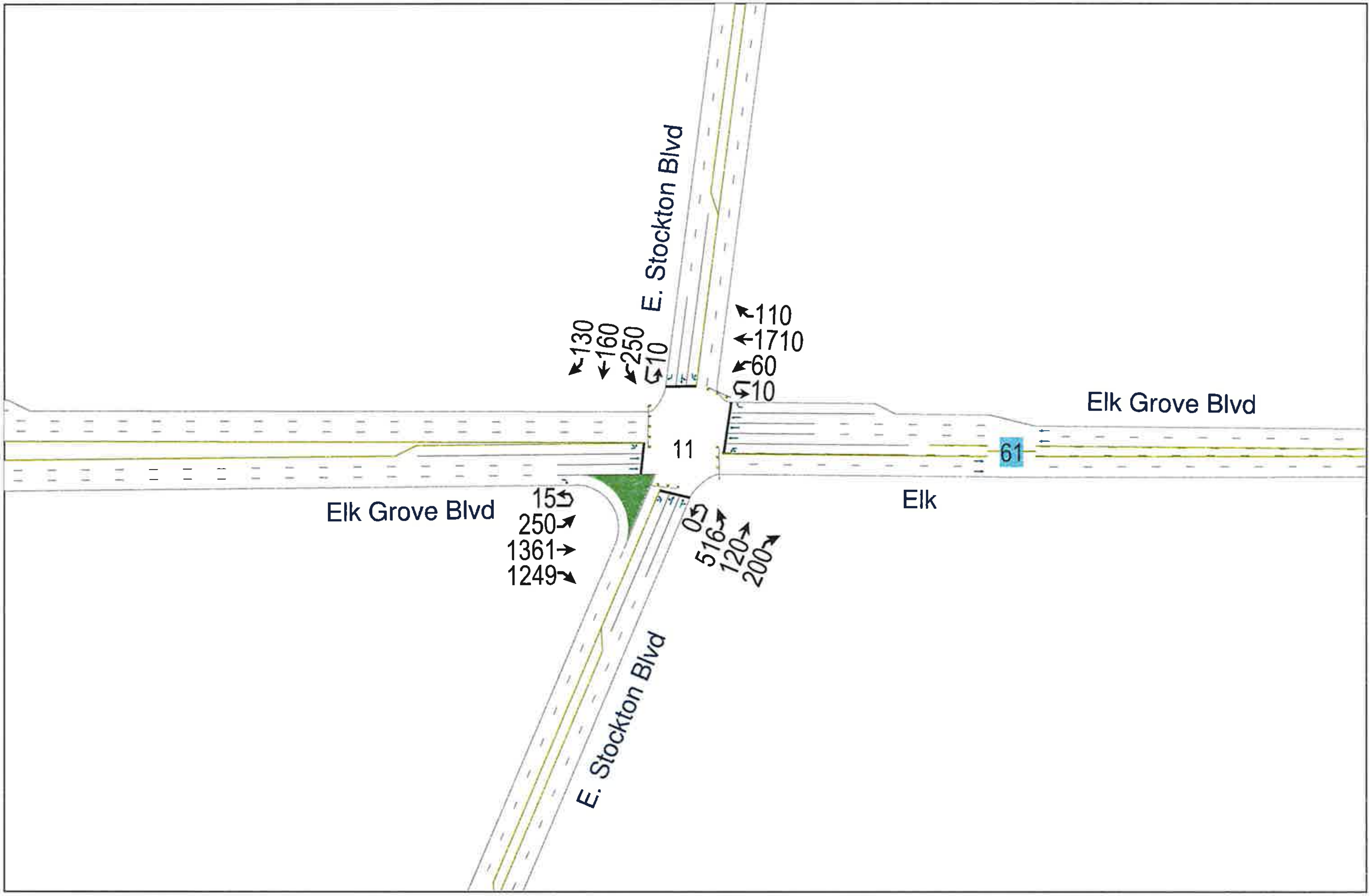
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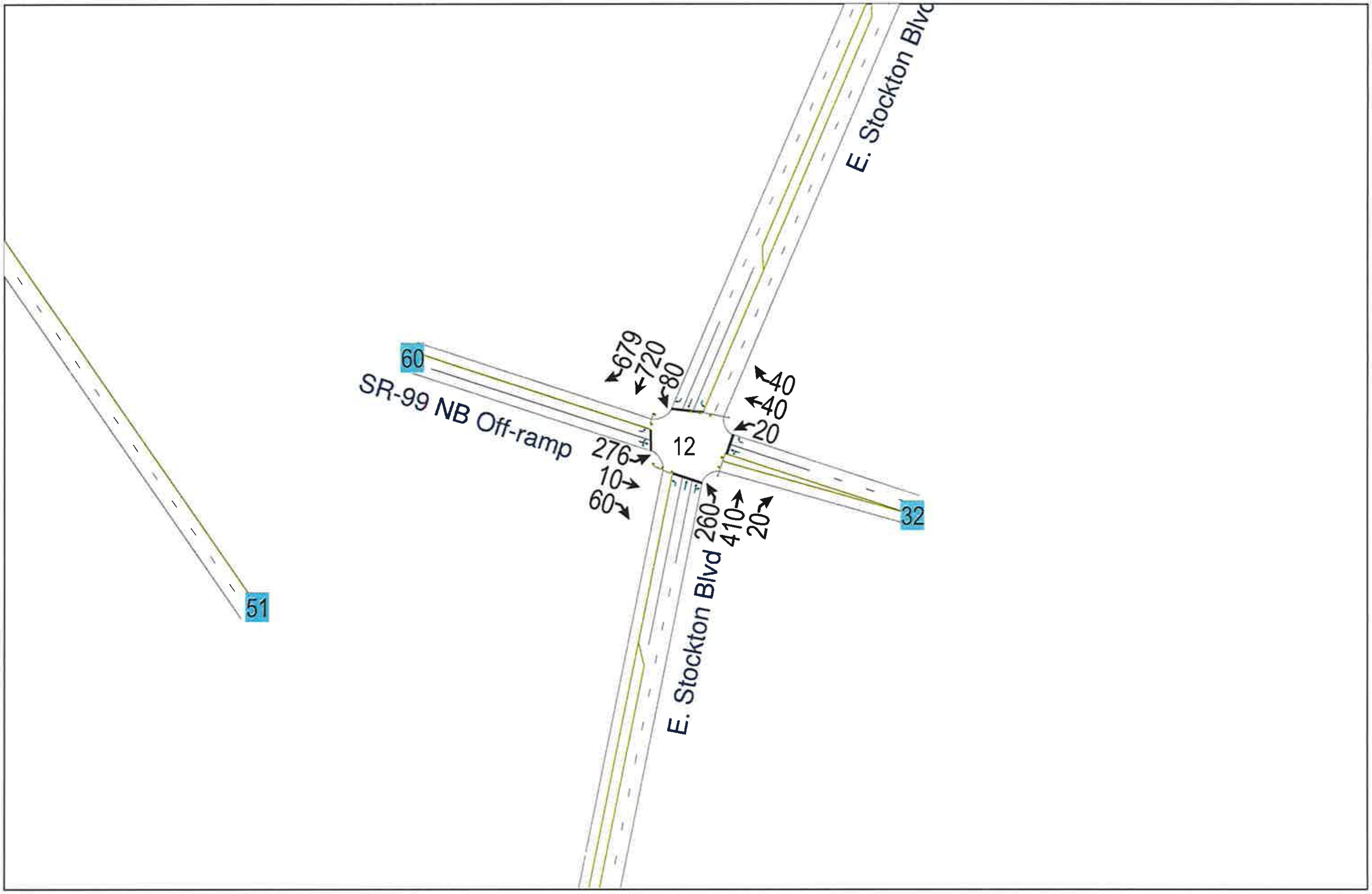
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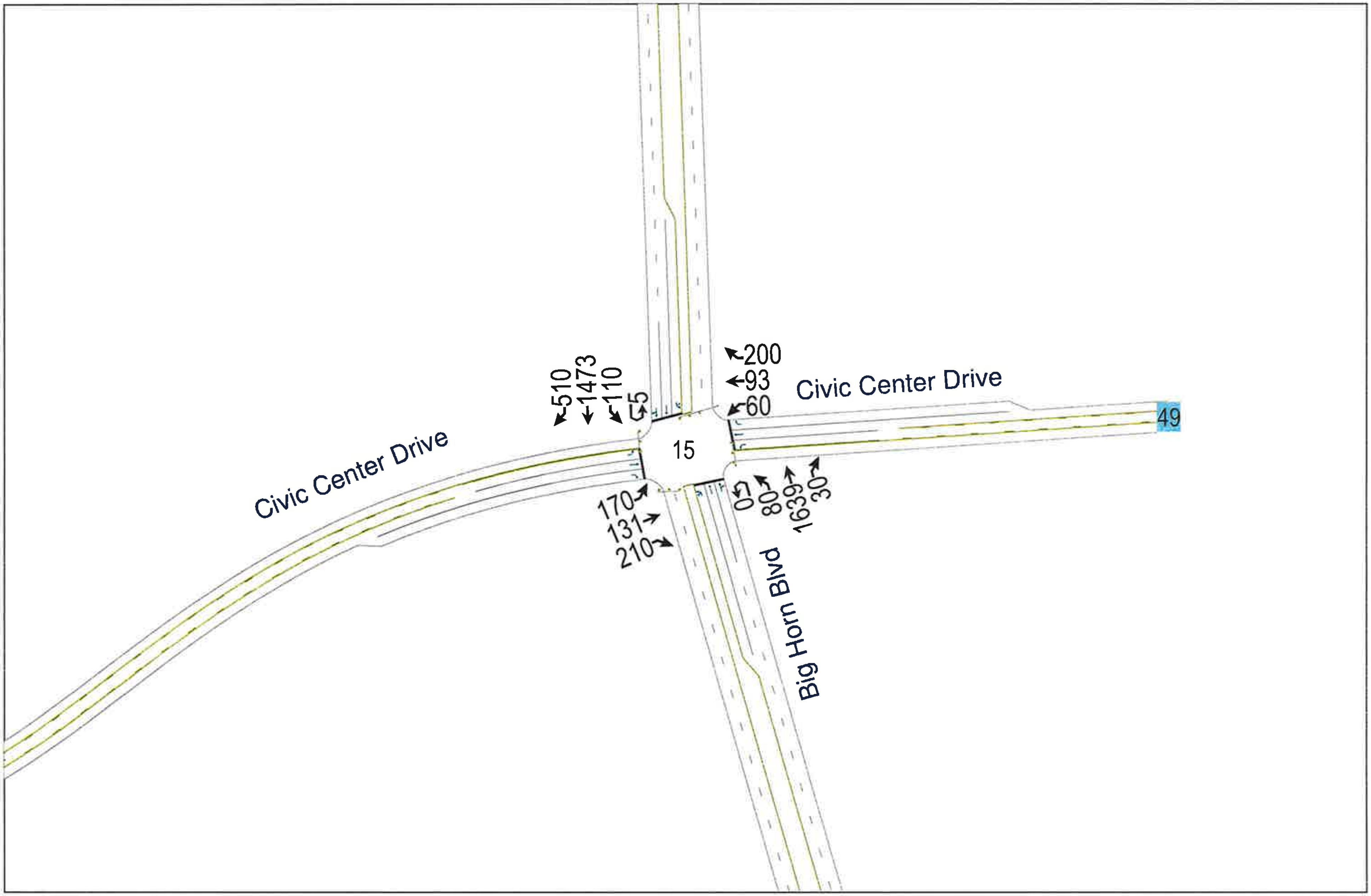
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Civic Center Drive
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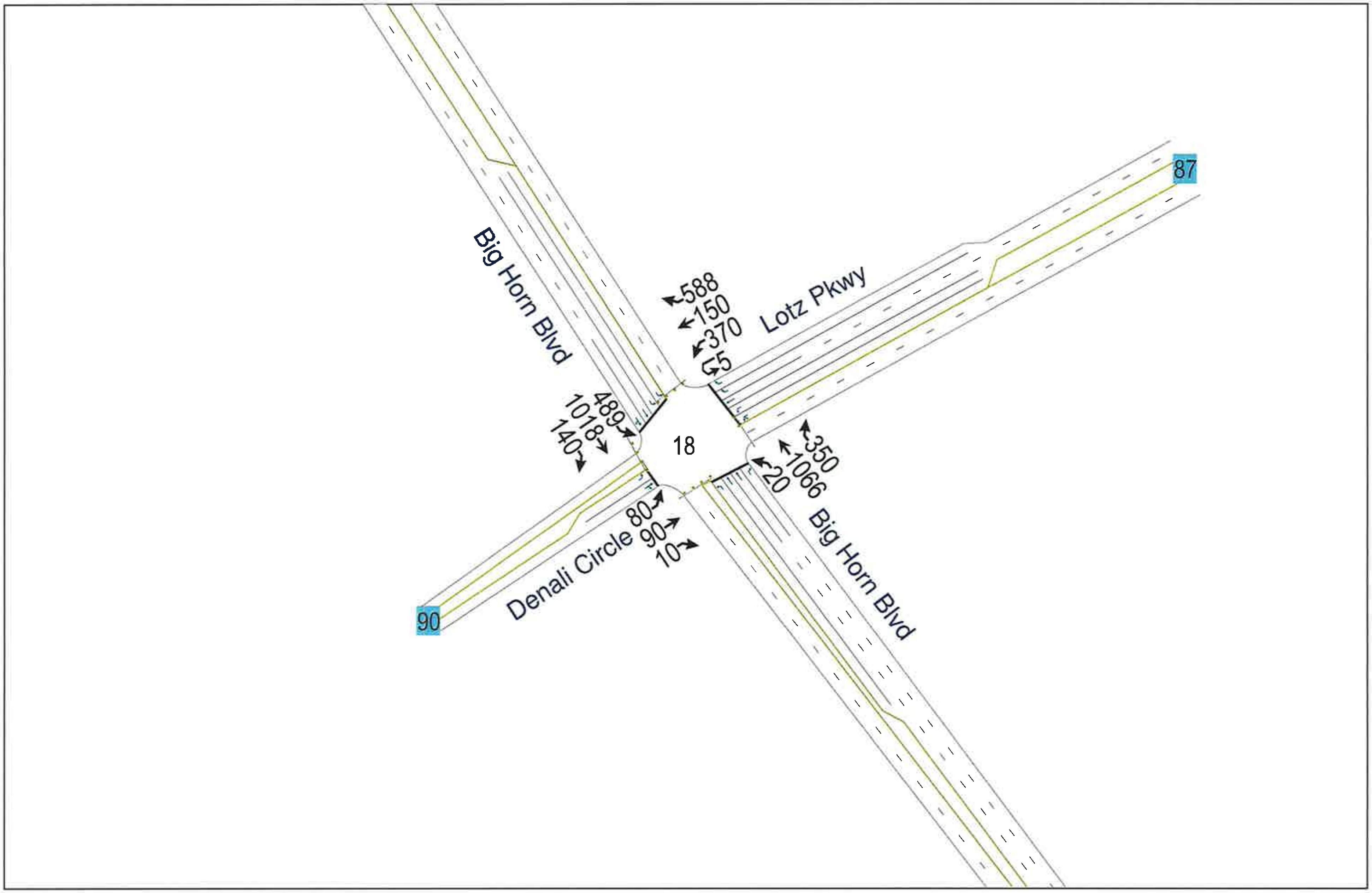
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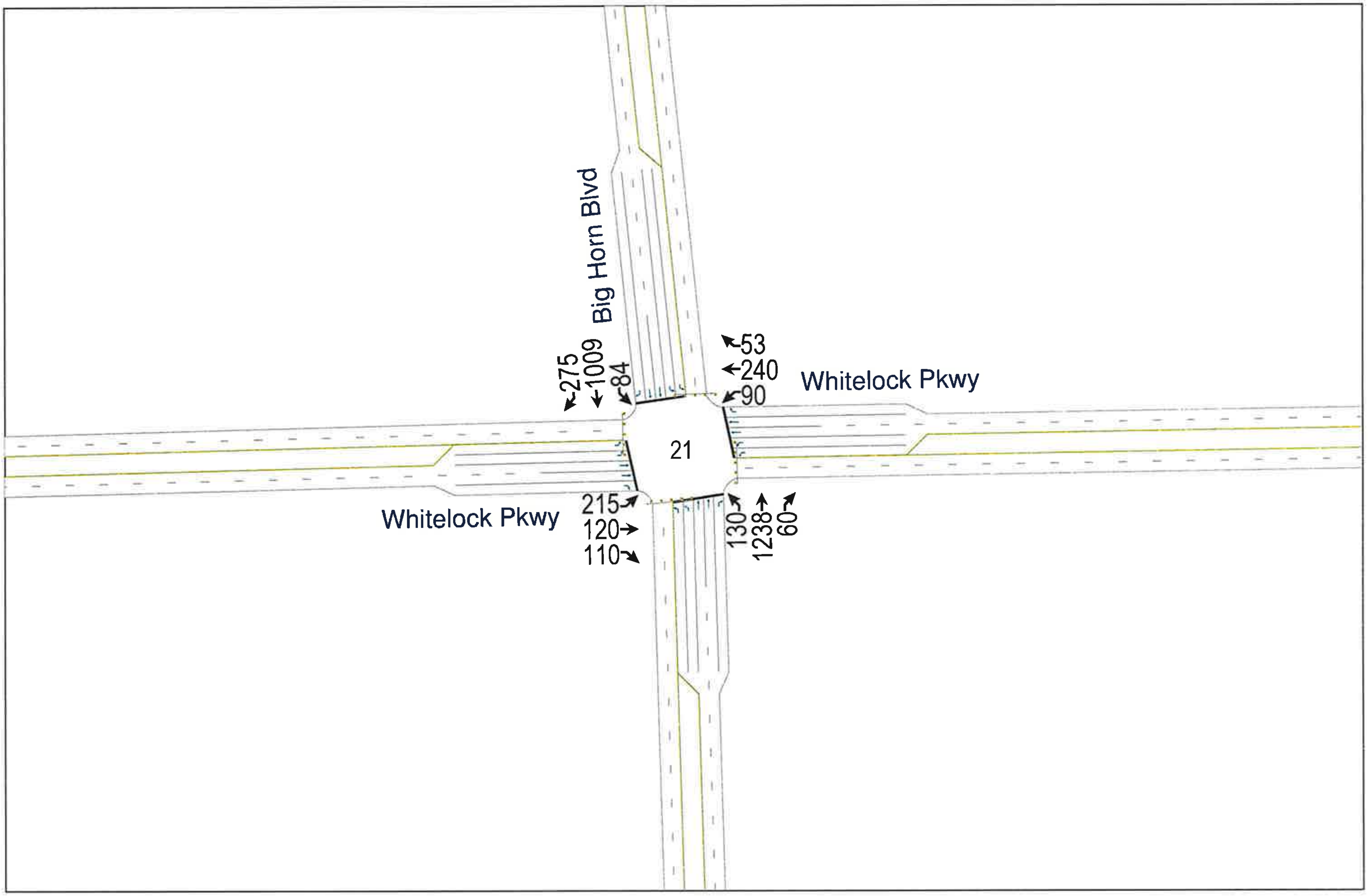
Big Horn Blvd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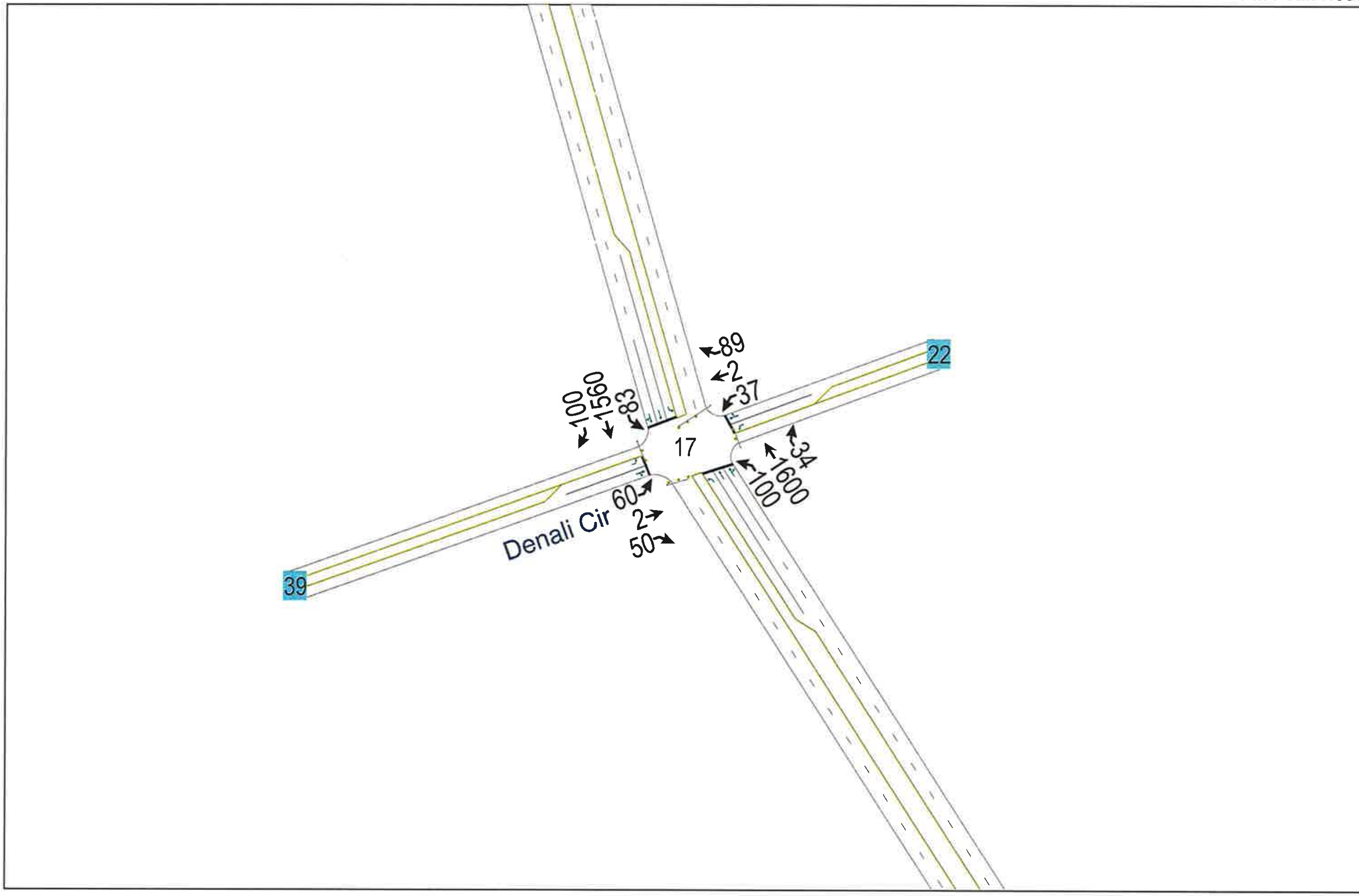
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83
17
34
1600
100
60
2
50
Denali Cir
22
39

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	10	20	10	120	1420	10
Sign Control		Stop	Stop		Free	
Grade		0%	0%		0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	11	21	11	126	1495	11
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	3000	2995	3000	0	0	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	3000	2995	3000	0	0	
tC, single (s)	7.1	6.7	6.5	6.2	4.1	
tC, 2 stage (s)						
tF (s)	3.5	4.2	4.0	3.3	2.2	
p0 queue free %	0	0	0	88	8	
cM capacity (veh/h)	0	1	1	1085	1623	

Direction, Lane #	EB 1	EB 2	WB 1	SB 1	SB 2
Volume Total	18	14	137	996	509
Volume Left	11	0	0	996	498
Volume Right	0	0	126	0	11
cSH	0	1	14	1623	1623
Volume to Capacity	Err	14.87	9.92	0.92	0.92
Queue Length 95th (ft)	Err	Err	Err	424	424
Control Delay (s)	Err	Err	Err	24.6	24.5
Lane LOS	F	F	F	C	C
Approach Delay (s)	Err		Err	24.6	
Approach LOS	F		F		

Intersection Summary			
Average Delay	Err		
Intersection Capacity Utilization	55.9%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	10	1430	0	0	120	740	10	0	220	0	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	10	1474	0	0	124	763	10	0	227	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)									17			
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	124			1474			1619	1619	737	995	1619	124
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	124			1474			1619	1619	737	995	1619	124
tC, single (s)	4.7			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.5			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			100			85	100	37	100	100	100
cM capacity (veh/h)	1284			453			68	102	361	74	102	904

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1
Volume Total	10	737	737	124	381	381	237
Volume Left	10	0	0	0	0	0	10
Volume Right	0	0	0	0	381	381	227
cSH	1284	1700	1700	1700	1700	1700	377
Volume to Capacity	0.01	0.43	0.43	0.07	0.22	0.22	0.63
Queue Length 95th (ft)	1	0	0	0	0	0	103
Control Delay (s)	7.8	0.0	0.0	0.0	0.0	0.0	32.0
Lane LOS	A						D
Approach Delay (s)	0.1			0.0			32.0
Approach LOS							D

Intersection Summary			
Average Delay	2.9		
Intersection Capacity Utilization	55.3%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Lane Configurations												
Volume (vph)	5	190	1330	620	5	80	910	340	125	500	590	160
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.6	6.8	6.8		5.6	7.2	7.2		5.6	7.2	7.2
Lane Util. Factor		0.97	0.91	0.88		0.97	0.91	1.00		0.97	0.91	1.00
Frpb, ped/bikes		1.00	1.00	0.99		1.00	1.00	0.98		1.00	1.00	0.98
Flpb, ped/bikes		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00
Frt		1.00	1.00	0.85		1.00	1.00	0.85		1.00	1.00	0.85
Flt Protected		0.95	1.00	1.00		0.95	1.00	1.00		0.95	1.00	1.00
Satd. Flow (prot)		3433	5085	2750		3433	5085	1558		3433	5085	1557
Flt Permitted		0.95	1.00	1.00		0.95	1.00	1.00		0.95	1.00	1.00
Satd. Flow (perm)		3433	5085	2750		3433	5085	1558		3433	5085	1557
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	5	200	1400	653	5	84	958	358	132	526	621	168
RTOR Reduction (vph)	0	0	0	309	0	0	0	163	0	0	0	68
Lane Group Flow (vph)	0	205	1400	344	0	89	958	195	0	658	621	100
Confl. Peds. (#/hr)								3				4
Confl. Bikes (#/hr)				2								
Turn Type	Prot	Prot		Perm	Prot	Prot		Perm	Prot	Prot		Perm
Protected Phases	1	1	6		5	5	2		3	3	8	
Permitted Phases				6				2				8
Actuated Green, G (s)		12.9	64.6	64.6		7.4	58.7	58.7		32.4	30.2	30.2
Effective Green, g (s)		12.9	64.6	64.6		7.4	58.7	58.7		32.4	30.2	30.2
Actuated g/C Ratio		0.09	0.43	0.43		0.05	0.39	0.39		0.22	0.20	0.20
Clearance Time (s)		5.6	6.8	6.8		5.6	7.2	7.2		5.6	7.2	7.2
Vehicle Extension (s)		2.0	2.0	2.0		2.0	2.0	2.0		2.0	2.0	2.0
Lane Grp Cap (vph)		295	2190	1184		169	1990	610		742	1024	313
v/s Ratio Prot		0.06	c0.28			0.03	c0.19			c0.19	0.12	
v/s Ratio Perm				0.13				0.13				0.06
v/c Ratio		0.69	0.64	0.29		0.53	0.48	0.32		0.89	0.61	0.32
Uniform Delay, d1		66.6	33.5	27.8		69.6	34.2	31.8		57.0	54.5	51.1
Progression Factor		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2		5.6	1.4	0.6		1.4	0.8	1.4		12.0	0.7	0.2
Delay (s)		72.3	35.0	28.4		71.0	35.1	33.2		69.1	55.2	51.3
Level of Service		E	C	C		E	D	C		E	E	D
Approach Delay (s)			36.5				36.9				61.1	
Approach LOS			D				D				E	

Intersection Summary			
HCM Average Control Delay	48.4	HCM Level of Service	D
HCM Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	12.4
Intersection Capacity Utilization	92.3%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBU	SBL	SBT	SBR
Lane Configurations				
Volume (vph)	5	410	480	310
Ideal Flow (vphpl)	1900	1900	1900	1900
Total Lost time (s)		5.6	6.3	6.3
Lane Util. Factor		0.97	0.91	1.00
Frpb, ped/bikes		1.00	1.00	0.98
Flpb, ped/bikes		1.00	1.00	1.00
Frt		1.00	1.00	0.85
Flt Protected		0.95	1.00	1.00
Satd. Flow (prot)		3433	5085	1557
Flt Permitted		0.95	1.00	1.00
Satd. Flow (perm)		3433	5085	1557
Peak-hour factor, PHF	0.95	0.95	0.95	0.95
Adj. Flow (vph)	5	432	505	326
RTOR Reduction (vph)	0	0	0	175
Lane Group Flow (vph)	0	437	505	151
Confl. Peds. (#/hr)				
Confl. Bikes (#/hr)				3
Turn Type	Prot	Prot		Perm
Protected Phases	7	7	4	
Permitted Phases				4
Actuated Green, G (s)		22.6	21.3	21.3
Effective Green, g (s)		22.6	21.3	21.3
Actuated g/C Ratio		0.15	0.14	0.14
Clearance Time (s)		5.6	6.3	6.3
Vehicle Extension (s)		2.0	2.0	2.0
Lane Grp Cap (vph)		517	722	221
v/s Ratio Prot		c0.13	0.10	
v/s Ratio Perm				0.10
v/c Ratio		0.85	0.70	0.68
Uniform Delay, d1		62.0	61.3	61.1
Progression Factor		1.00	1.00	1.00
Incremental Delay, d2		11.6	2.4	6.8
Delay (s)		73.6	63.7	67.9
Level of Service		E	E	E
Approach Delay (s)			68.2	
Approach LOS			E	

Intersection Summary

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Lane Configurations												
Volume (vph)	30	350	1100	140	5	520	1160	690	5	180	790	270
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.6	6.0	6.0		5.6	6.0	6.0		5.6	5.7	5.7
Lane Util. Factor		0.97	0.91	1.00		0.97	0.91	1.00		0.97	0.91	1.00
Frpb, ped/bikes		1.00	1.00	0.99		1.00	1.00	0.99		1.00	1.00	0.98
Flpb, ped/bikes		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00
Frt		1.00	1.00	0.85		1.00	1.00	0.85		1.00	1.00	0.85
Flt Protected		0.95	1.00	1.00		0.95	1.00	1.00		0.95	1.00	1.00
Satd. Flow (prot)		3433	5085	1562		3433	5085	1562		3433	5085	1544
Flt Permitted		0.95	1.00	1.00		0.95	1.00	1.00		0.95	1.00	1.00
Satd. Flow (perm)		3433	5085	1562		3433	5085	1562		3433	5085	1544
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	32	368	1158	147	5	547	1221	726	5	189	832	284
RTOR Reduction (vph)	0	0	0	65	0	0	0	114	0	0	0	176
Lane Group Flow (vph)	0	400	1158	82	0	552	1221	612	0	194	832	108
Confl. Peds. (#/hr)				1				1				6
Confl. Bikes (#/hr)								1				5
Turn Type	Prot	Prot		Perm	Prot	Prot		Perm	Prot	Prot		Perm
Protected Phases	1	1	6		5	5	2		3	3	8	
Permitted Phases				6				2				8
Actuated Green, G (s)		17.4	46.6	46.6		26.5	55.7	55.7		11.0	31.2	31.2
Effective Green, g (s)		17.4	46.6	46.6		26.5	55.7	55.7		11.0	31.2	31.2
Actuated g/C Ratio		0.12	0.31	0.31		0.18	0.37	0.37		0.07	0.21	0.21
Clearance Time (s)		5.6	6.0	6.0		5.6	6.0	6.0		5.6	5.7	5.7
Vehicle Extension (s)		2.0	2.0	2.0		2.0	2.0	2.0		2.0	2.0	2.0
Lane Grp Cap (vph)		398	1580	485		606	1888	580		252	1058	321
v/s Ratio Prot		c0.12	0.23			0.16	0.24			0.06	0.16	
v/s Ratio Perm				0.05				c0.39				0.07
v/c Ratio		1.01	0.73	0.17		0.91	0.65	1.06		0.77	0.79	0.34
Uniform Delay, d1		66.3	46.1	37.6		60.6	39.0	47.1		68.3	56.2	50.6
Progression Factor		1.00	1.00	1.00		0.89	0.38	0.44		1.00	1.00	1.00
Incremental Delay, d2		46.4	3.0	0.7		11.9	1.1	45.0		12.0	3.6	0.2
Delay (s)		112.7	49.2	38.4		66.0	15.8	65.5		80.2	59.9	50.8
Level of Service		F	D	D		E	B	E		F	E	D
Approach Delay (s)			63.2				41.4				60.9	
Approach LOS			E				D				E	

Intersection Summary			
HCM Average Control Delay	56.9	HCM Level of Service	E
HCM Volume to Capacity ratio	0.97		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	17.2
Intersection Capacity Utilization	105.1%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBU	SBL	SBT	SBR
Lane Configurations				
Volume (vph)	50	460	1060	360
Ideal Flow (vphpl)	1900	1900	1900	1900
Total Lost time (s)		5.6	5.7	5.7
Lane Util. Factor		0.97	0.86	0.86
Frpb, ped/bikes		1.00	1.00	0.98
Flpb, ped/bikes		1.00	1.00	1.00
Frt		1.00	0.99	0.85
Flt Protected		0.95	1.00	1.00
Satd. Flow (prot)		3433	4772	1339
Flt Permitted		0.95	1.00	1.00
Satd. Flow (perm)		3433	4772	1339
Peak-hour factor, PHF	0.95	0.95	0.95	0.95
Adj. Flow (vph)	53	484	1116	379
RTOR Reduction (vph)	0	0	3	133
Lane Group Flow (vph)	0	537	1162	197
Confl. Peds. (#/hr)				3
Confl. Bikes (#/hr)				1
Turn Type	Prot	Prot		Perm
Protected Phases	7	7	4	
Permitted Phases				4
Actuated Green, G (s)		22.8	43.0	43.0
Effective Green, g (s)		22.8	43.0	43.0
Actuated g/C Ratio		0.15	0.29	0.29
Clearance Time (s)		5.6	5.7	5.7
Vehicle Extension (s)		2.0	2.0	2.0
Lane Grp Cap (vph)		522	1368	384
v/s Ratio Prot		c0.16	c0.24	
v/s Ratio Perm				0.15
v/c Ratio		1.03	0.85	0.51
Uniform Delay, d1		63.6	50.4	44.8
Progression Factor		1.00	1.00	1.00
Incremental Delay, d2		46.9	4.9	0.5
Delay (s)		110.5	55.4	45.2
Level of Service		F	E	D
Approach Delay (s)			68.3	
Approach LOS			E	

Intersection Summary

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL
Lane Configurations												
Volume (vph)	5	20	1750	160	5	160	2340	120	130	10	230	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.7	6.7	6.7		5.6	6.7			5.6	5.6	5.6
Lane Util. Factor		1.00	0.91	1.00		1.00	0.91			1.00	1.00	0.95
Frpb, ped/bikes		1.00	1.00	0.97		1.00	1.00			1.00	0.99	1.00
Flpb, ped/bikes		1.00	1.00	1.00		1.00	1.00			1.00	1.00	1.00
Frt		1.00	1.00	0.85		1.00	0.99			1.00	0.85	1.00
Flt Protected		0.95	1.00	1.00		0.95	1.00			0.96	1.00	0.95
Satd. Flow (prot)		1770	5085	1541		1770	5040			1780	1560	1681
Flt Permitted		0.95	1.00	1.00		0.95	1.00			0.96	1.00	0.95
Satd. Flow (perm)		1770	5085	1541		1770	5040			1780	1560	1681
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	5	21	1842	168	5	168	2463	126	137	11	242	63
RTOR Reduction (vph)	0	0	0	38	0	0	2	0	0	0	212	0
Lane Group Flow (vph)	0	26	1842	130	0	173	2587	0	0	148	30	37
Confl. Peds. (#/hr)				1				3			2	
Confl. Bikes (#/hr)				5				5				
Turn Type	Prot	Prot		Perm	Prot	Prot			Split		Perm	Split
Protected Phases	1	1	6		5	5	2		3	3		4
Permitted Phases				6							3	
Actuated Green, G (s)		3.0	83.5	83.5		13.0	92.4			18.6	18.6	11.4
Effective Green, g (s)		3.0	83.5	83.5		13.0	92.4			18.6	18.6	11.4
Actuated g/C Ratio		0.02	0.56	0.56		0.09	0.62			0.12	0.12	0.08
Clearance Time (s)		6.7	6.7	6.7		5.6	6.7			5.6	5.6	5.6
Vehicle Extension (s)		2.0	3.0	3.0		2.0	3.0			2.0	2.0	2.0
Lane Grp Cap (vph)		35	2831	858		153	3105			221	193	128
v/s Ratio Prot		0.01	c0.36			c0.10	c0.51			c0.08		c0.02
v/s Ratio Perm				0.08							0.02	
v/c Ratio		0.74	0.65	0.15		1.13	0.83			0.67	0.16	0.29
Uniform Delay, d1		73.1	23.1	16.1		68.5	22.7			62.8	58.7	65.5
Progression Factor		1.13	0.45	0.37		0.63	0.34			1.00	1.00	1.00
Incremental Delay, d2		38.2	0.8	0.2		79.1	0.8			5.8	0.1	0.5
Delay (s)		120.6	11.2	6.3		122.0	8.5			68.6	58.8	65.9
Level of Service		F	B	A		F	A			E	E	E
Approach Delay (s)			12.2				15.6			62.5		
Approach LOS			B				B			E		

Intersection Summary			
HCM Average Control Delay	18.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	30.2
Intersection Capacity Utilization	86.5%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBT	SBR
Lane Configurations		
Volume (vph)	10	10
Ideal Flow (vphpl)	1900	1900
Total Lost time (s)	5.6	5.6
Lane Util. Factor	0.95	1.00
Frpb, ped/bikes	1.00	0.98
Flpb, ped/bikes	1.00	1.00
Frt	1.00	0.85
Flt Protected	0.97	1.00
Satd. Flow (prot)	1710	1558
Flt Permitted	0.97	1.00
Satd. Flow (perm)	1710	1558
Peak-hour factor, PHF	0.95	0.95
Adj. Flow (vph)	11	11
RTOR Reduction (vph)	0	10
Lane Group Flow (vph)	37	1
Confl. Peds. (#/hr)		1
Confl. Bikes (#/hr)		1
Turn Type		Perm
Protected Phases	4	
Permitted Phases		4
Actuated Green, G (s)	11.4	11.4
Effective Green, g (s)	11.4	11.4
Actuated g/C Ratio	0.08	0.08
Clearance Time (s)	5.6	5.6
Vehicle Extension (s)	2.0	2.0
Lane Grp Cap (vph)	130	118
v/s Ratio Prot	0.02	
v/s Ratio Perm		0.00
v/c Ratio	0.28	0.01
Uniform Delay, d1	65.4	64.1
Progression Factor	1.00	1.00
Incremental Delay, d2	0.4	0.0
Delay (s)	65.9	64.1
Level of Service	E	E
Approach Delay (s)	65.7	
Approach LOS	E	

Intersection Summary

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Lane Configurations												
Volume (vph)	65	160	1290	360	10	380	1580	200	5	570	1120	280
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.7	5.7	5.7		6.7	5.7	5.7		6.3	5.3	5.3
Lane Util. Factor		0.97	0.91	1.00		0.97	0.91	1.00		0.97	0.95	1.00
Frpb, ped/bikes		1.00	1.00	0.98		1.00	1.00	0.99		1.00	1.00	0.98
Flpb, ped/bikes		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00
Frt		1.00	1.00	0.85		1.00	1.00	0.85		1.00	1.00	0.85
Flt Protected		0.95	1.00	1.00		0.95	1.00	1.00		0.95	1.00	1.00
Satd. Flow (prot)		3433	5085	1557		3433	5085	1560		3433	3539	1549
Flt Permitted		0.95	1.00	1.00		0.95	1.00	1.00		0.95	1.00	1.00
Satd. Flow (perm)		3433	5085	1557		3433	5085	1560		3433	3539	1549
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	68	168	1358	379	11	400	1663	211	5	600	1179	295
RTOR Reduction (vph)	0	0	0	145	0	0	0	63	0	0	0	95
Lane Group Flow (vph)	0	236	1358	234	0	411	1663	148	0	605	1179	200
Confl. Peds. (#/hr)				2								6
Confl. Bikes (#/hr)				2				4				2
Turn Type	Prot	Prot		Perm	Prot	Prot		Perm	Prot	Prot		Perm
Protected Phases	1	1	6		5	5	2		3	3	8	
Permitted Phases				6				2				8
Actuated Green, G (s)		9.3	39.3	39.3		16.3	46.3	46.3		22.7	59.0	59.0
Effective Green, g (s)		9.3	39.3	39.3		16.3	46.3	46.3		22.7	59.0	59.0
Actuated g/C Ratio		0.06	0.26	0.26		0.11	0.31	0.31		0.15	0.39	0.39
Clearance Time (s)		6.7	5.7	5.7		6.7	5.7	5.7		6.3	5.3	5.3
Vehicle Extension (s)		2.0	2.0	2.0		2.0	2.0	2.0		2.0	2.0	2.0
Lane Grp Cap (vph)		213	1332	408		373	1570	482		520	1392	609
v/s Ratio Prot		0.07	c0.27			0.12	c0.33			c0.18	0.33	
v/s Ratio Perm				0.15				0.09				0.13
v/c Ratio		1.11	1.02	0.57		1.10	1.06	0.31		1.16	0.85	0.33
Uniform Delay, d1		70.3	55.4	48.1		66.8	51.9	39.6		63.6	41.4	31.7
Progression Factor		0.74	0.67	0.62		0.75	0.58	0.29		1.00	1.00	1.00
Incremental Delay, d2		87.7	27.3	4.7		65.8	35.2	0.9		93.0	4.8	0.1
Delay (s)		139.4	64.2	34.5		115.9	65.1	12.5		156.7	46.2	31.8
Level of Service		F	E	C		F	E	B		F	D	C
Approach Delay (s)			67.5				69.4				76.3	
Approach LOS			E				E				E	

Intersection Summary			
HCM Average Control Delay	77.7	HCM Level of Service	E
HCM Volume to Capacity ratio	1.07		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	17.3
Intersection Capacity Utilization	106.5%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBU	SBL	SBT	SBR
Lane Configurations				
Volume (vph)	5	190	1200	280
Ideal Flow (vphpl)	1900	1900	1900	1900
Total Lost time (s)		6.3	5.3	5.3
Lane Util. Factor		0.97	0.95	1.00
Frpb, ped/bikes		1.00	1.00	0.98
Flpb, ped/bikes		1.00	1.00	1.00
Frt		1.00	1.00	0.85
Flt Protected		0.95	1.00	1.00
Satd. Flow (prot)		3433	3539	1551
Flt Permitted		0.95	1.00	1.00
Satd. Flow (perm)		3433	3539	1551
Peak-hour factor, PHF	0.95	0.95	0.95	0.95
Adj. Flow (vph)	5	200	1263	295
RTOR Reduction (vph)	0	0	0	25
Lane Group Flow (vph)	0	205	1263	270
Confl. Peds. (#/hr)				6
Confl. Bikes (#/hr)				
Turn Type	Prot	Prot		Perm
Protected Phases	7	7	4	
Permitted Phases				4
Actuated Green, G (s)		11.4	47.7	47.7
Effective Green, g (s)		11.4	47.7	47.7
Actuated g/C Ratio		0.08	0.32	0.32
Clearance Time (s)		6.3	5.3	5.3
Vehicle Extension (s)		2.0	2.0	2.0
Lane Grp Cap (vph)		261	1125	493
v/s Ratio Prot		0.06	c0.36	
v/s Ratio Perm				0.17
v/c Ratio		0.79	1.12	0.55
Uniform Delay, d1		68.1	51.1	42.3
Progression Factor		1.00	1.00	1.00
Incremental Delay, d2		13.3	67.2	0.7
Delay (s)		81.4	118.4	42.9
Level of Service		F	F	D
Approach Delay (s)			101.5	
Approach LOS			F	

Intersection Summary

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Lane Configurations		↰	↑↑↑	↱		↰↰	↑↑↱			↰	↑	↱↱
Volume (vph)	10	100	1400	190	5	820	1730	80	5	230	350	1160
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.6	5.7	5.7		5.6	5.7			5.6	5.3	5.3
Lane Util. Factor		1.00	0.91	1.00		0.97	0.91			1.00	1.00	0.88
Frpb, ped/bikes		1.00	1.00	0.98		1.00	1.00			1.00	1.00	0.99
Flpb, ped/bikes		1.00	1.00	1.00		1.00	1.00			1.00	1.00	1.00
Frt		1.00	1.00	0.85		1.00	0.99			1.00	1.00	0.85
Flt Protected		0.95	1.00	1.00		0.95	1.00			0.95	1.00	1.00
Satd. Flow (prot)		1770	5085	1559		3433	5045			1770	1863	2749
Flt Permitted		0.95	1.00	1.00		0.95	1.00			0.95	1.00	1.00
Satd. Flow (perm)		1770	5085	1559		3433	5045			1770	1863	2749
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	11	105	1474	200	5	863	1821	84	5	242	368	1221
RTOR Reduction (vph)	0	0	0	73	0	0	3	0	0	0	0	515
Lane Group Flow (vph)	0	116	1474	127	0	868	1902	0	0	247	368	706
Confl. Peds. (#/hr)								3				1
Confl. Bikes (#/hr)				4				2				
Turn Type	Prot	Prot		Perm	Prot	Prot			Prot	Prot		Perm
Protected Phases	1	1	6		5	5	2		3	3	8	
Permitted Phases				6								8
Actuated Green, G (s)		13.8	42.6	42.6		35.4	64.2			30.0	37.0	37.0
Effective Green, g (s)		13.8	42.6	42.6		35.4	64.2			30.0	37.0	37.0
Actuated g/C Ratio		0.09	0.28	0.28		0.24	0.43			0.20	0.25	0.25
Clearance Time (s)		5.6	5.7	5.7		5.6	5.7			5.6	5.3	5.3
Vehicle Extension (s)		2.0	2.0	2.0		2.0	2.0			2.0	2.0	2.0
Lane Grp Cap (vph)		163	1444	443		810	2159			354	460	678
v/s Ratio Prot		0.07	c0.29			c0.25	0.38			0.14	0.20	
v/s Ratio Perm				0.08								c0.26
v/c Ratio		0.71	1.02	0.29		1.07	0.88			0.70	0.80	1.04
Uniform Delay, d1		66.2	53.7	41.9		57.3	39.4			55.8	53.0	56.5
Progression Factor		1.14	0.58	0.50		0.78	0.26			1.00	1.00	1.00
Incremental Delay, d2		5.2	21.1	0.7		41.1	2.0			4.8	9.1	46.0
Delay (s)		80.7	52.1	21.8		86.0	12.4			60.6	62.1	102.5
Level of Service		F	D	C		F	B			E	E	F
Approach Delay (s)			50.5				35.5				88.7	
Approach LOS			D				D				F	

Intersection Summary			
HCM Average Control Delay	57.4	HCM Level of Service	E
HCM Volume to Capacity ratio	1.04		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	22.2
Intersection Capacity Utilization	117.5%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBL	SBT	SBR
Lane Configurations			
Volume (vph)	140	230	160
Ideal Flow (vphpl)	1900	1900	1900
Total Lost time (s)	5.6	5.3	
Lane Util. Factor	1.00	0.95	
Frpb, ped/bikes	1.00	0.99	
Flpb, ped/bikes	1.00	1.00	
Frt	1.00	0.94	
Flt Protected	0.95	1.00	
Satd. Flow (prot)	1770	3303	
Flt Permitted	0.95	1.00	
Satd. Flow (perm)	1770	3303	
Peak-hour factor, PHF	0.95	0.95	0.95
Adj. Flow (vph)	147	242	168
RTOR Reduction (vph)	0	91	0
Lane Group Flow (vph)	147	319	0
Confl. Peds. (#/hr)			1
Confl. Bikes (#/hr)			
Turn Type	Prot		
Protected Phases	7	4	
Permitted Phases			
Actuated Green, G (s)	12.8	19.8	
Effective Green, g (s)	12.8	19.8	
Actuated g/C Ratio	0.09	0.13	
Clearance Time (s)	5.6	5.3	
Vehicle Extension (s)	2.0	2.0	
Lane Grp Cap (vph)	151	436	
v/s Ratio Prot	c0.08	0.10	
v/s Ratio Perm			
v/c Ratio	0.97	0.73	
Uniform Delay, d1	68.4	62.5	
Progression Factor	1.00	1.00	
Incremental Delay, d2	64.6	5.4	
Delay (s)	133.0	67.9	
Level of Service	F	E	
Approach Delay (s)		85.1	
Approach LOS		F	

Intersection Summary

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL
Lane Configurations												
Volume (vph)	5	120	2320	70	50	180	2460	10	150	30	250	190
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.6	5.7			5.6	5.7		5.6	4.6		5.9
Lane Util. Factor		1.00	0.91			0.97	0.91		1.00	1.00		0.97
Frpb, ped/bikes		1.00	1.00			1.00	1.00		1.00	1.00		1.00
Flpb, ped/bikes		1.00	1.00			1.00	1.00		1.00	1.00		1.00
Frt		1.00	1.00			1.00	1.00		1.00	0.87		1.00
Flt Protected		0.95	1.00			0.95	1.00		0.95	1.00		0.95
Satd. Flow (prot)		1770	5056			3433	5081		1770	1614		3433
Flt Permitted		0.95	1.00			0.95	1.00		0.95	1.00		0.95
Satd. Flow (perm)		1770	5056			3433	5081		1770	1614		3433
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	5	126	2442	74	53	189	2589	11	158	32	263	200
RTOR Reduction (vph)	0	0	2	0	0	0	0	0	0	35	0	0
Lane Group Flow (vph)	0	131	2514	0	0	242	2600	0	158	260	0	200
Confl. Peds. (#/hr)				18				15				
Confl. Bikes (#/hr)				2				4				
Turn Type	Prot	Prot			Prot	Prot			Prot			Prot
Protected Phases	1	1	6		5	5	2		7	4		3
Permitted Phases												
Actuated Green, G (s)		10.4	78.2			9.4	77.2		22.5	28.3		12.3
Effective Green, g (s)		10.4	78.2			9.4	77.2		22.5	28.3		12.3
Actuated g/C Ratio		0.07	0.52			0.06	0.51		0.15	0.19		0.08
Clearance Time (s)		5.6	5.7			5.6	5.7		5.6	4.6		5.9
Vehicle Extension (s)		2.0	2.0			2.0	2.0		2.0	2.0		2.0
Lane Grp Cap (vph)		123	2636			215	2615		266	305		282
v/s Ratio Prot		c0.07	0.50			0.07	c0.51		c0.09	c0.16		0.06
v/s Ratio Perm												
v/c Ratio		1.07	0.95			1.13	0.99		0.59	0.85		0.71
Uniform Delay, d1		69.8	34.2			70.3	36.2		59.5	58.8		67.1
Progression Factor		0.76	0.29			0.86	0.57		1.00	1.00		1.00
Incremental Delay, d2		43.7	1.2			80.0	10.4		2.4	19.3		6.5
Delay (s)		96.7	11.2			140.7	30.9		61.9	78.2		73.6
Level of Service		F	B			F	C		E	E		E
Approach Delay (s)			15.4				40.3			72.5		
Approach LOS			B				D			E		

Intersection Summary			
HCM Average Control Delay	33.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	10.3
Intersection Capacity Utilization	98.2%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBT	SBR
Lane Configurations		
Volume (vph)	20	120
Ideal Flow (vphpl)	1900	1900
Total Lost time (s)	4.9	
Lane Util. Factor	1.00	
Frpb, ped/bikes	0.98	
Flpb, ped/bikes	1.00	
Frt	0.87	
Flt Protected	1.00	
Satd. Flow (prot)	1585	
Flt Permitted	1.00	
Satd. Flow (perm)	1585	
Peak-hour factor, PHF	0.95	0.95
Adj. Flow (vph)	21	126
RTOR Reduction (vph)	102	0
Lane Group Flow (vph)	45	0
Confl. Peds. (#/hr)		13
Confl. Bikes (#/hr)		
Turn Type		
Protected Phases	8	
Permitted Phases		
Actuated Green, G (s)	18.1	
Effective Green, g (s)	18.1	
Actuated g/C Ratio	0.12	
Clearance Time (s)	4.9	
Vehicle Extension (s)	2.0	
Lane Grp Cap (vph)	191	
v/s Ratio Prot	0.03	
v/s Ratio Perm		
v/c Ratio	0.24	
Uniform Delay, d1	59.7	
Progression Factor	1.00	
Incremental Delay, d2	0.2	
Delay (s)	59.9	
Level of Service	E	
Approach Delay (s)	67.8	
Approach LOS	E	

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	2470	260	100	1860	0	0	0	0	690	0	1140
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0		5.6	5.7					6.7	6.7	6.7
Lane Util. Factor		0.91		0.97	0.91					0.95	0.95	0.88
Frpb, ped/bikes		1.00		1.00	1.00					1.00	1.00	0.98
Flpb, ped/bikes		1.00		1.00	1.00					1.00	1.00	1.00
Frt		0.99		1.00	1.00					1.00	1.00	0.85
Flt Protected		1.00		0.95	1.00					0.95	0.95	1.00
Satd. Flow (prot)		5001		3433	5085					1681	1681	2743
Flt Permitted		1.00		0.95	1.00					0.95	0.95	1.00
Satd. Flow (perm)		5001		3433	5085					1681	1681	2743
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	2600	274	105	1958	0	0	0	0	726	0	1200
RTOR Reduction (vph)	0	8	0	0	0	0	0	0	0	0	0	8
Lane Group Flow (vph)	0	2866	0	105	1958	0	0	0	0	363	363	1192
Confl. Peds. (#/hr)			5			7						3
Confl. Bikes (#/hr)			4			6						
Turn Type				Prot						Split		Perm
Protected Phases		2		1	6					4	4	
Permitted Phases												4
Actuated Green, G (s)		72.0		4.4	82.3					55.3	55.3	55.3
Effective Green, g (s)		72.0		4.4	82.3					55.3	55.3	55.3
Actuated g/C Ratio		0.48		0.03	0.55					0.37	0.37	0.37
Clearance Time (s)		6.0		5.6	5.7					6.7	6.7	6.7
Vehicle Extension (s)		2.0		2.0	2.0					1.0	1.0	1.0
Lane Grp Cap (vph)		2400		101	2790					620	620	1011
v/s Ratio Prot		c0.57		0.03	c0.39					0.22	0.22	
v/s Ratio Perm												c0.43
v/c Ratio		1.19		1.04	0.70					0.59	0.59	1.18
Uniform Delay, d1		39.0		72.8	24.8					38.1	38.1	47.4
Progression Factor		0.46		0.80	0.33					1.00	1.00	1.00
Incremental Delay, d2		89.1		78.4	0.9					0.9	0.9	90.9
Delay (s)		107.2		136.3	9.2					39.0	39.0	138.2
Level of Service		F		F	A					D	D	F
Approach Delay (s)		107.2			15.6			0.0			100.8	
Approach LOS		F			B			A			F	

Intersection Summary			
HCM Average Control Delay	77.9	HCM Level of Service	E
HCM Volume to Capacity ratio	1.14		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	12.7
Intersection Capacity Utilization	92.3%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	0	3160	1960	350	0	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	3326	2063	368	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		515	937			
pX, platoon unblocked	0.71				0.67	0.71
vC, conflicting volume	2432				3172	688
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1606				0	0
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	100
cM capacity (veh/h)	288				685	775

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	WB 4
Volume Total	1109	1109	1109	688	688	688	368
Volume Left	0	0	0	0	0	0	0
Volume Right	0	0	0	0	0	0	368
cSH	1700	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.65	0.65	0.65	0.40	0.40	0.40	0.22
Queue Length 95th (ft)	0	0	0	0	0	0	0
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS							
Approach Delay (s)	0.0			0.0			
Approach LOS							

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	92.3%	ICU Level of Service	F
Analysis Period (min)	15		

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBU
Lane Configurations												
Volume (vph)	15	120	1420	1620	10	60	1670	110	500	140	150	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.6	5.7	4.0		5.6	5.7	5.7	5.6	5.6		
Lane Util. Factor		1.00	0.95	1.00		1.00	0.91	1.00	0.91	0.91		
Frpb, ped/bikes		1.00	1.00	0.99		1.00	1.00	0.97	1.00	0.99		
Flpb, ped/bikes		1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00		
Frt		1.00	1.00	0.85		1.00	1.00	0.85	1.00	0.96		
Flt Protected		0.95	1.00	1.00		0.95	1.00	1.00	0.95	0.98		
Satd. Flow (prot)		1770	3539	1561		1770	5085	1543	1610	3154		
Flt Permitted		0.95	1.00	1.00		0.95	1.00	1.00	0.95	0.98		
Satd. Flow (perm)		1770	3539	1561		1770	5085	1543	1610	3154		
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	16	126	1495	1705	11	63	1758	116	526	147	158	11
RTOR Reduction (vph)	0	0	0	0	0	0	0	33	0	26	0	0
Lane Group Flow (vph)	0	142	1495	1705	0	74	1758	83	279	526	0	0
Confl. Peds. (#/hr)				4				7			6	
Confl. Bikes (#/hr)				4				2				
Turn Type	Prot	Prot		Free	Prot	Prot		Perm	Split			Split
Protected Phases	1	1	6		5	5	2		3	3		4
Permitted Phases				Free				2				
Actuated Green, G (s)		13.4	69.7	150.0		7.4	63.7	63.7	27.5	27.5		
Effective Green, g (s)		13.4	69.7	150.0		7.4	63.7	63.7	27.5	27.5		
Actuated g/C Ratio		0.09	0.46	1.00		0.05	0.42	0.42	0.18	0.18		
Clearance Time (s)		5.6	5.7			5.6	5.7	5.7	5.6	5.6		
Vehicle Extension (s)		2.0	3.9			2.0	3.9	3.9	2.0	2.0		
Lane Grp Cap (vph)		158	1644	1561		87	2159	655	295	578		
v/s Ratio Prot		0.08	0.42			0.04	0.35		0.17	0.17		
v/s Ratio Perm				c1.09				0.05				
v/c Ratio		0.90	0.91	1.09		0.85	0.81	0.13	0.95	0.91		
Uniform Delay, d1		67.6	37.2	75.0		70.8	37.9	26.2	60.5	60.0		
Progression Factor		0.88	0.81	1.00		1.00	1.00	1.00	0.68	0.66		
Incremental Delay, d2		6.4	1.0	42.7		49.5	3.5	0.4	36.5	17.3		
Delay (s)		66.0	31.2	117.7		120.3	41.5	26.6	77.6	57.0		
Level of Service		E	C	F		F	D	C	E	E		
Approach Delay (s)			76.8				43.6			63.9		
Approach LOS			E				D			E		

Intersection Summary			
HCM Average Control Delay	67.1	HCM Level of Service	E
HCM Volume to Capacity ratio	1.09		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	0.0
Intersection Capacity Utilization	91.7%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBL	SBT	SBR
Lane Configurations			
Volume (vph)	320	160	140
Ideal Flow (vphpl)	1900	1900	1900
Total Lost time (s)	4.6	4.6	4.6
Lane Util. Factor	0.95	0.95	1.00
Frpb, ped/bikes	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00
Frt	1.00	1.00	0.85
Flt Protected	0.95	0.98	1.00
Satd. Flow (prot)	1681	1738	1583
Flt Permitted	0.95	0.98	1.00
Satd. Flow (perm)	1681	1738	1583
Peak-hour factor, PHF	0.95	0.95	0.95
Adj. Flow (vph)	337	168	147
RTOR Reduction (vph)	0	0	106
Lane Group Flow (vph)	254	262	41
Confl. Peds. (#/hr)			
Confl. Bikes (#/hr)			
Turn Type	Split		Perm
Protected Phases	4	4	
Permitted Phases			4
Actuated Green, G (s)	23.9	23.9	23.9
Effective Green, g (s)	23.9	23.9	23.9
Actuated g/C Ratio	0.16	0.16	0.16
Clearance Time (s)	4.6	4.6	4.6
Vehicle Extension (s)	2.0	2.0	2.0
Lane Grp Cap (vph)	268	277	252
v/s Ratio Prot	0.15	0.15	
v/s Ratio Perm			0.03
v/c Ratio	0.95	0.95	0.16
Uniform Delay, d1	62.4	62.4	54.4
Progression Factor	1.00	1.00	1.00
Incremental Delay, d2	40.1	39.0	0.1
Delay (s)	102.6	101.4	54.5
Level of Service	F	F	D
Approach Delay (s)		91.4	
Approach LOS		F	

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	270	10	10	20	40	40	320	450	20	80	710	1050
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	5.5			5.5	5.5	5.5	5.5		5.5	5.5	5.5
Lane Util. Factor	0.95	0.95			1.00	1.00	1.00	0.95		1.00	1.00	1.00
Frt	1.00	0.99			1.00	0.85	1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	0.96			0.98	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1681	1679			1832	1583	1770	3517		1770	1863	1583
Flt Permitted	0.95	0.96			0.98	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1681	1679			1832	1583	1770	3517		1770	1863	1583
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	284	11	11	21	42	42	337	474	21	84	747	1105
RTOR Reduction (vph)	0	2	0	0	0	39	0	3	0	0	0	162
Lane Group Flow (vph)	153	151	0	0	63	3	337	492	0	84	747	943
Turn Type	Split			Split		Perm	Prot			Prot		pm+ov
Protected Phases	4	4		8	8		5	2		1	6	4
Permitted Phases						8						6
Actuated Green, G (s)	30.5	30.5			9.9	9.9	24.6	47.4		40.2	63.0	93.5
Effective Green, g (s)	30.5	30.5			9.9	9.9	24.6	47.4		40.2	63.0	93.5
Actuated g/C Ratio	0.20	0.20			0.07	0.07	0.16	0.32		0.27	0.42	0.62
Clearance Time (s)	5.5	5.5			5.5	5.5	5.5	5.5		5.5	5.5	5.5
Vehicle Extension (s)	2.0	2.0			2.0	2.0	2.0	2.0		2.0	2.0	2.0
Lane Grp Cap (vph)	342	341			121	104	290	1111		474	782	987
v/s Ratio Prot	0.09	0.09			c0.03		c0.19	0.14		0.05	0.40	c0.19
v/s Ratio Perm						0.00						0.40
v/c Ratio	0.45	0.44			0.52	0.03	1.16	0.44		0.18	0.96	0.96
Uniform Delay, d1	52.4	52.3			67.8	65.5	62.7	40.8		42.2	42.1	26.3
Progression Factor	1.00	1.00			1.00	1.00	1.00	1.00		0.99	0.90	0.75
Incremental Delay, d2	0.3	0.3			1.9	0.0	104.1	0.1		0.0	3.7	2.8
Delay (s)	52.7	52.7			69.6	65.6	166.8	40.9		41.6	41.8	22.6
Level of Service	D	D			E	E	F	D		D	D	C
Approach Delay (s)		52.7			68.0			91.9			30.9	
Approach LOS		D			E			F			C	

Intersection Summary			
HCM Average Control Delay	50.2	HCM Level of Service	D
HCM Volume to Capacity ratio	0.96		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	22.0
Intersection Capacity Utilization	100.7%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL
Lane Configurations												
Volume (vph)	80	70	170	140	150	80	15	100	1030	120	20	80
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.6	4.6	4.6	5.6	4.6	4.6		5.6	5.3	5.3		5.6
Lane Util. Factor	1.00	1.00	1.00	0.97	1.00	1.00		1.00	0.95	1.00		1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.99		1.00	1.00	0.98		1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00		1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	1.00	0.85		1.00
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.95	1.00	1.00		0.95
Satd. Flow (prot)	1770	1863	1583	3433	1863	1560		1770	3539	1549		1770
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00		0.95	1.00	1.00		0.95
Satd. Flow (perm)	1770	1863	1583	3433	1863	1560		1770	3539	1549		1770
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	84	74	179	147	158	84	16	105	1084	126	21	84
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	64	0	0
Lane Group Flow (vph)	84	74	179	147	158	84	0	121	1084	62	0	105
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)	1					2		1		2		1
Turn Type	Prot		Perm	Prot		Perm	Prot	Prot		Perm	Prot	Prot
Protected Phases	3	8		7	4		1	1	6		5	5
Permitted Phases			8			4				6		
Actuated Green, G (s)	7.0	17.5	17.5	6.1	16.6	16.6		9.2	49.2	49.2		9.5
Effective Green, g (s)	7.0	17.5	17.5	6.1	16.6	16.6		9.2	49.2	49.2		9.5
Actuated g/C Ratio	0.07	0.17	0.17	0.06	0.16	0.16		0.09	0.48	0.48		0.09
Clearance Time (s)	5.6	4.6	4.6	5.6	4.6	4.6		5.6	5.3	5.3		5.6
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0		2.0
Lane Grp Cap (vph)	120	315	268	203	299	250		157	1684	737		163
v/s Ratio Prot	c0.05	0.04		0.04	0.08			c0.07	0.31			0.06
v/s Ratio Perm			c0.11			0.05				0.04		
v/c Ratio	0.70	0.23	0.67	0.72	0.53	0.34		0.77	0.64	0.08		0.64
Uniform Delay, d1	47.2	37.2	40.2	47.8	39.8	38.5		46.1	20.5	14.8		45.3
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00		1.00
Incremental Delay, d2	13.4	0.1	4.8	10.3	0.8	0.3		18.9	0.6	0.0		6.4
Delay (s)	60.6	37.3	45.0	58.1	40.6	38.8		65.0	21.1	14.8		51.7
Level of Service	E	D	D	E	D	D		E	C	B		D
Approach Delay (s)		47.2			46.8				24.5			
Approach LOS		D			D				C			

Intersection Summary			
HCM Average Control Delay	31.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	103.4	Sum of lost time (s)	11.2
Intersection Capacity Utilization	77.7%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBT	SBR
Lane Configurations	↑↱	
Volume (vph)	1330	70
Ideal Flow (vphpl)	1900	1900
Total Lost time (s)	5.3	
Lane Util. Factor	0.95	
Frpb, ped/bikes	1.00	
Flpb, ped/bikes	1.00	
Frt	0.99	
Flt Protected	1.00	
Satd. Flow (prot)	3508	
Flt Permitted	1.00	
Satd. Flow (perm)	3508	
Peak-hour factor, PHF	0.95	0.95
Adj. Flow (vph)	1400	74
RTOR Reduction (vph)	3	0
Lane Group Flow (vph)	1471	0
Confl. Peds. (#/hr)		2
Confl. Bikes (#/hr)		1
Turn Type		
Protected Phases	2	
Permitted Phases		
Actuated Green, G (s)	49.5	
Effective Green, g (s)	49.5	
Actuated g/C Ratio	0.48	
Clearance Time (s)	5.3	
Vehicle Extension (s)	2.0	
Lane Grp Cap (vph)	1679	
v/s Ratio Prot	c0.42	
v/s Ratio Perm		
v/c Ratio	0.88	
Uniform Delay, d1	24.2	
Progression Factor	1.00	
Incremental Delay, d2	5.3	
Delay (s)	29.5	
Level of Service	C	
Approach Delay (s)	31.0	
Approach LOS	C	

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	30	320	90	120	360	20	180	110	30	40	130	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	5.5		5.5	5.5			5.5			5.5	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Frt	1.00	0.97		1.00	0.99			0.99			0.98	
Flt Protected	0.95	1.00		0.95	1.00			0.97			0.99	
Satd. Flow (prot)	1770	1801		1770	1848			1789			1807	
Flt Permitted	0.95	1.00		0.95	1.00			0.97			0.99	
Satd. Flow (perm)	1770	1801		1770	1848			1789			1807	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	32	337	95	126	379	21	189	116	32	42	137	32
RTOR Reduction (vph)	0	7	0	0	1	0	0	2	0	0	4	0
Lane Group Flow (vph)	32	425	0	126	399	0	0	335	0	0	207	0
Turn Type	Prot			Prot			Split			Split		
Protected Phases	7	4		3	8		2	2		6	6	
Permitted Phases												
Actuated Green, G (s)	3.6	34.9		12.6	43.9			26.7			17.7	
Effective Green, g (s)	3.6	34.9		12.6	43.9			26.7			17.7	
Actuated g/C Ratio	0.03	0.31		0.11	0.39			0.23			0.16	
Clearance Time (s)	5.5	5.5		5.5	5.5			5.5			5.5	
Vehicle Extension (s)	2.0	2.0		2.0	2.0			2.0			2.0	
Lane Grp Cap (vph)	56	552		196	712			419			281	
v/s Ratio Prot	0.02	c0.24		c0.07	0.22			c0.19			c0.11	
v/s Ratio Perm												
v/c Ratio	0.57	0.77		0.64	0.56			0.80			0.74	
Uniform Delay, d1	54.4	35.9		48.5	27.4			41.1			45.9	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	8.5	6.0		5.3	0.6			9.6			8.3	
Delay (s)	62.8	41.8		53.8	28.0			50.6			54.2	
Level of Service	E	D		D	C			D			D	
Approach Delay (s)		43.3			34.2			50.6			54.2	
Approach LOS		D			C			D			D	

Intersection Summary			
HCM Average Control Delay	43.3	HCM Level of Service	D
HCM Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	113.9	Sum of lost time (s)	22.0
Intersection Capacity Utilization	75.7%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Lane Configurations												
Volume (vph)	180	110	120	60	80	260	70	1650	40	5	110	1650
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.6	4.6	4.6	5.6	5.6	5.6	6.3	5.3			6.3	5.3
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95			1.00	0.95
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00			1.00	0.97
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00			0.95	1.00
Satd. Flow (prot)	1770	1863	1583	1770	1863	1583	1770	3527			1770	3432
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00			0.95	1.00
Satd. Flow (perm)	1770	1863	1583	1770	1863	1583	1770	3527			1770	3432
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	189	116	126	63	84	274	74	1737	42	5	116	1737
RTOR Reduction (vph)	0	0	100	0	0	62	0	1	0	0	0	14
Lane Group Flow (vph)	189	116	26	63	84	212	74	1778	0	0	121	2165
Turn Type	Prot		Perm	Prot		Perm	Prot			Prot	Prot	
Protected Phases	3	8		7	4		1	6		5	5	2
Permitted Phases			8			4						
Actuated Green, G (s)	12.4	29.3	29.3	7.8	23.7	23.7	5.7	72.3			8.7	75.3
Effective Green, g (s)	12.4	29.3	29.3	7.8	23.7	23.7	5.7	72.3			8.7	75.3
Actuated g/C Ratio	0.09	0.21	0.21	0.06	0.17	0.17	0.04	0.52			0.06	0.54
Clearance Time (s)	5.6	4.6	4.6	5.6	5.6	5.6	6.3	5.3			6.3	5.3
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0			2.0	2.0
Lane Grp Cap (vph)	157	390	332	99	316	268	72	1823			110	1847
v/s Ratio Prot	c0.11	c0.06		0.04	0.05		0.04	0.50			c0.07	c0.63
v/s Ratio Perm			0.02			c0.13						
v/c Ratio	1.20	0.30	0.08	0.64	0.27	0.79	1.03	0.98			1.10	1.17
Uniform Delay, d1	63.8	46.6	44.5	64.7	50.5	55.7	67.1	32.9			65.6	32.3
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00
Incremental Delay, d2	137.0	0.2	0.0	9.4	0.2	13.3	114.0	15.4			115.3	83.7
Delay (s)	200.8	46.8	44.5	74.1	50.7	69.0	181.1	48.4			180.9	116.0
Level of Service	F	D	D	E	D	E	F	D			F	F
Approach Delay (s)		113.6			66.1			53.7				119.4
Approach LOS		F			E			D				F

Intersection Summary			
HCM Average Control Delay	90.1	HCM Level of Service	F
HCM Volume to Capacity ratio	1.16		
Actuated Cycle Length (s)	139.9	Sum of lost time (s)	27.4
Intersection Capacity Utilization	97.5%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBR
Lane Configurations	
Volume (vph)	420
Ideal Flow (vphpl)	1900
Total Lost time (s)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Peak-hour factor, PHF	0.95
Adj. Flow (vph)	442
RTOR Reduction (vph)	0
Lane Group Flow (vph)	0
Turn Type	
Protected Phases	
Permitted Phases	
Actuated Green, G (s)	
Effective Green, g (s)	
Actuated g/C Ratio	
Clearance Time (s)	
Vehicle Extension (s)	
Lane Grp Cap (vph)	
v/s Ratio Prot	
v/s Ratio Perm	
v/c Ratio	
Uniform Delay, d1	
Progression Factor	
Incremental Delay, d2	
Delay (s)	
Level of Service	
Approach Delay (s)	
Approach LOS	

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Lane Configurations												
Volume (vph)	140	0	150	0	0	0	260	1350	0	0	0	1040
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.6		5.6				5.6	4.6				4.6
Lane Util. Factor	1.00		1.00				1.00	0.95				0.95
Frt	1.00		0.85				1.00	1.00				0.99
Flt Protected	0.95		1.00				0.95	1.00				1.00
Satd. Flow (prot)	1770		1583				1770	3539				3520
Flt Permitted	0.95		1.00				0.95	1.00				1.00
Satd. Flow (perm)	1770		1583				1770	3539				3520
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	147	0	158	0	0	0	274	1421	0	0	0	1095
RTOR Reduction (vph)	0	0	123	0	0	0	0	0	0	0	0	2
Lane Group Flow (vph)	147	0	35	0	0	0	274	1421	0	0	0	1135
Turn Type	Prot		custom	Prot			Prot			Prot		
Protected Phases	3			7	4		1	6		5		2
Permitted Phases			8									
Actuated Green, G (s)	10.9		21.5				19.9	64.1				38.6
Effective Green, g (s)	10.9		21.5				19.9	64.1				38.6
Actuated g/C Ratio	0.11		0.22				0.21	0.67				0.40
Clearance Time (s)	5.6		5.6				5.6	4.6				4.6
Vehicle Extension (s)	2.0		2.0				2.0	2.0				2.0
Lane Grp Cap (vph)	201		355				368	2368				1418
v/s Ratio Prot	c0.08						c0.15	0.40				c0.32
v/s Ratio Perm			c0.02									
v/c Ratio	0.73		0.10				0.74	0.60				0.80
Uniform Delay, d1	41.0		29.5				35.6	8.8				25.2
Progression Factor	1.00		1.00				1.00	1.00				1.00
Incremental Delay, d2	11.2		0.0				7.0	0.3				3.2
Delay (s)	52.2		29.5				42.6	9.1				28.4
Level of Service	D		C				D	A				C
Approach Delay (s)		40.4			0.0			14.5				28.4
Approach LOS		D			A			B				C

Intersection Summary			
HCM Average Control Delay	22.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	95.8	Sum of lost time (s)	15.8
Intersection Capacity Utilization	64.0%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBR
Lane Configurations	
Volume (vph)	40
Ideal Flow (vphpl)	1900
Total Lost time (s)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Peak-hour factor, PHF	0.95
Adj. Flow (vph)	42
RTOR Reduction (vph)	0
Lane Group Flow (vph)	0
Turn Type	
Protected Phases	
Permitted Phases	
Actuated Green, G (s)	
Effective Green, g (s)	
Actuated g/C Ratio	
Clearance Time (s)	
Vehicle Extension (s)	
Lane Grp Cap (vph)	
v/s Ratio Prot	
v/s Ratio Perm	
v/c Ratio	
Uniform Delay, d1	
Progression Factor	
Incremental Delay, d2	
Delay (s)	
Level of Service	
Approach Delay (s)	
Approach LOS	

Intersection Summary

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	50	20	110	1710	1740	90
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.6		5.3	5.3	5.3	
Lane Util. Factor	1.00		1.00	0.95	0.95	
Frt	0.96		1.00	1.00	0.99	
Flt Protected	0.97		0.95	1.00	1.00	
Satd. Flow (prot)	1729		1770	3539	3513	
Flt Permitted	0.97		0.95	1.00	1.00	
Satd. Flow (perm)	1729		1770	3539	3513	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	53	21	116	1800	1832	95
RTOR Reduction (vph)	17	0	0	0	2	0
Lane Group Flow (vph)	57	0	116	1800	1925	0
Turn Type			Prot			
Protected Phases	3		1	6	2	
Permitted Phases						
Actuated Green, G (s)	6.6		8.1	74.8	61.4	
Effective Green, g (s)	6.6		8.1	74.8	61.4	
Actuated g/C Ratio	0.07		0.09	0.82	0.67	
Clearance Time (s)	4.6		5.3	5.3	5.3	
Vehicle Extension (s)	2.0		2.0	2.0	2.0	
Lane Grp Cap (vph)	125		157	2899	2363	
v/s Ratio Prot	c0.03		0.07	c0.51	c0.55	
v/s Ratio Perm						
v/c Ratio	0.46		0.74	0.62	0.81	
Uniform Delay, d1	40.6		40.6	3.0	10.8	
Progression Factor	1.00		1.00	1.00	1.00	
Incremental Delay, d2	1.0		14.4	0.3	2.1	
Delay (s)	41.6		55.0	3.3	13.0	
Level of Service	D		E	A	B	
Approach Delay (s)	41.6			6.5	13.0	
Approach LOS	D			A	B	

Intersection Summary			
HCM Average Control Delay	10.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	91.3	Sum of lost time (s)	15.2
Intersection Capacity Utilization	73.9%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Volume (vph)	80	70	10	5	350	150	610	20	1130	310	580	1070
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.6	7.2			5.6	5.6	6.3	6.3	5.3	5.3	6.3	5.3
Lane Util. Factor	1.00	1.00			0.97	1.00	0.88	1.00	0.95	1.00	0.97	0.95
Frt	1.00	0.98			1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99
Flt Protected	0.95	1.00			0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	1827			3433	1863	2787	1770	3539	1583	3433	3490
Flt Permitted	0.95	1.00			0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1770	1827			3433	1863	2787	1770	3539	1583	3433	3490
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	84	74	11	5	368	158	642	21	1189	326	611	1126
RTOR Reduction (vph)	0	4	0	0	0	0	103	0	0	119	0	4
Lane Group Flow (vph)	84	81	0	0	373	158	539	21	1189	207	611	1238
Turn Type	Prot			Prot	Prot		pm+ov	Prot		Perm	Prot	
Protected Phases	3	8		7	7	4	5	1	6		5	2
Permitted Phases							4			6		
Actuated Green, G (s)	10.0	14.5			14.5	20.6	43.5	1.9	51.1	51.1	22.9	72.1
Effective Green, g (s)	10.0	14.5			14.5	20.6	43.5	1.9	51.1	51.1	22.9	72.1
Actuated g/C Ratio	0.08	0.11			0.11	0.16	0.34	0.01	0.40	0.40	0.18	0.57
Clearance Time (s)	5.6	7.2			5.6	5.6	6.3	6.3	5.3	5.3	6.3	5.3
Vehicle Extension (s)	2.0	2.0			2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	139	208			391	301	952	26	1419	635	617	1975
v/s Ratio Prot	0.05	0.04			c0.11	0.08	c0.10	0.01	c0.34		c0.18	0.35
v/s Ratio Perm							0.09			0.13		
v/c Ratio	0.60	0.39			0.95	0.52	0.57	0.81	0.84	0.33	0.99	0.63
Uniform Delay, d1	56.8	52.3			56.1	48.9	34.3	62.6	34.4	26.3	52.1	18.6
Progression Factor	1.00	1.00			1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	5.0	0.4			33.3	0.8	0.5	90.8	4.3	0.1	33.6	0.5
Delay (s)	61.8	52.8			89.4	49.7	34.7	153.4	38.7	26.4	85.7	19.1
Level of Service	E	D			F	D	C	F	D	C	F	B
Approach Delay (s)		57.3				54.1			37.7			41.0
Approach LOS		E				D			D			D

Intersection Summary			
HCM Average Control Delay	43.8	HCM Level of Service	D
HCM Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	127.4	Sum of lost time (s)	23.5
Intersection Capacity Utilization	82.5%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBR
Lane Configurations	
Volume (vph)	110
Ideal Flow (vphpl)	1900
Total Lost time (s)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Peak-hour factor, PHF	0.95
Adj. Flow (vph)	116
RTOR Reduction (vph)	0
Lane Group Flow (vph)	0
Turn Type	
Protected Phases	
Permitted Phases	
Actuated Green, G (s)	
Effective Green, g (s)	
Actuated g/C Ratio	
Clearance Time (s)	
Vehicle Extension (s)	
Lane Grp Cap (vph)	
v/s Ratio Prot	
v/s Ratio Perm	
v/c Ratio	
Uniform Delay, d1	
Progression Factor	
Incremental Delay, d2	
Delay (s)	
Level of Service	
Approach Delay (s)	
Approach LOS	

Intersection Summary

Movement	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL
Lane Configurations												
Volume (vph)	20	70	750	10	10	790	750	40	150	30	5	600
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.6	6.6	6.6	5.6	6.6	6.6	5.6	5.6	5.6		5.6
Lane Util. Factor		0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.95	1.00		0.97
Frpb, ped/bikes		1.00	1.00	0.99	1.00	1.00	1.00	1.00	1.00	0.98		1.00
Flpb, ped/bikes		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00
Frt		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85		1.00
Flt Protected		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00		0.95
Satd. Flow (prot)		3433	3539	1563	3433	3539	1583	3433	3539	1557		3433
Flt Permitted		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00		0.95
Satd. Flow (perm)		3433	3539	1563	3433	3539	1583	3433	3539	1557		3433
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	21	74	789	11	11	832	789	42	158	32	5	632
RTOR Reduction (vph)	0	0	0	7	0	0	382	0	0	27	0	0
Lane Group Flow (vph)	0	95	789	4	11	832	407	42	158	5	0	637
Confl. Peds. (#/hr)										2		
Confl. Bikes (#/hr)				2						2		1
Turn Type	Prot	Prot		Perm	Prot		Perm	Prot		Perm	Prot	Prot
Protected Phases	3	3	8		7	4		1	6		5	5
Permitted Phases				8			4			6		
Actuated Green, G (s)		4.4	38.0	38.0	0.7	34.3	34.3	2.7	15.0	15.0		18.5
Effective Green, g (s)		4.4	38.0	38.0	0.7	34.3	34.3	2.7	15.0	15.0		18.5
Actuated g/C Ratio		0.05	0.40	0.40	0.01	0.36	0.36	0.03	0.16	0.16		0.19
Clearance Time (s)		5.6	6.6	6.6	5.6	6.6	6.6	5.6	5.6	5.6		5.6
Vehicle Extension (s)		2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0		2.0
Lane Grp Cap (vph)		158	1407	621	25	1270	568	97	555	244		664
v/s Ratio Prot		c0.03	c0.22		0.00	0.24		0.01	c0.04			c0.19
v/s Ratio Perm				0.00			c0.26			0.00		
v/c Ratio		0.60	0.56	0.01	0.44	0.66	0.72	0.43	0.28	0.02		0.96
Uniform Delay, d1		44.7	22.3	17.4	47.3	25.7	26.5	45.7	35.6	34.1		38.2
Progression Factor		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00
Incremental Delay, d2		4.4	0.3	0.0	4.4	0.9	3.6	1.1	0.1	0.0		24.7
Delay (s)		49.1	22.6	17.4	51.7	26.6	30.0	46.8	35.7	34.1		62.9
Level of Service		D	C	B	D	C	C	D	D	C		E
Approach Delay (s)			25.4			28.4			37.5			
Approach LOS			C			C			D			

Intersection Summary			
HCM Average Control Delay	33.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	95.6	Sum of lost time (s)	30.0
Intersection Capacity Utilization	92.8%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBT	SBR
Lane Configurations		
Volume (vph)	140	170
Ideal Flow (vphpl)	1900	1900
Total Lost time (s)	4.6	4.6
Lane Util. Factor	0.95	1.00
Frpb, ped/bikes	1.00	0.99
Flpb, ped/bikes	1.00	1.00
Frt	1.00	0.85
Flt Protected	1.00	1.00
Satd. Flow (prot)	3539	1562
Flt Permitted	1.00	1.00
Satd. Flow (perm)	3539	1562
Peak-hour factor, PHF	0.95	0.95
Adj. Flow (vph)	147	179
RTOR Reduction (vph)	0	78
Lane Group Flow (vph)	147	101
Confl. Peds. (#/hr)		1
Confl. Bikes (#/hr)		1
Turn Type		Perm
Protected Phases	2	
Permitted Phases		2
Actuated Green, G (s)	31.8	31.8
Effective Green, g (s)	31.8	31.8
Actuated g/C Ratio	0.33	0.33
Clearance Time (s)	4.6	4.6
Vehicle Extension (s)	2.0	2.0
Lane Grp Cap (vph)	1177	520
v/s Ratio Prot	0.04	
v/s Ratio Perm		0.06
v/c Ratio	0.12	0.19
Uniform Delay, d1	22.2	22.8
Progression Factor	1.00	1.00
Incremental Delay, d2	0.0	0.1
Delay (s)	22.2	22.8
Level of Service	C	C
Approach Delay (s)	49.3	
Approach LOS	D	

Intersection Summary

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Lane Configurations												
Volume (vph)	5	350	270	70	5	130	360	240	25	150	530	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.6	4.9	4.9		5.6	4.9	4.9		6.3	5.3	5.3
Lane Util. Factor		0.97	0.95	1.00		0.97	0.95	1.00		0.97	0.95	1.00
Frt		1.00	1.00	0.85		1.00	1.00	0.85		1.00	1.00	0.85
Flt Protected		0.95	1.00	1.00		0.95	1.00	1.00		0.95	1.00	1.00
Satd. Flow (prot)		3433	3539	1583		3433	3539	1583		3433	3539	1583
Flt Permitted		0.95	1.00	1.00		0.95	1.00	1.00		0.95	1.00	1.00
Satd. Flow (perm)		3433	3539	1583		3433	3539	1583		3433	3539	1583
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	5	368	284	74	5	137	379	253	26	158	558	63
RTOR Reduction (vph)	0	0	0	54	0	0	0	143	0	0	0	47
Lane Group Flow (vph)	0	373	284	20	0	142	379	110	0	184	558	16
Turn Type	Prot	Prot		Perm	Prot	Prot		Perm	Prot	Prot		Perm
Protected Phases	3	3	8		7	7	4		1	1	6	
Permitted Phases				8				4				6
Actuated Green, G (s)		12.9	21.6	21.6		7.8	16.5	16.5		7.5	20.7	20.7
Effective Green, g (s)		12.9	21.6	21.6		7.8	16.5	16.5		7.5	20.7	20.7
Actuated g/C Ratio		0.16	0.26	0.26		0.10	0.20	0.20		0.09	0.25	0.25
Clearance Time (s)		5.6	4.9	4.9		5.6	4.9	4.9		6.3	5.3	5.3
Vehicle Extension (s)		2.0	2.0	2.0		2.0	2.0	2.0		2.0	2.0	2.0
Lane Grp Cap (vph)		542	936	419		328	715	320		315	897	401
v/s Ratio Prot		c0.11	c0.08			0.04	c0.11			0.05	0.16	
v/s Ratio Perm				0.01				0.07				0.01
v/c Ratio		0.69	0.30	0.05		0.43	0.53	0.34		0.58	0.62	0.04
Uniform Delay, d1		32.5	24.0	22.4		34.9	29.1	28.0		35.6	27.0	23.0
Progression Factor		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2		2.9	0.1	0.0		0.3	0.4	0.2		1.8	1.0	0.0
Delay (s)		35.4	24.1	22.4		35.2	29.5	28.2		37.4	28.0	23.0
Level of Service		D	C	C		D	C	C		D	C	C
Approach Delay (s)			29.7				30.1				29.8	
Approach LOS			C				C				C	

Intersection Summary			
HCM Average Control Delay	30.4	HCM Level of Service	C
HCM Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	81.7	Sum of lost time (s)	21.7
Intersection Capacity Utilization	77.6%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBU	SBL	SBT	SBR
Lane Configurations				
Volume (vph)	15	240	570	560
Ideal Flow (vphpl)	1900	1900	1900	1900
Total Lost time (s)		6.3	5.3	5.3
Lane Util. Factor		0.97	0.95	1.00
Frt		1.00	1.00	0.85
Flt Protected		0.95	1.00	1.00
Satd. Flow (prot)		3433	3539	1583
Flt Permitted		0.95	1.00	1.00
Satd. Flow (perm)		3433	3539	1583
Peak-hour factor, PHF	0.95	0.95	0.95	0.95
Adj. Flow (vph)	16	253	600	589
RTOR Reduction (vph)	0	0	0	258
Lane Group Flow (vph)	0	269	600	331
Turn Type	Prot	Prot		Perm
Protected Phases	5	5	2	
Permitted Phases				2
Actuated Green, G (s)		9.5	22.7	22.7
Effective Green, g (s)		9.5	22.7	22.7
Actuated g/C Ratio		0.12	0.28	0.28
Clearance Time (s)		6.3	5.3	5.3
Vehicle Extension (s)		2.0	2.0	2.0
Lane Grp Cap (vph)		399	983	440
v/s Ratio Prot		c0.08	0.17	
v/s Ratio Perm				c0.21
v/c Ratio		0.67	0.61	0.75
Uniform Delay, d1		34.6	25.7	26.9
Progression Factor		1.00	1.00	1.00
Incremental Delay, d2		3.5	0.8	6.4
Delay (s)		38.1	26.4	33.3
Level of Service		D	C	C
Approach Delay (s)			31.4	
Approach LOS			C	

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	210	120	60	80	270	120	130	1180	40	100	1110	270
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.6	5.3	5.3	5.6	5.3	5.3	5.6	5.3	5.3	5.6	5.3	5.3
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	3539	1583	3433	3539	1583	3433	3539	1583	3433	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	3539	1583	3433	3539	1583	3433	3539	1583	3433	3539	1583
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	221	126	63	84	284	126	137	1242	42	105	1168	284
RTOR Reduction (vph)	0	0	50	0	0	103	0	0	18	0	0	167
Lane Group Flow (vph)	221	126	13	84	284	23	137	1242	24	105	1168	117
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	1	6		5	2		3	8		7	4	
Permitted Phases			6			2			8			4
Actuated Green, G (s)	6.9	17.2	17.2	4.5	14.8	14.8	5.1	35.3	35.3	3.9	34.1	34.1
Effective Green, g (s)	6.9	17.2	17.2	4.5	14.8	14.8	5.1	35.3	35.3	3.9	34.1	34.1
Actuated g/C Ratio	0.08	0.21	0.21	0.05	0.18	0.18	0.06	0.43	0.43	0.05	0.41	0.41
Clearance Time (s)	5.6	5.3	5.3	5.6	5.3	5.3	5.6	5.3	5.3	5.6	5.3	5.3
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	286	736	329	187	633	283	212	1511	676	162	1459	653
v/s Ratio Prot	c0.06	0.04		0.02	c0.08		c0.04	c0.35		0.03	0.33	
v/s Ratio Perm			0.01			0.01			0.02			0.07
v/c Ratio	0.77	0.17	0.04	0.45	0.45	0.08	0.65	0.82	0.04	0.65	0.80	0.18
Uniform Delay, d1	37.1	26.9	26.2	37.9	30.3	28.3	37.9	20.9	13.8	38.7	21.3	15.4
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	11.2	0.0	0.0	0.6	0.2	0.0	5.0	3.6	0.0	6.5	3.1	0.0
Delay (s)	48.3	26.9	26.2	38.5	30.5	28.3	42.9	24.5	13.8	45.3	24.4	15.5
Level of Service	D	C	C	D	C	C	D	C	B	D	C	B
Approach Delay (s)		38.3			31.3			25.9			24.2	
Approach LOS		D			C			C			C	

Intersection Summary			
HCM Average Control Delay	27.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	82.7	Sum of lost time (s)	16.5
Intersection Capacity Utilization	68.2%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	10	10	10	170	450	10
Sign Control		Stop	Stop		Free	
Grade		0%	0%		0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	11	11	11	179	474	11
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	958	953	958	0	0	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	958	953	958	0	0	
tC, single (s)	7.1	6.5	6.5	6.2	4.1	
tC, 2 stage (s)						
tF (s)	3.5	4.0	4.0	3.3	2.2	
p0 queue free %	93	94	94	84	71	
cM capacity (veh/h)	147	184	182	1085	1623	

Direction, Lane #	EB 1	EB 2	WB 1	SB 1	SB 2
Volume Total	14	7	189	316	168
Volume Left	11	0	0	316	158
Volume Right	0	0	179	0	11
cSH	155	184	851	1623	1623
Volume to Capacity	0.09	0.04	0.22	0.29	0.29
Queue Length 95th (ft)	7	3	21	31	31
Control Delay (s)	30.6	25.4	10.4	8.1	7.8
Lane LOS	D	D	B	A	A
Approach Delay (s)	28.9		10.4	8.0	
Approach LOS	D		B		

Intersection Summary			
Average Delay	9.3		
Intersection Capacity Utilization	30.9%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	10	450	0	0	170	880	10	0	110	0	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	11	474	0	0	179	926	11	0	116	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)									17			
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	179			474			674	674	237	495	674	179
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	179			474			674	674	237	495	674	179
tC, single (s)	4.4			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.4			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			100			97	100	85	100	100	100
cM capacity (veh/h)	1291			1085			338	372	765	386	372	833

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1
Volume Total	11	237	237	179	463	463	126
Volume Left	11	0	0	0	0	0	11
Volume Right	0	0	0	0	463	463	116
cSH	1291	1700	1700	1700	1700	1700	834
Volume to Capacity	0.01	0.14	0.14	0.11	0.27	0.27	0.15
Queue Length 95th (ft)	1	0	0	0	0	0	13
Control Delay (s)	7.8	0.0	0.0	0.0	0.0	0.0	11.0
Lane LOS	A						B
Approach Delay (s)	0.2			0.0			11.0
Approach LOS							B

Intersection Summary			
Average Delay	0.9		
Intersection Capacity Utilization	47.5%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Lane Configurations												
Volume (vph)	5	160	740	250	5	50	670	230	60	460	670	170
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.6	6.8	6.8		5.6	7.2	7.2		5.6	7.2	7.2
Lane Util. Factor		0.97	0.91	0.88		0.97	0.91	1.00		0.97	0.91	1.00
Frpb, ped/bikes		1.00	1.00	0.99		1.00	1.00	0.98		1.00	1.00	0.97
Flpb, ped/bikes		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00
Frt		1.00	1.00	0.85		1.00	1.00	0.85		1.00	1.00	0.85
Flt Protected		0.95	1.00	1.00		0.95	1.00	1.00		0.95	1.00	1.00
Satd. Flow (prot)		3433	5085	2752		3433	5085	1549		3433	5085	1541
Flt Permitted		0.95	1.00	1.00		0.95	1.00	1.00		0.95	1.00	1.00
Satd. Flow (perm)		3433	5085	2752		3433	5085	1549		3433	5085	1541
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	5	168	779	263	5	53	705	242	63	484	705	179
RTOR Reduction (vph)	0	0	0	138	0	0	0	143	0	0	0	110
Lane Group Flow (vph)	0	173	779	125	0	58	705	99	0	547	705	69
Confl. Peds. (#/hr)								7				9
Confl. Bikes (#/hr)				1				1				4
Turn Type	Prot	Prot		Perm	Prot	Prot		Perm	Prot	Prot		Perm
Protected Phases	1	1	6		5	5	2		3	3	8	
Permitted Phases				6				2				8
Actuated Green, G (s)		16.6	71.5	71.5		5.1	59.6	59.6		37.6	29.8	29.8
Effective Green, g (s)		16.6	71.5	71.5		5.1	59.6	59.6		37.6	29.8	29.8
Actuated g/C Ratio		0.11	0.48	0.48		0.03	0.40	0.40		0.25	0.20	0.20
Clearance Time (s)		5.6	6.8	6.8		5.6	7.2	7.2		5.6	7.2	7.2
Vehicle Extension (s)		2.0	2.0	2.0		2.0	2.0	2.0		2.0	2.0	2.0
Lane Grp Cap (vph)		380	2424	1312		117	2020	615		861	1010	306
v/s Ratio Prot		c0.05	0.15			0.02	c0.14			c0.16	c0.14	
v/s Ratio Perm				0.05				0.06				0.04
v/c Ratio		0.46	0.32	0.10		0.50	0.35	0.16		0.64	0.70	0.23
Uniform Delay, d1		62.5	24.3	21.5		71.2	31.6	29.1		50.1	55.9	50.4
Progression Factor		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2		0.3	0.4	0.1		1.2	0.5	0.6		1.1	1.7	0.1
Delay (s)		62.8	24.6	21.7		72.4	32.1	29.7		51.2	57.6	50.6
Level of Service		E	C	C		E	C	C		D	E	D
Approach Delay (s)			29.4				33.8				54.3	
Approach LOS			C				C				D	

Intersection Summary			
HCM Average Control Delay	45.2	HCM Level of Service	D
HCM Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	31.2
Intersection Capacity Utilization	81.9%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBU	SBL	SBT	SBR
Lane Configurations				
Volume (vph)	5	300	230	180
Ideal Flow (vphpl)	1900	1900	1900	1900
Total Lost time (s)		5.6	6.3	6.3
Lane Util. Factor		0.97	0.91	1.00
Frpb, ped/bikes		1.00	1.00	0.97
Flpb, ped/bikes		1.00	1.00	1.00
Frt		1.00	1.00	0.85
Flt Protected		0.95	1.00	1.00
Satd. Flow (prot)		3433	5085	1537
Flt Permitted		0.95	1.00	1.00
Satd. Flow (perm)		3433	5085	1537
Peak-hour factor, PHF	0.95	0.95	0.95	0.95
Adj. Flow (vph)	5	316	242	189
RTOR Reduction (vph)	0	0	0	175
Lane Group Flow (vph)	0	321	242	14
Confl. Peds. (#/hr)				
Confl. Bikes (#/hr)				6
Turn Type	Prot	Prot		Perm
Protected Phases	7	7	4	
Permitted Phases				4
Actuated Green, G (s)		18.4	11.5	11.5
Effective Green, g (s)		18.4	11.5	11.5
Actuated g/C Ratio		0.12	0.08	0.08
Clearance Time (s)		5.6	6.3	6.3
Vehicle Extension (s)		2.0	2.0	2.0
Lane Grp Cap (vph)		421	390	118
v/s Ratio Prot		c0.09	0.05	
v/s Ratio Perm				0.01
v/c Ratio		0.76	0.62	0.12
Uniform Delay, d1		63.7	67.1	64.5
Progression Factor		1.00	1.00	1.00
Incremental Delay, d2		7.2	2.2	0.2
Delay (s)		70.9	69.3	64.7
Level of Service		E	E	E
Approach Delay (s)			68.8	
Approach LOS			E	

Intersection Summary

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Lane Configurations												
Volume (vph)	20	360	1010	90	5	440	580	430	5	170	770	360
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.6	6.0	6.0		5.6	6.0	6.0		5.6	5.7	5.7
Lane Util. Factor		0.97	0.91	1.00		0.97	0.91	1.00		0.97	0.91	1.00
Frpb, ped/bikes		1.00	1.00	0.98		1.00	1.00	0.99		1.00	1.00	0.98
Flpb, ped/bikes		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00
Frt		1.00	1.00	0.85		1.00	1.00	0.85		1.00	1.00	0.85
Flt Protected		0.95	1.00	1.00		0.95	1.00	1.00		0.95	1.00	1.00
Satd. Flow (prot)		3433	5085	1554		3433	5085	1561		3433	5085	1559
Flt Permitted		0.95	1.00	1.00		0.95	1.00	1.00		0.95	1.00	1.00
Satd. Flow (perm)		3433	5085	1554		3433	5085	1561		3433	5085	1559
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	21	379	1063	95	5	463	611	453	5	179	811	379
RTOR Reduction (vph)	0	0	0	44	0	0	0	151	0	0	0	243
Lane Group Flow (vph)	0	400	1063	51	0	468	611	302	0	184	811	136
Confl. Peds. (#/hr)				3				2				1
Confl. Bikes (#/hr)				4								2
Turn Type	Prot	Prot		Perm	Prot	Prot		Perm	Prot	Prot		Perm
Protected Phases	1	1	6		5	5	2		3	3	8	
Permitted Phases				6				2				8
Actuated Green, G (s)		22.4	49.6	49.6		23.7	50.9	50.9		11.9	29.9	29.9
Effective Green, g (s)		22.4	49.6	49.6		23.7	50.9	50.9		11.9	29.9	29.9
Actuated g/C Ratio		0.15	0.33	0.33		0.16	0.34	0.34		0.08	0.20	0.20
Clearance Time (s)		5.6	6.0	6.0		5.6	6.0	6.0		5.6	5.7	5.7
Vehicle Extension (s)		2.0	2.0	2.0		2.0	2.0	2.0		2.0	2.0	2.0
Lane Grp Cap (vph)		513	1681	514		542	1726	530		272	1014	311
v/s Ratio Prot		c0.12	c0.21			c0.14	0.12			0.05	c0.16	
v/s Ratio Perm				0.03				0.19				0.09
v/c Ratio		0.78	0.63	0.10		0.86	0.35	0.57		0.68	0.80	0.44
Uniform Delay, d1		61.4	42.5	34.7		61.6	37.2	40.6		67.2	57.2	52.7
Progression Factor		1.00	1.00	1.00		0.62	0.48	0.65		1.00	1.00	1.00
Incremental Delay, d2		6.7	1.8	0.4		12.1	0.5	4.1		5.2	4.2	0.4
Delay (s)		68.2	44.3	35.1		50.0	18.5	30.5		72.3	61.4	53.0
Level of Service		E	D	D		D	B	C		E	E	D
Approach Delay (s)			49.9				31.7				60.6	
Approach LOS			D				C				E	

Intersection Summary			
HCM Average Control Delay	48.9	HCM Level of Service	D
HCM Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	28.5
Intersection Capacity Utilization	96.4%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBU	SBL	SBT	SBR
Lane Configurations				
Volume (vph)	40	410	710	270
Ideal Flow (vphpl)	1900	1900	1900	1900
Total Lost time (s)		5.6	5.7	5.7
Lane Util. Factor		0.97	0.86	0.86
Frpb, ped/bikes		1.00	1.00	0.98
Flpb, ped/bikes		1.00	1.00	1.00
Frt		1.00	0.99	0.85
Flt Protected		0.95	1.00	1.00
Satd. Flow (prot)		3433	4752	1340
Flt Permitted		0.95	1.00	1.00
Satd. Flow (perm)		3433	4752	1340
Peak-hour factor, PHF	0.95	0.95	0.95	0.95
Adj. Flow (vph)	42	432	747	284
RTOR Reduction (vph)	0	0	5	166
Lane Group Flow (vph)	0	474	796	64
Confl. Peds. (#/hr)				2
Confl. Bikes (#/hr)				2
Turn Type	Prot	Prot		Perm
Protected Phases	7	7	4	
Permitted Phases				4
Actuated Green, G (s)		23.9	41.9	41.9
Effective Green, g (s)		23.9	41.9	41.9
Actuated g/C Ratio		0.16	0.28	0.28
Clearance Time (s)		5.6	5.7	5.7
Vehicle Extension (s)		2.0	2.0	2.0
Lane Grp Cap (vph)		547	1327	374
v/s Ratio Prot		c0.14	0.17	
v/s Ratio Perm				0.05
v/c Ratio		0.87	0.60	0.17
Uniform Delay, d1		61.5	46.8	40.9
Progression Factor		1.00	1.00	1.00
Incremental Delay, d2		13.1	0.5	0.1
Delay (s)		74.6	47.3	41.0
Level of Service		E	D	D
Approach Delay (s)			54.9	
Approach LOS			D	

Intersection Summary

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL
Lane Configurations												
Volume (vph)	5	10	1730	80	5	120	1330	70	90	10	110	80
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.7	6.7	6.7		5.6	6.7			5.6	5.6	5.6
Lane Util. Factor		1.00	0.91	1.00		1.00	0.91			1.00	1.00	0.95
Frpb, ped/bikes		1.00	1.00	0.98		1.00	1.00			1.00	0.99	1.00
Flpb, ped/bikes		1.00	1.00	1.00		1.00	1.00			1.00	1.00	1.00
Frt		1.00	1.00	0.85		1.00	0.99			1.00	0.85	1.00
Flt Protected		0.95	1.00	1.00		0.95	1.00			0.96	1.00	0.95
Satd. Flow (prot)		1770	5085	1548		1770	5038			1600	1562	1681
Flt Permitted		0.95	1.00	1.00		0.95	1.00			0.96	1.00	0.95
Satd. Flow (perm)		1770	5085	1548		1770	5038			1600	1562	1681
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	5	11	1821	84	5	126	1400	74	95	11	116	84
RTOR Reduction (vph)	0	0	0	19	0	0	2	0	0	0	103	0
Lane Group Flow (vph)	0	16	1821	65	0	131	1472	0	0	106	13	47
Confl. Peds. (#/hr)								5			1	
Confl. Bikes (#/hr)				3								
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	15%	2%	2%	2%
Turn Type	Prot	Prot		Perm	Prot	Prot			Split		Perm	Split
Protected Phases	1	1	6		5	5	2		3	3		4
Permitted Phases				6							3	
Actuated Green, G (s)		2.2	82.8	82.8		15.0	94.5			16.7	16.7	12.0
Effective Green, g (s)		2.2	82.8	82.8		15.0	94.5			16.7	16.7	12.0
Actuated g/C Ratio		0.01	0.55	0.55		0.10	0.63			0.11	0.11	0.08
Clearance Time (s)		6.7	6.7	6.7		5.6	6.7			5.6	5.6	5.6
Vehicle Extension (s)		2.0	3.0	3.0		2.0	3.0			2.0	2.0	2.0
Lane Grp Cap (vph)		26	2807	854		177	3174			178	174	134
v/s Ratio Prot		0.01	c0.36			c0.07	0.29			c0.07		0.03
v/s Ratio Perm				0.04							0.01	
v/c Ratio		0.62	0.65	0.08		0.74	0.46			0.60	0.07	0.35
Uniform Delay, d1		73.5	23.5	15.7		65.6	14.5			63.4	59.7	65.3
Progression Factor		1.18	0.40	0.21		0.57	0.31			1.00	1.00	1.00
Incremental Delay, d2		20.7	0.9	0.1		9.8	0.3			3.5	0.1	0.6
Delay (s)		107.8	10.3	3.4		47.2	4.8			67.0	59.8	65.9
Level of Service		F	B	A		D	A			E	E	E
Approach Delay (s)			10.8				8.3			63.2		
Approach LOS			B				A			E		

Intersection Summary			
HCM Average Control Delay	14.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	23.5
Intersection Capacity Utilization	74.0%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	SBT	SBR
Lane Configurations		
Volume (vph)	10	30
Ideal Flow (vphpl)	1900	1900
Total Lost time (s)	5.6	5.6
Lane Util. Factor	0.95	1.00
Frpb, ped/bikes	1.00	0.98
Flpb, ped/bikes	1.00	1.00
Frt	1.00	0.85
Flt Protected	0.96	1.00
Satd. Flow (prot)	1704	1558
Flt Permitted	0.96	1.00
Satd. Flow (perm)	1704	1558
Peak-hour factor, PHF	0.95	0.95
Adj. Flow (vph)	11	32
RTOR Reduction (vph)	0	29
Lane Group Flow (vph)	48	3
Confl. Peds. (#/hr)		3
Confl. Bikes (#/hr)		
Heavy Vehicles (%)	2%	2%
Turn Type		Perm
Protected Phases	4	
Permitted Phases		4
Actuated Green, G (s)	12.0	12.0
Effective Green, g (s)	12.0	12.0
Actuated g/C Ratio	0.08	0.08
Clearance Time (s)	5.6	5.6
Vehicle Extension (s)	2.0	2.0
Lane Grp Cap (vph)	136	125
v/s Ratio Prot	c0.03	
v/s Ratio Perm		0.00
v/c Ratio	0.35	0.02
Uniform Delay, d1	65.3	63.6
Progression Factor	1.00	1.00
Incremental Delay, d2	0.6	0.0
Delay (s)	65.9	63.6
Level of Service	E	E
Approach Delay (s)	65.3	
Approach LOS	E	

Intersection Summary

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Lane Configurations												
Volume (vph)	80	220	1280	210	15	280	930	130	5	370	1930	350
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.7	5.7	5.7		6.7	5.7	5.7		6.3	5.3	5.3
Lane Util. Factor		0.97	0.91	1.00		0.97	0.91	1.00		0.97	0.95	1.00
Frpb, ped/bikes		1.00	1.00	0.99		1.00	1.00	0.98		1.00	1.00	0.99
Flpb, ped/bikes		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00
Frt		1.00	1.00	0.85		1.00	1.00	0.85		1.00	1.00	0.85
Flt Protected		0.95	1.00	1.00		0.95	1.00	1.00		0.95	1.00	1.00
Satd. Flow (prot)		3433	5085	1562		3433	5085	1553		3433	3539	1561
Flt Permitted		0.95	1.00	1.00		0.95	1.00	1.00		0.95	1.00	1.00
Satd. Flow (perm)		3433	5085	1562		3433	5085	1553		3433	3539	1561
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	84	232	1347	221	16	295	979	137	5	389	2032	368
RTOR Reduction (vph)	0	0	0	85	0	0	0	65	0	0	0	70
Lane Group Flow (vph)	0	316	1347	136	0	311	979	72	0	394	2032	298
Confl. Peds. (#/hr)								4				
Confl. Bikes (#/hr)				2				1				4
Turn Type	Prot	Prot		Perm	Prot	Prot		Perm	Prot	Prot		Perm
Protected Phases	1	1	6		5	5	2		3	3	8	
Permitted Phases				6				2				8
Actuated Green, G (s)		14.8	37.3	37.3		11.3	33.8	33.8		38.9	69.7	69.7
Effective Green, g (s)		14.8	37.3	37.3		11.3	33.8	33.8		38.9	69.7	69.7
Actuated g/C Ratio		0.10	0.25	0.25		0.08	0.23	0.23		0.26	0.46	0.46
Clearance Time (s)		6.7	5.7	5.7		6.7	5.7	5.7		6.3	5.3	5.3
Vehicle Extension (s)		2.0	2.0	2.0		2.0	2.0	2.0		2.0	2.0	2.0
Lane Grp Cap (vph)		339	1264	388		259	1146	350		890	1644	725
v/s Ratio Prot		0.09	c0.26			c0.09	0.19			0.11	c0.57	
v/s Ratio Perm				0.09				0.05				0.19
v/c Ratio		0.93	1.07	0.35		1.20	0.85	0.21		0.44	1.24	0.41
Uniform Delay, d1		67.1	56.4	46.4		69.3	55.7	47.2		46.5	40.1	26.6
Progression Factor		0.64	0.58	0.49		0.70	0.53	0.45		1.00	1.00	1.00
Incremental Delay, d2		27.7	42.8	2.1		119.1	7.5	1.2		0.1	111.7	0.1
Delay (s)		70.4	75.4	25.0		168.0	37.1	22.5		46.6	151.8	26.7
Level of Service		E	E	C		F	D	C		D	F	C
Approach Delay (s)			68.6				64.2				120.5	
Approach LOS			E				E				F	

Intersection Summary			
HCM Average Control Delay	88.7	HCM Level of Service	F
HCM Volume to Capacity ratio	1.17		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	23.0
Intersection Capacity Utilization	111.6%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBU	SBL	SBT	SBR
Lane Configurations				
Volume (vph)	10	170	730	170
Ideal Flow (vphpl)	1900	1900	1900	1900
Total Lost time (s)		6.3	5.3	5.3
Lane Util. Factor		0.97	0.95	1.00
Frpb, ped/bikes		1.00	1.00	0.98
Flpb, ped/bikes		1.00	1.00	1.00
Frt		1.00	1.00	0.85
Flt Protected		0.95	1.00	1.00
Satd. Flow (prot)		3433	3539	1550
Flt Permitted		0.95	1.00	1.00
Satd. Flow (perm)		3433	3539	1550
Peak-hour factor, PHF	0.95	0.95	0.95	0.95
Adj. Flow (vph)	11	179	768	179
RTOR Reduction (vph)	0	0	0	74
Lane Group Flow (vph)	0	190	768	105
Confl. Peds. (#/hr)				4
Confl. Bikes (#/hr)				4
Turn Type	Prot	Prot		Perm
Protected Phases	7	7	4	
Permitted Phases				4
Actuated Green, G (s)		7.7	38.5	38.5
Effective Green, g (s)		7.7	38.5	38.5
Actuated g/C Ratio		0.05	0.26	0.26
Clearance Time (s)		6.3	5.3	5.3
Vehicle Extension (s)		2.0	2.0	2.0
Lane Grp Cap (vph)		176	908	398
v/s Ratio Prot		0.06	c0.22	
v/s Ratio Perm				0.07
v/c Ratio		1.08	0.85	0.26
Uniform Delay, d1		71.2	52.9	44.5
Progression Factor		1.00	1.00	1.00
Incremental Delay, d2		90.6	7.0	0.1
Delay (s)		161.8	60.0	44.6
Level of Service		F	E	D
Approach Delay (s)			74.6	
Approach LOS			E	

Intersection Summary

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL
Lane Configurations												
Volume (vph)	10	80	1530	110	10	300	1180	100	20	140	780	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.6	5.7	5.7		5.6	5.7		5.6	5.3	5.3	5.6
Lane Util. Factor		1.00	0.91	1.00		0.97	0.91		1.00	1.00	0.88	1.00
Frpb, ped/bikes		1.00	1.00	0.98		1.00	1.00		1.00	1.00	0.98	1.00
Flpb, ped/bikes		1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00
Frt		1.00	1.00	0.85		1.00	0.99		1.00	1.00	0.85	1.00
Flt Protected		0.95	1.00	1.00		0.95	1.00		0.95	1.00	1.00	0.95
Satd. Flow (prot)		1770	5085	1553		3433	5015		1770	1863	2738	1770
Flt Permitted		0.95	1.00	1.00		0.95	1.00		0.95	1.00	1.00	0.95
Satd. Flow (perm)		1770	5085	1553		3433	5015		1770	1863	2738	1770
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	11	84	1611	116	11	316	1242	105	21	147	821	63
RTOR Reduction (vph)	0	0	0	34	0	0	5	0	0	0	395	0
Lane Group Flow (vph)	0	95	1611	82	0	327	1342	0	21	147	426	63
Confl. Peds. (#/hr)				4				2			3	
Confl. Bikes (#/hr)				2				1			1	
Turn Type	Prot	Prot		Perm	Prot	Prot			Prot		Perm	Prot
Protected Phases	1	1	6		5	5	2		3	8		7
Permitted Phases				6							8	
Actuated Green, G (s)		12.0	71.1	71.1		20.4	79.5		3.6	28.6	28.6	7.7
Effective Green, g (s)		12.0	71.1	71.1		20.4	79.5		3.6	28.6	28.6	7.7
Actuated g/C Ratio		0.08	0.47	0.47		0.14	0.53		0.02	0.19	0.19	0.05
Clearance Time (s)		5.6	5.7	5.7		5.6	5.7		5.6	5.3	5.3	5.6
Vehicle Extension (s)		2.0	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0
Lane Grp Cap (vph)		142	2410	736		467	2658		42	355	522	91
v/s Ratio Prot		0.05	c0.32			c0.10	0.27		0.01	0.08		c0.04
v/s Ratio Perm				0.05							c0.16	
v/c Ratio		0.67	0.67	0.11		0.70	0.50		0.50	0.41	0.82	0.69
Uniform Delay, d1		67.1	30.4	21.9		61.9	22.6		72.3	53.3	58.2	70.0
Progression Factor		1.05	0.38	0.09		0.63	0.14		1.00	1.00	1.00	1.00
Incremental Delay, d2		3.1	0.5	0.1		2.8	0.5		3.4	0.3	9.1	16.8
Delay (s)		73.8	12.1	2.0		41.9	3.7		75.7	53.6	67.3	86.7
Level of Service		E	B	A		D	A		E	D	E	F
Approach Delay (s)			14.7				11.1			65.4		
Approach LOS			B				B			E		

Intersection Summary			
HCM Average Control Delay	26.1	HCM Level of Service	C
HCM Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	27.5
Intersection Capacity Utilization	88.7%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBT	SBR
Lane Configurations	↑↑	
Volume (vph)	70	70
Ideal Flow (vphpl)	1900	1900
Total Lost time (s)	5.3	
Lane Util. Factor	0.95	
Frpb, ped/bikes	0.99	
Flpb, ped/bikes	1.00	
Frt	0.93	
Flt Protected	1.00	
Satd. Flow (prot)	3243	
Flt Permitted	1.00	
Satd. Flow (perm)	3243	
Peak-hour factor, PHF	0.95	0.95
Adj. Flow (vph)	74	74
RTOR Reduction (vph)	58	0
Lane Group Flow (vph)	90	0
Confl. Peds. (#/hr)		4
Confl. Bikes (#/hr)		1
Turn Type		
Protected Phases	4	
Permitted Phases		
Actuated Green, G (s)	32.7	
Effective Green, g (s)	32.7	
Actuated g/C Ratio	0.22	
Clearance Time (s)	5.3	
Vehicle Extension (s)	2.0	
Lane Grp Cap (vph)	707	
v/s Ratio Prot	c0.03	
v/s Ratio Perm		
v/c Ratio	0.13	
Uniform Delay, d1	47.2	
Progression Factor	1.00	
Incremental Delay, d2	0.0	
Delay (s)	47.2	
Level of Service	D	
Approach Delay (s)	59.0	
Approach LOS	E	

Intersection Summary

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL
Lane Configurations												
Volume (vph)	5	130	2230	170	100	270	1600	10	130	40	250	170
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.6	5.7			5.6	5.7		5.6	4.6		5.9
Lane Util. Factor		1.00	0.91			0.97	0.91		1.00	1.00		0.97
Frpb, ped/bikes		1.00	1.00			1.00	1.00		1.00	0.99		1.00
Flpb, ped/bikes		1.00	1.00			1.00	1.00		1.00	1.00		1.00
Frt		1.00	0.99			1.00	1.00		1.00	0.87		1.00
Flt Protected		0.95	1.00			0.95	1.00		0.95	1.00		0.95
Satd. Flow (prot)		1770	5020			3433	5079		1770	1603		3433
Flt Permitted		0.95	1.00			0.95	1.00		0.95	1.00		0.95
Satd. Flow (perm)		1770	5020			3433	5079		1770	1603		3433
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	5	137	2347	179	105	284	1684	11	137	42	263	179
RTOR Reduction (vph)	0	0	5	0	0	0	1	0	0	38	0	0
Lane Group Flow (vph)	0	142	2521	0	0	389	1694	0	137	267	0	179
Confl. Peds. (#/hr)				11				6				
Confl. Bikes (#/hr)				1				2			1	
Turn Type	Prot	Prot			Prot	Prot			Prot			Prot
Protected Phases	1	1	6		5	5	2		7	4		3
Permitted Phases												
Actuated Green, G (s)		16.3	72.7			14.4	70.8		17.0	28.7		12.4
Effective Green, g (s)		16.3	72.7			14.4	70.8		17.0	28.7		12.4
Actuated g/C Ratio		0.11	0.48			0.10	0.47		0.11	0.19		0.08
Clearance Time (s)		5.6	5.7			5.6	5.7		5.6	4.6		5.9
Vehicle Extension (s)		2.0	2.0			2.0	2.0		2.0	2.0		2.0
Lane Grp Cap (vph)		192	2433			330	2397		201	307		284
v/s Ratio Prot		0.08	c0.50			c0.11	0.33		c0.08	c0.17		0.05
v/s Ratio Perm												
v/c Ratio		0.74	1.04			1.18	0.71		0.68	0.87		0.63
Uniform Delay, d1		64.8	38.6			67.8	31.4		63.9	58.8		66.6
Progression Factor		0.92	0.51			0.97	0.68		1.00	1.00		1.00
Incremental Delay, d2		9.4	26.3			98.4	1.1		7.4	21.4		3.3
Delay (s)		69.2	46.1			164.4	22.5		71.3	80.3		69.9
Level of Service		E	D			F	C		E	F		E
Approach Delay (s)			47.3				49.0			77.5		
Approach LOS			D				D			E		

Intersection Summary			
HCM Average Control Delay	51.3	HCM Level of Service	D
HCM Volume to Capacity ratio	0.99		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	21.5
Intersection Capacity Utilization	99.7%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBT	SBR
Lane Configurations		
Volume (vph)	30	70
Ideal Flow (vphpl)	1900	1900
Total Lost time (s)	4.9	
Lane Util. Factor	1.00	
Frpb, ped/bikes	0.98	
Flpb, ped/bikes	1.00	
Frt	0.90	
Flt Protected	1.00	
Satd. Flow (prot)	1628	
Flt Permitted	1.00	
Satd. Flow (perm)	1628	
Peak-hour factor, PHF	0.95	0.95
Adj. Flow (vph)	32	74
RTOR Reduction (vph)	62	0
Lane Group Flow (vph)	44	0
Confl. Peds. (#/hr)		16
Confl. Bikes (#/hr)		2
Turn Type		
Protected Phases	8	
Permitted Phases		
Actuated Green, G (s)	24.1	
Effective Green, g (s)	24.1	
Actuated g/C Ratio	0.16	
Clearance Time (s)	4.9	
Vehicle Extension (s)	2.0	
Lane Grp Cap (vph)	262	
v/s Ratio Prot	0.03	
v/s Ratio Perm		
v/c Ratio	0.17	
Uniform Delay, d1	54.3	
Progression Factor	1.00	
Incremental Delay, d2	0.1	
Delay (s)	54.4	
Level of Service	D	
Approach Delay (s)	64.1	
Approach LOS	E	

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	2400	260	50	1430	0	0	0	0	480	0	1060
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0		5.6	5.7					6.7	6.7	6.7
Lane Util. Factor		0.91		0.97	0.91					0.95	0.95	0.88
Frpb, ped/bikes		1.00		1.00	1.00					1.00	1.00	0.99
Flpb, ped/bikes		1.00		1.00	1.00					1.00	1.00	1.00
Frt		0.99		1.00	1.00					1.00	1.00	0.85
Flt Protected		1.00		0.95	1.00					0.95	0.95	1.00
Satd. Flow (prot)		5002		3367	5085					1681	1681	2746
Flt Permitted		1.00		0.95	1.00					0.95	0.95	1.00
Satd. Flow (perm)		5002		3367	5085					1681	1681	2746
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	2526	274	53	1505	0	0	0	0	505	0	1116
RTOR Reduction (vph)	0	9	0	0	0	0	0	0	0	0	0	32
Lane Group Flow (vph)	0	2792	0	53	1505	0	0	0	0	252	253	1084
Confl. Peds. (#/hr)			3			2						2
Confl. Bikes (#/hr)			1			2						
Heavy Vehicles (%)	2%	2%	2%	4%	2%	2%	2%	2%	2%	2%	2%	2%
Turn Type				Prot						Split		Perm
Protected Phases		2		1	6					4	4	
Permitted Phases												4
Actuated Green, G (s)		75.0		3.0	83.9					53.7	53.7	53.7
Effective Green, g (s)		75.0		3.0	83.9					53.7	53.7	53.7
Actuated g/C Ratio		0.50		0.02	0.56					0.36	0.36	0.36
Clearance Time (s)		6.0		5.6	5.7					6.7	6.7	6.7
Vehicle Extension (s)		2.0		2.0	2.0					1.0	1.0	1.0
Lane Grp Cap (vph)		2501		67	2844					602	602	983
v/s Ratio Prot		c0.56		0.02	c0.30					0.15	0.15	
v/s Ratio Perm												c0.39
v/c Ratio		1.12		0.79	0.53					0.42	0.42	1.10
Uniform Delay, d1		37.5		73.2	20.7					36.4	36.4	48.1
Progression Factor		0.37		0.81	0.48					1.00	1.00	1.00
Incremental Delay, d2		54.0		36.6	0.6					0.2	0.2	61.1
Delay (s)		67.9		96.2	10.5					36.5	36.6	109.2
Level of Service		E		F	B					D	D	F
Approach Delay (s)		67.9			13.4			0.0			86.6	
Approach LOS		E			B			A			F	

Intersection Summary			
HCM Average Control Delay	58.8	HCM Level of Service	E
HCM Volume to Capacity ratio	1.06		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	12.7
Intersection Capacity Utilization	85.1%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	0	2880	1480	320	0	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	3032	1558	337	0	0
Pedestrians					1	
Lane Width (ft)					0.0	
Walking Speed (ft/s)					4.0	
Percent Blockage					0	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		515	937			
pX, platoon unblocked	0.84				0.59	0.84
vC, conflicting volume	1896				2569	520
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1417				0	0
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	100
cM capacity (veh/h)	403				598	916

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	WB 4
Volume Total	1011	1011	1011	519	519	519	337
Volume Left	0	0	0	0	0	0	0
Volume Right	0	0	0	0	0	0	337
cSH	1700	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.59	0.59	0.59	0.31	0.31	0.31	0.20
Queue Length 95th (ft)	0	0	0	0	0	0	0
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS							
Approach Delay (s)	0.0			0.0			
Approach LOS							

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	85.1%	ICU Level of Service	E
Analysis Period (min)	15		

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBU
Lane Configurations												
Volume (vph)	15	70	1660	1150	10	40	1250	130	440	100	180	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.6	5.7	4.0		5.6	5.7	5.7	5.6	5.6		
Lane Util. Factor		1.00	0.95	1.00		1.00	0.91	1.00	0.91	0.91		
Frpb, ped/bikes		1.00	1.00	0.99		1.00	1.00	0.98	1.00	0.99		
Flpb, ped/bikes		1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00		
Frt		1.00	1.00	0.85		1.00	1.00	0.85	1.00	0.94		
Flt Protected		0.95	1.00	1.00		0.95	1.00	1.00	0.95	0.98		
Satd. Flow (prot)		1770	3539	1563		1770	5085	1557	1610	3105		
Flt Permitted		0.95	1.00	1.00		0.95	1.00	1.00	0.95	0.98		
Satd. Flow (perm)		1770	3539	1563		1770	5085	1557	1610	3105		
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	16	74	1747	1211	11	42	1316	137	463	105	189	11
RTOR Reduction (vph)	0	0	0	0	0	0	0	51	0	53	0	0
Lane Group Flow (vph)	0	90	1747	1211	0	53	1316	86	259	445	0	0
Confl. Peds. (#/hr)				2				2			4	
Confl. Bikes (#/hr)				1				3			4	
Turn Type	Prot	Prot		Free	Prot	Prot		Perm	Split			Split
Protected Phases	1	1	6		5	5	2		3	3		4
Permitted Phases				Free				2				
Actuated Green, G (s)		15.2	81.8	150.0		5.5	72.1	72.1	26.4	26.4		
Effective Green, g (s)		15.2	81.8	150.0		5.5	72.1	72.1	26.4	26.4		
Actuated g/C Ratio		0.10	0.55	1.00		0.04	0.48	0.48	0.18	0.18		
Clearance Time (s)		5.6	5.7			5.6	5.7	5.7	5.6	5.6		
Vehicle Extension (s)		2.0	3.9			2.0	3.9	3.9	2.0	2.0		
Lane Grp Cap (vph)		179	1930	1563		65	2444	748	283	546		
v/s Ratio Prot		0.05	c0.49			0.03	0.26		0.16	0.14		
v/s Ratio Perm				c0.77				0.05				
v/c Ratio		0.50	0.91	0.77		0.82	0.54	0.11	0.92	0.82		
Uniform Delay, d1		63.8	30.6	0.0		71.7	27.3	21.4	60.7	59.5		
Progression Factor		0.66	0.35	1.00		1.00	1.00	1.00	0.72	0.68		
Incremental Delay, d2		0.2	2.0	0.9		50.2	0.9	0.3	31.1	8.5		
Delay (s)		42.0	12.8	0.9		121.9	28.1	21.7	75.1	49.2		
Level of Service		D	B	A		F	C	C	E	D		
Approach Delay (s)			8.9				30.9			58.0		
Approach LOS			A				C			E		

Intersection Summary			
HCM Average Control Delay	27.1	HCM Level of Service	C
HCM Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	5.7
Intersection Capacity Utilization	91.1%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBL	SBT	SBR
Lane Configurations			
Volume (vph)	200	70	110
Ideal Flow (vphpl)	1900	1900	1900
Total Lost time (s)	4.6	4.6	4.6
Lane Util. Factor	0.95	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.99
Flpb, ped/bikes	1.00	1.00	1.00
Frt	1.00	1.00	0.85
Flt Protected	0.95	0.98	1.00
Satd. Flow (prot)	1681	1726	1561
Flt Permitted	0.95	0.98	1.00
Satd. Flow (perm)	1681	1726	1561
Peak-hour factor, PHF	0.95	0.95	0.95
Adj. Flow (vph)	211	74	116
RTOR Reduction (vph)	0	0	105
Lane Group Flow (vph)	146	150	11
Confl. Peds. (#/hr)			
Confl. Bikes (#/hr)			1
Turn Type	Split		Perm
Protected Phases	4	4	
Permitted Phases			4
Actuated Green, G (s)	14.8	14.8	14.8
Effective Green, g (s)	14.8	14.8	14.8
Actuated g/C Ratio	0.10	0.10	0.10
Clearance Time (s)	4.6	4.6	4.6
Vehicle Extension (s)	2.0	2.0	2.0
Lane Grp Cap (vph)	166	170	154
v/s Ratio Prot	0.09	0.09	
v/s Ratio Perm			0.01
v/c Ratio	0.88	0.88	0.07
Uniform Delay, d1	66.7	66.7	61.4
Progression Factor	1.00	1.00	1.00
Incremental Delay, d2	36.3	36.7	0.1
Delay (s)	103.0	103.5	61.5
Level of Service	F	F	E
Approach Delay (s)		91.5	
Approach LOS		F	

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	230	10	20	20	30	30	250	430	20	60	400	800
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	5.5			5.5	5.5	5.5	5.5		5.5	5.5	5.5
Lane Util. Factor	0.95	0.95			1.00	1.00	1.00	0.95		1.00	1.00	1.00
Frt	1.00	0.98			1.00	0.85	1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	0.96			0.98	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1681	1665			1827	1583	1770	3516		1770	1863	1583
Flt Permitted	0.95	0.96			0.98	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1681	1665			1827	1583	1770	3516		1770	1863	1583
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	242	11	21	21	32	32	263	453	21	63	421	842
RTOR Reduction (vph)	0	5	0	0	0	30	0	2	0	0	0	182
Lane Group Flow (vph)	138	131	0	0	53	2	263	472	0	63	421	660
Turn Type	Split			Split		Perm	Prot			Prot		pm+ov
Protected Phases	4	4		8	8		5	2		1	6	4
Permitted Phases						8						6
Actuated Green, G (s)	22.4	22.4			9.5	9.5	25.0	87.9		8.2	71.1	93.5
Effective Green, g (s)	22.4	22.4			9.5	9.5	25.0	87.9		8.2	71.1	93.5
Actuated g/C Ratio	0.15	0.15			0.06	0.06	0.17	0.59		0.05	0.47	0.62
Clearance Time (s)	5.5	5.5			5.5	5.5	5.5	5.5		5.5	5.5	5.5
Vehicle Extension (s)	2.0	2.0			2.0	2.0	2.0	2.0		2.0	2.0	2.0
Lane Grp Cap (vph)	251	249			116	100	295	2060		97	883	1045
v/s Ratio Prot	0.08	0.08			c0.03		c0.15	0.13		0.04	0.23	c0.09
v/s Ratio Perm						0.00						0.32
v/c Ratio	0.55	0.53			0.46	0.02	0.89	0.23		0.65	0.48	0.63
Uniform Delay, d1	59.1	58.9			67.8	65.9	61.2	14.9		69.5	26.8	17.5
Progression Factor	1.00	1.00			1.00	1.00	1.00	1.00		0.90	1.05	1.01
Incremental Delay, d2	1.3	0.9			1.0	0.0	26.2	0.0		6.6	1.1	0.6
Delay (s)	60.4	59.8			68.8	65.9	87.4	14.9		69.2	29.3	18.2
Level of Service	E	E			E	E	F	B		E	C	B
Approach Delay (s)		60.1			67.7			40.7			24.2	
Approach LOS		E			E			D			C	

Intersection Summary			
HCM Average Control Delay	34.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	16.5
Intersection Capacity Utilization	81.3%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL
Lane Configurations												
Volume (vph)	60	60	90	90	90	60	20	110	1030	160	10	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.6	4.6	4.6	5.6	4.6	4.6		5.6	5.3	5.3		5.6
Lane Util. Factor	1.00	1.00	1.00	0.97	1.00	1.00		1.00	0.95	1.00		1.00
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	0.98		1.00	1.00	0.97		1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00		1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	1.00	0.85		1.00
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.95	1.00	1.00		0.95
Satd. Flow (prot)	1770	1863	1559	3433	1863	1555		1770	3539	1529		1770
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00		0.95	1.00	1.00		0.95
Satd. Flow (perm)	1770	1863	1559	3433	1863	1555		1770	3539	1529		1770
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	63	63	95	95	95	63	21	116	1084	168	11	42
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	91	0	0
Lane Group Flow (vph)	63	63	95	95	95	63	0	137	1084	77	0	53
Confl. Peds. (#/hr)						4				8		
Confl. Bikes (#/hr)	1		2			2		1		3		1
Turn Type	Prot		Perm	Prot		Perm	Prot	Prot		Perm	Prot	Prot
Protected Phases	3	8		7	4		1	1	6		5	5
Permitted Phases			8			4				6		
Actuated Green, G (s)	4.6	10.2	10.2	3.7	9.3	9.3		9.8	33.1	33.1		3.7
Effective Green, g (s)	4.6	10.2	10.2	3.7	9.3	9.3		9.8	33.1	33.1		3.7
Actuated g/C Ratio	0.06	0.14	0.14	0.05	0.13	0.13		0.14	0.46	0.46		0.05
Clearance Time (s)	5.6	4.6	4.6	5.6	4.6	4.6		5.6	5.3	5.3		5.6
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0		2.0
Lane Grp Cap (vph)	113	265	221	177	241	201		242	1631	705		91
v/s Ratio Prot	c0.04	0.03		0.03	0.05			c0.08	c0.31			0.03
v/s Ratio Perm			c0.06			0.04				0.05		
v/c Ratio	0.56	0.24	0.43	0.54	0.39	0.31		0.57	0.66	0.11		0.58
Uniform Delay, d1	32.6	27.3	28.1	33.2	28.7	28.4		29.0	15.0	11.0		33.3
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00		1.00
Incremental Delay, d2	3.4	0.2	0.5	1.6	0.4	0.3		1.8	0.8	0.0		6.0
Delay (s)	36.0	27.5	28.6	34.8	29.1	28.7		30.8	15.8	11.0		39.3
Level of Service	D	C	C	C	C	C		C	B	B		D
Approach Delay (s)		30.4			31.1				16.7			
Approach LOS		C			C				B			

Intersection Summary			
HCM Average Control Delay	20.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	71.8	Sum of lost time (s)	16.5
Intersection Capacity Utilization	60.4%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBT	SBR
Lane Configurations	↑↱	
Volume (vph)	820	40
Ideal Flow (vphpl)	1900	1900
Total Lost time (s)	5.3	
Lane Util. Factor	0.95	
Frpb, ped/bikes	1.00	
Flpb, ped/bikes	1.00	
Frt	0.99	
Flt Protected	1.00	
Satd. Flow (prot)	3509	
Flt Permitted	1.00	
Satd. Flow (perm)	3509	
Peak-hour factor, PHF	0.95	0.95
Adj. Flow (vph)	863	42
RTOR Reduction (vph)	3	0
Lane Group Flow (vph)	902	0
Confl. Peds. (#/hr)		5
Confl. Bikes (#/hr)		3
Turn Type		
Protected Phases	2	
Permitted Phases		
Actuated Green, G (s)	27.0	
Effective Green, g (s)	27.0	
Actuated g/C Ratio	0.38	
Clearance Time (s)	5.3	
Vehicle Extension (s)	2.0	
Lane Grp Cap (vph)	1320	
v/s Ratio Prot	0.26	
v/s Ratio Perm		
v/c Ratio	0.68	
Uniform Delay, d1	18.8	
Progression Factor	1.00	
Incremental Delay, d2	1.2	
Delay (s)	20.0	
Level of Service	B	
Approach Delay (s)	21.1	
Approach LOS	C	

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	20	290	30	80	190	30	150	170	110	10	60	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	5.5		5.5	5.5			5.5			5.5	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Frt	1.00	0.99		1.00	0.98			0.97			0.97	
Flt Protected	0.95	1.00		0.95	1.00			0.98			0.99	
Satd. Flow (prot)	1770	1836		1770	1824			1768			1797	
Flt Permitted	0.95	1.00		0.95	1.00			0.98			0.99	
Satd. Flow (perm)	1770	1836		1770	1824			1768			1797	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	21	305	32	84	200	32	158	179	116	11	63	21
RTOR Reduction (vph)	0	4	0	0	5	0	0	12	0	0	12	0
Lane Group Flow (vph)	21	333	0	84	227	0	0	441	0	0	83	0
Turn Type	Prot			Prot			Split			Split		
Protected Phases	7	4		3	8		2	2		6	6	
Permitted Phases												
Actuated Green, G (s)	1.7	21.2		4.6	24.1			24.4			7.5	
Effective Green, g (s)	1.7	21.2		4.6	24.1			24.4			7.5	
Actuated g/C Ratio	0.02	0.27		0.06	0.30			0.31			0.09	
Clearance Time (s)	5.5	5.5		5.5	5.5			5.5			5.5	
Vehicle Extension (s)	2.0	2.0		2.0	2.0			2.0			2.0	
Lane Grp Cap (vph)	38	488		102	552			541			169	
v/s Ratio Prot	0.01	c0.18		c0.05	c0.12			c0.25			c0.05	
v/s Ratio Perm												
v/c Ratio	0.55	0.68		0.82	0.41			0.81			0.49	
Uniform Delay, d1	38.6	26.2		37.1	22.1			25.6			34.3	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	9.5	3.1		37.7	0.2			8.7			0.8	
Delay (s)	48.1	29.4		74.9	22.3			34.2			35.1	
Level of Service	D	C		E	C			C			D	
Approach Delay (s)		30.5			36.3			34.2			35.1	
Approach LOS		C			D			C			D	

Intersection Summary			
HCM Average Control Delay	33.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	79.7	Sum of lost time (s)	27.5
Intersection Capacity Utilization	65.9%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	290	120	20	20	30	70	10	2000	60	70	790	260
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.6	4.6	4.6	5.6	5.6	5.6	6.3	5.3		6.3	5.3	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00		1.00	0.96	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1863	1583	1770	1863	1583	1770	3524		1770	3408	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	1863	1583	1770	1863	1583	1770	3524		1770	3408	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	305	126	21	21	32	74	11	2105	63	74	832	274
RTOR Reduction (vph)	0	0	16	0	0	66	0	1	0	0	16	0
Lane Group Flow (vph)	305	126	5	21	32	8	11	2167	0	74	1090	0
Turn Type	Prot		Perm	Prot		Perm	Prot			Prot		
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases			8			4						
Actuated Green, G (s)	17.6	28.3	28.3	2.2	11.9	11.9	0.8	71.1		5.8	76.1	
Effective Green, g (s)	17.6	28.3	28.3	2.2	11.9	11.9	0.8	71.1		5.8	76.1	
Actuated g/C Ratio	0.14	0.22	0.22	0.02	0.09	0.09	0.01	0.55		0.04	0.59	
Clearance Time (s)	5.6	4.6	4.6	5.6	5.6	5.6	6.3	5.3		6.3	5.3	
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	241	408	347	30	172	146	11	1939		79	2007	
v/s Ratio Prot	c0.17	c0.07		0.01	0.02		0.01	c0.61		c0.04	c0.32	
v/s Ratio Perm			0.00			0.00						
v/c Ratio	1.27	0.31	0.01	0.70	0.19	0.05	1.00	1.12		0.94	0.54	
Uniform Delay, d1	55.8	42.3	39.5	63.2	54.2	53.5	64.2	29.0		61.5	16.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	148.2	0.2	0.0	44.4	0.2	0.1	271.4	60.5		78.5	0.2	
Delay (s)	204.0	42.4	39.5	107.6	54.4	53.6	335.6	89.6		140.0	16.2	
Level of Service	F	D	D	F	D	D	F	F		F	B	
Approach Delay (s)		151.3			62.7			90.8			24.0	
Approach LOS		F			E			F			C	

Intersection Summary			
HCM Average Control Delay	76.8	HCM Level of Service	E
HCM Volume to Capacity ratio	1.05		
Actuated Cycle Length (s)	129.2	Sum of lost time (s)	22.5
Intersection Capacity Utilization	90.5%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Lane Configurations												
Volume (vph)	130	0	140	0	0	0	130	470	0	5	0	410
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.6		5.6				5.6	4.6		5.6		4.6
Lane Util. Factor	1.00		1.00				1.00	0.95		1.00		0.95
Frt	1.00		0.85				1.00	1.00		1.00		0.99
Flt Protected	0.95		1.00				0.95	1.00		0.95		1.00
Satd. Flow (prot)	1770		1583				1770	3539		1770		3515
Flt Permitted	0.95		1.00				0.95	1.00		0.95		1.00
Satd. Flow (perm)	1770		1583				1770	3539		1770		3515
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	137	0	147	0	0	0	137	495	0	5	0	432
RTOR Reduction (vph)	0	0	102	0	0	0	0	0	0	0	0	4
Lane Group Flow (vph)	137	0	45	0	0	0	137	495	0	5	0	449
Turn Type	Prot		custom	Prot			Prot			Prot		
Protected Phases	3			7	4		1	6		5		2
Permitted Phases			8									
Actuated Green, G (s)	9.6		18.9				9.6	26.9		0.5		17.8
Effective Green, g (s)	9.6		18.9				9.6	26.9		0.5		17.8
Actuated g/C Ratio	0.15		0.30				0.15	0.43		0.01		0.29
Clearance Time (s)	5.6		5.6				5.6	4.6		5.6		4.6
Vehicle Extension (s)	2.0		2.0				2.0	2.0		2.0		2.0
Lane Grp Cap (vph)	274		482				274	1533		14		1008
v/s Ratio Prot	c0.08						c0.08	0.14		0.00		c0.13
v/s Ratio Perm			c0.03									
v/c Ratio	0.50		0.09				0.50	0.32		0.36		0.45
Uniform Delay, d1	24.1		15.5				24.1	11.6		30.6		18.1
Progression Factor	1.00		1.00				1.00	1.00		1.00		1.00
Incremental Delay, d2	0.5		0.0				0.5	0.0		5.6		0.1
Delay (s)	24.6		15.5				24.6	11.6		36.2		18.2
Level of Service	C		B				C	B		D		B
Approach Delay (s)		19.9			0.0			14.4				18.4
Approach LOS		B			A			B				B

Intersection Summary			
HCM Average Control Delay	16.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.39		
Actuated Cycle Length (s)	62.1	Sum of lost time (s)	15.8
Intersection Capacity Utilization	38.2%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBR
Lane Configurations	
Volume (vph)	20
Ideal Flow (vphpl)	1900
Total Lost time (s)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Peak-hour factor, PHF	0.95
Adj. Flow (vph)	21
RTOR Reduction (vph)	0
Lane Group Flow (vph)	0
Turn Type	
Protected Phases	
Permitted Phases	
Actuated Green, G (s)	
Effective Green, g (s)	
Actuated g/C Ratio	
Clearance Time (s)	
Vehicle Extension (s)	
Lane Grp Cap (vph)	
v/s Ratio Prot	
v/s Ratio Perm	
v/c Ratio	
Uniform Delay, d1	
Progression Factor	
Incremental Delay, d2	
Delay (s)	
Level of Service	
Approach Delay (s)	
Approach LOS	

Intersection Summary

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	70	60	90	1970	820	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.6		5.3	5.3	5.3	
Lane Util. Factor	1.00		1.00	0.95	0.95	
Frt	0.94		1.00	1.00	0.99	
Flt Protected	0.97		0.95	1.00	1.00	
Satd. Flow (prot)	1701		1770	3539	3515	
Flt Permitted	0.97		0.95	1.00	1.00	
Satd. Flow (perm)	1701		1770	3539	3515	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	74	63	95	2074	863	42
RTOR Reduction (vph)	43	0	0	0	3	0
Lane Group Flow (vph)	94	0	95	2074	902	0
Turn Type			Prot			
Protected Phases	3		1	6	2	
Permitted Phases						
Actuated Green, G (s)	11.1		7.0	55.4	43.1	
Effective Green, g (s)	11.1		7.0	55.4	43.1	
Actuated g/C Ratio	0.15		0.09	0.73	0.56	
Clearance Time (s)	4.6		5.3	5.3	5.3	
Vehicle Extension (s)	2.0		2.0	2.0	2.0	
Lane Grp Cap (vph)	247		162	2566	1983	
v/s Ratio Prot	c0.06		0.05	c0.59	0.26	
v/s Ratio Perm						
v/c Ratio	0.38		0.59	0.81	0.46	
Uniform Delay, d1	29.5		33.3	7.0	9.8	
Progression Factor	1.00		1.00	1.00	1.00	
Incremental Delay, d2	0.4		3.5	1.9	0.1	
Delay (s)	29.9		36.8	8.8	9.8	
Level of Service	C		D	A	A	
Approach Delay (s)	29.9			10.0	9.8	
Approach LOS	C			B	A	

Intersection Summary			
HCM Average Control Delay	10.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	76.4	Sum of lost time (s)	9.9
Intersection Capacity Utilization	70.3%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Volume (vph)	90	40	40	5	180	50	160	10	1580	280	350	510
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.6	7.2			5.6	5.6	6.3	6.3	5.3	5.3	6.3	5.3
Lane Util. Factor	1.00	1.00			0.97	1.00	0.88	1.00	0.95	1.00	0.97	0.95
Frpb, ped/bikes	1.00	0.99			1.00	1.00	0.99	1.00	1.00	0.98	1.00	1.00
Flpb, ped/bikes	1.00	1.00			1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.93			1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99
Flt Protected	0.95	1.00			0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	1711			3433	1863	2757	1770	3539	1558	3433	3483
Flt Permitted	0.95	1.00			0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1770	1711			3433	1863	2757	1770	3539	1558	3433	3483
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	95	42	42	5	189	53	168	11	1663	295	368	537
RTOR Reduction (vph)	0	29	0	0	0	0	38	0	0	72	0	3
Lane Group Flow (vph)	95	55	0	0	194	53	130	11	1663	223	368	587
Confl. Peds. (#/hr)			2									
Confl. Bikes (#/hr)							2			9		
Turn Type	Prot			Prot	Prot		pm+ov	Prot		Perm	Prot	
Protected Phases	3	8		7	7	4	5	1	6		5	2
Permitted Phases							4			6		
Actuated Green, G (s)	12.8	15.1			7.5	11.4	25.2	0.8	68.5	68.5	13.8	81.5
Effective Green, g (s)	12.8	15.1			7.5	11.4	25.2	0.8	68.5	68.5	13.8	81.5
Actuated g/C Ratio	0.10	0.12			0.06	0.09	0.19	0.01	0.53	0.53	0.11	0.63
Clearance Time (s)	5.6	7.2			5.6	5.6	6.3	6.3	5.3	5.3	6.3	5.3
Vehicle Extension (s)	2.0	2.0			2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	175	200			199	164	537	11	1875	825	366	2195
v/s Ratio Prot	0.05	c0.03			c0.06	c0.03	0.03	0.01	c0.47		c0.11	0.17
v/s Ratio Perm							0.02			0.14		
v/c Ratio	0.54	0.27			0.97	0.32	0.24	1.00	0.89	0.27	1.01	0.27
Uniform Delay, d1	55.5	52.1			60.8	55.3	44.0	64.2	27.0	16.7	57.8	10.6
Progression Factor	1.00	1.00			1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.8	0.3			55.9	0.4	0.1	271.4	5.3	0.1	48.4	0.0
Delay (s)	57.3	52.4			116.7	55.7	44.1	335.6	32.3	16.7	106.2	10.6
Level of Service	E	D			F	E	D	F	C	B	F	B
Approach Delay (s)		55.0				79.5			31.7			47.3
Approach LOS		D				E			C			D

Intersection Summary			
HCM Average Control Delay	42.8	HCM Level of Service	D
HCM Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	129.3	Sum of lost time (s)	30.0
Intersection Capacity Utilization	82.5%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBR
Lane Configurations	
Volume (vph)	50
Ideal Flow (vphpl)	1900
Total Lost time (s)	
Lane Util. Factor	
Frpb, ped/bikes	
Flpb, ped/bikes	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Peak-hour factor, PHF	0.95
Adj. Flow (vph)	53
RTOR Reduction (vph)	0
Lane Group Flow (vph)	0
Confl. Peds. (#/hr)	2
Confl. Bikes (#/hr)	3
Turn Type	
Protected Phases	
Permitted Phases	
Actuated Green, G (s)	
Effective Green, g (s)	
Actuated g/C Ratio	
Clearance Time (s)	
Vehicle Extension (s)	
Lane Grp Cap (vph)	
v/s Ratio Prot	
v/s Ratio Perm	
v/c Ratio	
Uniform Delay, d1	
Progression Factor	
Incremental Delay, d2	
Delay (s)	
Level of Service	
Approach Delay (s)	
Approach LOS	

Intersection Summary

Movement	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Volume (vph)	10	50	1000	10	0	470	100	10	30	10	600	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.6	6.6	6.6		6.6	6.6	5.6	5.6	5.6	5.6	4.6
Lane Util. Factor		0.97	0.95	1.00		0.95	1.00	0.97	0.95	1.00	0.97	0.95
Frpb, ped/bikes		1.00	1.00	0.99		1.00	0.98	1.00	1.00	0.99	1.00	1.00
Flpb, ped/bikes		1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		1.00	1.00	0.85		1.00	0.85	1.00	1.00	0.85	1.00	1.00
Flt Protected		0.95	1.00	1.00		1.00	1.00	0.95	1.00	1.00	0.95	1.00
Satd. Flow (prot)		3433	3539	1563		3539	1559	3433	3539	1560	3433	3539
Flt Permitted		0.95	1.00	1.00		1.00	1.00	0.95	1.00	1.00	0.95	1.00
Satd. Flow (perm)		3433	3539	1563		3539	1559	3433	3539	1560	3433	3539
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	11	53	1053	11	0	495	105	11	32	11	632	53
RTOR Reduction (vph)	0	0	0	6	0	0	77	0	0	10	0	0
Lane Group Flow (vph)	0	64	1053	5	0	495	28	11	32	1	632	53
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)				1			4			1	1	
Turn Type	Prot	Prot		Perm	Prot		Perm	Prot		Perm	Prot	
Protected Phases	3	3	8		7	4		1	6		5	2
Permitted Phases				8			4			6		
Actuated Green, G (s)		4.6	29.7	29.7		19.5	19.5	0.6	6.3	6.3	19.9	26.6
Effective Green, g (s)		4.6	29.7	29.7		19.5	19.5	0.6	6.3	6.3	19.9	26.6
Actuated g/C Ratio		0.06	0.40	0.40		0.26	0.26	0.01	0.09	0.09	0.27	0.36
Clearance Time (s)		5.6	6.6	6.6		6.6	6.6	5.6	5.6	5.6	5.6	4.6
Vehicle Extension (s)		2.0	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)		214	1426	630		936	412	28	303	133	927	1277
v/s Ratio Prot		0.02	c0.30			0.14		0.00	0.01		c0.18	0.01
v/s Ratio Perm				0.00			0.02			0.00		
v/c Ratio		0.30	0.74	0.01		0.53	0.07	0.39	0.11	0.01	0.68	0.04
Uniform Delay, d1		33.0	18.7	13.2		23.2	20.3	36.4	31.1	30.8	24.1	15.3
Progression Factor		1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		0.3	1.8	0.0		0.3	0.0	3.3	0.1	0.0	1.7	0.0
Delay (s)		33.3	20.5	13.2		23.4	20.3	39.7	31.2	30.8	25.7	15.3
Level of Service		C	C	B		C	C	D	C	C	C	B
Approach Delay (s)			21.1			22.9			32.8			23.6
Approach LOS			C			C			C			C

Intersection Summary			
HCM Average Control Delay	22.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	73.7	Sum of lost time (s)	12.2
Intersection Capacity Utilization	63.8%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBR
Lane Configurations	
Volume (vph)	110
Ideal Flow (vphpl)	1900
Total Lost time (s)	4.6
Lane Util. Factor	1.00
Frpb, ped/bikes	0.99
Flpb, ped/bikes	1.00
Frt	0.85
Flt Protected	1.00
Satd. Flow (prot)	1561
Flt Permitted	1.00
Satd. Flow (perm)	1561
Peak-hour factor, PHF	0.95
Adj. Flow (vph)	116
RTOR Reduction (vph)	74
Lane Group Flow (vph)	42
Confl. Peds. (#/hr)	3
Confl. Bikes (#/hr)	1
Turn Type	Perm
Protected Phases	
Permitted Phases	2
Actuated Green, G (s)	26.6
Effective Green, g (s)	26.6
Actuated g/C Ratio	0.36
Clearance Time (s)	4.6
Vehicle Extension (s)	2.0
Lane Grp Cap (vph)	563
v/s Ratio Prot	
v/s Ratio Perm	c0.03
v/c Ratio	0.07
Uniform Delay, d1	15.5
Progression Factor	1.00
Incremental Delay, d2	0.0
Delay (s)	15.5
Level of Service	B
Approach Delay (s)	
Approach LOS	

Intersection Summary

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Lane Configurations												
Volume (vph)	5	400	410	140	5	50	170	190	45	170	650	80
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.6	4.9	4.9		5.6	4.9	4.9		6.3	5.3	5.3
Lane Util. Factor		0.97	0.95	1.00		0.97	0.95	1.00		0.97	0.95	1.00
Frpb, ped/bikes		1.00	1.00	0.98		1.00	1.00	0.98		1.00	1.00	0.98
Flpb, ped/bikes		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00
Frt		1.00	1.00	0.85		1.00	1.00	0.85		1.00	1.00	0.85
Flt Protected		0.95	1.00	1.00		0.95	1.00	1.00		0.95	1.00	1.00
Satd. Flow (prot)		3433	3539	1546		3433	3539	1549		3433	3539	1555
Flt Permitted		0.95	1.00	1.00		0.95	1.00	1.00		0.95	1.00	1.00
Satd. Flow (perm)		3433	3539	1546		3433	3539	1549		3433	3539	1555
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	5	421	432	147	5	53	179	200	47	179	684	84
RTOR Reduction (vph)	0	0	0	102	0	0	0	150	0	0	0	63
Lane Group Flow (vph)	0	426	432	45	0	58	179	50	0	226	684	21
Confl. Peds. (#/hr)				14				5				7
Confl. Bikes (#/hr)				4				6				1
Turn Type	Prot	Prot		Perm	Prot	Prot		Perm	Prot	Prot		Perm
Protected Phases	3	3	8		7	7	4		1	1	6	
Permitted Phases				8				4				6
Actuated Green, G (s)		12.0	24.1	24.1		3.0	15.1	15.1		8.8	19.8	19.8
Effective Green, g (s)		12.0	24.1	24.1		3.0	15.1	15.1		8.8	19.8	19.8
Actuated g/C Ratio		0.15	0.30	0.30		0.04	0.19	0.19		0.11	0.25	0.25
Clearance Time (s)		5.6	4.9	4.9		5.6	4.9	4.9		6.3	5.3	5.3
Vehicle Extension (s)		2.0	2.0	2.0		2.0	2.0	2.0		2.0	2.0	2.0
Lane Grp Cap (vph)		520	1077	470		130	675	295		381	885	389
v/s Ratio Prot		c0.12	c0.12			0.02	0.05			0.07	c0.19	
v/s Ratio Perm				0.03				0.03				0.01
v/c Ratio		0.82	0.40	0.10		0.45	0.27	0.17		0.59	0.77	0.05
Uniform Delay, d1		32.5	21.8	19.7		37.3	27.3	26.8		33.5	27.6	22.6
Progression Factor		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2		9.3	0.1	0.0		0.9	0.1	0.1		1.7	3.9	0.0
Delay (s)		41.8	21.9	19.8		38.2	27.4	26.9		35.1	31.5	22.6
Level of Service		D	C	B		D	C	C		D	C	C
Approach Delay (s)			30.0				28.6				31.6	
Approach LOS			C				C				C	

Intersection Summary			
HCM Average Control Delay	29.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	79.2	Sum of lost time (s)	17.2
Intersection Capacity Utilization	74.4%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBU	SBL	SBT	SBR
Lane Configurations				
Volume (vph)	15	310	410	340
Ideal Flow (vphpl)	1900	1900	1900	1900
Total Lost time (s)		6.3	5.3	5.3
Lane Util. Factor		0.97	0.95	1.00
Frpb, ped/bikes		1.00	1.00	0.98
Flpb, ped/bikes		1.00	1.00	1.00
Frt		1.00	1.00	0.85
Flt Protected		0.95	1.00	1.00
Satd. Flow (prot)		3433	3539	1556
Flt Permitted		0.95	1.00	1.00
Satd. Flow (perm)		3433	3539	1556
Peak-hour factor, PHF	0.95	0.95	0.95	0.95
Adj. Flow (vph)	16	326	432	358
RTOR Reduction (vph)	0	0	0	262
Lane Group Flow (vph)	0	342	432	96
Confl. Peds. (#/hr)				4
Confl. Bikes (#/hr)				3
Turn Type	Prot	Prot		Perm
Protected Phases	5	5	2	
Permitted Phases				2
Actuated Green, G (s)		10.2	21.2	21.2
Effective Green, g (s)		10.2	21.2	21.2
Actuated g/C Ratio		0.13	0.27	0.27
Clearance Time (s)		6.3	5.3	5.3
Vehicle Extension (s)		2.0	2.0	2.0
Lane Grp Cap (vph)		442	947	417
v/s Ratio Prot		c0.10	0.12	
v/s Ratio Perm				0.06
v/c Ratio		0.77	0.46	0.23
Uniform Delay, d1		33.4	24.2	22.6
Progression Factor		1.00	1.00	1.00
Incremental Delay, d2		7.5	0.1	0.1
Delay (s)		40.9	24.3	22.7
Level of Service		D	C	C
Approach Delay (s)			28.8	
Approach LOS			C	

Intersection Summary

Movement	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Volume (vph)	5	270	170	50	70	120	110	110	1040	40	260	980
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.6	5.3	5.3	5.6	5.3	5.3	5.6	5.3	5.3	5.6	5.3
Lane Util. Factor		0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.95
Frpb, ped/bikes		1.00	1.00	0.98	1.00	1.00	0.99	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00
Flt Protected		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Satd. Flow (prot)		3433	3539	1546	3433	3539	1561	3433	3539	1583	3433	3539
Flt Permitted		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Satd. Flow (perm)		3433	3539	1546	3433	3539	1561	3433	3539	1583	3433	3539
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	5	284	179	53	74	126	116	116	1095	42	274	1032
RTOR Reduction (vph)	0	0	0	43	0	0	98	0	0	21	0	0
Lane Group Flow (vph)	0	289	179	10	74	126	18	116	1095	21	274	1032
Confl. Peds. (#/hr)							1					
Confl. Bikes (#/hr)				10			1					
Turn Type	Prot	Prot		Perm	Prot		Perm	Prot		Perm	Prot	
Protected Phases	1	1	6		5	2		3	8		7	4
Permitted Phases				6			2			8		
Actuated Green, G (s)		6.5	14.5	14.5	3.9	11.9	11.9	5.1	30.2	30.2	6.5	31.6
Effective Green, g (s)		6.5	14.5	14.5	3.9	11.9	11.9	5.1	30.2	30.2	6.5	31.6
Actuated g/C Ratio		0.08	0.19	0.19	0.05	0.15	0.15	0.07	0.39	0.39	0.08	0.41
Clearance Time (s)		5.6	5.3	5.3	5.6	5.3	5.3	5.6	5.3	5.3	5.6	5.3
Vehicle Extension (s)		2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)		290	667	292	174	548	242	228	1390	622	290	1454
v/s Ratio Prot		c0.08	c0.05		0.02	0.04		0.03	c0.31		c0.08	0.29
v/s Ratio Perm				0.01			0.01			0.01		
v/c Ratio		1.00	0.27	0.03	0.43	0.23	0.07	0.51	0.79	0.03	0.94	0.71
Uniform Delay, d1		35.2	26.7	25.5	35.4	28.5	27.8	34.7	20.5	14.4	35.0	18.8
Progression Factor		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		51.5	0.1	0.0	0.6	0.1	0.0	0.7	2.8	0.0	37.7	1.3
Delay (s)		86.7	26.7	25.5	36.0	28.6	27.8	35.3	23.3	14.4	72.7	20.2
Level of Service		F	C	C	D	C	C	D	C	B	E	C
Approach Delay (s)			59.9			30.0			24.1			29.3
Approach LOS			E			C			C			C

Intersection Summary			
HCM Average Control Delay	32.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	76.9	Sum of lost time (s)	21.8
Intersection Capacity Utilization	66.8%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBR
Lane Configurations	
Volume (vph)	150
Ideal Flow (vphpl)	1900
Total Lost time (s)	5.3
Lane Util. Factor	1.00
Frpb, ped/bikes	0.99
Flpb, ped/bikes	1.00
Frt	0.85
Flt Protected	1.00
Satd. Flow (prot)	1562
Flt Permitted	1.00
Satd. Flow (perm)	1562
Peak-hour factor, PHF	0.95
Adj. Flow (vph)	158
RTOR Reduction (vph)	93
Lane Group Flow (vph)	65
Confl. Peds. (#/hr)	
Confl. Bikes (#/hr)	3
Turn Type	Perm
Protected Phases	
Permitted Phases	4
Actuated Green, G (s)	31.6
Effective Green, g (s)	31.6
Actuated g/C Ratio	0.41
Clearance Time (s)	5.3
Vehicle Extension (s)	2.0
Lane Grp Cap (vph)	642
v/s Ratio Prot	
v/s Ratio Perm	0.04
v/c Ratio	0.10
Uniform Delay, d1	13.9
Progression Factor	1.00
Incremental Delay, d2	0.0
Delay (s)	13.9
Level of Service	B
Approach Delay (s)	
Approach LOS	

Intersection Summary

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	10	20	10	129	1436	10
Sign Control		Stop	Stop		Free	
Grade		0%	0%		0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	11	21	11	136	1512	11
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	3034	3028	3034	0	0	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	3034	3028	3034	0	0	
tC, single (s)	7.1	6.7	6.5	6.2	4.1	
tC, 2 stage (s)						
tF (s)	3.5	4.2	4.0	3.3	2.2	
p0 queue free %	0	0	0	87	7	
cM capacity (veh/h)	0	1	1	1085	1623	

Direction, Lane #	EB 1	EB 2	WB 1	SB 1	SB 2
Volume Total	18	14	146	1008	514
Volume Left	11	0	0	1008	504
Volume Right	0	0	136	0	11
cSH	0	1	12	1623	1623
Volume to Capacity	Err	18.04	12.00	0.93	0.93
Queue Length 95th (ft)	Err	Err	Err	446	446
Control Delay (s)	Err	Err	Err	25.9	25.9
Lane LOS	F	F	F	D	D
Approach Delay (s)	Err		Err	25.9	
Approach LOS	F		F		

Intersection Summary			
Average Delay	Err		
Intersection Capacity Utilization	56.4%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	10	1446	0	0	129	758	10	0	228	0	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	10	1491	0	0	133	781	10	0	235	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)									17			
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	133			1491			1644	1644	745	1016	1644	133
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	133			1491			1644	1644	745	1016	1644	133
tC, single (s)	4.7			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.5			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			100			84	100	34	100	100	100
cM capacity (veh/h)	1273			447			65	98	356	65	98	892

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1
Volume Total	10	745	745	133	391	391	245
Volume Left	10	0	0	0	0	0	10
Volume Right	0	0	0	0	391	391	235
cSH	1273	1700	1700	1700	1700	1700	372
Volume to Capacity	0.01	0.44	0.44	0.08	0.23	0.23	0.66
Queue Length 95th (ft)	1	0	0	0	0	0	113
Control Delay (s)	7.9	0.0	0.0	0.0	0.0	0.0	34.2
Lane LOS	A						D
Approach Delay (s)	0.1			0.0			34.2
Approach LOS							D

Intersection Summary			
Average Delay	3.2		
Intersection Capacity Utilization	56.0%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Lane Configurations												
Volume (vph)	5	190	1358	620	5	82	940	352	125	500	590	162
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.6	6.8	6.8		5.6	7.2	7.2		5.6	7.2	7.2
Lane Util. Factor		0.97	0.91	0.88		0.97	0.91	1.00		0.97	0.91	1.00
Frpb, ped/bikes		1.00	1.00	0.99		1.00	1.00	0.98		1.00	1.00	0.98
Flpb, ped/bikes		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00
Frt		1.00	1.00	0.85		1.00	1.00	0.85		1.00	1.00	0.85
Flt Protected		0.95	1.00	1.00		0.95	1.00	1.00		0.95	1.00	1.00
Satd. Flow (prot)		3433	5085	2750		3433	5085	1558		3433	5085	1557
Flt Permitted		0.95	1.00	1.00		0.95	1.00	1.00		0.95	1.00	1.00
Satd. Flow (perm)		3433	5085	2750		3433	5085	1558		3433	5085	1557
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	5	200	1429	653	5	86	989	371	132	526	621	171
RTOR Reduction (vph)	0	0	0	308	0	0	0	163	0	0	0	66
Lane Group Flow (vph)	0	205	1429	345	0	91	989	208	0	658	621	105
Confl. Peds. (#/hr)								3				4
Confl. Bikes (#/hr)				2								
Turn Type	Prot	Prot		Perm	Prot	Prot		Perm	Prot	Prot		Perm
Protected Phases	1	1	6		5	5	2		3	3	8	
Permitted Phases				6				2				8
Actuated Green, G (s)		12.9	64.7	64.7		7.4	58.8	58.8		32.3	29.9	29.9
Effective Green, g (s)		12.9	64.7	64.7		7.4	58.8	58.8		32.3	29.9	29.9
Actuated g/C Ratio		0.09	0.43	0.43		0.05	0.39	0.39		0.22	0.20	0.20
Clearance Time (s)		5.6	6.8	6.8		5.6	7.2	7.2		5.6	7.2	7.2
Vehicle Extension (s)		2.0	2.0	2.0		2.0	2.0	2.0		2.0	2.0	2.0
Lane Grp Cap (vph)		295	2193	1186		169	1993	611		739	1014	310
v/s Ratio Prot		0.06	c0.28			0.03	c0.19			c0.19	0.12	
v/s Ratio Perm				0.13				0.13				0.07
v/c Ratio		0.69	0.65	0.29		0.54	0.50	0.34		0.89	0.61	0.34
Uniform Delay, d1		66.6	33.7	27.7		69.6	34.4	32.0		57.1	54.8	51.5
Progression Factor		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2		5.6	1.5	0.6		1.7	0.9	1.5		12.6	0.8	0.2
Delay (s)		72.3	35.3	28.4		71.3	35.3	33.5		69.8	55.5	51.8
Level of Service		E	D	C		E	D	C		E	E	D
Approach Delay (s)			36.6				37.1				61.6	
Approach LOS			D				D				E	

Intersection Summary			
HCM Average Control Delay	48.7	HCM Level of Service	D
HCM Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	12.4
Intersection Capacity Utilization	92.3%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBU	SBL	SBT	SBR
Lane Configurations				
Volume (vph)	5	421	480	310
Ideal Flow (vphpl)	1900	1900	1900	1900
Total Lost time (s)		5.6	6.3	6.3
Lane Util. Factor		0.97	0.91	1.00
Frpb, ped/bikes		1.00	1.00	0.98
Flpb, ped/bikes		1.00	1.00	1.00
Frt		1.00	1.00	0.85
Flt Protected		0.95	1.00	1.00
Satd. Flow (prot)		3433	5085	1557
Flt Permitted		0.95	1.00	1.00
Satd. Flow (perm)		3433	5085	1557
Peak-hour factor, PHF	0.95	0.95	0.95	0.95
Adj. Flow (vph)	5	443	505	326
RTOR Reduction (vph)	0	0	0	174
Lane Group Flow (vph)	0	448	505	152
Confl. Peds. (#/hr)				
Confl. Bikes (#/hr)				3
Turn Type	Prot	Prot		Perm
Protected Phases	7	7	4	
Permitted Phases				4
Actuated Green, G (s)		22.8	21.3	21.3
Effective Green, g (s)		22.8	21.3	21.3
Actuated g/C Ratio		0.15	0.14	0.14
Clearance Time (s)		5.6	6.3	6.3
Vehicle Extension (s)		2.0	2.0	2.0
Lane Grp Cap (vph)		522	722	221
v/s Ratio Prot		c0.13	0.10	
v/s Ratio Perm				0.10
v/c Ratio		0.86	0.70	0.69
Uniform Delay, d1		62.0	61.3	61.2
Progression Factor		1.00	1.00	1.00
Incremental Delay, d2		12.7	2.4	6.9
Delay (s)		74.7	63.7	68.1
Level of Service		E	E	E
Approach Delay (s)			68.7	
Approach LOS			E	

Intersection Summary

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Lane Configurations												
Volume (vph)	30	350	1129	151	5	520	1192	694	5	192	794	270
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.6	6.0	6.0		5.6	6.0	6.0		5.6	5.7	5.7
Lane Util. Factor		0.97	0.91	1.00		0.97	0.91	1.00		0.97	0.91	1.00
Frpb, ped/bikes		1.00	1.00	0.99		1.00	1.00	0.99		1.00	1.00	0.98
Flpb, ped/bikes		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00
Frt		1.00	1.00	0.85		1.00	1.00	0.85		1.00	1.00	0.85
Flt Protected		0.95	1.00	1.00		0.95	1.00	1.00		0.95	1.00	1.00
Satd. Flow (prot)		3433	5085	1562		3433	5085	1562		3433	5085	1544
Flt Permitted		0.95	1.00	1.00		0.95	1.00	1.00		0.95	1.00	1.00
Satd. Flow (perm)		3433	5085	1562		3433	5085	1562		3433	5085	1544
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	32	368	1188	159	5	547	1255	731	5	202	836	284
RTOR Reduction (vph)	0	0	0	69	0	0	0	114	0	0	0	175
Lane Group Flow (vph)	0	400	1188	90	0	552	1255	617	0	207	836	109
Confl. Peds. (#/hr)				1				1				6
Confl. Bikes (#/hr)								1				5
Turn Type	Prot	Prot		Perm	Prot	Prot		Perm	Prot	Prot		Perm
Protected Phases	1	1	6		5	5	2		3	3	8	
Permitted Phases				6				2				8
Actuated Green, G (s)		17.4	46.6	46.6		26.5	55.7	55.7		11.1	31.2	31.2
Effective Green, g (s)		17.4	46.6	46.6		26.5	55.7	55.7		11.1	31.2	31.2
Actuated g/C Ratio		0.12	0.31	0.31		0.18	0.37	0.37		0.07	0.21	0.21
Clearance Time (s)		5.6	6.0	6.0		5.6	6.0	6.0		5.6	5.7	5.7
Vehicle Extension (s)		2.0	2.0	2.0		2.0	2.0	2.0		2.0	2.0	2.0
Lane Grp Cap (vph)		398	1580	485		606	1888	580		254	1058	321
v/s Ratio Prot		c0.12	0.23			0.16	0.25			0.06	0.16	
v/s Ratio Perm				0.06				c0.40				0.07
v/c Ratio		1.01	0.75	0.19		0.91	0.66	1.06		0.81	0.79	0.34
Uniform Delay, d1		66.3	46.5	37.8		60.6	39.4	47.1		68.4	56.3	50.6
Progression Factor		1.00	1.00	1.00		0.89	0.38	0.44		1.00	1.00	1.00
Incremental Delay, d2		46.4	3.4	0.8		11.7	1.1	47.4		17.0	3.8	0.2
Delay (s)		112.7	49.9	38.7		65.4	16.1	68.3		85.5	60.1	50.8
Level of Service		F	D	D		E	B	E		F	E	D
Approach Delay (s)			63.2				41.9				62.1	
Approach LOS			E				D				E	

Intersection Summary			
HCM Average Control Delay	57.5	HCM Level of Service	E
HCM Volume to Capacity ratio	0.97		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	17.2
Intersection Capacity Utilization	105.5%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBU	SBL	SBT	SBR
Lane Configurations				
Volume (vph)	50	463	1063	360
Ideal Flow (vphpl)	1900	1900	1900	1900
Total Lost time (s)		5.6	5.7	5.7
Lane Util. Factor		0.97	0.86	0.86
Frpb, ped/bikes		1.00	1.00	0.98
Flpb, ped/bikes		1.00	1.00	1.00
Frt		1.00	0.99	0.85
Flt Protected		0.95	1.00	1.00
Satd. Flow (prot)		3433	4775	1339
Flt Permitted		0.95	1.00	1.00
Satd. Flow (perm)		3433	4775	1339
Peak-hour factor, PHF	0.95	0.95	0.95	0.95
Adj. Flow (vph)	53	487	1119	379
RTOR Reduction (vph)	0	0	3	131
Lane Group Flow (vph)	0	540	1161	203
Confl. Peds. (#/hr)				3
Confl. Bikes (#/hr)				1
Turn Type	Prot	Prot		Perm
Protected Phases	7	7	4	
Permitted Phases				4
Actuated Green, G (s)		22.8	42.9	42.9
Effective Green, g (s)		22.8	42.9	42.9
Actuated g/C Ratio		0.15	0.29	0.29
Clearance Time (s)		5.6	5.7	5.7
Vehicle Extension (s)		2.0	2.0	2.0
Lane Grp Cap (vph)		522	1366	383
v/s Ratio Prot		c0.16	c0.24	
v/s Ratio Perm				0.15
v/c Ratio		1.03	0.85	0.53
Uniform Delay, d1		63.6	50.5	45.1
Progression Factor		1.00	1.00	1.00
Incremental Delay, d2		48.6	5.1	0.6
Delay (s)		112.2	55.6	45.7
Level of Service		F	E	D
Approach Delay (s)			69.0	
Approach LOS			E	

Intersection Summary

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL
Lane Configurations												
Volume (vph)	5	20	1782	160	5	160	2375	120	130	12	230	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.7	6.7	6.7		5.6	6.7			5.6	5.6	5.6
Lane Util. Factor		1.00	0.91	1.00		1.00	0.91			1.00	1.00	0.95
Frpb, ped/bikes		1.00	1.00	0.97		1.00	1.00			1.00	0.99	1.00
Flpb, ped/bikes		1.00	1.00	1.00		1.00	1.00			1.00	1.00	1.00
Frt		1.00	1.00	0.85		1.00	0.99			1.00	0.85	1.00
Flt Protected		0.95	1.00	1.00		0.95	1.00			0.96	1.00	0.95
Satd. Flow (prot)		1770	5085	1541		1770	5041			1781	1560	1681
Flt Permitted		0.95	1.00	1.00		0.95	1.00			0.96	1.00	0.95
Satd. Flow (perm)		1770	5085	1541		1770	5041			1781	1560	1681
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	5	21	1876	168	5	168	2500	126	137	13	242	63
RTOR Reduction (vph)	0	0	0	38	0	0	2	0	0	0	212	0
Lane Group Flow (vph)	0	26	1876	130	0	173	2624	0	0	150	30	38
Confl. Peds. (#/hr)				1				3			2	
Confl. Bikes (#/hr)				5				5				
Turn Type	Prot	Prot		Perm	Prot	Prot			Split		Perm	Split
Protected Phases	1	1	6		5	5	2		3	3		4
Permitted Phases				6							3	
Actuated Green, G (s)		3.0	83.2	83.2		13.1	92.2			18.7	18.7	11.5
Effective Green, g (s)		3.0	83.2	83.2		13.1	92.2			18.7	18.7	11.5
Actuated g/C Ratio		0.02	0.55	0.55		0.09	0.61			0.12	0.12	0.08
Clearance Time (s)		6.7	6.7	6.7		5.6	6.7			5.6	5.6	5.6
Vehicle Extension (s)		2.0	3.0	3.0		2.0	3.0			2.0	2.0	2.0
Lane Grp Cap (vph)		35	2820	855		155	3099			222	194	129
v/s Ratio Prot		0.01	c0.37			c0.10	c0.52			c0.08		c0.02
v/s Ratio Perm				0.08							0.02	
v/c Ratio		0.74	0.67	0.15		1.12	0.85			0.68	0.16	0.29
Uniform Delay, d1		73.1	23.6	16.2		68.5	23.2			62.8	58.6	65.4
Progression Factor		1.11	0.45	0.37		0.63	0.33			1.00	1.00	1.00
Incremental Delay, d2		37.5	0.8	0.2		71.0	0.7			6.3	0.1	0.5
Delay (s)		119.0	11.4	6.2		114.2	8.5			69.0	58.7	65.9
Level of Service		F	B	A		F	A			E	E	E
Approach Delay (s)			12.4				15.0			62.7		
Approach LOS			B				B			E		

Intersection Summary			
HCM Average Control Delay	18.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	30.2
Intersection Capacity Utilization	87.2%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBT	SBR
Lane Configurations		
Volume (vph)	12	10
Ideal Flow (vphpl)	1900	1900
Total Lost time (s)	5.6	5.6
Lane Util. Factor	0.95	1.00
Frpb, ped/bikes	1.00	0.98
Flpb, ped/bikes	1.00	1.00
Frt	1.00	0.85
Flt Protected	0.97	1.00
Satd. Flow (prot)	1713	1558
Flt Permitted	0.97	1.00
Satd. Flow (perm)	1713	1558
Peak-hour factor, PHF	0.95	0.95
Adj. Flow (vph)	13	11
RTOR Reduction (vph)	0	10
Lane Group Flow (vph)	38	1
Confl. Peds. (#/hr)		1
Confl. Bikes (#/hr)		1
Turn Type		Perm
Protected Phases	4	
Permitted Phases		4
Actuated Green, G (s)	11.5	11.5
Effective Green, g (s)	11.5	11.5
Actuated g/C Ratio	0.08	0.08
Clearance Time (s)	5.6	5.6
Vehicle Extension (s)	2.0	2.0
Lane Grp Cap (vph)	131	119
v/s Ratio Prot	0.02	
v/s Ratio Perm		0.00
v/c Ratio	0.29	0.01
Uniform Delay, d1	65.4	64.0
Progression Factor	1.00	1.00
Incremental Delay, d2	0.4	0.0
Delay (s)	65.8	64.0
Level of Service	E	E
Approach Delay (s)	65.6	
Approach LOS	E	

Intersection Summary

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Lane Configurations												
Volume (vph)	65	160	1290	392	10	422	1580	200	5	605	1129	326
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.7	5.7	5.7		6.7	5.7	5.7		6.3	5.3	5.3
Lane Util. Factor		0.97	0.91	1.00		0.97	0.91	1.00		0.97	0.95	1.00
Frpb, ped/bikes		1.00	1.00	0.98		1.00	1.00	0.99		1.00	1.00	0.98
Flpb, ped/bikes		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00
Frt		1.00	1.00	0.85		1.00	1.00	0.85		1.00	1.00	0.85
Flt Protected		0.95	1.00	1.00		0.95	1.00	1.00		0.95	1.00	1.00
Satd. Flow (prot)		3433	5085	1557		3433	5085	1560		3433	3539	1549
Flt Permitted		0.95	1.00	1.00		0.95	1.00	1.00		0.95	1.00	1.00
Satd. Flow (perm)		3433	5085	1557		3433	5085	1560		3433	3539	1549
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	68	168	1358	413	11	444	1663	211	5	637	1188	343
RTOR Reduction (vph)	0	0	0	158	0	0	0	63	0	0	0	110
Lane Group Flow (vph)	0	236	1358	255	0	455	1663	148	0	642	1188	233
Confl. Peds. (#/hr)				2								6
Confl. Bikes (#/hr)				2				4				2
Turn Type	Prot	Prot		Perm	Prot	Prot		Perm	Prot	Prot		Perm
Protected Phases	1	1	6		5	5	2		3	3	8	
Permitted Phases				6				2				8
Actuated Green, G (s)		9.3	39.3	39.3		16.3	46.3	46.3		22.7	59.0	59.0
Effective Green, g (s)		9.3	39.3	39.3		16.3	46.3	46.3		22.7	59.0	59.0
Actuated g/C Ratio		0.06	0.26	0.26		0.11	0.31	0.31		0.15	0.39	0.39
Clearance Time (s)		6.7	5.7	5.7		6.7	5.7	5.7		6.3	5.3	5.3
Vehicle Extension (s)		2.0	2.0	2.0		2.0	2.0	2.0		2.0	2.0	2.0
Lane Grp Cap (vph)		213	1332	408		373	1570	482		520	1392	609
v/s Ratio Prot		0.07	c0.27			0.13	c0.33			c0.19	0.34	
v/s Ratio Perm				0.16				0.09				0.15
v/c Ratio		1.11	1.02	0.63		1.22	1.06	0.31		1.23	0.85	0.38
Uniform Delay, d1		70.3	55.4	48.8		66.8	51.9	39.6		63.6	41.6	32.5
Progression Factor		0.73	0.66	0.63		0.76	0.57	0.28		1.00	1.00	1.00
Incremental Delay, d2		87.3	27.1	5.7		111.3	34.8	0.9		121.4	5.1	0.1
Delay (s)		138.8	63.8	36.4		162.1	64.3	12.1		185.1	46.7	32.6
Level of Service		F	E	D		F	E	B		F	D	C
Approach Delay (s)			67.0				78.7				85.3	
Approach LOS			E				E				F	

Intersection Summary			
HCM Average Control Delay	83.0	HCM Level of Service	F
HCM Volume to Capacity ratio	1.09		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	17.3
Intersection Capacity Utilization	108.1%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBU	SBL	SBT	SBR
Lane Configurations				
Volume (vph)	5	190	1208	280
Ideal Flow (vphpl)	1900	1900	1900	1900
Total Lost time (s)		6.3	5.3	5.3
Lane Util. Factor		0.97	0.95	1.00
Frpb, ped/bikes		1.00	1.00	0.98
Flpb, ped/bikes		1.00	1.00	1.00
Frt		1.00	1.00	0.85
Flt Protected		0.95	1.00	1.00
Satd. Flow (prot)		3433	3539	1551
Flt Permitted		0.95	1.00	1.00
Satd. Flow (perm)		3433	3539	1551
Peak-hour factor, PHF	0.95	0.95	0.95	0.95
Adj. Flow (vph)	5	200	1272	295
RTOR Reduction (vph)	0	0	0	24
Lane Group Flow (vph)	0	205	1272	271
Confl. Peds. (#/hr)				6
Confl. Bikes (#/hr)				
Turn Type	Prot	Prot		Perm
Protected Phases	7	7	4	
Permitted Phases				4
Actuated Green, G (s)		11.4	47.7	47.7
Effective Green, g (s)		11.4	47.7	47.7
Actuated g/C Ratio		0.08	0.32	0.32
Clearance Time (s)		6.3	5.3	5.3
Vehicle Extension (s)		2.0	2.0	2.0
Lane Grp Cap (vph)		261	1125	493
v/s Ratio Prot		0.06	c0.36	
v/s Ratio Perm				0.17
v/c Ratio		0.79	1.13	0.55
Uniform Delay, d1		68.1	51.1	42.3
Progression Factor		1.00	1.00	1.00
Incremental Delay, d2		13.3	70.4	0.7
Delay (s)		81.4	121.5	43.0
Level of Service		F	F	D
Approach Delay (s)			103.8	
Approach LOS			F	

Intersection Summary

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Lane Configurations												
Volume (vph)	10	100	1446	190	5	849	1772	80	5	230	355	1192
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.6	5.7	5.7		5.6	5.7			5.6	5.3	5.3
Lane Util. Factor		1.00	0.91	1.00		0.97	0.91			1.00	1.00	0.88
Frpb, ped/bikes		1.00	1.00	0.98		1.00	1.00			1.00	1.00	0.99
Flpb, ped/bikes		1.00	1.00	1.00		1.00	1.00			1.00	1.00	1.00
Frt		1.00	1.00	0.85		1.00	0.99			1.00	1.00	0.85
Flt Protected		0.95	1.00	1.00		0.95	1.00			0.95	1.00	1.00
Satd. Flow (prot)		1770	5085	1559		3433	5046			1770	1863	2749
Flt Permitted		0.95	1.00	1.00		0.95	1.00			0.95	1.00	1.00
Satd. Flow (perm)		1770	5085	1559		3433	5046			1770	1863	2749
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	11	105	1522	200	5	894	1865	84	5	242	374	1255
RTOR Reduction (vph)	0	0	0	71	0	0	3	0	0	0	0	515
Lane Group Flow (vph)	0	116	1522	129	0	899	1946	0	0	247	374	740
Confl. Peds. (#/hr)								3				1
Confl. Bikes (#/hr)				4				2				
Turn Type	Prot	Prot		Perm	Prot	Prot			Prot	Prot		Perm
Protected Phases	1	1	6		5	5	2		3	3	8	
Permitted Phases				6								8
Actuated Green, G (s)		13.8	42.6	42.6		35.4	64.2			29.7	37.0	37.0
Effective Green, g (s)		13.8	42.6	42.6		35.4	64.2			29.7	37.0	37.0
Actuated g/C Ratio		0.09	0.28	0.28		0.24	0.43			0.20	0.25	0.25
Clearance Time (s)		5.6	5.7	5.7		5.6	5.7			5.6	5.3	5.3
Vehicle Extension (s)		2.0	2.0	2.0		2.0	2.0			2.0	2.0	2.0
Lane Grp Cap (vph)		163	1444	443		810	2160			350	460	678
v/s Ratio Prot		0.07	c0.30			c0.26	0.39			0.14	0.20	
v/s Ratio Perm				0.08								c0.27
v/c Ratio		0.71	1.05	0.29		1.11	0.90			0.71	0.81	1.09
Uniform Delay, d1		66.2	53.7	41.9		57.3	39.9			56.1	53.2	56.5
Progression Factor		1.13	0.60	0.48		0.78	0.26			1.00	1.00	1.00
Incremental Delay, d2		5.2	32.3	0.7		55.2	2.1			5.2	10.0	62.4
Delay (s)		80.0	64.3	20.8		99.9	12.7			61.3	63.2	118.9
Level of Service		E	E	C		F	B			E	E	F
Approach Delay (s)			60.6				40.2				100.2	
Approach LOS			E				D				F	

Intersection Summary			
HCM Average Control Delay	64.8	HCM Level of Service	E
HCM Volume to Capacity ratio	1.07		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	22.2
Intersection Capacity Utilization	120.4%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBL	SBT	SBR
Lane Configurations			
Volume (vph)	140	235	160
Ideal Flow (vphpl)	1900	1900	1900
Total Lost time (s)	5.6	5.3	
Lane Util. Factor	1.00	0.95	
Frpb, ped/bikes	1.00	0.99	
Flpb, ped/bikes	1.00	1.00	
Frt	1.00	0.94	
Flt Protected	0.95	1.00	
Satd. Flow (prot)	1770	3306	
Flt Permitted	0.95	1.00	
Satd. Flow (perm)	1770	3306	
Peak-hour factor, PHF	0.95	0.95	0.95
Adj. Flow (vph)	147	247	168
RTOR Reduction (vph)	0	87	0
Lane Group Flow (vph)	147	328	0
Confl. Peds. (#/hr)			1
Confl. Bikes (#/hr)			
Turn Type	Prot		
Protected Phases	7	4	
Permitted Phases			
Actuated Green, G (s)	12.8	20.1	
Effective Green, g (s)	12.8	20.1	
Actuated g/C Ratio	0.09	0.13	
Clearance Time (s)	5.6	5.3	
Vehicle Extension (s)	2.0	2.0	
Lane Grp Cap (vph)	151	443	
v/s Ratio Prot	c0.08	0.10	
v/s Ratio Perm			
v/c Ratio	0.97	0.74	
Uniform Delay, d1	68.4	62.4	
Progression Factor	1.00	1.00	
Incremental Delay, d2	64.6	5.5	
Delay (s)	133.0	67.9	
Level of Service	F	E	
Approach Delay (s)		85.0	
Approach LOS		F	

Intersection Summary

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL
Lane Configurations												
Volume (vph)	5	120	2397	70	50	180	2531	10	150	30	250	190
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.6	5.7			5.6	5.7		5.6	4.6		5.9
Lane Util. Factor		1.00	0.91			0.97	0.91		1.00	1.00		0.97
Frpb, ped/bikes		1.00	1.00			1.00	1.00		1.00	1.00		1.00
Flpb, ped/bikes		1.00	1.00			1.00	1.00		1.00	1.00		1.00
Frt		1.00	1.00			1.00	1.00		1.00	0.87		1.00
Flt Protected		0.95	1.00			0.95	1.00		0.95	1.00		0.95
Satd. Flow (prot)		1770	5057			3433	5081		1770	1614		3433
Flt Permitted		0.95	1.00			0.95	1.00		0.95	1.00		0.95
Satd. Flow (perm)		1770	5057			3433	5081		1770	1614		3433
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	5	126	2523	74	53	189	2664	11	158	32	263	200
RTOR Reduction (vph)	0	0	2	0	0	0	0	0	0	35	0	0
Lane Group Flow (vph)	0	131	2595	0	0	242	2675	0	158	260	0	200
Confl. Peds. (#/hr)				18				15				
Confl. Bikes (#/hr)				2				4				
Turn Type	Prot	Prot			Prot	Prot			Prot			Prot
Protected Phases	1	1	6		5	5	2		7	4		3
Permitted Phases												
Actuated Green, G (s)		10.4	78.2			9.4	77.2		22.5	28.3		12.3
Effective Green, g (s)		10.4	78.2			9.4	77.2		22.5	28.3		12.3
Actuated g/C Ratio		0.07	0.52			0.06	0.51		0.15	0.19		0.08
Clearance Time (s)		5.6	5.7			5.6	5.7		5.6	4.6		5.9
Vehicle Extension (s)		2.0	2.0			2.0	2.0		2.0	2.0		2.0
Lane Grp Cap (vph)		123	2636			215	2615		266	305		282
v/s Ratio Prot		c0.07	0.51			0.07	c0.53		c0.09	c0.16		0.06
v/s Ratio Perm												
v/c Ratio		1.07	0.98			1.13	1.02		0.59	0.85		0.71
Uniform Delay, d1		69.8	35.3			70.3	36.4		59.5	58.8		67.1
Progression Factor		0.76	0.31			0.86	0.58		1.00	1.00		1.00
Incremental Delay, d2		43.7	2.8			78.1	17.5		2.4	19.3		6.5
Delay (s)		96.5	13.6			138.9	38.4		61.9	78.2		73.6
Level of Service		F	B			F	D		E	E		E
Approach Delay (s)			17.5				46.7			72.5		
Approach LOS			B				D			E		

Intersection Summary			
HCM Average Control Delay	37.3	HCM Level of Service	D
HCM Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	10.3
Intersection Capacity Utilization	99.6%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBT	SBR
Lane Configurations		
Volume (vph)	20	120
Ideal Flow (vphpl)	1900	1900
Total Lost time (s)	4.9	
Lane Util. Factor	1.00	
Frpb, ped/bikes	0.98	
Flpb, ped/bikes	1.00	
Frt	0.87	
Flt Protected	1.00	
Satd. Flow (prot)	1585	
Flt Permitted	1.00	
Satd. Flow (perm)	1585	
Peak-hour factor, PHF	0.95	0.95
Adj. Flow (vph)	21	126
RTOR Reduction (vph)	102	0
Lane Group Flow (vph)	45	0
Confl. Peds. (#/hr)		13
Confl. Bikes (#/hr)		
Turn Type		
Protected Phases	8	
Permitted Phases		
Actuated Green, G (s)	18.1	
Effective Green, g (s)	18.1	
Actuated g/C Ratio	0.12	
Clearance Time (s)	4.9	
Vehicle Extension (s)	2.0	
Lane Grp Cap (vph)	191	
v/s Ratio Prot	0.03	
v/s Ratio Perm		
v/c Ratio	0.24	
Uniform Delay, d1	59.7	
Progression Factor	1.00	
Incremental Delay, d2	0.2	
Delay (s)	59.9	
Level of Service	E	
Approach Delay (s)	67.8	
Approach LOS	E	

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	2530	278	100	1886	0	0	0	0	690	0	1185
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0		5.6	5.7					6.7	6.7	6.7
Lane Util. Factor		0.91		0.97	0.91					0.95	0.95	0.88
Frpb, ped/bikes		1.00		1.00	1.00					1.00	1.00	0.98
Flpb, ped/bikes		1.00		1.00	1.00					1.00	1.00	1.00
Frt		0.99		1.00	1.00					1.00	1.00	0.85
Flt Protected		1.00		0.95	1.00					0.95	0.95	1.00
Satd. Flow (prot)		4998		3433	5085					1681	1681	2743
Flt Permitted		1.00		0.95	1.00					0.95	0.95	1.00
Satd. Flow (perm)		4998		3433	5085					1681	1681	2743
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	2663	293	105	1985	0	0	0	0	726	0	1247
RTOR Reduction (vph)	0	9	0	0	0	0	0	0	0	0	0	8
Lane Group Flow (vph)	0	2947	0	105	1985	0	0	0	0	363	363	1239
Confl. Peds. (#/hr)			5			7						3
Confl. Bikes (#/hr)			4			6						
Turn Type				Prot						Split		Perm
Protected Phases		2		1	6					4	4	
Permitted Phases												4
Actuated Green, G (s)		72.0		4.4	82.3					55.3	55.3	55.3
Effective Green, g (s)		72.0		4.4	82.3					55.3	55.3	55.3
Actuated g/C Ratio		0.48		0.03	0.55					0.37	0.37	0.37
Clearance Time (s)		6.0		5.6	5.7					6.7	6.7	6.7
Vehicle Extension (s)		2.0		2.0	2.0					1.0	1.0	1.0
Lane Grp Cap (vph)		2399		101	2790					620	620	1011
v/s Ratio Prot		c0.59		0.03	c0.39					0.22	0.22	
v/s Ratio Perm												c0.45
v/c Ratio		1.23		1.04	0.71					0.59	0.59	1.23
Uniform Delay, d1		39.0		72.8	25.1					38.1	38.1	47.4
Progression Factor		0.47		0.80	0.34					1.00	1.00	1.00
Incremental Delay, d2		104.2		77.3	0.9					0.9	0.9	110.3
Delay (s)		122.5		135.3	9.3					39.0	39.0	157.6
Level of Service		F		F	A					D	D	F
Approach Delay (s)		122.5			15.7			0.0			114.0	
Approach LOS		F			B			A			F	

Intersection Summary			
HCM Average Control Delay	88.3	HCM Level of Service	F
HCM Volume to Capacity ratio	1.17		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	12.7
Intersection Capacity Utilization	93.9%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑↑	↑↑↑	↱		
Volume (veh/h)	0	3220	1986	350	0	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	3389	2091	368	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		515	937			
pX, platoon unblocked	0.71				0.67	0.71
vC, conflicting volume	2459				3220	697
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1626				0	0
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	100
cM capacity (veh/h)	281				688	770

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	WB 4
Volume Total	1130	1130	1130	697	697	697	368
Volume Left	0	0	0	0	0	0	0
Volume Right	0	0	0	0	0	0	368
cSH	1700	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.66	0.66	0.66	0.41	0.41	0.41	0.22
Queue Length 95th (ft)	0	0	0	0	0	0	0
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS							
Approach Delay (s)	0.0			0.0			
Approach LOS							

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	93.9%	ICU Level of Service	F
Analysis Period (min)	15		

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBU
Lane Configurations												
Volume (vph)	15	120	1431	1669	10	60	1680	110	516	140	150	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.6	5.7	4.0		5.6	5.7	5.7	5.6	5.6		
Lane Util. Factor		1.00	0.95	1.00		1.00	0.91	1.00	0.91	0.91		
Frpb, ped/bikes		1.00	1.00	0.99		1.00	1.00	0.97	1.00	0.99		
Flpb, ped/bikes		1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00		
Frt		1.00	1.00	0.85		1.00	1.00	0.85	1.00	0.96		
Flt Protected		0.95	1.00	1.00		0.95	1.00	1.00	0.95	0.98		
Satd. Flow (prot)		1770	3539	1561		1770	5085	1543	1610	3155		
Flt Permitted		0.95	1.00	1.00		0.95	1.00	1.00	0.95	0.98		
Satd. Flow (perm)		1770	3539	1561		1770	5085	1543	1610	3155		
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	16	126	1506	1757	11	63	1768	116	543	147	158	11
RTOR Reduction (vph)	0	0	0	0	0	0	0	33	0	25	0	0
Lane Group Flow (vph)	0	142	1506	1757	0	74	1768	83	288	535	0	0
Confl. Peds. (#/hr)				4				7			6	
Confl. Bikes (#/hr)				4				2				
Turn Type	Prot	Prot		Free	Prot	Prot		Perm	Split			Split
Protected Phases	1	1	6		5	5	2		3	3		4
Permitted Phases				Free				2				
Actuated Green, G (s)		13.4	69.3	150.0		7.4	63.3	63.3	27.9	27.9		
Effective Green, g (s)		13.4	69.3	150.0		7.4	63.3	63.3	27.9	27.9		
Actuated g/C Ratio		0.09	0.46	1.00		0.05	0.42	0.42	0.19	0.19		
Clearance Time (s)		5.6	5.7			5.6	5.7	5.7	5.6	5.6		
Vehicle Extension (s)		2.0	3.9			2.0	3.9	3.9	2.0	2.0		
Lane Grp Cap (vph)		158	1635	1561		87	2146	651	299	587		
v/s Ratio Prot		0.08	0.43			0.04	0.35		0.18	0.17		
v/s Ratio Perm				c1.13				0.05				
v/c Ratio		0.90	0.92	1.13		0.85	0.82	0.13	0.96	0.91		
Uniform Delay, d1		67.6	37.8	75.0		70.8	38.4	26.5	60.5	59.8		
Progression Factor		0.88	0.81	1.00		1.00	1.00	1.00	0.68	0.66		
Incremental Delay, d2		6.4	1.1	57.4		49.5	3.7	0.4	40.6	17.5		
Delay (s)		65.8	31.6	132.4		120.3	42.2	26.9	81.5	57.1		
Level of Service		E	C	F		F	D	C	F	E		
Approach Delay (s)			85.1				44.2			65.4		
Approach LOS			F				D			E		

Intersection Summary			
HCM Average Control Delay	71.6	HCM Level of Service	E
HCM Volume to Capacity ratio	1.13		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	0.0
Intersection Capacity Utilization	92.2%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBL	SBT	SBR
Lane Configurations			
Volume (vph)	320	160	140
Ideal Flow (vphpl)	1900	1900	1900
Total Lost time (s)	4.6	4.6	4.6
Lane Util. Factor	0.95	0.95	1.00
Frpb, ped/bikes	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00
Frt	1.00	1.00	0.85
Flt Protected	0.95	0.98	1.00
Satd. Flow (prot)	1681	1738	1583
Flt Permitted	0.95	0.98	1.00
Satd. Flow (perm)	1681	1738	1583
Peak-hour factor, PHF	0.95	0.95	0.95
Adj. Flow (vph)	337	168	147
RTOR Reduction (vph)	0	0	105
Lane Group Flow (vph)	254	262	42
Confl. Peds. (#/hr)			
Confl. Bikes (#/hr)			
Turn Type	Split		Perm
Protected Phases	4	4	
Permitted Phases			4
Actuated Green, G (s)	23.9	23.9	23.9
Effective Green, g (s)	23.9	23.9	23.9
Actuated g/C Ratio	0.16	0.16	0.16
Clearance Time (s)	4.6	4.6	4.6
Vehicle Extension (s)	2.0	2.0	2.0
Lane Grp Cap (vph)	268	277	252
v/s Ratio Prot	0.15	0.15	
v/s Ratio Perm			0.03
v/c Ratio	0.95	0.95	0.17
Uniform Delay, d1	62.4	62.4	54.4
Progression Factor	1.00	1.00	1.00
Incremental Delay, d2	40.1	39.0	0.1
Delay (s)	102.6	101.4	54.6
Level of Service	F	F	D
Approach Delay (s)		91.5	
Approach LOS		F	

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	286	10	10	20	40	40	320	450	20	80	710	1099
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	5.5			5.5	5.5	5.5	5.5		5.5	5.5	5.5
Lane Util. Factor	0.95	0.95			1.00	1.00	1.00	0.95		1.00	1.00	1.00
Frt	1.00	0.99			1.00	0.85	1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	0.96			0.98	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1681	1679			1832	1583	1770	3517		1770	1863	1583
Flt Permitted	0.95	0.96			0.98	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1681	1679			1832	1583	1770	3517		1770	1863	1583
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	301	11	11	21	42	42	337	474	21	84	747	1157
RTOR Reduction (vph)	0	2	0	0	0	39	0	3	0	0	0	162
Lane Group Flow (vph)	163	158	0	0	63	3	337	492	0	84	747	995
Turn Type	Split			Split		Perm	Prot			Prot		pm+ov
Protected Phases	4	4		8	8		5	2		1	6	4
Permitted Phases						8						6
Actuated Green, G (s)	30.5	30.5			9.9	9.9	24.6	47.4		40.2	63.0	93.5
Effective Green, g (s)	30.5	30.5			9.9	9.9	24.6	47.4		40.2	63.0	93.5
Actuated g/C Ratio	0.20	0.20			0.07	0.07	0.16	0.32		0.27	0.42	0.62
Clearance Time (s)	5.5	5.5			5.5	5.5	5.5	5.5		5.5	5.5	5.5
Vehicle Extension (s)	2.0	2.0			2.0	2.0	2.0	2.0		2.0	2.0	2.0
Lane Grp Cap (vph)	342	341			121	104	290	1111		474	782	987
v/s Ratio Prot	0.10	0.09			c0.03		c0.19	0.14		0.05	0.40	c0.21
v/s Ratio Perm						0.00						0.42
v/c Ratio	0.48	0.46			0.52	0.03	1.16	0.44		0.18	0.96	1.01
Uniform Delay, d1	52.7	52.6			67.8	65.5	62.7	40.8		42.2	42.1	28.2
Progression Factor	1.00	1.00			1.00	1.00	1.00	1.00		0.99	0.91	0.76
Incremental Delay, d2	0.4	0.4			1.9	0.0	104.1	0.1		0.0	3.7	10.8
Delay (s)	53.1	52.9			69.6	65.6	166.8	40.9		41.7	42.2	32.2
Level of Service	D	D			E	E	F	D		D	D	C
Approach Delay (s)		53.0			68.0			91.9			36.4	
Approach LOS		D			E			F			D	

Intersection Summary			
HCM Average Control Delay	53.3	HCM Level of Service	D
HCM Volume to Capacity ratio	1.00		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	22.0
Intersection Capacity Utilization	103.7%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL
Lane Configurations												
Volume (vph)	80	72	170	144	152	96	15	100	1030	123	20	95
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.6	4.6	4.6	5.6	4.6	4.6		5.6	5.3	5.3		5.6
Lane Util. Factor	1.00	1.00	1.00	0.97	1.00	1.00		1.00	0.95	1.00		1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.99		1.00	1.00	0.98		1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00		1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	1.00	0.85		1.00
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.95	1.00	1.00		0.95
Satd. Flow (prot)	1770	1863	1583	3433	1863	1560		1770	3539	1549		1770
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00		0.95	1.00	1.00		0.95
Satd. Flow (perm)	1770	1863	1583	3433	1863	1560		1770	3539	1549		1770
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	84	76	179	152	160	101	16	105	1084	129	21	100
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	67	0	0
Lane Group Flow (vph)	84	76	179	152	160	101	0	121	1084	62	0	121
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)	1					2		1		2		1
Turn Type	Prot		Perm	Prot		Perm	Prot	Prot		Perm	Prot	Prot
Protected Phases	3	8		7	4		1	1	6		5	5
Permitted Phases			8			4				6		
Actuated Green, G (s)	7.0	17.5	17.5	6.1	16.6	16.6		9.2	48.7	48.7		10.0
Effective Green, g (s)	7.0	17.5	17.5	6.1	16.6	16.6		9.2	48.7	48.7		10.0
Actuated g/C Ratio	0.07	0.17	0.17	0.06	0.16	0.16		0.09	0.47	0.47		0.10
Clearance Time (s)	5.6	4.6	4.6	5.6	4.6	4.6		5.6	5.3	5.3		5.6
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0		2.0
Lane Grp Cap (vph)	120	315	268	203	299	250		157	1667	730		171
v/s Ratio Prot	c0.05	0.04		0.04	0.09			c0.07	0.31			0.07
v/s Ratio Perm			c0.11			0.06				0.04		
v/c Ratio	0.70	0.24	0.67	0.75	0.54	0.40		0.77	0.65	0.09		0.71
Uniform Delay, d1	47.2	37.2	40.2	47.9	39.9	39.0		46.1	20.9	15.1		45.3
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00		1.00
Incremental Delay, d2	13.4	0.1	4.8	12.4	0.9	0.4		18.9	0.7	0.0		10.4
Delay (s)	60.6	37.3	45.0	60.3	40.8	39.3		65.0	21.6	15.1		55.7
Level of Service	E	D	D	E	D	D		E	C	B		E
Approach Delay (s)		47.2			47.6				24.9			
Approach LOS		D			D				C			

Intersection Summary			
HCM Average Control Delay	32.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	103.4	Sum of lost time (s)	11.2
Intersection Capacity Utilization	77.7%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBT	SBR
Lane Configurations	↑↑→	
Volume (vph)	1330	70
Ideal Flow (vphpl)	1900	1900
Total Lost time (s)	5.3	
Lane Util. Factor	0.95	
Frpb, ped/bikes	1.00	
Flpb, ped/bikes	1.00	
Frt	0.99	
Flt Protected	1.00	
Satd. Flow (prot)	3508	
Flt Permitted	1.00	
Satd. Flow (perm)	3508	
Peak-hour factor, PHF	0.95	0.95
Adj. Flow (vph)	1400	74
RTOR Reduction (vph)	3	0
Lane Group Flow (vph)	1471	0
Confl. Peds. (#/hr)		2
Confl. Bikes (#/hr)		1
Turn Type		
Protected Phases	2	
Permitted Phases		
Actuated Green, G (s)	49.5	
Effective Green, g (s)	49.5	
Actuated g/C Ratio	0.48	
Clearance Time (s)	5.3	
Vehicle Extension (s)	2.0	
Lane Grp Cap (vph)	1679	
v/s Ratio Prot	c0.42	
v/s Ratio Perm		
v/c Ratio	0.88	
Uniform Delay, d1	24.2	
Progression Factor	1.00	
Incremental Delay, d2	5.3	
Delay (s)	29.5	
Level of Service	C	
Approach Delay (s)	31.5	
Approach LOS	C	

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	30	339	90	120	381	22	180	110	30	42	130	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	5.5		5.5	5.5			5.5			5.5	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Frt	1.00	0.97		1.00	0.99			0.99			0.98	
Flt Protected	0.95	1.00		0.95	1.00			0.97			0.99	
Satd. Flow (prot)	1770	1804		1770	1848			1789			1806	
Flt Permitted	0.95	1.00		0.95	1.00			0.97			0.99	
Satd. Flow (perm)	1770	1804		1770	1848			1789			1806	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	32	357	95	126	401	23	189	116	32	44	137	32
RTOR Reduction (vph)	0	6	0	0	1	0	0	2	0	0	4	0
Lane Group Flow (vph)	32	446	0	126	423	0	0	335	0	0	209	0
Turn Type	Prot			Prot			Split			Split		
Protected Phases	7	4		3	8		2	2		6	6	
Permitted Phases												
Actuated Green, G (s)	3.6	36.8		12.6	45.8			27.2			18.1	
Effective Green, g (s)	3.6	36.8		12.6	45.8			27.2			18.1	
Actuated g/C Ratio	0.03	0.32		0.11	0.39			0.23			0.16	
Clearance Time (s)	5.5	5.5		5.5	5.5			5.5			5.5	
Vehicle Extension (s)	2.0	2.0		2.0	2.0			2.0			2.0	
Lane Grp Cap (vph)	55	569		191	725			417			280	
v/s Ratio Prot	0.02	c0.25		c0.07	0.23			c0.19			c0.12	
v/s Ratio Perm												
v/c Ratio	0.58	0.78		0.66	0.58			0.80			0.75	
Uniform Delay, d1	55.8	36.3		50.0	27.9			42.2			47.1	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	9.7	6.4		6.1	0.8			10.1			9.1	
Delay (s)	65.5	42.8		56.1	28.7			52.3			56.2	
Level of Service	E	D		E	C			D			E	
Approach Delay (s)		44.3			35.0			52.3			56.2	
Approach LOS		D			C			D			E	

Intersection Summary			
HCM Average Control Delay	44.4	HCM Level of Service	D
HCM Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	116.7	Sum of lost time (s)	22.0
Intersection Capacity Utilization	76.9%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Lane Configurations												
Volume (vph)	180	131	120	60	103	260	70	1739	40	5	110	1733
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.6	4.6	4.6	5.6	5.6	5.6	6.3	5.3			6.3	5.3
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95			1.00	0.95
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00			1.00	0.97
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00			0.95	1.00
Satd. Flow (prot)	1770	1863	1583	1770	1863	1583	1770	3527			1770	3436
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00			0.95	1.00
Satd. Flow (perm)	1770	1863	1583	1770	1863	1583	1770	3527			1770	3436
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	189	138	126	63	108	274	74	1831	42	5	116	1824
RTOR Reduction (vph)	0	0	99	0	0	61	0	1	0	0	0	13
Lane Group Flow (vph)	189	138	27	63	108	213	74	1872	0	0	121	2253
Turn Type	Prot		Perm	Prot		Perm	Prot			Prot	Prot	
Protected Phases	3	8		7	4		1	6		5	5	2
Permitted Phases			8			4						
Actuated Green, G (s)	12.4	29.5	29.5	7.8	23.9	23.9	5.7	72.3			8.7	75.3
Effective Green, g (s)	12.4	29.5	29.5	7.8	23.9	23.9	5.7	72.3			8.7	75.3
Actuated g/C Ratio	0.09	0.21	0.21	0.06	0.17	0.17	0.04	0.52			0.06	0.54
Clearance Time (s)	5.6	4.6	4.6	5.6	5.6	5.6	6.3	5.3			6.3	5.3
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0			2.0	2.0
Lane Grp Cap (vph)	157	392	333	99	318	270	72	1820			110	1847
v/s Ratio Prot	c0.11	c0.07		0.04	0.06		0.04	0.53			c0.07	c0.66
v/s Ratio Perm			0.02			c0.13						
v/c Ratio	1.20	0.35	0.08	0.64	0.34	0.79	1.03	1.03			1.10	1.22
Uniform Delay, d1	63.8	47.2	44.4	64.8	51.2	55.7	67.2	33.9			65.7	32.4
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00
Incremental Delay, d2	137.0	0.2	0.0	9.4	0.2	13.6	114.0	28.8			115.3	104.1
Delay (s)	200.9	47.4	44.4	74.2	51.4	69.3	181.2	62.7			181.0	136.5
Level of Service	F	D	D	E	D	E	F	E			F	F
Approach Delay (s)		110.6			65.7			67.2				138.7
Approach LOS		F			E			E				F

Intersection Summary			
HCM Average Control Delay	103.5	HCM Level of Service	F
HCM Volume to Capacity ratio	1.19		
Actuated Cycle Length (s)	140.1	Sum of lost time (s)	27.4
Intersection Capacity Utilization	100.0%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBR
Lane Configurations	
Volume (vph)	420
Ideal Flow (vphpl)	1900
Total Lost time (s)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Peak-hour factor, PHF	0.95
Adj. Flow (vph)	442
RTOR Reduction (vph)	0
Lane Group Flow (vph)	0
Turn Type	
Protected Phases	
Permitted Phases	
Actuated Green, G (s)	
Effective Green, g (s)	
Actuated g/C Ratio	
Clearance Time (s)	
Vehicle Extension (s)	
Lane Grp Cap (vph)	
v/s Ratio Prot	
v/s Ratio Perm	
v/c Ratio	
Uniform Delay, d1	
Progression Factor	
Incremental Delay, d2	
Delay (s)	
Level of Service	
Approach Delay (s)	
Approach LOS	

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Lane Configurations												
Volume (vph)	165	0	150	0	0	0	260	1362	0	0	0	1051
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.6		5.6				5.6	4.6				4.6
Lane Util. Factor	1.00		1.00				1.00	0.95				0.95
Frt	1.00		0.85				1.00	1.00				0.99
Flt Protected	0.95		1.00				0.95	1.00				1.00
Satd. Flow (prot)	1770		1583				1770	3539				3509
Flt Permitted	0.95		1.00				0.95	1.00				1.00
Satd. Flow (perm)	1770		1583				1770	3539				3509
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	174	0	158	0	0	0	274	1434	0	0	0	1106
RTOR Reduction (vph)	0	0	123	0	0	0	0	0	0	0	0	3
Lane Group Flow (vph)	174	0	35	0	0	0	274	1434	0	0	0	1169
Turn Type	Prot		custom	Prot			Prot			Prot		
Protected Phases	3			7	4		1	6		5		2
Permitted Phases			8									
Actuated Green, G (s)	10.8		21.5				19.9	66.1				40.6
Effective Green, g (s)	10.8		21.5				19.9	66.1				40.6
Actuated g/C Ratio	0.11		0.22				0.20	0.68				0.42
Clearance Time (s)	5.6		5.6				5.6	4.6				4.6
Vehicle Extension (s)	2.0		2.0				2.0	2.0				2.0
Lane Grp Cap (vph)	195		348				360	2392				1457
v/s Ratio Prot	c0.10						c0.15	0.41				c0.33
v/s Ratio Perm			c0.02									
v/c Ratio	0.89		0.10				0.76	0.60				0.80
Uniform Delay, d1	42.9		30.4				36.7	8.6				25.1
Progression Factor	1.00		1.00				1.00	1.00				1.00
Incremental Delay, d2	35.4		0.0				8.3	0.3				3.1
Delay (s)	78.4		30.5				45.0	8.9				28.2
Level of Service	E		C				D	A				C
Approach Delay (s)		55.6			0.0			14.7				28.2
Approach LOS		E			A			B				C

Intersection Summary			
HCM Average Control Delay	23.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	97.8	Sum of lost time (s)	15.8
Intersection Capacity Utilization	66.4%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBR
Lane Configurations	
Volume (vph)	63
Ideal Flow (vphpl)	1900
Total Lost time (s)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Peak-hour factor, PHF	0.95
Adj. Flow (vph)	66
RTOR Reduction (vph)	0
Lane Group Flow (vph)	0
Turn Type	
Protected Phases	
Permitted Phases	
Actuated Green, G (s)	
Effective Green, g (s)	
Actuated g/C Ratio	
Clearance Time (s)	
Vehicle Extension (s)	
Lane Grp Cap (vph)	
v/s Ratio Prot	
v/s Ratio Perm	
v/c Ratio	
Uniform Delay, d1	
Progression Factor	
Incremental Delay, d2	
Delay (s)	
Level of Service	
Approach Delay (s)	
Approach LOS	
Intersection Summary	

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	50	2	20	37	2	89	110	1710	34	83	1740	90
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.6	4.6		4.6	4.6		5.3	5.3		5.3	5.3	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	0.86		1.00	0.85		1.00	1.00		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1608		1770	1589		1770	3529		1770	3513	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	1608		1770	1589		1770	3529		1770	3513	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	53	2	21	39	2	94	116	1800	36	87	1832	95
RTOR Reduction (vph)	0	19	0	0	85	0	0	1	0	0	2	0
Lane Group Flow (vph)	53	4	0	39	11	0	116	1835	0	87	1925	0
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases												
Actuated Green, G (s)	5.4	11.1		6.4	12.1		10.6	79.5		8.5	77.4	
Effective Green, g (s)	5.4	11.1		6.4	12.1		10.6	79.5		8.5	77.4	
Actuated g/C Ratio	0.04	0.09		0.05	0.10		0.08	0.63		0.07	0.62	
Clearance Time (s)	4.6	4.6		4.6	4.6		5.3	5.3		5.3	5.3	
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	76	142		90	153		150	2239		120	2170	
v/s Ratio Prot	c0.03	0.00		0.02	c0.01		c0.07	0.52		0.05	c0.55	
v/s Ratio Perm												
v/c Ratio	0.70	0.03		0.43	0.07		0.77	0.82		0.72	0.89	
Uniform Delay, d1	59.1	52.2		57.7	51.5		56.2	17.4		57.3	20.3	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	20.1	0.0		1.2	0.1		19.9	2.3		16.7	4.7	
Delay (s)	79.2	52.2		58.9	51.6		76.0	19.8		74.0	24.9	
Level of Service	E	D		E	D		E	B		E	C	
Approach Delay (s)		71.0			53.7			23.1			27.1	
Approach LOS		E			D			C			C	

Intersection Summary			
HCM Average Control Delay	26.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	125.3	Sum of lost time (s)	15.2
Intersection Capacity Utilization	79.2%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Volume (vph)	80	70	10	5	350	150	628	20	1146	310	599	1088
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.6	7.2			5.6	5.6	6.3	6.3	5.3	5.3	6.3	5.3
Lane Util. Factor	1.00	1.00			0.97	1.00	0.88	1.00	0.95	1.00	0.97	0.95
Frt	1.00	0.98			1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99
Flt Protected	0.95	1.00			0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	1827			3433	1863	2787	1770	3539	1583	3433	3490
Flt Permitted	0.95	1.00			0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1770	1827			3433	1863	2787	1770	3539	1583	3433	3490
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	84	74	11	5	368	158	661	21	1206	326	631	1145
RTOR Reduction (vph)	0	4	0	0	0	0	102	0	0	117	0	4
Lane Group Flow (vph)	84	81	0	0	373	158	559	21	1206	209	631	1257
Turn Type	Prot			Prot	Prot		pm+ov	Prot		Perm	Prot	
Protected Phases	3	8		7	7	4	5	1	6		5	2
Permitted Phases							4			6		
Actuated Green, G (s)	10.0	14.5			14.5	20.6	43.5	1.9	51.1	51.1	22.9	72.1
Effective Green, g (s)	10.0	14.5			14.5	20.6	43.5	1.9	51.1	51.1	22.9	72.1
Actuated g/C Ratio	0.08	0.11			0.11	0.16	0.34	0.01	0.40	0.40	0.18	0.57
Clearance Time (s)	5.6	7.2			5.6	5.6	6.3	6.3	5.3	5.3	6.3	5.3
Vehicle Extension (s)	2.0	2.0			2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	139	208			391	301	952	26	1419	635	617	1975
v/s Ratio Prot	0.05	0.04			c0.11	0.08	c0.11	0.01	c0.34		c0.18	0.36
v/s Ratio Perm							0.09			0.13		
v/c Ratio	0.60	0.39			0.95	0.52	0.59	0.81	0.85	0.33	1.02	0.64
Uniform Delay, d1	56.8	52.3			56.1	48.9	34.6	62.6	34.7	26.3	52.2	18.8
Progression Factor	1.00	1.00			1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	5.0	0.4			33.3	0.8	0.6	90.8	4.8	0.1	42.1	0.5
Delay (s)	61.8	52.8			89.4	49.7	35.2	153.4	39.4	26.4	94.4	19.3
Level of Service	E	D			F	D	D	F	D	C	F	B
Approach Delay (s)		57.3				54.1			38.2			44.3
Approach LOS		E				D			D			D

Intersection Summary			
HCM Average Control Delay	45.2	HCM Level of Service	D
HCM Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	127.4	Sum of lost time (s)	23.5
Intersection Capacity Utilization	83.5%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBR
Lane Configurations	
Volume (vph)	110
Ideal Flow (vphpl)	1900
Total Lost time (s)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Peak-hour factor, PHF	0.95
Adj. Flow (vph)	116
RTOR Reduction (vph)	0
Lane Group Flow (vph)	0
Turn Type	
Protected Phases	
Permitted Phases	
Actuated Green, G (s)	
Effective Green, g (s)	
Actuated g/C Ratio	
Clearance Time (s)	
Vehicle Extension (s)	
Lane Grp Cap (vph)	
v/s Ratio Prot	
v/s Ratio Perm	
v/c Ratio	
Uniform Delay, d1	
Progression Factor	
Incremental Delay, d2	
Delay (s)	
Level of Service	
Approach Delay (s)	
Approach LOS	

Intersection Summary

Movement	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL
Lane Configurations												
Volume (vph)	20	82	757	10	10	796	750	40	150	30	5	600
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.6	6.6	6.6	5.6	6.6	6.6	5.6	5.6	5.6		5.6
Lane Util. Factor		0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.95	1.00		0.97
Frpb, ped/bikes		1.00	1.00	0.99	1.00	1.00	1.00	1.00	1.00	0.98		1.00
Flpb, ped/bikes		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00
Frt		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85		1.00
Flt Protected		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00		0.95
Satd. Flow (prot)		3433	3539	1563	3433	3539	1583	3433	3539	1557		3433
Flt Permitted		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00		0.95
Satd. Flow (perm)		3433	3539	1563	3433	3539	1583	3433	3539	1557		3433
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	21	86	797	11	11	838	789	42	158	32	5	632
RTOR Reduction (vph)	0	0	0	6	0	0	376	0	0	27	0	0
Lane Group Flow (vph)	0	107	797	5	11	838	413	42	158	5	0	637
Confl. Peds. (#/hr)										2		
Confl. Bikes (#/hr)				2						2		1
Turn Type	Prot	Prot		Perm	Prot		Perm	Prot		Perm	Prot	Prot
Protected Phases	3	3	8		7	4		1	6		5	5
Permitted Phases				8			4			6		
Actuated Green, G (s)		5.9	41.1	41.1	0.7	35.9	35.9	2.8	14.9	14.9		18.1
Effective Green, g (s)		5.9	41.1	41.1	0.7	35.9	35.9	2.8	14.9	14.9		18.1
Actuated g/C Ratio		0.06	0.42	0.42	0.01	0.37	0.37	0.03	0.15	0.15		0.18
Clearance Time (s)		5.6	6.6	6.6	5.6	6.6	6.6	5.6	5.6	5.6		5.6
Vehicle Extension (s)		2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0		2.0
Lane Grp Cap (vph)		206	1481	654	24	1294	579	98	537	236		633
v/s Ratio Prot		c0.03	c0.23		0.00	0.24		0.01	c0.04			c0.19
v/s Ratio Perm				0.00			c0.26			0.00		
v/c Ratio		0.52	0.54	0.01	0.46	0.65	0.71	0.43	0.29	0.02		1.01
Uniform Delay, d1		44.8	21.4	16.6	48.6	25.9	26.7	46.9	37.0	35.4		40.0
Progression Factor		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00
Incremental Delay, d2		0.9	0.2	0.0	5.0	0.8	3.5	1.1	0.1	0.0		37.3
Delay (s)		45.7	21.6	16.7	53.5	26.7	30.2	48.0	37.1	35.5		77.4
Level of Service		D	C	B	D	C	C	D	D	D		E
Approach Delay (s)			24.4			28.6			38.8			
Approach LOS			C			C			D			

Intersection Summary			
HCM Average Control Delay	36.1	HCM Level of Service	D
HCM Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	98.2	Sum of lost time (s)	30.0
Intersection Capacity Utilization	92.8%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBT	SBR
Lane Configurations	↑↑	↱
Volume (vph)	140	181
Ideal Flow (vphpl)	1900	1900
Total Lost time (s)	4.6	4.6
Lane Util. Factor	0.95	1.00
Frpb, ped/bikes	1.00	0.99
Flpb, ped/bikes	1.00	1.00
Frt	1.00	0.85
Flt Protected	1.00	1.00
Satd. Flow (prot)	3539	1562
Flt Permitted	1.00	1.00
Satd. Flow (perm)	3539	1562
Peak-hour factor, PHF	0.95	0.95
Adj. Flow (vph)	147	191
RTOR Reduction (vph)	0	79
Lane Group Flow (vph)	147	112
Confl. Peds. (#/hr)		1
Confl. Bikes (#/hr)		1
Turn Type		Perm
Protected Phases	2	
Permitted Phases		2
Actuated Green, G (s)	31.2	31.2
Effective Green, g (s)	31.2	31.2
Actuated g/C Ratio	0.32	0.32
Clearance Time (s)	4.6	4.6
Vehicle Extension (s)	2.0	2.0
Lane Grp Cap (vph)	1124	496
v/s Ratio Prot	0.04	
v/s Ratio Perm		0.07
v/c Ratio	0.13	0.23
Uniform Delay, d1	23.8	24.6
Progression Factor	1.00	1.00
Incremental Delay, d2	0.0	0.1
Delay (s)	23.9	24.7
Level of Service	C	C
Approach Delay (s)	59.0	
Approach LOS	E	

Intersection Summary

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Lane Configurations												
Volume (vph)	5	352	272	70	5	134	362	240	25	150	532	63
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.6	4.9	4.9		5.6	4.9	4.9		6.3	5.3	5.3
Lane Util. Factor		0.97	0.95	1.00		0.97	0.95	1.00		0.97	0.95	1.00
Frt		1.00	1.00	0.85		1.00	1.00	0.85		1.00	1.00	0.85
Flt Protected		0.95	1.00	1.00		0.95	1.00	1.00		0.95	1.00	1.00
Satd. Flow (prot)		3433	3539	1583		3433	3539	1583		3433	3539	1583
Flt Permitted		0.95	1.00	1.00		0.95	1.00	1.00		0.95	1.00	1.00
Satd. Flow (perm)		3433	3539	1583		3433	3539	1583		3433	3539	1583
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	5	371	286	74	5	141	381	253	26	158	560	66
RTOR Reduction (vph)	0	0	0	55	0	0	0	142	0	0	0	49
Lane Group Flow (vph)	0	376	286	19	0	146	381	111	0	184	560	17
Turn Type	Prot	Prot		Perm	Prot	Prot		Perm	Prot	Prot		Perm
Protected Phases	3	3	8		7	7	4		1	1	6	
Permitted Phases				8				4				6
Actuated Green, G (s)		12.9	21.6	21.6		7.8	16.5	16.5		7.5	21.0	21.0
Effective Green, g (s)		12.9	21.6	21.6		7.8	16.5	16.5		7.5	21.0	21.0
Actuated g/C Ratio		0.16	0.26	0.26		0.10	0.20	0.20		0.09	0.26	0.26
Clearance Time (s)		5.6	4.9	4.9		5.6	4.9	4.9		6.3	5.3	5.3
Vehicle Extension (s)		2.0	2.0	2.0		2.0	2.0	2.0		2.0	2.0	2.0
Lane Grp Cap (vph)		540	932	417		327	712	319		314	906	405
v/s Ratio Prot		c0.11	c0.08			0.04	c0.11			0.05	0.16	
v/s Ratio Perm				0.01				0.07				0.01
v/c Ratio		0.70	0.31	0.05		0.45	0.54	0.35		0.59	0.62	0.04
Uniform Delay, d1		32.7	24.2	22.5		35.1	29.3	28.1		35.8	27.0	22.9
Progression Factor		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2		3.2	0.1	0.0		0.4	0.4	0.2		1.8	0.9	0.0
Delay (s)		35.8	24.3	22.5		35.4	29.7	28.4		37.6	27.8	22.9
Level of Service		D	C	C		D	C	C		D	C	C
Approach Delay (s)			30.0				30.3				29.7	
Approach LOS			C				C				C	

Intersection Summary			
HCM Average Control Delay	30.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	82.0	Sum of lost time (s)	21.7
Intersection Capacity Utilization	77.8%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBU	SBL	SBT	SBR
Lane Configurations				
Volume (vph)	15	240	572	562
Ideal Flow (vphpl)	1900	1900	1900	1900
Total Lost time (s)		6.3	5.3	5.3
Lane Util. Factor		0.97	0.95	1.00
Frt		1.00	1.00	0.85
Flt Protected		0.95	1.00	1.00
Satd. Flow (prot)		3433	3539	1583
Flt Permitted		0.95	1.00	1.00
Satd. Flow (perm)		3433	3539	1583
Peak-hour factor, PHF	0.95	0.95	0.95	0.95
Adj. Flow (vph)	16	253	602	592
RTOR Reduction (vph)	0	0	0	255
Lane Group Flow (vph)	0	269	602	337
Turn Type	Prot	Prot		Perm
Protected Phases	5	5	2	
Permitted Phases				2
Actuated Green, G (s)		9.5	23.0	23.0
Effective Green, g (s)		9.5	23.0	23.0
Actuated g/C Ratio		0.12	0.28	0.28
Clearance Time (s)		6.3	5.3	5.3
Vehicle Extension (s)		2.0	2.0	2.0
Lane Grp Cap (vph)		398	993	444
v/s Ratio Prot		c0.08	0.17	
v/s Ratio Perm				c0.21
v/c Ratio		0.68	0.61	0.76
Uniform Delay, d1		34.8	25.6	27.0
Progression Factor		1.00	1.00	1.00
Incremental Delay, d2		3.6	0.7	6.5
Delay (s)		38.3	26.3	33.4
Level of Service		D	C	C
Approach Delay (s)			31.4	
Approach LOS			C	

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	215	120	60	80	270	123	130	1188	40	104	1119	275
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.6	5.3	5.3	5.6	5.3	5.3	5.6	5.3	5.3	5.6	5.3	5.3
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	3539	1583	3433	3539	1583	3433	3539	1583	3433	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	3539	1583	3433	3539	1583	3433	3539	1583	3433	3539	1583
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	226	126	63	84	284	129	137	1251	42	109	1178	289
RTOR Reduction (vph)	0	0	50	0	0	106	0	0	18	0	0	169
Lane Group Flow (vph)	226	126	13	84	284	23	137	1251	24	109	1178	120
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	1	6		5	2		3	8		7	4	
Permitted Phases			6			2			8			4
Actuated Green, G (s)	6.9	17.1	17.1	4.5	14.7	14.7	5.1	35.6	35.6	3.9	34.4	34.4
Effective Green, g (s)	6.9	17.1	17.1	4.5	14.7	14.7	5.1	35.6	35.6	3.9	34.4	34.4
Actuated g/C Ratio	0.08	0.21	0.21	0.05	0.18	0.18	0.06	0.43	0.43	0.05	0.41	0.41
Clearance Time (s)	5.6	5.3	5.3	5.6	5.3	5.3	5.6	5.3	5.3	5.6	5.3	5.3
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	286	730	327	186	628	281	211	1520	680	162	1469	657
v/s Ratio Prot	c0.07	0.04		0.02	c0.08		c0.04	c0.35		0.03	0.33	
v/s Ratio Perm			0.01			0.01			0.02			0.08
v/c Ratio	0.79	0.17	0.04	0.45	0.45	0.08	0.65	0.82	0.04	0.67	0.80	0.18
Uniform Delay, d1	37.3	27.1	26.3	38.0	30.5	28.5	38.0	20.9	13.7	38.9	21.3	15.3
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	12.9	0.0	0.0	0.6	0.2	0.0	5.1	3.6	0.0	8.3	3.1	0.0
Delay (s)	50.2	27.1	26.3	38.6	30.7	28.5	43.1	24.4	13.7	47.2	24.3	15.4
Level of Service	D	C	C	D	C	C	D	C	B	D	C	B
Approach Delay (s)		39.6			31.5			25.9			24.3	
Approach LOS		D			C			C			C	

Intersection Summary			
HCM Average Control Delay	27.4	HCM Level of Service	C
HCM Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	82.9	Sum of lost time (s)	16.5
Intersection Capacity Utilization	68.5%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	10	10	10	180	493	10
Sign Control		Stop	Stop		Free	
Grade		0%	0%		0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	11	11	11	189	519	11
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1048	1043	1048	0	0	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1048	1043	1048	0	0	
tC, single (s)	7.1	6.5	6.5	6.2	4.1	
tC, 2 stage (s)						
tF (s)	3.5	4.0	4.0	3.3	2.2	
p0 queue free %	91	93	93	83	68	
cM capacity (veh/h)	121	156	155	1085	1623	

Direction, Lane #	EB 1	EB 2	WB 1	SB 1	SB 2
Volume Total	14	7	200	346	184
Volume Left	11	0	0	346	173
Volume Right	0	0	189	0	11
cSH	129	156	824	1623	1623
Volume to Capacity	0.11	0.04	0.24	0.32	0.32
Queue Length 95th (ft)	9	4	24	35	35
Control Delay (s)	36.4	29.2	10.8	8.3	7.9
Lane LOS	E	D	B	A	A
Approach Delay (s)	34.0		10.8	8.1	
Approach LOS	D		B		

Intersection Summary			
Average Delay	9.6		
Intersection Capacity Utilization	32.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	10	493	0	0	180	899	10	0	131	0	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	11	519	0	0	189	946	11	0	138	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)									17			
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	189			519			729	729	259	539	729	189
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	189			519			729	729	259	539	729	189
tC, single (s)	4.4			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.4			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			100			97	100	81	100	100	100
cM capacity (veh/h)	1279			1043			308	345	739	344	345	820

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1
Volume Total	11	259	259	189	473	473	148
Volume Left	11	0	0	0	0	0	11
Volume Right	0	0	0	0	473	473	138
cSH	1279	1700	1700	1700	1700	1700	796
Volume to Capacity	0.01	0.15	0.15	0.11	0.28	0.28	0.19
Queue Length 95th (ft)	1	0	0	0	0	0	17
Control Delay (s)	7.8	0.0	0.0	0.0	0.0	0.0	11.4
Lane LOS	A						B
Approach Delay (s)	0.2			0.0			11.4
Approach LOS							B

Intersection Summary			
Average Delay	1.0		
Intersection Capacity Utilization	48.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Lane Configurations												
Volume (vph)	5	160	813	250	5	52	703	244	60	460	670	174
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.6	6.8	6.8		5.6	7.2	7.2		5.6	7.2	7.2
Lane Util. Factor		0.97	0.91	0.88		0.97	0.91	1.00		0.97	0.91	1.00
Frpb, ped/bikes		1.00	1.00	0.99		1.00	1.00	0.98		1.00	1.00	0.97
Flpb, ped/bikes		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00
Frt		1.00	1.00	0.85		1.00	1.00	0.85		1.00	1.00	0.85
Flt Protected		0.95	1.00	1.00		0.95	1.00	1.00		0.95	1.00	1.00
Satd. Flow (prot)		3433	5085	2752		3433	5085	1549		3433	5085	1541
Flt Permitted		0.95	1.00	1.00		0.95	1.00	1.00		0.95	1.00	1.00
Satd. Flow (perm)		3433	5085	2752		3433	5085	1549		3433	5085	1541
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	5	168	856	263	5	55	740	257	63	484	705	183
RTOR Reduction (vph)	0	0	0	140	0	0	0	147	0	0	0	99
Lane Group Flow (vph)	0	173	856	123	0	60	740	110	0	547	705	84
Confl. Peds. (#/hr)								7				9
Confl. Bikes (#/hr)				1				1				4
Turn Type	Prot	Prot		Perm	Prot	Prot		Perm	Prot	Prot		Perm
Protected Phases	1	1	6		5	5	2		3	3	8	
Permitted Phases				6				2				8
Actuated Green, G (s)		16.5	70.3	70.3		5.1	58.5	58.5		38.8	29.8	29.8
Effective Green, g (s)		16.5	70.3	70.3		5.1	58.5	58.5		38.8	29.8	29.8
Actuated g/C Ratio		0.11	0.47	0.47		0.03	0.39	0.39		0.26	0.20	0.20
Clearance Time (s)		5.6	6.8	6.8		5.6	7.2	7.2		5.6	7.2	7.2
Vehicle Extension (s)		2.0	2.0	2.0		2.0	2.0	2.0		2.0	2.0	2.0
Lane Grp Cap (vph)		378	2383	1290		117	1983	604		888	1010	306
v/s Ratio Prot		c0.05	c0.17			0.02	c0.15			c0.16	c0.14	
v/s Ratio Perm				0.04				0.07				0.05
v/c Ratio		0.46	0.36	0.10		0.51	0.37	0.18		0.62	0.70	0.28
Uniform Delay, d1		62.6	25.5	22.2		71.2	32.7	30.0		49.0	55.9	51.0
Progression Factor		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2		0.3	0.4	0.1		1.6	0.5	0.7		0.9	1.7	0.2
Delay (s)		62.9	25.9	22.3		72.8	33.2	30.7		49.9	57.6	51.1
Level of Service		E	C	C		E	C	C		D	E	D
Approach Delay (s)			30.1				34.8				53.9	
Approach LOS			C				C				D	

Intersection Summary			
HCM Average Control Delay	45.3	HCM Level of Service	D
HCM Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	38.0
Intersection Capacity Utilization	82.8%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBU	SBL	SBT	SBR
Lane Configurations				
Volume (vph)	5	330	230	180
Ideal Flow (vphpl)	1900	1900	1900	1900
Total Lost time (s)		5.6	6.3	6.3
Lane Util. Factor		0.97	0.91	1.00
Frpb, ped/bikes		1.00	1.00	0.97
Flpb, ped/bikes		1.00	1.00	1.00
Frt		1.00	1.00	0.85
Flt Protected		0.95	1.00	1.00
Satd. Flow (prot)		3433	5085	1537
Flt Permitted		0.95	1.00	1.00
Satd. Flow (perm)		3433	5085	1537
Peak-hour factor, PHF	0.95	0.95	0.95	0.95
Adj. Flow (vph)	5	347	242	189
RTOR Reduction (vph)	0	0	0	175
Lane Group Flow (vph)	0	352	242	14
Confl. Peds. (#/hr)				
Confl. Bikes (#/hr)				6
Turn Type	Prot	Prot		Perm
Protected Phases	7	7	4	
Permitted Phases				4
Actuated Green, G (s)		19.6	11.5	11.5
Effective Green, g (s)		19.6	11.5	11.5
Actuated g/C Ratio		0.13	0.08	0.08
Clearance Time (s)		5.6	6.3	6.3
Vehicle Extension (s)		2.0	2.0	2.0
Lane Grp Cap (vph)		449	390	118
v/s Ratio Prot		c0.10	0.05	
v/s Ratio Perm				0.01
v/c Ratio		0.78	0.62	0.12
Uniform Delay, d1		63.1	67.1	64.5
Progression Factor		1.00	1.00	1.00
Incremental Delay, d2		8.1	2.2	0.2
Delay (s)		71.2	69.3	64.7
Level of Service		E	E	E
Approach Delay (s)			69.1	
Approach LOS			E	

Intersection Summary

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Lane Configurations												
Volume (vph)	20	360	1087	120	5	440	615	434	5	184	774	360
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.6	6.0	6.0		5.6	6.0	6.0		5.6	5.7	5.7
Lane Util. Factor		0.97	0.91	1.00		0.97	0.91	1.00		0.97	0.91	1.00
Frpb, ped/bikes		1.00	1.00	0.98		1.00	1.00	0.99		1.00	1.00	0.98
Flpb, ped/bikes		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00
Frt		1.00	1.00	0.85		1.00	1.00	0.85		1.00	1.00	0.85
Flt Protected		0.95	1.00	1.00		0.95	1.00	1.00		0.95	1.00	1.00
Satd. Flow (prot)		3433	5085	1554		3433	5085	1561		3433	5085	1559
Flt Permitted		0.95	1.00	1.00		0.95	1.00	1.00		0.95	1.00	1.00
Satd. Flow (perm)		3433	5085	1554		3433	5085	1561		3433	5085	1559
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	21	379	1144	126	5	463	647	457	5	194	815	379
RTOR Reduction (vph)	0	0	0	54	0	0	0	152	0	0	0	242
Lane Group Flow (vph)	0	400	1144	72	0	468	647	305	0	199	815	137
Confl. Peds. (#/hr)				3				2				1
Confl. Bikes (#/hr)				4								2
Turn Type	Prot	Prot		Perm	Prot	Prot		Perm	Prot	Prot		Perm
Protected Phases	1	1	6		5	5	2		3	3	8	
Permitted Phases				6				2				8
Actuated Green, G (s)		22.4	49.2	49.2		23.7	50.5	50.5		12.3	30.0	30.0
Effective Green, g (s)		22.4	49.2	49.2		23.7	50.5	50.5		12.3	30.0	30.0
Actuated g/C Ratio		0.15	0.33	0.33		0.16	0.34	0.34		0.08	0.20	0.20
Clearance Time (s)		5.6	6.0	6.0		5.6	6.0	6.0		5.6	5.7	5.7
Vehicle Extension (s)		2.0	2.0	2.0		2.0	2.0	2.0		2.0	2.0	2.0
Lane Grp Cap (vph)		513	1668	510		542	1712	526		282	1017	312
v/s Ratio Prot		c0.12	c0.22			c0.14	0.13			0.06	c0.16	
v/s Ratio Perm				0.05				0.20				0.09
v/c Ratio		0.78	0.69	0.14		0.86	0.38	0.58		0.71	0.80	0.44
Uniform Delay, d1		61.4	43.7	35.5		61.6	37.8	41.0		67.1	57.2	52.6
Progression Factor		1.00	1.00	1.00		0.60	0.49	0.68		1.00	1.00	1.00
Incremental Delay, d2		6.7	2.3	0.6		12.0	0.6	4.2		6.4	4.4	0.4
Delay (s)		68.2	46.0	36.1		49.0	19.2	31.9		73.5	61.5	53.0
Level of Service		E	D	D		D	B	C		E	E	D
Approach Delay (s)			50.6				31.8				60.9	
Approach LOS			D				C				E	

Intersection Summary			
HCM Average Control Delay	49.3	HCM Level of Service	D
HCM Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	28.5
Intersection Capacity Utilization	96.7%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBU	SBL	SBT	SBR
Lane Configurations				
Volume (vph)	40	419	719	270
Ideal Flow (vphpl)	1900	1900	1900	1900
Total Lost time (s)		5.6	5.7	5.7
Lane Util. Factor		0.97	0.86	0.86
Frpb, ped/bikes		1.00	1.00	0.98
Flpb, ped/bikes		1.00	1.00	1.00
Frt		1.00	0.99	0.85
Flt Protected		0.95	1.00	1.00
Satd. Flow (prot)		3433	4753	1340
Flt Permitted		0.95	1.00	1.00
Satd. Flow (perm)		3433	4753	1340
Peak-hour factor, PHF	0.95	0.95	0.95	0.95
Adj. Flow (vph)	42	441	757	284
RTOR Reduction (vph)	0	0	5	166
Lane Group Flow (vph)	0	483	806	64
Confl. Peds. (#/hr)				2
Confl. Bikes (#/hr)				2
Turn Type	Prot	Prot		Perm
Protected Phases	7	7	4	
Permitted Phases				4
Actuated Green, G (s)		24.2	41.9	41.9
Effective Green, g (s)		24.2	41.9	41.9
Actuated g/C Ratio		0.16	0.28	0.28
Clearance Time (s)		5.6	5.7	5.7
Vehicle Extension (s)		2.0	2.0	2.0
Lane Grp Cap (vph)		554	1328	374
v/s Ratio Prot		c0.14	0.17	
v/s Ratio Perm				0.05
v/c Ratio		0.87	0.61	0.17
Uniform Delay, d1		61.4	46.9	40.9
Progression Factor		1.00	1.00	1.00
Incremental Delay, d2		13.7	0.5	0.1
Delay (s)		75.1	47.4	41.0
Level of Service		E	D	D
Approach Delay (s)			55.2	
Approach LOS			E	

Intersection Summary

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL
Lane Configurations												
Volume (vph)	5	10	1816	80	5	120	1369	70	90	12	110	80
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.7	6.7	6.7		5.6	6.7			5.6	5.6	5.6
Lane Util. Factor		1.00	0.91	1.00		1.00	0.91			1.00	1.00	0.95
Frpb, ped/bikes		1.00	1.00	0.98		1.00	1.00			1.00	0.99	1.00
Flpb, ped/bikes		1.00	1.00	1.00		1.00	1.00			1.00	1.00	1.00
Frt		1.00	1.00	0.85		1.00	0.99			1.00	0.85	1.00
Flt Protected		0.95	1.00	1.00		0.95	1.00			0.96	1.00	0.95
Satd. Flow (prot)		1770	5085	1548		1770	5039			1604	1562	1681
Flt Permitted		0.95	1.00	1.00		0.95	1.00			0.96	1.00	0.95
Satd. Flow (perm)		1770	5085	1548		1770	5039			1604	1562	1681
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	5	11	1912	84	5	126	1441	74	95	13	116	84
RTOR Reduction (vph)	0	0	0	18	0	0	2	0	0	0	103	0
Lane Group Flow (vph)	0	16	1912	66	0	131	1513	0	0	108	13	50
Confl. Peds. (#/hr)								5			1	
Confl. Bikes (#/hr)				3								
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	15%	2%	2%	2%
Turn Type	Prot	Prot		Perm	Prot	Prot			Split		Perm	Split
Protected Phases	1	1	6		5	5	2		3	3		4
Permitted Phases				6							3	
Actuated Green, G (s)		2.2	82.6	82.6		15.0	94.3			16.8	16.8	12.1
Effective Green, g (s)		2.2	82.6	82.6		15.0	94.3			16.8	16.8	12.1
Actuated g/C Ratio		0.01	0.55	0.55		0.10	0.63			0.11	0.11	0.08
Clearance Time (s)		6.7	6.7	6.7		5.6	6.7			5.6	5.6	5.6
Vehicle Extension (s)		2.0	3.0	3.0		2.0	3.0			2.0	2.0	2.0
Lane Grp Cap (vph)		26	2800	852		177	3168			180	175	136
v/s Ratio Prot		0.01	c0.38			c0.07	0.30			c0.07		c0.03
v/s Ratio Perm				0.04							0.01	
v/c Ratio		0.62	0.68	0.08		0.74	0.48			0.60	0.07	0.37
Uniform Delay, d1		73.5	24.3	15.8		65.6	14.8			63.4	59.6	65.3
Progression Factor		1.21	0.38	0.20		0.57	0.30			1.00	1.00	1.00
Incremental Delay, d2		19.8	1.0	0.1		9.6	0.4			3.6	0.1	0.6
Delay (s)		108.5	10.2	3.2		47.3	4.8			67.0	59.7	65.9
Level of Service		F	B	A		D	A			E	E	E
Approach Delay (s)			10.7				8.2			63.2		
Approach LOS			B				A			E		

Intersection Summary			
HCM Average Control Delay	14.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	23.5
Intersection Capacity Utilization	75.6%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	SBT	SBR
Lane Configurations		
Volume (vph)	14	30
Ideal Flow (vphpl)	1900	1900
Total Lost time (s)	5.6	5.6
Lane Util. Factor	0.95	1.00
Frpb, ped/bikes	1.00	0.98
Flpb, ped/bikes	1.00	1.00
Frt	1.00	0.85
Flt Protected	0.97	1.00
Satd. Flow (prot)	1710	1558
Flt Permitted	0.97	1.00
Satd. Flow (perm)	1710	1558
Peak-hour factor, PHF	0.95	0.95
Adj. Flow (vph)	15	32
RTOR Reduction (vph)	0	29
Lane Group Flow (vph)	49	3
Confl. Peds. (#/hr)		3
Confl. Bikes (#/hr)		
Heavy Vehicles (%)	2%	2%
Turn Type		Perm
Protected Phases	4	
Permitted Phases		4
Actuated Green, G (s)	12.1	12.1
Effective Green, g (s)	12.1	12.1
Actuated g/C Ratio	0.08	0.08
Clearance Time (s)	5.6	5.6
Vehicle Extension (s)	2.0	2.0
Lane Grp Cap (vph)	138	126
v/s Ratio Prot	0.03	
v/s Ratio Perm		0.00
v/c Ratio	0.36	0.02
Uniform Delay, d1	65.3	63.5
Progression Factor	1.00	1.00
Incremental Delay, d2	0.6	0.0
Delay (s)	65.8	63.5
Level of Service	E	E
Approach Delay (s)	65.3	
Approach LOS	E	

Intersection Summary

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Lane Configurations												
Volume (vph)	80	220	1280	296	15	392	930	130	5	409	1940	400
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.7	5.7	5.7		6.7	5.7	5.7		6.3	5.3	5.3
Lane Util. Factor		0.97	0.91	1.00		0.97	0.91	1.00		0.97	0.95	1.00
Frpb, ped/bikes		1.00	1.00	0.99		1.00	1.00	0.98		1.00	1.00	0.99
Flpb, ped/bikes		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00
Frt		1.00	1.00	0.85		1.00	1.00	0.85		1.00	1.00	0.85
Flt Protected		0.95	1.00	1.00		0.95	1.00	1.00		0.95	1.00	1.00
Satd. Flow (prot)		3433	5085	1562		3433	5085	1553		3433	3539	1561
Flt Permitted		0.95	1.00	1.00		0.95	1.00	1.00		0.95	1.00	1.00
Satd. Flow (perm)		3433	5085	1562		3433	5085	1553		3433	3539	1561
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	84	232	1347	312	16	413	979	137	5	431	2042	421
RTOR Reduction (vph)	0	0	0	120	0	0	0	65	0	0	0	79
Lane Group Flow (vph)	0	316	1347	192	0	429	979	72	0	436	2042	342
Confl. Peds. (#/hr)								4				
Confl. Bikes (#/hr)				2				1				4
Turn Type	Prot	Prot		Perm	Prot	Prot		Perm	Prot	Prot		Perm
Protected Phases	1	1	6		5	5	2		3	3	8	
Permitted Phases				6				2				8
Actuated Green, G (s)		14.8	37.3	37.3		11.3	33.8	33.8		37.8	69.7	69.7
Effective Green, g (s)		14.8	37.3	37.3		11.3	33.8	33.8		37.8	69.7	69.7
Actuated g/C Ratio		0.10	0.25	0.25		0.08	0.23	0.23		0.25	0.46	0.46
Clearance Time (s)		6.7	5.7	5.7		6.7	5.7	5.7		6.3	5.3	5.3
Vehicle Extension (s)		2.0	2.0	2.0		2.0	2.0	2.0		2.0	2.0	2.0
Lane Grp Cap (vph)		339	1264	388		259	1146	350		865	1644	725
v/s Ratio Prot		0.09	c0.26			c0.12	0.19			0.13	c0.58	
v/s Ratio Perm				0.12				0.05				0.22
v/c Ratio		0.93	1.07	0.49		1.66	0.85	0.21		0.50	1.24	0.47
Uniform Delay, d1		67.1	56.4	48.3		69.3	55.7	47.2		48.1	40.1	27.5
Progression Factor		0.63	0.57	0.53		0.74	0.49	0.40		1.00	1.00	1.00
Incremental Delay, d2		27.1	42.4	3.6		310.1	7.3	1.2		0.2	114.3	0.2
Delay (s)		69.2	74.5	29.0		361.2	34.6	20.2		48.2	154.4	27.7
Level of Service		E	E	C		F	C	C		D	F	C
Approach Delay (s)			66.5				124.0				120.1	
Approach LOS			E				F				F	

Intersection Summary			
HCM Average Control Delay	99.8	HCM Level of Service	F
HCM Volume to Capacity ratio	1.22		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	23.0
Intersection Capacity Utilization	115.1%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBU	SBL	SBT	SBR
Lane Configurations				
Volume (vph)	10	170	751	170
Ideal Flow (vphpl)	1900	1900	1900	1900
Total Lost time (s)		6.3	5.3	5.3
Lane Util. Factor		0.97	0.95	1.00
Frpb, ped/bikes		1.00	1.00	0.98
Flpb, ped/bikes		1.00	1.00	1.00
Frt		1.00	1.00	0.85
Flt Protected		0.95	1.00	1.00
Satd. Flow (prot)		3433	3539	1550
Flt Permitted		0.95	1.00	1.00
Satd. Flow (perm)		3433	3539	1550
Peak-hour factor, PHF	0.95	0.95	0.95	0.95
Adj. Flow (vph)	11	179	791	179
RTOR Reduction (vph)	0	0	0	69
Lane Group Flow (vph)	0	190	791	110
Confl. Peds. (#/hr)				4
Confl. Bikes (#/hr)				4
Turn Type	Prot	Prot		Perm
Protected Phases	7	7	4	
Permitted Phases				4
Actuated Green, G (s)		7.7	39.6	39.6
Effective Green, g (s)		7.7	39.6	39.6
Actuated g/C Ratio		0.05	0.26	0.26
Clearance Time (s)		6.3	5.3	5.3
Vehicle Extension (s)		2.0	2.0	2.0
Lane Grp Cap (vph)		176	934	409
v/s Ratio Prot		0.06	c0.22	
v/s Ratio Perm				0.07
v/c Ratio		1.08	0.85	0.27
Uniform Delay, d1		71.2	52.3	43.7
Progression Factor		1.00	1.00	1.00
Incremental Delay, d2		90.6	6.9	0.1
Delay (s)		161.8	59.2	43.9
Level of Service		F	E	D
Approach Delay (s)			73.7	
Approach LOS			E	

Intersection Summary

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL
Lane Configurations												
Volume (vph)	10	80	1580	110	10	377	1292	100	20	146	815	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.6	5.7	5.7		5.6	5.7		5.6	5.3	5.3	5.6
Lane Util. Factor		1.00	0.91	1.00		0.97	0.91		1.00	1.00	0.88	1.00
Frpb, ped/bikes		1.00	1.00	0.98		1.00	1.00		1.00	1.00	0.98	1.00
Flpb, ped/bikes		1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00
Frt		1.00	1.00	0.85		1.00	0.99		1.00	1.00	0.85	1.00
Flt Protected		0.95	1.00	1.00		0.95	1.00		0.95	1.00	1.00	0.95
Satd. Flow (prot)		1770	5085	1553		3433	5021		1770	1863	2738	1770
Flt Permitted		0.95	1.00	1.00		0.95	1.00		0.95	1.00	1.00	0.95
Satd. Flow (perm)		1770	5085	1553		3433	5021		1770	1863	2738	1770
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	11	84	1663	116	11	397	1360	105	21	154	858	63
RTOR Reduction (vph)	0	0	0	33	0	0	5	0	0	0	389	0
Lane Group Flow (vph)	0	95	1663	83	0	408	1460	0	21	154	469	63
Confl. Peds. (#/hr)				4				2			3	
Confl. Bikes (#/hr)				2				1			1	
Turn Type	Prot	Prot		Perm	Prot	Prot			Prot		Perm	Prot
Protected Phases	1	1	6		5	5	2		3	8		7
Permitted Phases				6							8	
Actuated Green, G (s)		12.0	69.2	69.2		20.4	77.6		3.6	30.5	30.5	7.7
Effective Green, g (s)		12.0	69.2	69.2		20.4	77.6		3.6	30.5	30.5	7.7
Actuated g/C Ratio		0.08	0.46	0.46		0.14	0.52		0.02	0.20	0.20	0.05
Clearance Time (s)		5.6	5.7	5.7		5.6	5.7		5.6	5.3	5.3	5.6
Vehicle Extension (s)		2.0	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0
Lane Grp Cap (vph)		142	2346	716		467	2598		42	379	557	91
v/s Ratio Prot		0.05	c0.33			c0.12	0.29		0.01	0.08		c0.04
v/s Ratio Perm				0.05							c0.17	
v/c Ratio		0.67	0.71	0.12		0.87	0.56		0.50	0.41	0.84	0.69
Uniform Delay, d1		67.1	32.3	23.0		63.5	24.6		72.3	51.9	57.4	70.0
Progression Factor		1.02	0.44	0.11		0.61	0.13		1.00	1.00	1.00	1.00
Incremental Delay, d2		3.1	0.6	0.1		10.6	0.5		3.4	0.3	10.7	16.8
Delay (s)		71.5	15.0	2.5		49.4	3.6		75.7	52.1	68.1	86.7
Level of Service		E	B	A		D	A		E	D	E	F
Approach Delay (s)			17.1				13.6			65.9		
Approach LOS			B				B			E		

Intersection Summary			
HCM Average Control Delay	27.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	27.5
Intersection Capacity Utilization	93.1%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBT	SBR
Lane Configurations	↑↑	
Volume (vph)	83	70
Ideal Flow (vphpl)	1900	1900
Total Lost time (s)	5.3	
Lane Util. Factor	0.95	
Frpb, ped/bikes	0.99	
Flpb, ped/bikes	1.00	
Frt	0.93	
Flt Protected	1.00	
Satd. Flow (prot)	3267	
Flt Permitted	1.00	
Satd. Flow (perm)	3267	
Peak-hour factor, PHF	0.95	0.95
Adj. Flow (vph)	87	74
RTOR Reduction (vph)	57	0
Lane Group Flow (vph)	104	0
Confl. Peds. (#/hr)		4
Confl. Bikes (#/hr)		1
Turn Type		
Protected Phases	4	
Permitted Phases		
Actuated Green, G (s)	34.6	
Effective Green, g (s)	34.6	
Actuated g/C Ratio	0.23	
Clearance Time (s)	5.3	
Vehicle Extension (s)	2.0	
Lane Grp Cap (vph)	754	
v/s Ratio Prot	c0.03	
v/s Ratio Perm		
v/c Ratio	0.14	
Uniform Delay, d1	45.9	
Progression Factor	1.00	
Incremental Delay, d2	0.0	
Delay (s)	45.9	
Level of Service	D	
Approach Delay (s)	57.4	
Approach LOS	E	

Intersection Summary

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL
Lane Configurations												
Volume (vph)	5	130	2315	170	100	270	1789	10	130	40	250	170
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.6	5.7			5.6	5.7		5.6	4.6		5.9
Lane Util. Factor		1.00	0.91			0.97	0.91		1.00	1.00		0.97
Frpb, ped/bikes		1.00	1.00			1.00	1.00		1.00	0.99		1.00
Flpb, ped/bikes		1.00	1.00			1.00	1.00		1.00	1.00		1.00
Frt		1.00	0.99			1.00	1.00		1.00	0.87		1.00
Flt Protected		0.95	1.00			0.95	1.00		0.95	1.00		0.95
Satd. Flow (prot)		1770	5022			3433	5080		1770	1603		3433
Flt Permitted		0.95	1.00			0.95	1.00		0.95	1.00		0.95
Satd. Flow (perm)		1770	5022			3433	5080		1770	1603		3433
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	5	137	2437	179	105	284	1883	11	137	42	263	179
RTOR Reduction (vph)	0	0	5	0	0	0	1	0	0	51	0	0
Lane Group Flow (vph)	0	142	2611	0	0	389	1893	0	137	254	0	179
Confl. Peds. (#/hr)				11				6				
Confl. Bikes (#/hr)				1				2			1	
Turn Type	Prot	Prot			Prot	Prot			Prot			Prot
Protected Phases	1	1	6		5	5	2		7	4		3
Permitted Phases												
Actuated Green, G (s)		18.4	72.5			16.5	70.6		15.1	27.2		12.0
Effective Green, g (s)		18.4	72.5			16.5	70.6		15.1	27.2		12.0
Actuated g/C Ratio		0.12	0.48			0.11	0.47		0.10	0.18		0.08
Clearance Time (s)		5.6	5.7			5.6	5.7		5.6	4.6		5.9
Vehicle Extension (s)		2.0	2.0			2.0	2.0		2.0	2.0		2.0
Lane Grp Cap (vph)		217	2427			378	2391		178	291		275
v/s Ratio Prot		0.08	c0.52			c0.11	0.37		c0.08	c0.16		0.05
v/s Ratio Perm												
v/c Ratio		0.65	1.08			1.03	0.79		0.77	0.87		0.65
Uniform Delay, d1		62.8	38.8			66.8	33.5		65.8	59.7		67.0
Progression Factor		0.93	0.51			1.00	0.70		1.00	1.00		1.00
Incremental Delay, d2		3.9	40.5			40.2	1.4		16.3	23.3		4.2
Delay (s)		62.2	60.1			106.7	24.8		82.1	83.0		71.1
Level of Service		E	E			F	C		F	F		E
Approach Delay (s)			60.2				38.8			82.7		
Approach LOS			E				D			F		

Intersection Summary			
HCM Average Control Delay	53.7	HCM Level of Service	D
HCM Volume to Capacity ratio	1.01		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	21.5
Intersection Capacity Utilization	101.4%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBT	SBR
Lane Configurations		
Volume (vph)	30	70
Ideal Flow (vphpl)	1900	1900
Total Lost time (s)	4.9	
Lane Util. Factor	1.00	
Frpb, ped/bikes	0.98	
Flpb, ped/bikes	1.00	
Frt	0.90	
Flt Protected	1.00	
Satd. Flow (prot)	1628	
Flt Permitted	1.00	
Satd. Flow (perm)	1628	
Peak-hour factor, PHF	0.95	0.95
Adj. Flow (vph)	32	74
RTOR Reduction (vph)	62	0
Lane Group Flow (vph)	44	0
Confl. Peds. (#/hr)		16
Confl. Bikes (#/hr)		2
Turn Type		
Protected Phases	8	
Permitted Phases		
Actuated Green, G (s)	24.1	
Effective Green, g (s)	24.1	
Actuated g/C Ratio	0.16	
Clearance Time (s)	4.9	
Vehicle Extension (s)	2.0	
Lane Grp Cap (vph)	262	
v/s Ratio Prot	0.03	
v/s Ratio Perm		
v/c Ratio	0.17	
Uniform Delay, d1	54.3	
Progression Factor	1.00	
Incremental Delay, d2	0.1	
Delay (s)	54.4	
Level of Service	D	
Approach Delay (s)	64.9	
Approach LOS	E	

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	2466	279	50	1499	0	0	0	0	480	0	1180
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0		5.6	5.7					6.7	6.7	6.7
Lane Util. Factor		0.91		0.97	0.91					0.95	0.95	0.88
Frpb, ped/bikes		1.00		1.00	1.00					1.00	1.00	0.99
Flpb, ped/bikes		1.00		1.00	1.00					1.00	1.00	1.00
Frt		0.98		1.00	1.00					1.00	1.00	0.85
Flt Protected		1.00		0.95	1.00					0.95	0.95	1.00
Satd. Flow (prot)		4998		3367	5085					1681	1681	2746
Flt Permitted		1.00		0.95	1.00					0.95	0.95	1.00
Satd. Flow (perm)		4998		3367	5085					1681	1681	2746
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	2596	294	53	1578	0	0	0	0	505	0	1242
RTOR Reduction (vph)	0	9	0	0	0	0	0	0	0	0	0	26
Lane Group Flow (vph)	0	2881	0	53	1578	0	0	0	0	252	253	1216
Confl. Peds. (#/hr)			3			2						2
Confl. Bikes (#/hr)			1			2						
Heavy Vehicles (%)	2%	2%	2%	4%	2%	2%	2%	2%	2%	2%	2%	2%
Turn Type				Prot						Split		Perm
Protected Phases		2		1	6					4	4	
Permitted Phases												4
Actuated Green, G (s)		75.0		3.0	83.9					53.7	53.7	53.7
Effective Green, g (s)		75.0		3.0	83.9					53.7	53.7	53.7
Actuated g/C Ratio		0.50		0.02	0.56					0.36	0.36	0.36
Clearance Time (s)		6.0		5.6	5.7					6.7	6.7	6.7
Vehicle Extension (s)		2.0		2.0	2.0					1.0	1.0	1.0
Lane Grp Cap (vph)		2499		67	2844					602	602	983
v/s Ratio Prot		c0.58		0.02	c0.31					0.15	0.15	
v/s Ratio Perm												c0.44
v/c Ratio		1.15		0.79	0.55					0.42	0.42	1.24
Uniform Delay, d1		37.5		73.2	21.1					36.4	36.4	48.1
Progression Factor		0.34		0.82	0.49					1.00	1.00	1.00
Incremental Delay, d2		69.3		35.7	0.6					0.2	0.2	115.4
Delay (s)		82.0		95.6	10.9					36.5	36.6	163.5
Level of Service		F		F	B					D	D	F
Approach Delay (s)		82.0			13.7			0.0			126.8	
Approach LOS		F			B			A			F	

Intersection Summary			
HCM Average Control Delay	76.7	HCM Level of Service	E
HCM Volume to Capacity ratio	1.14		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	12.7
Intersection Capacity Utilization	86.8%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑↑	↑↑↑	↱		
Volume (veh/h)	0	2946	1549	320	0	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	3101	1631	337	0	0
Pedestrians					1	
Lane Width (ft)					0.0	
Walking Speed (ft/s)					4.0	
Percent Blockage					0	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		515	937			
pX, platoon unblocked	0.84				0.59	0.84
vC, conflicting volume	1968				2665	545
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1473				0	0
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	100
cM capacity (veh/h)	379				603	907

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	WB 4
Volume Total	1034	1034	1034	544	544	544	337
Volume Left	0	0	0	0	0	0	0
Volume Right	0	0	0	0	0	0	337
cSH	1700	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.61	0.61	0.61	0.32	0.32	0.32	0.20
Queue Length 95th (ft)	0	0	0	0	0	0	0
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS							
Approach Delay (s)	0.0			0.0			
Approach LOS							

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	86.8%	ICU Level of Service	E
Analysis Period (min)	15		

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBU
Lane Configurations		↰	↑↑	↱		↰	↑↑↑	↱	↰	↰↑↱		
Volume (vph)	15	70	1672	1204	10	40	1276	130	483	100	180	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.6	5.7	4.0		5.6	5.7	5.7	5.6	5.6		
Lane Util. Factor		1.00	0.95	1.00		1.00	0.91	1.00	0.91	0.91		
Frpb, ped/bikes		1.00	1.00	0.99		1.00	1.00	0.98	1.00	0.99		
Flpb, ped/bikes		1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00		
Frt		1.00	1.00	0.85		1.00	1.00	0.85	1.00	0.95		
Flt Protected		0.95	1.00	1.00		0.95	1.00	1.00	0.95	0.98		
Satd. Flow (prot)		1770	3539	1563		1770	5085	1557	1610	3113		
Flt Permitted		0.95	1.00	1.00		0.95	1.00	1.00	0.95	0.98		
Satd. Flow (perm)		1770	3539	1563		1770	5085	1557	1610	3113		
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	16	74	1760	1267	11	42	1343	137	508	105	189	11
RTOR Reduction (vph)	0	0	0	0	0	0	0	51	0	45	0	0
Lane Group Flow (vph)	0	90	1760	1267	0	53	1343	86	274	483	0	0
Confl. Peds. (#/hr)				2				2			4	
Confl. Bikes (#/hr)				1				3			4	
Turn Type	Prot	Prot		Free	Prot	Prot		Perm	Split			Split
Protected Phases	1	1	6		5	5	2		3	3		4
Permitted Phases				Free				2				
Actuated Green, G (s)		15.2	80.9	150.0		5.5	71.2	71.2	27.3	27.3		
Effective Green, g (s)		15.2	80.9	150.0		5.5	71.2	71.2	27.3	27.3		
Actuated g/C Ratio		0.10	0.54	1.00		0.04	0.47	0.47	0.18	0.18		
Clearance Time (s)		5.6	5.7			5.6	5.7	5.7	5.6	5.6		
Vehicle Extension (s)		2.0	3.9			2.0	3.9	3.9	2.0	2.0		
Lane Grp Cap (vph)		179	1909	1563		65	2414	739	293	567		
v/s Ratio Prot		0.05	c0.50			0.03	0.26		0.17	0.16		
v/s Ratio Perm				c0.81				0.06				
v/c Ratio		0.50	0.92	0.81		0.82	0.56	0.12	0.94	0.85		
Uniform Delay, d1		63.8	31.7	0.0		71.7	28.1	21.9	60.5	59.4		
Progression Factor		0.65	0.35	1.00		1.00	1.00	1.00	0.71	0.67		
Incremental Delay, d2		0.1	1.0	0.4		50.2	0.9	0.3	34.6	11.2		
Delay (s)		41.7	12.1	0.4		121.9	29.1	22.2	77.4	51.2		
Level of Service		D	B	A		F	C	C	E	D		
Approach Delay (s)			8.2				31.7			60.2		
Approach LOS			A				C			E		

Intersection Summary			
HCM Average Control Delay	27.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	5.7
Intersection Capacity Utilization	92.1%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBL	SBT	SBR
Lane Configurations			
Volume (vph)	200	70	110
Ideal Flow (vphpl)	1900	1900	1900
Total Lost time (s)	4.6	4.6	4.6
Lane Util. Factor	0.95	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.99
Flpb, ped/bikes	1.00	1.00	1.00
Frt	1.00	1.00	0.85
Flt Protected	0.95	0.98	1.00
Satd. Flow (prot)	1681	1726	1561
Flt Permitted	0.95	0.98	1.00
Satd. Flow (perm)	1681	1726	1561
Peak-hour factor, PHF	0.95	0.95	0.95
Adj. Flow (vph)	211	74	116
RTOR Reduction (vph)	0	0	105
Lane Group Flow (vph)	146	150	11
Confl. Peds. (#/hr)			
Confl. Bikes (#/hr)			1
Turn Type	Split		Perm
Protected Phases	4	4	
Permitted Phases			4
Actuated Green, G (s)	14.8	14.8	14.8
Effective Green, g (s)	14.8	14.8	14.8
Actuated g/C Ratio	0.10	0.10	0.10
Clearance Time (s)	4.6	4.6	4.6
Vehicle Extension (s)	2.0	2.0	2.0
Lane Grp Cap (vph)	166	170	154
v/s Ratio Prot	0.09	0.09	
v/s Ratio Perm			0.01
v/c Ratio	0.88	0.88	0.07
Uniform Delay, d1	66.7	66.7	61.4
Progression Factor	1.00	1.00	1.00
Incremental Delay, d2	36.3	36.7	0.1
Delay (s)	103.0	103.5	61.5
Level of Service	F	F	E
Approach Delay (s)		91.5	
Approach LOS		F	

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	273	10	20	20	30	30	250	430	20	60	400	854
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	5.5			5.5	5.5	5.5	5.5		5.5	5.5	5.5
Lane Util. Factor	0.95	0.95			1.00	1.00	1.00	0.95		1.00	1.00	1.00
Frt	1.00	0.98			1.00	0.85	1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	0.96			0.98	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1681	1668			1827	1583	1770	3516		1770	1863	1583
Flt Permitted	0.95	0.96			0.98	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1681	1668			1827	1583	1770	3516		1770	1863	1583
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	287	11	21	21	32	32	263	453	21	63	421	899
RTOR Reduction (vph)	0	4	0	0	0	30	0	2	0	0	0	182
Lane Group Flow (vph)	161	154	0	0	53	2	263	472	0	63	421	717
Turn Type	Split			Split		Perm	Prot			Prot		pm+ov
Protected Phases	4	4		8	8		5	2		1	6	4
Permitted Phases						8						6
Actuated Green, G (s)	26.0	26.0			9.5	9.5	25.0	84.3		8.2	67.5	93.5
Effective Green, g (s)	26.0	26.0			9.5	9.5	25.0	84.3		8.2	67.5	93.5
Actuated g/C Ratio	0.17	0.17			0.06	0.06	0.17	0.56		0.05	0.45	0.62
Clearance Time (s)	5.5	5.5			5.5	5.5	5.5	5.5		5.5	5.5	5.5
Vehicle Extension (s)	2.0	2.0			2.0	2.0	2.0	2.0		2.0	2.0	2.0
Lane Grp Cap (vph)	291	289			116	100	295	1976		97	838	1045
v/s Ratio Prot	0.10	0.09			c0.03		c0.15	0.13		0.04	0.23	c0.12
v/s Ratio Perm						0.00						0.33
v/c Ratio	0.55	0.53			0.46	0.02	0.89	0.24		0.65	0.50	0.69
Uniform Delay, d1	56.7	56.5			67.8	65.9	61.2	16.6		69.5	29.3	18.6
Progression Factor	1.00	1.00			1.00	1.00	1.00	1.00		0.90	1.05	1.05
Incremental Delay, d2	1.3	0.9			1.0	0.0	26.2	0.0		6.1	1.2	0.8
Delay (s)	58.0	57.4			68.8	65.9	87.4	16.6		68.6	32.0	20.4
Level of Service	E	E			E	E	F	B		E	C	C
Approach Delay (s)		57.7			67.7			41.9			26.2	
Approach LOS		E			E			D			C	

Intersection Summary			
HCM Average Control Delay	36.1	HCM Level of Service	D
HCM Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	16.5
Intersection Capacity Utilization	84.6%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL
Lane Configurations												
Volume (vph)	60	64	90	94	92	77	20	110	1030	169	10	79
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.6	4.6	4.6	5.6	4.6	4.6		5.6	5.3	5.3		5.6
Lane Util. Factor	1.00	1.00	1.00	0.97	1.00	1.00		1.00	0.95	1.00		1.00
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	0.98		1.00	1.00	0.97		1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00		1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	1.00	0.85		1.00
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.95	1.00	1.00		0.95
Satd. Flow (prot)	1770	1863	1560	3433	1863	1555		1770	3539	1530		1770
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00		0.95	1.00	1.00		0.95
Satd. Flow (perm)	1770	1863	1560	3433	1863	1555		1770	3539	1530		1770
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	63	67	95	99	97	81	21	116	1084	178	11	83
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	106	0	0
Lane Group Flow (vph)	63	67	95	99	97	81	0	137	1084	72	0	94
Confl. Peds. (#/hr)						4				8		
Confl. Bikes (#/hr)	1		2			2		1		3		1
Turn Type	Prot		Perm	Prot		Perm	Prot	Prot		Perm	Prot	Prot
Protected Phases	3	8		7	4		1	1	6		5	5
Permitted Phases			8			4				6		
Actuated Green, G (s)	4.6	10.1	10.1	3.6	9.1	9.1		10.0	27.6	27.6		5.9
Effective Green, g (s)	4.6	10.1	10.1	3.6	9.1	9.1		10.0	27.6	27.6		5.9
Actuated g/C Ratio	0.07	0.15	0.15	0.05	0.13	0.13		0.15	0.40	0.40		0.09
Clearance Time (s)	5.6	4.6	4.6	5.6	4.6	4.6		5.6	5.3	5.3		5.6
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0		2.0
Lane Grp Cap (vph)	119	275	231	181	248	207		259	1430	618		153
v/s Ratio Prot	c0.04	0.04		0.03	0.05			c0.08	c0.31			0.05
v/s Ratio Perm			c0.06			0.05				0.05		
v/c Ratio	0.53	0.24	0.41	0.55	0.39	0.39		0.53	0.76	0.12		0.61
Uniform Delay, d1	30.8	25.7	26.4	31.6	27.1	27.1		27.0	17.5	12.7		30.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00		1.00
Incremental Delay, d2	2.0	0.2	0.4	1.8	0.4	0.4		0.9	2.1	0.0		5.1
Delay (s)	32.8	25.9	26.8	33.4	27.4	27.5		27.9	19.6	12.8		35.2
Level of Service	C	C	C	C	C	C		C	B	B		D
Approach Delay (s)		28.2			29.6				19.5			
Approach LOS		C			C				B			

Intersection Summary			
HCM Average Control Delay	22.4	HCM Level of Service	C
HCM Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	68.3	Sum of lost time (s)	16.5
Intersection Capacity Utilization	62.1%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBT	SBR
Lane Configurations	↑↱	
Volume (vph)	820	40
Ideal Flow (vphpl)	1900	1900
Total Lost time (s)	5.3	
Lane Util. Factor	0.95	
Frpb, ped/bikes	1.00	
Flpb, ped/bikes	1.00	
Frt	0.99	
Flt Protected	1.00	
Satd. Flow (prot)	3509	
Flt Permitted	1.00	
Satd. Flow (perm)	3509	
Peak-hour factor, PHF	0.95	0.95
Adj. Flow (vph)	863	42
RTOR Reduction (vph)	3	0
Lane Group Flow (vph)	902	0
Confl. Peds. (#/hr)		5
Confl. Bikes (#/hr)		3
Turn Type		
Protected Phases	2	
Permitted Phases		
Actuated Green, G (s)	23.5	
Effective Green, g (s)	23.5	
Actuated g/C Ratio	0.34	
Clearance Time (s)	5.3	
Vehicle Extension (s)	2.0	
Lane Grp Cap (vph)	1207	
v/s Ratio Prot	0.26	
v/s Ratio Perm		
v/c Ratio	0.75	
Uniform Delay, d1	19.8	
Progression Factor	1.00	
Incremental Delay, d2	2.2	
Delay (s)	22.0	
Level of Service	C	
Approach Delay (s)	23.3	
Approach LOS	C	

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	20	341	30	80	213	32	150	170	110	14	60	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	5.5		5.5	5.5			5.5			5.5	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Frt	1.00	0.99		1.00	0.98			0.97			0.97	
Flt Protected	0.95	1.00		0.95	1.00			0.98			0.99	
Satd. Flow (prot)	1770	1840		1770	1826			1768			1796	
Flt Permitted	0.95	1.00		0.95	1.00			0.98			0.99	
Satd. Flow (perm)	1770	1840		1770	1826			1768			1796	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	21	359	32	84	224	34	158	179	116	15	63	21
RTOR Reduction (vph)	0	3	0	0	5	0	0	13	0	0	11	0
Lane Group Flow (vph)	21	388	0	84	253	0	0	440	0	0	88	0
Turn Type	Prot			Prot			Split			Split		
Protected Phases	7	4		3	8		2	2		6	6	
Permitted Phases												
Actuated Green, G (s)	1.8	24.4		4.7	27.3			24.1			7.9	
Effective Green, g (s)	1.8	24.4		4.7	27.3			24.1			7.9	
Actuated g/C Ratio	0.02	0.29		0.06	0.33			0.29			0.10	
Clearance Time (s)	5.5	5.5		5.5	5.5			5.5			5.5	
Vehicle Extension (s)	2.0	2.0		2.0	2.0			2.0			2.0	
Lane Grp Cap (vph)	38	540		100	600			513			171	
v/s Ratio Prot	0.01	c0.21		c0.05	c0.14			c0.25			c0.05	
v/s Ratio Perm												
v/c Ratio	0.55	0.72		0.84	0.42			0.86			0.52	
Uniform Delay, d1	40.3	26.3		38.8	21.8			27.9			35.8	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	9.5	3.8		41.6	0.2			12.9			1.1	
Delay (s)	49.8	30.1		80.4	21.9			40.8			36.9	
Level of Service	D	C		F	C			D			D	
Approach Delay (s)		31.1			36.3			40.8			36.9	
Approach LOS		C			D			D			D	

Intersection Summary			
HCM Average Control Delay	36.2	HCM Level of Service	D
HCM Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	83.1	Sum of lost time (s)	27.5
Intersection Capacity Utilization	68.6%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	290	176	20	20	55	70	10	2098	60	70	1009	260
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.6	4.6	4.6	5.6	5.6	5.6	6.3	5.3		6.3	5.3	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00		1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1863	1583	1770	1863	1583	1770	3524		1770	3430	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	1863	1583	1770	1863	1583	1770	3524		1770	3430	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	305	185	21	21	58	74	11	2208	63	74	1062	274
RTOR Reduction (vph)	0	0	16	0	0	64	0	1	0	0	12	0
Lane Group Flow (vph)	305	185	5	21	58	10	11	2270	0	74	1324	0
Turn Type	Prot		Perm	Prot		Perm	Prot			Prot		
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases			8			4						
Actuated Green, G (s)	17.5	31.7	31.7	2.3	15.5	15.5	0.9	70.9		5.7	75.7	
Effective Green, g (s)	17.5	31.7	31.7	2.3	15.5	15.5	0.9	70.9		5.7	75.7	
Actuated g/C Ratio	0.13	0.24	0.24	0.02	0.12	0.12	0.01	0.54		0.04	0.57	
Clearance Time (s)	5.6	4.6	4.6	5.6	5.6	5.6	6.3	5.3		6.3	5.3	
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	234	446	379	31	218	185	12	1887		76	1961	
v/s Ratio Prot	c0.17	c0.10		0.01	0.03		0.01	c0.64		c0.04	c0.39	
v/s Ratio Perm			0.00			0.01						
v/c Ratio	1.30	0.41	0.01	0.68	0.27	0.06	0.92	1.20		0.97	0.67	
Uniform Delay, d1	57.5	42.5	38.4	64.7	53.3	52.0	65.7	30.8		63.3	19.8	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	164.0	0.2	0.0	37.4	0.2	0.0	209.7	96.6		93.3	0.7	
Delay (s)	221.5	42.7	38.4	102.1	53.5	52.0	275.4	127.3		156.6	20.5	
Level of Service	F	D	D	F	D	D	F	F		F	C	
Approach Delay (s)		149.3			59.4			128.1			27.6	
Approach LOS		F			E			F			C	

Intersection Summary			
HCM Average Control Delay	95.6	HCM Level of Service	F
HCM Volume to Capacity ratio	1.11		
Actuated Cycle Length (s)	132.4	Sum of lost time (s)	22.5
Intersection Capacity Utilization	93.2%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Lane Configurations												
Volume (vph)	157	0	140	0	0	0	130	484	0	5	0	440
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.6		5.6				5.6	4.6		5.6		4.6
Lane Util. Factor	1.00		1.00				1.00	0.95		1.00		0.95
Frt	1.00		0.85				1.00	1.00		1.00		0.98
Flt Protected	0.95		1.00				0.95	1.00		0.95		1.00
Satd. Flow (prot)	1770		1583				1770	3539		1770		3458
Flt Permitted	0.95		1.00				0.95	1.00		0.95		1.00
Satd. Flow (perm)	1770		1583				1770	3539		1770		3458
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	165	0	147	0	0	0	137	509	0	5	0	463
RTOR Reduction (vph)	0	0	101	0	0	0	0	0	0	0	0	14
Lane Group Flow (vph)	165	0	46	0	0	0	137	509	0	5	0	533
Turn Type	Prot		custom	Prot			Prot			Prot		
Protected Phases	3			7	4		1	6		5		2
Permitted Phases			8									
Actuated Green, G (s)	10.5		19.9				9.6	27.9		0.6		18.9
Effective Green, g (s)	10.5		19.9				9.6	27.9		0.6		18.9
Actuated g/C Ratio	0.16		0.31				0.15	0.43		0.01		0.29
Clearance Time (s)	5.6		5.6				5.6	4.6		5.6		4.6
Vehicle Extension (s)	2.0		2.0				2.0	2.0		2.0		2.0
Lane Grp Cap (vph)	289		491				265	1538		17		1018
v/s Ratio Prot	c0.09						c0.08	0.14		0.00		c0.15
v/s Ratio Perm			c0.03									
v/c Ratio	0.57		0.09				0.52	0.33		0.29		0.52
Uniform Delay, d1	24.8		15.7				25.2	12.0		31.6		18.9
Progression Factor	1.00		1.00				1.00	1.00		1.00		1.00
Incremental Delay, d2	1.7		0.0				0.7	0.0		3.5		0.2
Delay (s)	26.5		15.8				25.9	12.0		35.1		19.1
Level of Service	C		B				C	B		D		B
Approach Delay (s)		21.4			0.0			15.0				19.3
Approach LOS		C			A			B				B

Intersection Summary			
HCM Average Control Delay	17.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.44		
Actuated Cycle Length (s)	64.2	Sum of lost time (s)	15.8
Intersection Capacity Utilization	42.4%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBR
Lane Configurations	
Volume (vph)	80
Ideal Flow (vphpl)	1900
Total Lost time (s)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Peak-hour factor, PHF	0.95
Adj. Flow (vph)	84
RTOR Reduction (vph)	0
Lane Group Flow (vph)	0
Turn Type	
Protected Phases	
Permitted Phases	
Actuated Green, G (s)	
Effective Green, g (s)	
Actuated g/C Ratio	
Clearance Time (s)	
Vehicle Extension (s)	
Lane Grp Cap (vph)	
v/s Ratio Prot	
v/s Ratio Perm	
v/c Ratio	
Uniform Delay, d1	
Progression Factor	
Incremental Delay, d2	
Delay (s)	
Level of Service	
Approach Delay (s)	
Approach LOS	

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	70	4	60	41	2	98	90	1970	90	219	820	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.6	4.6		4.6	4.6		5.3	5.3		5.3	5.3	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	0.86		1.00	0.85		1.00	0.99		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1600		1770	1589		1770	3516		1770	3515	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	1600		1770	1589		1770	3516		1770	3515	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	74	4	63	43	2	103	95	2074	95	231	863	42
RTOR Reduction (vph)	0	57	0	0	94	0	0	2	0	0	2	0
Lane Group Flow (vph)	74	10	0	43	11	0	95	2167	0	231	903	0
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases												
Actuated Green, G (s)	5.4	12.6		4.0	11.2		10.9	76.6		15.8	81.5	
Effective Green, g (s)	5.4	12.6		4.0	11.2		10.9	76.6		15.8	81.5	
Actuated g/C Ratio	0.04	0.10		0.03	0.09		0.08	0.59		0.12	0.63	
Clearance Time (s)	4.6	4.6		4.6	4.6		5.3	5.3		5.3	5.3	
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	74	157		55	138		150	2091		217	2224	
v/s Ratio Prot	c0.04	0.01		0.02	c0.01		0.05	c0.62		c0.13	c0.26	
v/s Ratio Perm												
v/c Ratio	1.00	0.06		0.78	0.08		0.63	1.04		1.06	0.41	
Uniform Delay, d1	61.7	52.8		62.0	54.1		57.0	26.1		56.5	11.7	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	104.6	0.1		47.4	0.1		6.3	29.9		79.2	0.0	
Delay (s)	166.3	52.8		109.4	54.2		63.3	56.0		135.7	11.7	
Level of Service	F	D		F	D		E	E		F	B	
Approach Delay (s)		112.4			70.2			56.3			36.9	
Approach LOS		F			E			E			D	

Intersection Summary			
HCM Average Control Delay	53.0	HCM Level of Service	D
HCM Volume to Capacity ratio	0.98		
Actuated Cycle Length (s)	128.8	Sum of lost time (s)	25.1
Intersection Capacity Utilization	92.7%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Volume (vph)	90	40	40	5	180	50	207	10	1623	280	371	529
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.6	7.2			5.6	5.6	6.3	6.3	5.3	5.3	6.3	5.3
Lane Util. Factor	1.00	1.00			0.97	1.00	0.88	1.00	0.95	1.00	0.97	0.95
Frpb, ped/bikes	1.00	0.99			1.00	1.00	0.99	1.00	1.00	0.98	1.00	1.00
Flpb, ped/bikes	1.00	1.00			1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.93			1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99
Flt Protected	0.95	1.00			0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	1711			3433	1863	2757	1770	3539	1558	3433	3485
Flt Permitted	0.95	1.00			0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1770	1711			3433	1863	2757	1770	3539	1558	3433	3485
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	95	42	42	5	189	53	218	11	1708	295	391	557
RTOR Reduction (vph)	0	29	0	0	0	0	37	0	0	70	0	3
Lane Group Flow (vph)	95	55	0	0	194	53	181	11	1708	225	391	607
Confl. Peds. (#/hr)			2									
Confl. Bikes (#/hr)							2			9		
Turn Type	Prot			Prot	Prot		pm+ov	Prot		Perm	Prot	
Protected Phases	3	8		7	7	4	5	1	6		5	2
Permitted Phases							4			6		
Actuated Green, G (s)	12.8	15.1			7.5	11.4	25.2	0.8	68.5	68.5	13.8	81.5
Effective Green, g (s)	12.8	15.1			7.5	11.4	25.2	0.8	68.5	68.5	13.8	81.5
Actuated g/C Ratio	0.10	0.12			0.06	0.09	0.19	0.01	0.53	0.53	0.11	0.63
Clearance Time (s)	5.6	7.2			5.6	5.6	6.3	6.3	5.3	5.3	6.3	5.3
Vehicle Extension (s)	2.0	2.0			2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	175	200			199	164	537	11	1875	825	366	2197
v/s Ratio Prot	0.05	c0.03			c0.06	0.03	c0.04	0.01	c0.48		c0.11	0.17
v/s Ratio Perm							0.03			0.14		
v/c Ratio	0.54	0.27			0.97	0.32	0.34	1.00	0.91	0.27	1.07	0.28
Uniform Delay, d1	55.5	52.1			60.8	55.3	44.9	64.2	27.6	16.7	57.8	10.7
Progression Factor	1.00	1.00			1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.8	0.3			55.9	0.4	0.1	271.4	7.0	0.1	66.4	0.0
Delay (s)	57.3	52.4			116.7	55.7	45.0	335.6	34.6	16.8	124.1	10.7
Level of Service	E	D			F	E	D	F	C	B	F	B
Approach Delay (s)		55.0				76.1			33.7			55.0
Approach LOS		D				E			C			E

Intersection Summary			
HCM Average Control Delay	45.9	HCM Level of Service	D
HCM Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	129.3	Sum of lost time (s)	30.7
Intersection Capacity Utilization	84.3%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBR
Lane Configurations	
Volume (vph)	50
Ideal Flow (vphpl)	1900
Total Lost time (s)	
Lane Util. Factor	
Frpb, ped/bikes	
Flpb, ped/bikes	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Peak-hour factor, PHF	0.95
Adj. Flow (vph)	53
RTOR Reduction (vph)	0
Lane Group Flow (vph)	0
Confl. Peds. (#/hr)	2
Confl. Bikes (#/hr)	3
Turn Type	
Protected Phases	
Permitted Phases	
Actuated Green, G (s)	
Effective Green, g (s)	
Actuated g/C Ratio	
Clearance Time (s)	
Vehicle Extension (s)	
Lane Grp Cap (vph)	
v/s Ratio Prot	
v/s Ratio Perm	
v/c Ratio	
Uniform Delay, d1	
Progression Factor	
Incremental Delay, d2	
Delay (s)	
Level of Service	
Approach Delay (s)	
Approach LOS	

Intersection Summary

Movement	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations		↰↰	↑↑	↱	↰↰	↑↑	↱	↰↰	↑↑	↱	↰↰	↑↑
Volume (vph)	10	64	1008	10	0	487	100	10	30	10	600	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.6	6.6	6.6		6.6	6.6	5.6	5.6	5.6	5.6	4.6
Lane Util. Factor		0.97	0.95	1.00		0.95	1.00	0.97	0.95	1.00	0.97	0.95
Frpb, ped/bikes		1.00	1.00	0.99		1.00	0.98	1.00	1.00	0.99	1.00	1.00
Flpb, ped/bikes		1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		1.00	1.00	0.85		1.00	0.85	1.00	1.00	0.85	1.00	1.00
Flt Protected		0.95	1.00	1.00		1.00	1.00	0.95	1.00	1.00	0.95	1.00
Satd. Flow (prot)		3433	3539	1563		3539	1559	3433	3539	1561	3433	3539
Flt Permitted		0.95	1.00	1.00		1.00	1.00	0.95	1.00	1.00	0.95	1.00
Satd. Flow (perm)		3433	3539	1563		3539	1559	3433	3539	1561	3433	3539
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	11	67	1061	11	0	513	105	11	32	11	632	53
RTOR Reduction (vph)	0	0	0	6	0	0	78	0	0	10	0	0
Lane Group Flow (vph)	0	78	1061	5	0	513	27	11	32	1	632	53
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)				1			4			1	1	
Turn Type	Prot	Prot		Perm	Prot		Perm	Prot		Perm	Prot	
Protected Phases	3	3	8		7	4		1	6		5	2
Permitted Phases				8			4			6		
Actuated Green, G (s)		4.7	30.1	30.1		19.8	19.8	0.6	9.0	9.0	19.8	29.2
Effective Green, g (s)		4.7	30.1	30.1		19.8	19.8	0.6	9.0	9.0	19.8	29.2
Actuated g/C Ratio		0.06	0.39	0.39		0.26	0.26	0.01	0.12	0.12	0.26	0.38
Clearance Time (s)		5.6	6.6	6.6		6.6	6.6	5.6	5.6	5.6	5.6	4.6
Vehicle Extension (s)		2.0	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)		210	1389	613		914	402	27	415	183	886	1347
v/s Ratio Prot		0.02	c0.30			0.14		0.00	0.01		c0.18	0.01
v/s Ratio Perm				0.00			0.02			0.00		
v/c Ratio		0.37	0.76	0.01		0.56	0.07	0.41	0.08	0.01	0.71	0.04
Uniform Delay, d1		34.6	20.2	14.2		24.7	21.5	37.9	30.2	29.9	25.9	14.9
Progression Factor		1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		0.4	2.3	0.0		0.5	0.0	3.6	0.0	0.0	2.3	0.0
Delay (s)		35.0	22.5	14.2		25.2	21.5	41.5	30.2	29.9	28.2	14.9
Level of Service		C	C	B		C	C	D	C	C	C	B
Approach Delay (s)			23.3			24.5			32.4			25.0
Approach LOS			C			C			C			C

Intersection Summary			
HCM Average Control Delay	24.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	76.7	Sum of lost time (s)	12.2
Intersection Capacity Utilization	65.4%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBR
Lane Configurations	
Volume (vph)	140
Ideal Flow (vphpl)	1900
Total Lost time (s)	4.6
Lane Util. Factor	1.00
Frpb, ped/bikes	0.99
Flpb, ped/bikes	1.00
Frt	0.85
Flt Protected	1.00
Satd. Flow (prot)	1560
Flt Permitted	1.00
Satd. Flow (perm)	1560
Peak-hour factor, PHF	0.95
Adj. Flow (vph)	147
RTOR Reduction (vph)	91
Lane Group Flow (vph)	56
Confl. Peds. (#/hr)	3
Confl. Bikes (#/hr)	1
Turn Type	Perm
Protected Phases	
Permitted Phases	2
Actuated Green, G (s)	29.2
Effective Green, g (s)	29.2
Actuated g/C Ratio	0.38
Clearance Time (s)	4.6
Vehicle Extension (s)	2.0
Lane Grp Cap (vph)	594
v/s Ratio Prot	
v/s Ratio Perm	c0.04
v/c Ratio	0.09
Uniform Delay, d1	15.3
Progression Factor	1.00
Incremental Delay, d2	0.0
Delay (s)	15.3
Level of Service	B
Approach Delay (s)	
Approach LOS	

Intersection Summary

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Lane Configurations												
Volume (vph)	5	404	414	140	5	54	172	190	45	170	654	89
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.6	4.9	4.9		5.6	4.9	4.9		6.3	5.3	5.3
Lane Util. Factor		0.97	0.95	1.00		0.97	0.95	1.00		0.97	0.95	1.00
Frpb, ped/bikes		1.00	1.00	0.98		1.00	1.00	0.98		1.00	1.00	0.98
Flpb, ped/bikes		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00
Frt		1.00	1.00	0.85		1.00	1.00	0.85		1.00	1.00	0.85
Flt Protected		0.95	1.00	1.00		0.95	1.00	1.00		0.95	1.00	1.00
Satd. Flow (prot)		3433	3539	1546		3433	3539	1548		3433	3539	1555
Flt Permitted		0.95	1.00	1.00		0.95	1.00	1.00		0.95	1.00	1.00
Satd. Flow (perm)		3433	3539	1546		3433	3539	1548		3433	3539	1555
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	5	425	436	147	5	57	181	200	47	179	688	94
RTOR Reduction (vph)	0	0	0	106	0	0	0	151	0	0	0	70
Lane Group Flow (vph)	0	430	436	41	0	62	181	49	0	226	688	24
Confl. Peds. (#/hr)				14				5				7
Confl. Bikes (#/hr)				4				6				1
Turn Type	Prot	Prot		Perm	Prot	Prot		Perm	Prot	Prot		Perm
Protected Phases	3	3	8		7	7	4		1	1	6	
Permitted Phases				8				4				6
Actuated Green, G (s)		11.9	21.6	21.6		4.2	13.9	13.9		8.8	20.1	20.1
Effective Green, g (s)		11.9	21.6	21.6		4.2	13.9	13.9		8.8	20.1	20.1
Actuated g/C Ratio		0.15	0.28	0.28		0.05	0.18	0.18		0.11	0.26	0.26
Clearance Time (s)		5.6	4.9	4.9		5.6	4.9	4.9		6.3	5.3	5.3
Vehicle Extension (s)		2.0	2.0	2.0		2.0	2.0	2.0		2.0	2.0	2.0
Lane Grp Cap (vph)		522	978	427		184	629	275		386	910	400
v/s Ratio Prot		c0.13	c0.12			0.02	0.05			0.07	c0.19	
v/s Ratio Perm				0.03				0.03				0.02
v/c Ratio		0.82	0.45	0.10		0.34	0.29	0.18		0.59	0.76	0.06
Uniform Delay, d1		32.1	23.4	21.0		35.7	27.9	27.3		33.0	26.8	21.9
Progression Factor		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2		9.7	0.1	0.0		0.4	0.1	0.1		1.5	3.2	0.0
Delay (s)		41.8	23.5	21.1		36.1	28.0	27.4		34.4	30.0	21.9
Level of Service		D	C	C		D	C	C		C	C	C
Approach Delay (s)			30.9				28.8				30.2	
Approach LOS			C				C				C	

Intersection Summary			
HCM Average Control Delay	29.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	78.2	Sum of lost time (s)	17.2
Intersection Capacity Utilization	74.6%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBU	SBL	SBT	SBR
Lane Configurations				
Volume (vph)	15	310	412	342
Ideal Flow (vphpl)	1900	1900	1900	1900
Total Lost time (s)		6.3	5.3	5.3
Lane Util. Factor		0.97	0.95	1.00
Frpb, ped/bikes		1.00	1.00	0.98
Flpb, ped/bikes		1.00	1.00	1.00
Frt		1.00	1.00	0.85
Flt Protected		0.95	1.00	1.00
Satd. Flow (prot)		3433	3539	1556
Flt Permitted		0.95	1.00	1.00
Satd. Flow (perm)		3433	3539	1556
Peak-hour factor, PHF	0.95	0.95	0.95	0.95
Adj. Flow (vph)	16	326	434	360
RTOR Reduction (vph)	0	0	0	261
Lane Group Flow (vph)	0	342	434	99
Confl. Peds. (#/hr)				4
Confl. Bikes (#/hr)				3
Turn Type	Prot	Prot		Perm
Protected Phases	5	5	2	
Permitted Phases				2
Actuated Green, G (s)		10.2	21.5	21.5
Effective Green, g (s)		10.2	21.5	21.5
Actuated g/C Ratio		0.13	0.27	0.27
Clearance Time (s)		6.3	5.3	5.3
Vehicle Extension (s)		2.0	2.0	2.0
Lane Grp Cap (vph)		448	973	428
v/s Ratio Prot		c0.10	0.12	
v/s Ratio Perm				0.06
v/c Ratio		0.76	0.45	0.23
Uniform Delay, d1		32.8	23.4	22.0
Progression Factor		1.00	1.00	1.00
Incremental Delay, d2		6.8	0.1	0.1
Delay (s)		39.7	23.5	22.1
Level of Service		D	C	C
Approach Delay (s)			27.9	
Approach LOS			C	

Intersection Summary

Movement	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Volume (vph)	5	283	170	50	70	120	119	110	1061	40	264	990
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.6	5.3	5.3	5.6	5.3	5.3	5.6	5.3	5.3	5.6	5.3
Lane Util. Factor		0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.95
Frpb, ped/bikes		1.00	1.00	0.98	1.00	1.00	0.99	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00
Flt Protected		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Satd. Flow (prot)		3433	3539	1545	3433	3539	1561	3433	3539	1583	3433	3539
Flt Permitted		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Satd. Flow (perm)		3433	3539	1545	3433	3539	1561	3433	3539	1583	3433	3539
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	5	298	179	53	74	126	125	116	1117	42	278	1042
RTOR Reduction (vph)	0	0	0	43	0	0	106	0	0	20	0	0
Lane Group Flow (vph)	0	303	179	10	74	126	19	116	1117	22	278	1042
Confl. Peds. (#/hr)							1					
Confl. Bikes (#/hr)				10			1					
Turn Type	Prot	Prot		Perm	Prot		Perm	Prot		Perm	Prot	
Protected Phases	1	1	6		5	2		3	8		7	4
Permitted Phases				6			2			8		
Actuated Green, G (s)		6.5	14.5	14.5	3.9	11.9	11.9	5.1	31.3	31.3	6.5	32.7
Effective Green, g (s)		6.5	14.5	14.5	3.9	11.9	11.9	5.1	31.3	31.3	6.5	32.7
Actuated g/C Ratio		0.08	0.19	0.19	0.05	0.15	0.15	0.07	0.40	0.40	0.08	0.42
Clearance Time (s)		5.6	5.3	5.3	5.6	5.3	5.3	5.6	5.3	5.3	5.6	5.3
Vehicle Extension (s)		2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)		286	658	287	172	540	238	224	1420	635	286	1484
v/s Ratio Prot		c0.09	c0.05		0.02	0.04		0.03	c0.32		c0.08	0.29
v/s Ratio Perm				0.01			0.01			0.01		
v/c Ratio		1.06	0.27	0.03	0.43	0.23	0.08	0.52	0.79	0.03	0.97	0.70
Uniform Delay, d1		35.8	27.2	26.0	36.0	29.0	28.4	35.3	20.4	14.2	35.7	18.6
Progression Factor		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		69.8	0.1	0.0	0.6	0.1	0.1	0.8	2.7	0.0	45.1	1.2
Delay (s)		105.5	27.3	26.0	36.6	29.1	28.4	36.1	23.2	14.2	80.8	19.9
Level of Service		F	C	C	D	C	C	D	C	B	F	B
Approach Delay (s)			71.5			30.6			24.0			30.6
Approach LOS			E			C			C			C

Intersection Summary			
HCM Average Control Delay	34.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	78.0	Sum of lost time (s)	21.8
Intersection Capacity Utilization	67.9%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBR
Lane Configurations	
Volume (vph)	156
Ideal Flow (vphpl)	1900
Total Lost time (s)	5.3
Lane Util. Factor	1.00
Frpb, ped/bikes	0.99
Flpb, ped/bikes	1.00
Frt	0.85
Flt Protected	1.00
Satd. Flow (prot)	1562
Flt Permitted	1.00
Satd. Flow (perm)	1562
Peak-hour factor, PHF	0.95
Adj. Flow (vph)	164
RTOR Reduction (vph)	95
Lane Group Flow (vph)	69
Confl. Peds. (#/hr)	
Confl. Bikes (#/hr)	3
Turn Type	Perm
Protected Phases	
Permitted Phases	4
Actuated Green, G (s)	32.7
Effective Green, g (s)	32.7
Actuated g/C Ratio	0.42
Clearance Time (s)	5.3
Vehicle Extension (s)	2.0
Lane Grp Cap (vph)	655
v/s Ratio Prot	
v/s Ratio Perm	0.04
v/c Ratio	0.10
Uniform Delay, d1	13.8
Progression Factor	1.00
Incremental Delay, d2	0.0
Delay (s)	13.8
Level of Service	B
Approach Delay (s)	
Approach LOS	

Intersection Summary

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Lane Configurations												
Volume (vph)	65	150	1260	322	10	522	1580	200	5	625	1079	306
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.7	5.7	5.7		6.7	5.7	5.7		6.3	5.3	5.3
Lane Util. Factor		0.97	0.91	1.00		0.97	0.91	1.00		0.97	0.95	1.00
Frpb, ped/bikes		1.00	1.00	0.98		1.00	1.00	0.99		1.00	1.00	0.98
Flpb, ped/bikes		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00
Frt		1.00	1.00	0.85		1.00	1.00	0.85		1.00	1.00	0.85
Flt Protected		0.95	1.00	1.00		0.95	1.00	1.00		0.95	1.00	1.00
Satd. Flow (prot)		3433	5085	1557		3433	5085	1560		3433	3539	1549
Flt Permitted		0.95	1.00	1.00		0.95	1.00	1.00		0.95	1.00	1.00
Satd. Flow (perm)		3433	5085	1557		3433	5085	1560		3433	3539	1549
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	68	158	1326	339	11	549	1663	211	5	658	1136	322
RTOR Reduction (vph)	0	0	0	133	0	0	0	63	0	0	0	108
Lane Group Flow (vph)	0	226	1326	206	0	560	1663	148	0	663	1136	214
Confl. Peds. (#/hr)				2								6
Confl. Bikes (#/hr)				2				4				2
Turn Type	Prot	Prot		Perm	Prot	Prot		Perm	Prot	Prot		Perm
Protected Phases	1	1	6		5	5	2		3	3	8	
Permitted Phases				6				2				8
Actuated Green, G (s)		8.3	36.3	36.3		19.3	47.3	47.3		22.7	59.0	59.0
Effective Green, g (s)		8.3	36.3	36.3		19.3	47.3	47.3		22.7	59.0	59.0
Actuated g/C Ratio		0.06	0.24	0.24		0.13	0.32	0.32		0.15	0.39	0.39
Clearance Time (s)		6.7	5.7	5.7		6.7	5.7	5.7		6.3	5.3	5.3
Vehicle Extension (s)		2.0	2.0	2.0		2.0	2.0	2.0		2.0	2.0	2.0
Lane Grp Cap (vph)		190	1231	377		442	1603	492		520	1392	609
v/s Ratio Prot		0.07	c0.26			c0.16	0.33			c0.19	0.32	
v/s Ratio Perm				0.13				0.09				0.14
v/c Ratio		1.19	1.08	0.55		1.27	1.04	0.30		1.27	0.82	0.35
Uniform Delay, d1		70.8	56.9	49.7		65.3	51.4	38.8		63.6	40.7	32.0
Progression Factor		0.73	0.67	0.62		0.73	0.75	0.44		1.00	1.00	1.00
Incremental Delay, d2		119.4	46.9	4.5		126.6	24.5	0.6		138.1	3.6	0.1
Delay (s)		171.4	85.2	35.3		174.3	62.7	17.7		201.8	44.3	32.2
Level of Service		F	F	D		F	E	B		F	D	C
Approach Delay (s)			86.6				84.5				91.7	
Approach LOS			F				F				F	

Intersection Summary			
HCM Average Control Delay	93.6	HCM Level of Service	F
HCM Volume to Capacity ratio	1.18		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	24.0
Intersection Capacity Utilization	112.6%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBU	SBL	SBT	SBR
Lane Configurations				
Volume (vph)	5	190	1248	260
Ideal Flow (vphpl)	1900	1900	1900	1900
Total Lost time (s)		6.3	5.3	5.3
Lane Util. Factor		0.97	0.95	1.00
Frpb, ped/bikes		1.00	1.00	0.98
Flpb, ped/bikes		1.00	1.00	1.00
Frt		1.00	1.00	0.85
Flt Protected		0.95	1.00	1.00
Satd. Flow (prot)		3433	3539	1551
Flt Permitted		0.95	1.00	1.00
Satd. Flow (perm)		3433	3539	1551
Peak-hour factor, PHF	0.95	0.95	0.95	0.95
Adj. Flow (vph)	5	200	1314	274
RTOR Reduction (vph)	0	0	0	18
Lane Group Flow (vph)	0	205	1314	256
Confl. Peds. (#/hr)				6
Confl. Bikes (#/hr)				
Turn Type	Prot	Prot		Perm
Protected Phases	7	7	4	
Permitted Phases				4
Actuated Green, G (s)		11.4	47.7	47.7
Effective Green, g (s)		11.4	47.7	47.7
Actuated g/C Ratio		0.08	0.32	0.32
Clearance Time (s)		6.3	5.3	5.3
Vehicle Extension (s)		2.0	2.0	2.0
Lane Grp Cap (vph)		261	1125	493
v/s Ratio Prot		0.06	c0.37	
v/s Ratio Perm				0.16
v/c Ratio		0.79	1.17	0.52
Uniform Delay, d1		68.1	51.1	41.8
Progression Factor		1.00	1.00	1.00
Incremental Delay, d2		13.3	85.4	0.4
Delay (s)		81.4	136.6	42.2
Level of Service		F	F	D
Approach Delay (s)			115.9	
Approach LOS			F	

Intersection Summary

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Lane Configurations												
Volume (vph)	10	100	1446	210	5	439	1772	80	5	450	375	802
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.6	5.7	5.7		5.6	5.7			5.6	5.3	5.3
Lane Util. Factor		1.00	0.91	1.00		0.97	0.91			1.00	1.00	0.88
Frpb, ped/bikes		1.00	1.00	0.99		1.00	1.00			1.00	1.00	0.99
Flpb, ped/bikes		1.00	1.00	1.00		1.00	1.00			1.00	1.00	1.00
Frt		1.00	1.00	0.85		1.00	0.99			1.00	1.00	0.85
Flt Protected		0.95	1.00	1.00		0.95	1.00			0.95	1.00	1.00
Satd. Flow (prot)		1770	5085	1560		3433	5046			1770	1863	2749
Flt Permitted		0.95	1.00	1.00		0.95	1.00			0.95	1.00	1.00
Satd. Flow (perm)		1770	5085	1560		3433	5046			1770	1863	2749
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	11	105	1522	221	5	462	1865	84	5	474	395	844
RTOR Reduction (vph)	0	0	0	71	0	0	3	0	0	0	0	386
Lane Group Flow (vph)	0	116	1522	150	0	467	1946	0	0	479	395	458
Confl. Peds. (#/hr)								3				1
Confl. Bikes (#/hr)				4				2				
Turn Type	Prot	Prot		Perm	Prot	Prot			Prot	Prot		Perm
Protected Phases	1	1	6		5	5	2		3	3	8	
Permitted Phases				6								8
Actuated Green, G (s)		9.4	53.4	53.4		18.4	62.4			36.4	41.0	41.0
Effective Green, g (s)		9.4	53.4	53.4		18.4	62.4			36.4	41.0	41.0
Actuated g/C Ratio		0.06	0.36	0.36		0.12	0.42			0.24	0.27	0.27
Clearance Time (s)		5.6	5.7	5.7		5.6	5.7			5.6	5.3	5.3
Vehicle Extension (s)		2.0	2.0	2.0		2.0	2.0			2.0	2.0	2.0
Lane Grp Cap (vph)		111	1810	555		421	2099			430	509	751
v/s Ratio Prot		0.07	c0.30			c0.14	c0.39			c0.27	c0.21	
v/s Ratio Perm				0.10								0.17
v/c Ratio		1.05	0.84	0.27		1.11	0.93			1.11	0.78	0.61
Uniform Delay, d1		70.3	44.4	34.4		65.8	41.6			56.8	50.3	47.5
Progression Factor		1.14	0.40	0.12		0.63	0.41			1.00	1.00	1.00
Incremental Delay, d2		63.8	1.9	0.4		71.7	6.8			78.1	6.7	1.0
Delay (s)		143.8	19.5	4.7		113.3	24.0			134.9	56.9	48.6
Level of Service		F	B	A		F	C			F	E	D
Approach Delay (s)			25.5				41.2				74.6	
Approach LOS			C				D				E	

Intersection Summary			
HCM Average Control Delay	48.3	HCM Level of Service	D
HCM Volume to Capacity ratio	1.07		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	33.2
Intersection Capacity Utilization	97.1%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBL	SBT	SBR
Lane Configurations			
Volume (vph)	140	225	150
Ideal Flow (vphpl)	1900	1900	1900
Total Lost time (s)	5.6	5.3	
Lane Util. Factor	1.00	0.95	
Frpb, ped/bikes	1.00	0.99	
Flpb, ped/bikes	1.00	1.00	
Frt	1.00	0.94	
Flt Protected	0.95	1.00	
Satd. Flow (prot)	1770	3309	
Flt Permitted	0.95	1.00	
Satd. Flow (perm)	1770	3309	
Peak-hour factor, PHF	0.95	0.95	0.95
Adj. Flow (vph)	147	237	158
RTOR Reduction (vph)	0	83	0
Lane Group Flow (vph)	147	312	0
Confl. Peds. (#/hr)			1
Confl. Bikes (#/hr)			
Turn Type	Prot		
Protected Phases	7	4	
Permitted Phases			
Actuated Green, G (s)	15.0	19.6	
Effective Green, g (s)	15.0	19.6	
Actuated g/C Ratio	0.10	0.13	
Clearance Time (s)	5.6	5.3	
Vehicle Extension (s)	2.0	2.0	
Lane Grp Cap (vph)	177	432	
v/s Ratio Prot	0.08	c0.09	
v/s Ratio Perm			
v/c Ratio	0.83	0.72	
Uniform Delay, d1	66.3	62.6	
Progression Factor	1.00	1.00	
Incremental Delay, d2	25.8	5.0	
Delay (s)	92.1	67.6	
Level of Service	F	E	
Approach Delay (s)		74.3	
Approach LOS		E	

Intersection Summary

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL
Lane Configurations												
Volume (vph)	5	120	2047	70	50	180	1811	10	150	30	250	190
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.6	5.7			5.6	5.7		5.6	4.6		5.9
Lane Util. Factor		1.00	0.91			0.97	0.91		1.00	1.00		0.97
Frpb, ped/bikes		1.00	1.00			1.00	1.00		1.00	1.00		1.00
Flpb, ped/bikes		1.00	1.00			1.00	1.00		1.00	1.00		1.00
Frt		1.00	1.00			1.00	1.00		1.00	0.87		1.00
Flt Protected		0.95	1.00			0.95	1.00		0.95	1.00		0.95
Satd. Flow (prot)		1770	5052			3433	5079		1770	1614		3433
Flt Permitted		0.95	1.00			0.95	1.00		0.95	1.00		0.95
Satd. Flow (perm)		1770	5052			3433	5079		1770	1614		3433
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	5	126	2155	74	53	189	1906	11	158	32	263	200
RTOR Reduction (vph)	0	0	2	0	0	0	0	0	0	53	0	0
Lane Group Flow (vph)	0	131	2227	0	0	242	1917	0	158	242	0	200
Confl. Peds. (#/hr)				18				15				
Confl. Bikes (#/hr)				2				4				
Turn Type	Prot	Prot			Prot	Prot			Prot			Prot
Protected Phases	1	1	6		5	5	2		7	4		3
Permitted Phases												
Actuated Green, G (s)		12.6	76.4			11.4	75.2		22.5	26.8		13.6
Effective Green, g (s)		12.6	76.4			11.4	75.2		22.5	26.8		13.6
Actuated g/C Ratio		0.08	0.51			0.08	0.50		0.15	0.18		0.09
Clearance Time (s)		5.6	5.7			5.6	5.7		5.6	4.6		5.9
Vehicle Extension (s)		2.0	2.0			2.0	2.0		2.0	2.0		2.0
Lane Grp Cap (vph)		149	2573			261	2546		266	288		311
v/s Ratio Prot		c0.07	c0.44			0.07	0.38		c0.09	c0.15		0.06
v/s Ratio Perm												
v/c Ratio		0.88	0.87			0.93	0.75		0.59	0.84		0.64
Uniform Delay, d1		67.9	32.3			68.9	30.0		59.5	59.6		65.9
Progression Factor		0.86	0.35			0.97	0.53		1.00	1.00		1.00
Incremental Delay, d2		27.1	2.6			26.4	1.3		2.4	18.7		3.4
Delay (s)		85.4	14.0			93.4	17.2		61.9	78.3		69.2
Level of Service		F	B			F	B		E	E		E
Approach Delay (s)			18.0				25.7			72.6		
Approach LOS			B				C			E		

Intersection Summary			
HCM Average Control Delay	28.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	10.3
Intersection Capacity Utilization	91.3%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBT	SBR
Lane Configurations		
Volume (vph)	20	120
Ideal Flow (vphpl)	1900	1900
Total Lost time (s)	4.9	
Lane Util. Factor	1.00	
Frpb, ped/bikes	0.98	
Flpb, ped/bikes	1.00	
Frt	0.87	
Flt Protected	1.00	
Satd. Flow (prot)	1585	
Flt Permitted	1.00	
Satd. Flow (perm)	1585	
Peak-hour factor, PHF	0.95	0.95
Adj. Flow (vph)	21	126
RTOR Reduction (vph)	111	0
Lane Group Flow (vph)	36	0
Confl. Peds. (#/hr)		13
Confl. Bikes (#/hr)		
Turn Type		
Protected Phases	8	
Permitted Phases		
Actuated Green, G (s)	17.9	
Effective Green, g (s)	17.9	
Actuated g/C Ratio	0.12	
Clearance Time (s)	4.9	
Vehicle Extension (s)	2.0	
Lane Grp Cap (vph)	189	
v/s Ratio Prot	0.02	
v/s Ratio Perm		
v/c Ratio	0.19	
Uniform Delay, d1	59.5	
Progression Factor	1.00	
Incremental Delay, d2	0.2	
Delay (s)	59.7	
Level of Service	E	
Approach Delay (s)	65.2	
Approach LOS	E	

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	2210	238	220	1386	0	0	0	0	740	10	1025
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0		5.6	5.7					6.7	6.7	6.7
Lane Util. Factor		0.91		0.97	0.91					0.95	0.95	0.88
Frpb, ped/bikes		1.00		1.00	1.00					1.00	1.00	0.98
Flpb, ped/bikes		1.00		1.00	1.00					1.00	1.00	1.00
Frt		0.99		1.00	1.00					1.00	1.00	0.85
Flt Protected		1.00		0.95	1.00					0.95	0.95	1.00
Satd. Flow (prot)		4999		3433	5085					1681	1688	2743
Flt Permitted		1.00		0.95	1.00					0.95	0.95	1.00
Satd. Flow (perm)		4999		3433	5085					1681	1688	2743
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	2326	251	232	1459	0	0	0	0	779	11	1079
RTOR Reduction (vph)	0	9	0	0	0	0	0	0	0	0	0	40
Lane Group Flow (vph)	0	2568	0	232	1459	0	0	0	0	397	393	1039
Confl. Peds. (#/hr)			5			7						3
Confl. Bikes (#/hr)			4			6						
Turn Type				Prot						Split		Perm
Protected Phases		2		1	6					4	4	
Permitted Phases												4
Actuated Green, G (s)		71.0		9.4	86.3					51.3	51.3	51.3
Effective Green, g (s)		71.0		9.4	86.3					51.3	51.3	51.3
Actuated g/C Ratio		0.47		0.06	0.58					0.34	0.34	0.34
Clearance Time (s)		6.0		5.6	5.7					6.7	6.7	6.7
Vehicle Extension (s)		2.0		2.0	2.0					1.0	1.0	1.0
Lane Grp Cap (vph)		2366		215	2926					575	577	938
v/s Ratio Prot		c0.51		c0.07	0.29					0.24	0.23	
v/s Ratio Perm												c0.38
v/c Ratio		1.09		1.08	0.50					0.69	0.68	1.11
Uniform Delay, d1		39.5		70.3	19.0					42.5	42.3	49.4
Progression Factor		0.43		0.88	0.34					1.00	1.00	1.00
Incremental Delay, d2		43.1		60.6	0.2					2.9	2.6	63.5
Delay (s)		60.2		122.8	6.8					45.4	45.0	112.8
Level of Service		E		F	A					D	D	F
Approach Delay (s)		60.2			22.7			0.0			84.2	
Approach LOS		E			C			A			F	

Intersection Summary			
HCM Average Control Delay	57.2	HCM Level of Service	E
HCM Volume to Capacity ratio	1.09		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	18.3
Intersection Capacity Utilization	91.2%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑↑	↑↑↑	↱		
Volume (veh/h)	0	2950	1606	750	0	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	3105	1691	789	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		515	937			
pX, platoon unblocked	0.71				0.68	0.71
vC, conflicting volume	2480				2726	564
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1656				0	0
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	100
cM capacity (veh/h)	274				695	770

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	WB 4
Volume Total	1035	1035	1035	564	564	564	789
Volume Left	0	0	0	0	0	0	0
Volume Right	0	0	0	0	0	0	789
cSH	1700	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.61	0.61	0.61	0.33	0.33	0.33	0.46
Queue Length 95th (ft)	0	0	0	0	0	0	0
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS							
Approach Delay (s)	0.0			0.0			
Approach LOS							

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	91.2%	ICU Level of Service	F
Analysis Period (min)	15		

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBU
Lane Configurations												
Volume (vph)	15	250	1361	1249	10	60	1710	110	516	120	200	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.6	5.7	4.0		5.6	5.7	5.7	5.6	5.6		
Lane Util. Factor		1.00	0.95	1.00		1.00	0.91	1.00	0.91	0.91		
Frpb, ped/bikes		1.00	1.00	0.99		1.00	1.00	0.97	1.00	0.99		
Flpb, ped/bikes		1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00		
Frt		1.00	1.00	0.85		1.00	1.00	0.85	1.00	0.95		
Flt Protected		0.95	1.00	1.00		0.95	1.00	1.00	0.95	0.98		
Satd. Flow (prot)		1770	3539	1561		1770	5085	1543	1610	3115		
Flt Permitted		0.95	1.00	1.00		0.95	1.00	1.00	0.95	0.98		
Satd. Flow (perm)		1770	3539	1561		1770	5085	1543	1610	3115		
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	16	263	1433	1315	11	63	1800	116	543	126	211	11
RTOR Reduction (vph)	0	0	0	0	0	0	0	33	0	47	0	0
Lane Group Flow (vph)	0	279	1433	1315	0	74	1800	83	299	534	0	0
Confl. Peds. (#/hr)				4				7			6	
Confl. Bikes (#/hr)				4				2				
Turn Type	Prot	Prot		Free	Prot	Prot		Perm	Split			Split
Protected Phases	1	1	6		5	5	2		3	3		4
Permitted Phases				Free				2				
Actuated Green, G (s)		24.6	70.8	150.0		8.7	54.9	54.9	28.7	28.7		
Effective Green, g (s)		24.6	70.8	150.0		8.7	54.9	54.9	28.7	28.7		
Actuated g/C Ratio		0.16	0.47	1.00		0.06	0.37	0.37	0.19	0.19		
Clearance Time (s)		5.6	5.7			5.6	5.7	5.7	5.6	5.6		
Vehicle Extension (s)		2.0	3.9			2.0	3.9	3.9	2.0	2.0		
Lane Grp Cap (vph)		290	1670	1561		103	1861	565	308	596		
v/s Ratio Prot		0.16	0.40			0.04	c0.35		0.19	0.17		
v/s Ratio Perm				c0.84				0.05				
v/c Ratio		0.96	0.86	0.84		0.72	0.97	0.15	0.97	0.90		
Uniform Delay, d1		62.2	35.1	0.0		69.4	46.7	31.9	60.2	59.2		
Progression Factor		0.85	0.77	1.00		1.00	1.00	1.00	0.58	0.54		
Incremental Delay, d2		18.0	1.6	1.5		18.0	14.4	0.5	41.3	14.8		
Delay (s)		70.9	28.8	1.5		87.4	61.1	32.4	76.5	46.8		
Level of Service		E	C	A		F	E	C	E	D		
Approach Delay (s)			20.8				60.4			56.9		
Approach LOS			C				E			E		

Intersection Summary			
HCM Average Control Delay	44.8	HCM Level of Service	D
HCM Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	0.0
Intersection Capacity Utilization	94.9%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBL	SBT	SBR
Lane Configurations			
Volume (vph)	250	160	130
Ideal Flow (vphpl)	1900	1900	1900
Total Lost time (s)	4.6	4.6	4.6
Lane Util. Factor	0.95	0.95	1.00
Frpb, ped/bikes	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00
Frt	1.00	1.00	0.85
Flt Protected	0.95	0.99	1.00
Satd. Flow (prot)	1681	1747	1583
Flt Permitted	0.95	0.99	1.00
Satd. Flow (perm)	1681	1747	1583
Peak-hour factor, PHF	0.95	0.95	0.95
Adj. Flow (vph)	263	168	137
RTOR Reduction (vph)	0	0	118
Lane Group Flow (vph)	216	226	19
Confl. Peds. (#/hr)			
Confl. Bikes (#/hr)			
Turn Type	Split		Perm
Protected Phases	4	4	
Permitted Phases			4
Actuated Green, G (s)	20.3	20.3	20.3
Effective Green, g (s)	20.3	20.3	20.3
Actuated g/C Ratio	0.14	0.14	0.14
Clearance Time (s)	4.6	4.6	4.6
Vehicle Extension (s)	2.0	2.0	2.0
Lane Grp Cap (vph)	227	236	214
v/s Ratio Prot	0.13	0.13	
v/s Ratio Perm			0.01
v/c Ratio	0.95	0.96	0.09
Uniform Delay, d1	64.4	64.4	56.7
Progression Factor	1.00	1.00	1.00
Incremental Delay, d2	45.7	46.0	0.1
Delay (s)	110.1	110.4	56.8
Level of Service	F	F	E
Approach Delay (s)		97.6	
Approach LOS		F	

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	276	10	60	20	40	40	260	410	20	80	720	679
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	5.5			5.5	5.5	5.5	5.5		5.5	5.5	5.5
Lane Util. Factor	0.95	0.95			1.00	1.00	1.00	0.95		1.00	1.00	1.00
Frt	1.00	0.95			1.00	0.85	1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	0.97			0.98	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1681	1628			1832	1583	1770	3515		1770	1863	1583
Flt Permitted	0.95	0.97			0.98	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1681	1628			1832	1583	1770	3515		1770	1863	1583
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	291	11	63	21	42	42	274	432	21	84	758	715
RTOR Reduction (vph)	0	13	0	0	0	39	0	3	0	0	0	170
Lane Group Flow (vph)	186	166	0	0	63	3	274	450	0	84	758	545
Turn Type	Split			Split		Perm	Prot			Prot		pm+ov
Protected Phases	4	4		8	8		5	2		1	6	4
Permitted Phases						8						6
Actuated Green, G (s)	18.4	18.4			9.9	9.9	25.3	49.0		50.7	74.4	92.8
Effective Green, g (s)	18.4	18.4			9.9	9.9	25.3	49.0		50.7	74.4	92.8
Actuated g/C Ratio	0.12	0.12			0.07	0.07	0.17	0.33		0.34	0.50	0.62
Clearance Time (s)	5.5	5.5			5.5	5.5	5.5	5.5		5.5	5.5	5.5
Vehicle Extension (s)	2.0	2.0			2.0	2.0	2.0	2.0		2.0	2.0	2.0
Lane Grp Cap (vph)	206	200			121	104	299	1148		598	924	979
v/s Ratio Prot	c0.11	0.10			c0.03		c0.15	0.13		0.05	c0.41	0.07
v/s Ratio Perm						0.00						0.28
v/c Ratio	0.90	0.83			0.52	0.03	0.92	0.39		0.14	0.82	0.56
Uniform Delay, d1	64.9	64.3			67.8	65.5	61.3	39.0		34.5	32.1	16.6
Progression Factor	1.00	1.00			1.00	1.00	1.00	1.00		1.03	0.72	0.54
Incremental Delay, d2	36.4	22.8			1.9	0.0	30.5	0.1		0.0	4.3	0.2
Delay (s)	101.3	87.0			69.6	65.6	91.8	39.1		35.6	27.6	9.2
Level of Service	F	F			E	E	F	D		D	C	A
Approach Delay (s)		94.3			68.0			59.0			19.6	
Approach LOS		F			E			E			B	

Intersection Summary			
HCM Average Control Delay	41.7	HCM Level of Service	D
HCM Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	22.0
Intersection Capacity Utilization	82.5%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Lane Configurations												
Volume (vph)	170	131	210	60	93	200	80	1639	30	5	110	1473
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.6	4.6	4.6	5.6	5.6	5.6	6.3	5.3			6.3	5.3
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95			1.00	0.95
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00			1.00	0.96
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00			0.95	1.00
Satd. Flow (prot)	1770	1863	1583	1770	1863	1583	1770	3530			1770	3403
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00			0.95	1.00
Satd. Flow (perm)	1770	1863	1583	1770	1863	1583	1770	3530			1770	3403
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	179	138	221	63	98	211	84	1725	32	5	116	1551
RTOR Reduction (vph)	0	0	118	0	0	76	0	1	0	0	0	20
Lane Group Flow (vph)	179	138	103	63	98	135	84	1756	0	0	121	2068
Turn Type	Prot		Perm	Prot		Perm	Prot			Prot	Prot	
Protected Phases	3	8		7	4		1	6		5	5	2
Permitted Phases			8			4						
Actuated Green, G (s)	12.5	23.9	23.9	7.6	18.0	18.0	6.7	71.2			9.9	74.4
Effective Green, g (s)	12.5	23.9	23.9	7.6	18.0	18.0	6.7	71.2			9.9	74.4
Actuated g/C Ratio	0.09	0.18	0.18	0.06	0.13	0.13	0.05	0.53			0.07	0.55
Clearance Time (s)	5.6	4.6	4.6	5.6	5.6	5.6	6.3	5.3			6.3	5.3
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0			2.0	2.0
Lane Grp Cap (vph)	165	331	282	100	250	212	88	1870			130	1884
v/s Ratio Prot	c0.10	c0.07		0.04	0.05		0.05	0.50			c0.07	c0.61
v/s Ratio Perm			0.07			c0.09						
v/c Ratio	1.08	0.42	0.37	0.63	0.39	0.64	0.95	0.94			0.93	1.10
Uniform Delay, d1	61.0	49.1	48.6	62.0	53.2	55.1	63.7	29.6			61.9	30.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00
Incremental Delay, d2	94.5	0.3	0.3	9.1	0.4	4.5	79.8	9.6			57.3	52.9
Delay (s)	155.5	49.4	48.9	71.1	53.6	59.6	143.5	39.2			119.2	82.9
Level of Service	F	D	D	E	D	E	F	D			F	F
Approach Delay (s)		84.5			60.0			43.9				84.8
Approach LOS		F			E			D				F

Intersection Summary			
HCM Average Control Delay	67.8	HCM Level of Service	E
HCM Volume to Capacity ratio	1.07		
Actuated Cycle Length (s)	134.4	Sum of lost time (s)	27.4
Intersection Capacity Utilization	96.8%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBR
Lane Configurations	
Volume (vph)	510
Ideal Flow (vphpl)	1900
Total Lost time (s)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Peak-hour factor, PHF	0.95
Adj. Flow (vph)	537
RTOR Reduction (vph)	0
Lane Group Flow (vph)	0
Turn Type	
Protected Phases	
Permitted Phases	
Actuated Green, G (s)	
Effective Green, g (s)	
Actuated g/C Ratio	
Clearance Time (s)	
Vehicle Extension (s)	
Lane Grp Cap (vph)	
v/s Ratio Prot	
v/s Ratio Perm	
v/c Ratio	
Uniform Delay, d1	
Progression Factor	
Incremental Delay, d2	
Delay (s)	
Level of Service	
Approach Delay (s)	
Approach LOS	

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	60	2	50	37	2	89	100	1600	34	83	1560	100
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.6	4.6		4.6	4.6		5.3	5.3		5.3	5.3	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	0.86		1.00	0.85		1.00	1.00		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1593		1770	1589		1770	3528		1770	3507	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	1593		1770	1589		1770	3528		1770	3507	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	63	2	53	39	2	94	105	1684	36	87	1642	105
RTOR Reduction (vph)	0	47	0	0	85	0	0	1	0	0	3	0
Lane Group Flow (vph)	63	8	0	39	11	0	105	1719	0	87	1744	0
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases												
Actuated Green, G (s)	6.8	12.9		4.8	10.9		10.3	63.6		8.7	62.0	
Effective Green, g (s)	6.8	12.9		4.8	10.9		10.3	63.6		8.7	62.0	
Actuated g/C Ratio	0.06	0.12		0.04	0.10		0.09	0.58		0.08	0.56	
Clearance Time (s)	4.6	4.6		4.6	4.6		5.3	5.3		5.3	5.3	
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	110	187		77	158		166	2044		140	1980	
v/s Ratio Prot	c0.04	0.01		0.02	c0.01		c0.06	0.49		0.05	c0.50	
v/s Ratio Perm												
v/c Ratio	0.57	0.04		0.51	0.07		0.63	0.84		0.62	0.88	
Uniform Delay, d1	50.1	43.0		51.3	44.9		47.9	19.0		49.0	20.7	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	4.4	0.0		1.9	0.1		5.7	3.2		6.0	4.8	
Delay (s)	54.5	43.0		53.2	44.9		53.6	22.1		55.0	25.5	
Level of Service	D	D		D	D		D	C		D	C	
Approach Delay (s)		49.1			47.3			23.9			26.9	
Approach LOS		D			D			C			C	

Intersection Summary			
HCM Average Control Delay	26.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	109.8	Sum of lost time (s)	19.8
Intersection Capacity Utilization	74.5%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Volume (vph)	80	90	10	5	370	150	588	20	1066	350	489	1018
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.6	7.2			5.6	5.6	6.3	6.3	5.3	5.3	6.3	5.3
Lane Util. Factor	1.00	1.00			0.97	1.00	0.88	1.00	0.95	1.00	0.97	0.95
Frt	1.00	0.98			1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98
Flt Protected	0.95	1.00			0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	1834			3433	1863	2787	1770	3539	1583	3433	3475
Flt Permitted	0.95	1.00			0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1770	1834			3433	1863	2787	1770	3539	1583	3433	3475
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	84	95	11	5	389	158	619	21	1122	368	515	1072
RTOR Reduction (vph)	0	4	0	0	0	0	104	0	0	144	0	5
Lane Group Flow (vph)	84	102	0	0	394	158	515	21	1122	224	515	1214
Turn Type	Prot			Prot	Prot		pm+ov	Prot		Perm	Prot	
Protected Phases	3	8		7	7	4	5	1	6		5	2
Permitted Phases							4			6		
Actuated Green, G (s)	10.0	15.3			16.7	23.6	45.5	1.9	49.9	49.9	21.9	69.9
Effective Green, g (s)	10.0	15.3			16.7	23.6	45.5	1.9	49.9	49.9	21.9	69.9
Actuated g/C Ratio	0.08	0.12			0.13	0.18	0.35	0.01	0.39	0.39	0.17	0.55
Clearance Time (s)	5.6	7.2			5.6	5.6	6.3	6.3	5.3	5.3	6.3	5.3
Vehicle Extension (s)	2.0	2.0			2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	138	219			447	343	989	26	1378	616	586	1895
v/s Ratio Prot	0.05	0.06			c0.11	0.08	c0.09	0.01	c0.32		c0.15	0.35
v/s Ratio Perm							0.10			0.14		
v/c Ratio	0.61	0.47			0.88	0.46	0.52	0.81	0.81	0.36	0.88	0.64
Uniform Delay, d1	57.2	52.7			54.8	46.6	32.7	63.0	35.0	27.9	51.9	20.4
Progression Factor	1.00	1.00			1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	5.1	0.6			17.6	0.4	0.2	90.8	3.6	0.1	13.6	0.6
Delay (s)	62.3	53.2			72.4	47.0	33.0	153.8	38.6	28.0	65.5	20.9
Level of Service	E	D			E	D	C	F	D	C	E	C
Approach Delay (s)		57.3				48.1			37.6			34.2
Approach LOS		E				D			D			C

Intersection Summary			
HCM Average Control Delay	39.8	HCM Level of Service	D
HCM Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	128.2	Sum of lost time (s)	17.2
Intersection Capacity Utilization	79.8%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBR
Lane Configurations	
Volume (vph)	140
Ideal Flow (vphpl)	1900
Total Lost time (s)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Peak-hour factor, PHF	0.95
Adj. Flow (vph)	147
RTOR Reduction (vph)	0
Lane Group Flow (vph)	0
Turn Type	
Protected Phases	
Permitted Phases	
Actuated Green, G (s)	
Effective Green, g (s)	
Actuated g/C Ratio	
Clearance Time (s)	
Vehicle Extension (s)	
Lane Grp Cap (vph)	
v/s Ratio Prot	
v/s Ratio Perm	
v/c Ratio	
Uniform Delay, d1	
Progression Factor	
Incremental Delay, d2	
Delay (s)	
Level of Service	
Approach Delay (s)	
Approach LOS	

Intersection Summary

Movement	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL
Lane Configurations												
Volume (vph)	20	82	757	10	10	796	750	40	150	30	5	600
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.6	6.6	6.6	5.6	6.6	6.6	5.6	5.6	5.6		5.6
Lane Util. Factor		0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.95	1.00		0.97
Frpb, ped/bikes		1.00	1.00	0.99	1.00	1.00	1.00	1.00	1.00	0.98		1.00
Flpb, ped/bikes		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00
Frt		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85		1.00
Flt Protected		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00		0.95
Satd. Flow (prot)		3433	3539	1563	3433	3539	1583	3433	3539	1557		3433
Flt Permitted		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00		0.95
Satd. Flow (perm)		3433	3539	1563	3433	3539	1583	3433	3539	1557		3433
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	21	86	797	11	11	838	789	42	158	32	5	632
RTOR Reduction (vph)	0	0	0	6	0	0	376	0	0	27	0	0
Lane Group Flow (vph)	0	107	797	5	11	838	413	42	158	5	0	637
Confl. Peds. (#/hr)										2		
Confl. Bikes (#/hr)				2						2		1
Turn Type	Prot	Prot		Perm	Prot		Perm	Prot		Perm	Prot	Prot
Protected Phases	3	3	8		7	4		1	6		5	5
Permitted Phases				8			4			6		
Actuated Green, G (s)		5.9	41.1	41.1	0.7	35.9	35.9	2.8	14.9	14.9		18.1
Effective Green, g (s)		5.9	41.1	41.1	0.7	35.9	35.9	2.8	14.9	14.9		18.1
Actuated g/C Ratio		0.06	0.42	0.42	0.01	0.37	0.37	0.03	0.15	0.15		0.18
Clearance Time (s)		5.6	6.6	6.6	5.6	6.6	6.6	5.6	5.6	5.6		5.6
Vehicle Extension (s)		2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0		2.0
Lane Grp Cap (vph)		206	1481	654	24	1294	579	98	537	236		633
v/s Ratio Prot		c0.03	c0.23		0.00	0.24		0.01	c0.04			c0.19
v/s Ratio Perm				0.00			c0.26			0.00		
v/c Ratio		0.52	0.54	0.01	0.46	0.65	0.71	0.43	0.29	0.02		1.01
Uniform Delay, d1		44.8	21.4	16.6	48.6	25.9	26.7	46.9	37.0	35.4		40.0
Progression Factor		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00
Incremental Delay, d2		0.9	0.2	0.0	5.0	0.8	3.5	1.1	0.1	0.0		37.3
Delay (s)		45.7	21.6	16.7	53.5	26.7	30.2	48.0	37.1	35.5		77.4
Level of Service		D	C	B	D	C	C	D	D	D		E
Approach Delay (s)			24.4			28.6			38.8			
Approach LOS			C			C			D			

Intersection Summary			
HCM Average Control Delay	36.1	HCM Level of Service	D
HCM Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	98.2	Sum of lost time (s)	30.0
Intersection Capacity Utilization	92.8%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBT	SBR
Lane Configurations	↑↑	↱
Volume (vph)	140	181
Ideal Flow (vphpl)	1900	1900
Total Lost time (s)	4.6	4.6
Lane Util. Factor	0.95	1.00
Frpb, ped/bikes	1.00	0.99
Flpb, ped/bikes	1.00	1.00
Frt	1.00	0.85
Flt Protected	1.00	1.00
Satd. Flow (prot)	3539	1562
Flt Permitted	1.00	1.00
Satd. Flow (perm)	3539	1562
Peak-hour factor, PHF	0.95	0.95
Adj. Flow (vph)	147	191
RTOR Reduction (vph)	0	79
Lane Group Flow (vph)	147	112
Confl. Peds. (#/hr)		1
Confl. Bikes (#/hr)		1
Turn Type		Perm
Protected Phases	2	
Permitted Phases		2
Actuated Green, G (s)	31.2	31.2
Effective Green, g (s)	31.2	31.2
Actuated g/C Ratio	0.32	0.32
Clearance Time (s)	4.6	4.6
Vehicle Extension (s)	2.0	2.0
Lane Grp Cap (vph)	1124	496
v/s Ratio Prot	0.04	
v/s Ratio Perm		0.07
v/c Ratio	0.13	0.23
Uniform Delay, d1	23.8	24.6
Progression Factor	1.00	1.00
Incremental Delay, d2	0.0	0.1
Delay (s)	23.9	24.7
Level of Service	C	C
Approach Delay (s)	59.0	
Approach LOS	E	

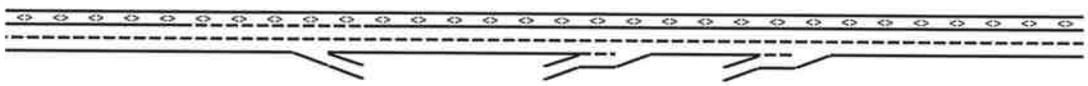
Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	215	120	110	90	240	53	130	1238	60	84	1009	275
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.6	5.3	5.3	5.6	5.3	5.3	5.6	5.3	5.3	5.6	5.3	5.3
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	3539	1583	3433	3539	1583	3433	3539	1583	3433	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	3539	1583	3433	3539	1583	3433	3539	1583	3433	3539	1583
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	226	126	116	95	253	56	137	1303	63	88	1062	289
RTOR Reduction (vph)	0	0	93	0	0	46	0	0	26	0	0	170
Lane Group Flow (vph)	226	126	23	95	253	10	137	1303	37	88	1062	119
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	1	6		5	2		3	8		7	4	
Permitted Phases			6			2			8			4
Actuated Green, G (s)	7.0	16.4	16.4	4.9	14.3	14.3	5.1	34.8	34.8	3.9	33.6	33.6
Effective Green, g (s)	7.0	16.4	16.4	4.9	14.3	14.3	5.1	34.8	34.8	3.9	33.6	33.6
Actuated g/C Ratio	0.09	0.20	0.20	0.06	0.17	0.17	0.06	0.43	0.43	0.05	0.41	0.41
Clearance Time (s)	5.6	5.3	5.3	5.6	5.3	5.3	5.6	5.3	5.3	5.6	5.3	5.3
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	294	710	317	206	619	277	214	1506	673	164	1454	650
v/s Ratio Prot	c0.07	0.04		0.03	c0.07		c0.04	c0.37		0.03	0.30	
v/s Ratio Perm			0.01			0.01			0.02			0.07
v/c Ratio	0.77	0.18	0.07	0.46	0.41	0.04	0.64	0.87	0.06	0.54	0.73	0.18
Uniform Delay, d1	36.6	27.1	26.5	37.2	30.0	28.0	37.5	21.4	13.8	38.1	20.3	15.4
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	10.4	0.0	0.0	0.6	0.2	0.0	4.8	5.3	0.0	1.7	1.7	0.0
Delay (s)	47.0	27.2	26.6	37.8	30.2	28.0	42.3	26.6	13.8	39.8	21.9	15.4
Level of Service	D	C	C	D	C	C	D	C	B	D	C	B
Approach Delay (s)		36.6			31.7			27.5			21.7	
Approach LOS		D			C			C			C	

Intersection Summary			
HCM Average Control Delay	26.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	81.8	Sum of lost time (s)	16.5
Intersection Capacity Utilization	69.1%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Project:	**Elk Grove Civic Center**	**Alternative:**	**Cumulative + Project**
Freeway Corridor:	**State Route 99 NB**	**Time Period:**	**Wkdy PM Peak Hour**

Location	1	2	3	4	5	6



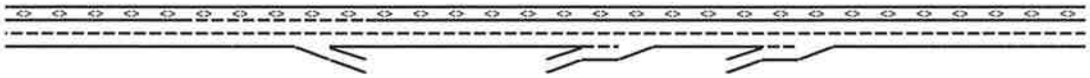
Key

<> Express Lane (HOV)

No Trucks

Name	SR 99 south of Elk Grove Blvd	East Stockton Loop Off-Ramp	E. Stockton Off to Elk Grove On	Elk Grove Loop On-Ramp	Elk Grove Blvd On-Ramp	SR 99 north of Elk Grove
Define Freeway Segment						
Type	Basic	Diverge	Basic	Merge	Merge	Basic
Length (ft)	1,050	1,500	1,700	850	1,500	180
Accel Length				175	1,200	
Decel Length		170				
Mainline Volume	3,296	3,296	2,990	2,990	4,449	4,799
On Ramp Volume				1,459	350	
Off Ramp Volume		306				
Express Lane Volume	989	989	897	897	1,335	1,440
EL On Ramp Volume						
EL Off Ramp Volume						
Calculate Flow Rate in General Purpose Lanes (GP)						
GP Volume (vph)	2,307	2,307	2,093	3,552	3,464	3,359
PHF	0.93	0.97	0.93	0.97	0.93	0.93
GP Lanes	2	2	2	2	2	2
Terrain	Level	Level	Level	Level	Level	Level
Grade %	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Grade Length (mi)	0.00	0.00	0.00	0.00	0.00	0.00
Truck & Bus %	15.0%	5.0%	10.0%	5.0%	5.0%	10.0%
RV %	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
E_T	1.5	1.5	1.5	1.5	1.5	1.5
E_R	1.2	1.2	1.2	1.2	1.2	1.2
f_{HV}	0.930	0.976	0.952	0.976	0.976	0.952
f_P	1.00	1.00	1.00	1.00	1.00	1.00
GP Flow (pcph)	2,667	2,438	2,363	3,753	3,818	3,793
GP Flow (pcphpl)	1,333	1,219	1,182	1,877	1,909	1,896
Calculate Speed in General Purpose Lanes						
Lane Width (ft)	12	12	12	12	12	12
Shoulder Width	>6	>6	>6	>6	>6	>6
TRD	1.8	1.8	1.8	1.8	1.8	1.8
f_{LW}	0.0	0.0	0.0	0.0	0.0	0.0
f_{LC}	0.0	0.0	0.0	0.0	0.0	0.0
Calc'd FFS	70.1	70.1	70.1	70.1	70.1	70.1
Measured FFS	70.0	70.0	70.0		70.0	70.0
FFS	70	70	70	70	70	70

Location	1	2	3	4	5	6



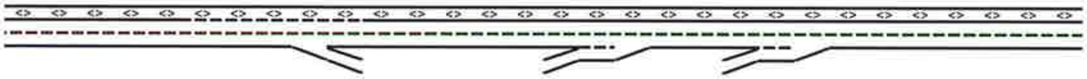
Key

<> Express Lane (HOV)

No Trucks

Name	SR 99 south of Elk Grove Blvd	East Stockton Loop Off-Ramp	E. Stockton Off to Elk Grove On	Elk Grove Loop On-Ramp	Elk Grove Blvd On-Ramp	SR 99 north of Elk Grove
Calculate Operations in General Purpose Lanes						
v/c ratio	0.56	0.51	0.49	0.78	0.80	0.79
Speed (mph)	69.8	70.0	70.0	64.7	64.2	64.4
Density (pcphpl)	19.1	17.4	16.9	29.0	29.8	29.5
LOS	C	B	B	D	D	D
Calculate Operations for Entering GP Lanes						
GP_{IN} Vol (pcph)				2,212	3,432	
GP_{IN} Cap (pcph)				4,800	4,800	
GP_{IN} v/c ratio				0.46	0.72	
Calculate Operations for Exiting GP Lanes						
GP_{OUT} Vol (pcph)		2,115				
GP_{OUT} Cap (pcph)		4,800				
GP_{OUT} v/c ratio		0.44				
Calculate On Ramp Flow Rate						
On Volume (vph)				1,459	350	
PHF				0.97	0.93	
Total Lanes				1	1	
Terrain				Level	Level	
Grade %				0.0%	0.0%	
Grade Length (mi)				0.00	0.00	
Truck & Bus %				5.0%	5.0%	
RV %				0.0%	0.0%	
E_T				1.5	1.5	
E_R				1.2	1.2	
f_{HV}				0.976	0.976	
f_P				1.00	1.00	
On Flow (pcph)				1,542	386	
On Flow (pcphpl)				1,542	386	
Calculate On Ramp Roadway Operations						
On Ramp Type				Right	Right	
On Ramp Speed (mph)				45	45	
On Ramp Cap (pcph)				2,100	2,100	
On Ramp v/c ratio				0.73	0.18	

Location	1	2	3	4	5	6

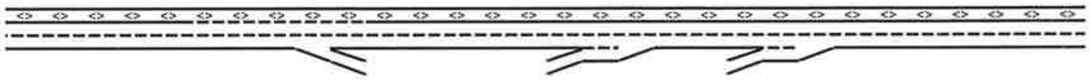


Key

<> Express Lane (HOV)

No Trucks

Name	SR 99 south of Elk Grove Blvd	East Stockton Loop Off-Ramp	E. Stockton Off to Elk Grove On	Elk Grove Loop On-Ramp	Elk Grove Blvd On-Ramp	SR 99 north of Elk Grove
Calculate Off Ramp Flow Rate						
Off Volume (vph)		306				
PHF		0.97				
Total Lanes		1				
Terrain		Level				
Grade %		0.0%				
Grade Length (mi)		0.00				
Truck & Bus %		5.0%				
RV %		0.0%				
E_T		1.5				
E_R		1.2				
f_{HV}		0.976				
f_P		1.00				
Off Flow (pcph)		323				
Off Flow (pcphpl)		323				
Calculate Off Ramp Roadway Operations						
Off Ramp Type		Right				
Off Ramp Speed		35				
Off Ramp Cap (pcph)		2,000				
Off Ramp v/c ratio		0.16				
Determine Adjacent Ramp for Three-Lane Mainline Segments with One-Lane Ramps						
Up Type						
Up Distance						
Up Flow (pcph)						
Down Type						
Down Distance						
Down Flow (pcph)						



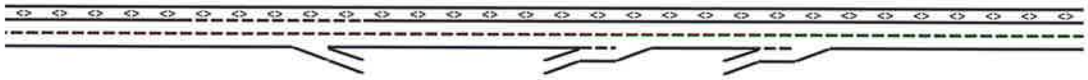
Key

<> Express Lane (HOV)

No Trucks

Location	1	2	3	4	5	6
Name	SR 99 south of Elk Grove Blvd	East Stockton Loop Off-Ramp	E. Stockton Off to Elk Grove On	Elk Grove Loop On-Ramp	Elk Grove Blvd On-Ramp	SR 99 north of Elk Grove
Calculate Merge Influence Area Operations						
Effective v_P (pcph)				2,212	3,432	
Up Ramp L_{EQ}						
Down Ramp L_{EQ}						
P_{FM} (Eqn 13-3)				0.582	0.611	
P_{FM} (Eqn 13-4)						
P_{FM} (Eqn 13-5)						
P_{FM}				1.000	1.000	
v_{12} (pcph)				2,212	3,432	
v_3 (pcph)						
v_{34} (pcph)						
v_{12a} (pcph)				2,212	3,432	
v_{R12a} (pcph)				3,753	3,818	
Merge Speed Index				0.47	0.39	
Merge Area Speed				56.8	59.1	
Outer Lanes Volume						
Outer Lanes Speed						
Segment Speed				56.8	59.1	
Merge v/c ratio				0.82	0.83	
Merge Density				32.9	27.6	
Merge LOS				D	C	
Calculate Diverge Influence Area Operations						
Effective v_P (pcph)		2,438				
Up Ramp L_{EQ}						
Down Ramp L_{EQ}						
P_{FD} (Eqn 13-9)		0.684				
P_{FD} (Eqn 13-10)						
P_{FD} (Eqn 13-11)						
P_{FD}		1.000				
v_{12} (pcph)		2,438				
v_3 (pcph)						
v_{34} (pcph)						
v_{12a} (pcph)		2,438				
Diverge Speed Index		0.46				
Diverge Area Speed		57.2				
Outer Lanes Volume						
Outer Lanes Speed						
Segment Speed		57.2				
Diverge v/c ratio		0.55				
Diverge Density		23.7				
Diverge LOS		C				

Location	[illegible]	[illegible]	3	[illegible]	[illegible]	[illegible]



Key

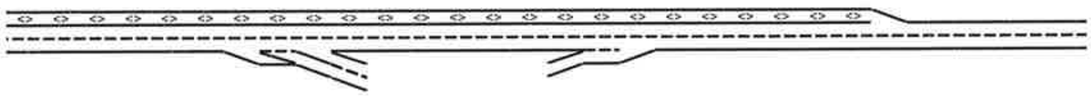
<> Express Lane (HOV)

No Trucks

Name	SR 99 south of Elk Grove Blvd	East Stockton Loop Off-Ramp	E. Stockton Off to Elk Grove On	Elk Grove Loop On-Ramp	Elk Grove Blvd On-Ramp	SR 99 north of Elk Grove
Summarize Segment Operations						
Segment v/c ratio	0.56	0.55	0.49	0.82	0.83	0.79
Segment Density	19.1	23.7	16.9	32.9	27.6	29.5
Segment LOS	C	C	B	D	C	D
Over Capacity						

Project:	**Elk Grove Civic Center**	**Alternative:**	**Cumulative + Project**
Freeway Corridor:	**State Route 99 SB**	**Time Period:**	**Wkdy PM Peak Hour**

Location	1	2	3	4	5	6



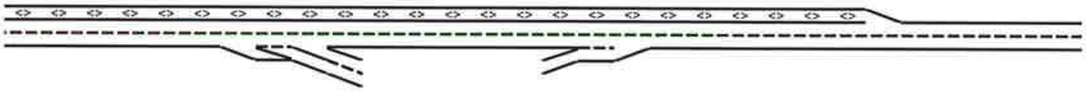
Key

<> Express Lane (HOV)

No Trucks

Name	SR 99 north of Elk Grove Blvd	Elk Grove Off-Ramp	Elk Grove Off-Ramp to On-Ramp	Elk Grove On-Ramp	SR 99 south of Elk Grove Blvd	SR 99 south of Elk Grove Blvd
Define Freeway Segment						
Type	Basic	Diverge	Basic	Merge	Basic	Basic
Length (ft)	250	1,500	2,250	1,500	400	8,050
Accel Length				300		
Decel Length		1,500				
Mainline Volume	4,245	4,245	2,370	2,370	2,748	2,748
On Ramp Volume				378		
Off Ramp Volume		1,875				
Express Lane Volume	1,274	1,274				
EL On Ramp Volume						
EL Off Ramp Volume						
Calculate Flow Rate in General Purpose Lanes (GP)						
GP Volume (vph)	2,972	2,972	2,370	2,748	2,748	2,748
PHF	0.95	0.98	0.95	0.98	0.95	0.95
GP Lanes	2	2	2	2	2	2
Terrain	Level	Level	Level	Level	Level	Level
Grade %	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Grade Length (mi)	0.00	0.00	0.00	0.00	0.00	0.00
Truck & Bus %	10.0%	5.0%	10.0%	5.0%	15.0%	15.0%
RV %	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
E_T	1.5	1.5	1.5	1.5	1.5	1.5
E_R	1.2	1.2	1.2	1.2	1.2	1.2
f_{HV}	0.952	0.976	0.952	0.976	0.930	0.930
f_P	1.00	1.00	1.00	1.00	1.00	1.00
GP Flow (pcph)	3,284	3,108	2,619	2,874	3,110	3,110
GP Flow (pcphpl)	1,642	1,554	1,310	1,437	1,555	1,555
Calculate Speed in General Purpose Lanes						
Lane Width (ft)	12	12	12	12	12	12
Shoulder Width	>6	>6	>6	>6	>6	>6
TRD	1.8	1.8	1.8	1.8	1.8	1.8
f_{LW}	0.0	0.0	0.0	0.0	0.0	0.0
f_{LC}	0.0	0.0	0.0	0.0	0.0	0.0
Calc'd FFS	70.1	70.1	70.1	70.1	70.1	70.1
Measured FFS	70.0	70.0	70.0	70.0	70.0	70.0
FFS	70	70	70	70	70	70

Location	1	2	3	4	5	6



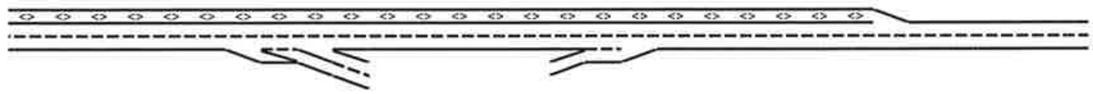
Key

<> Express Lane (HOV)

No Trucks

Name	SR 99 north of Elk Grove Blvd	Elk Grove Off-Ramp	Elk Grove Off-Ramp to On-Ramp	Elk Grove On-Ramp	SR 99 south of Elk Grove Blvd	SR 99 south of Elk Grove Blvd
Calculate Operations in General Purpose Lanes						
v/c ratio	0.68	0.65	0.55	0.60	0.65	0.65
Speed (mph)	67.7	68.5	69.9	69.3	68.5	68.5
Density (pcphpl)	24.2	22.7	18.7	20.7	22.7	22.7
LOS	C	C	C	C	C	C
Calculate Operations for Entering GP Lanes						
GP_{IN} Vol (pcph)				2,479		
GP_{IN} Cap (pcph)				4,800		
GP_{IN} v/c ratio				0.52		
Calculate Operations for Exiting GP Lanes						
GP_{OUT} Vol (pcph)		1,147				
GP_{OUT} Cap (pcph)		4,800				
GP_{OUT} v/c ratio		0.24				
Calculate On Ramp Flow Rate						
On Volume (vph)				378		
PHF				0.98		
Total Lanes				1		
Terrain				Level		
Grade %				0.0%		
Grade Length (mi)				0.00		
Truck & Bus %				5.0%		
RV %				0.0%		
E_T				1.5		
E_R				1.2		
f_{HV}				0.976		
f_P				1.00		
On Flow (pcph)				395		
On Flow (pcphpl)				395		
Calculate On Ramp Roadway Operations						
On Ramp Type				Right		
On Ramp Speed (mph)				60		
On Ramp Cap (pcph)				2,200		
On Ramp v/c ratio				0.18		

Location	1	2	3	4	5	6



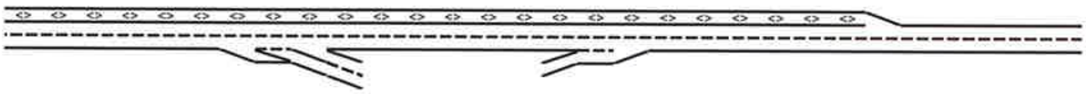
Key

<> Express Lane (HOV)

No Trucks

Name	SR 99 north of Elk Grove Blvd	Elk Grove Off-Ramp	Elk Grove Off-Ramp to On-Ramp	Elk Grove On-Ramp	SR 99 south of Elk Grove Blvd	SR 99 south of Elk Grove Blvd
Calculate Off Ramp Flow Rate						
Off Volume (vph)		1,875				
PHF		0.98				
Total Lanes		2				
Terrain		Level				
Grade %		0.0%				
Grade Length (mi)		0.00				
Truck & Bus %		5.0%				
RV %		0.0%				
E_T		1.5				
E_R		1.2				
f_{HV}		0.976				
f_P		1.00				
Off Flow (pcph)		1,961				
Off Flow (pcphpl)		981				
Calculate Off Ramp Roadway Operations						
Off Ramp Type		Right				
Off Ramp Speed		35				
Off Ramp Cap (pcph)		4,000				
Off Ramp v/c ratio		0.49				
Determine Adjacent Ramp for Three-Lane Mainline Segments with One-Lane Ramps						
Up Type						
Up Distance						
Up Flow (pcph)						
Down Type						
Down Distance						
Down Flow (pcph)						

Location	1	2	3	4	5	6



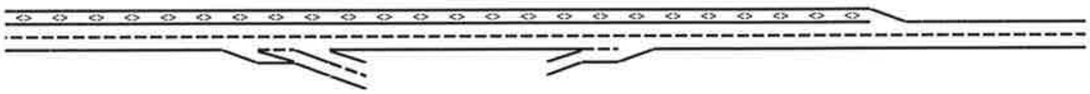
Key

<> Express Lane (HOV)

No Trucks

Name	SR 99 north of Elk Grove Blvd	Elk Grove Off-Ramp	Elk Grove Off-Ramp to On-Ramp	Elk Grove On-Ramp	SR 99 south of Elk Grove Blvd	SR 99 south of Elk Grove Blvd
Calculate Merge Influence Area Operations						
Effective v_P (pcph)				2,479		
Up Ramp L_{EQ}						
Down Ramp L_{EQ}						
P_{FM} (Eqn 13-3)				0.586		
P_{FM} (Eqn 13-4)						
P_{FM} (Eqn 13-5)						
P_{FM}				1.000		
v_{12} (pcph)				2,479		
v_3 (pcph)						
v_{34} (pcph)						
v_{12a} (pcph)				2,479		
v_{R12a} (pcph)				2,874		
Merge Speed Index				0.35		
Merge Area Speed				60.1		
Outer Lanes Volume						
Outer Lanes Speed						
Segment Speed				60.1		
Merge v/c ratio				0.62		
Merge Density				25.8		
Merge LOS				C		
Calculate Diverge Influence Area Operations						
Effective v_P (pcph)		3,108				
Up Ramp L_{EQ}						
Down Ramp L_{EQ}						
P_{FD} (Eqn 13-9)		0.592				
P_{FD} (Eqn 13-10)						
P_{FD} (Eqn 13-11)						
P_{FD}		1.000				
v_{12} (pcph)		3,108				
v_3 (pcph)						
v_{34} (pcph)						
v_{12a} (pcph)		3,108				
Diverge Speed Index		0.60				
Diverge Area Speed		53.1				
Outer Lanes Volume						
Outer Lanes Speed						
Segment Speed		53.1				
Diverge v/c ratio		0.71				
Diverge Density		17.5				
Diverge LOS		B				

Location	[illegible]	[illegible]	3	[illegible]	5	6



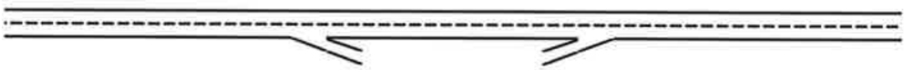
Key

<> Express Lane (HOV)

No Trucks

Name	SR 99 north of Elk Grove Blvd	Elk Grove Off-Ramp	Elk Grove Off-Ramp to On-Ramp	Elk Grove On-Ramp	SR 99 south of Elk Grove Blvd	SR 99 south of Elk Grove Blvd
Summarize Segment Operations						
Segment v/c ratio	0.68	0.71	0.55	0.62	0.65	0.65
Segment Density	24.2	17.5	18.7	25.8	22.7	22.7
Segment LOS	C	B	C	C	C	C
Over Capacity						

Project:	**Elk Grove Civic Center**	**Alternative:**	**Cumulative + Project**
Freeway Corridor:	**Interstate 5 NB**	**Time Period:**	**Wkdy PM Peak Hour**



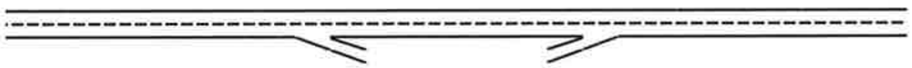
Key

<> Express Lane (HOV)

No Trucks

Location	1	2	3	4	5
Name	I-5 south of Elk Grove B lvd	Elk Grove Blvd Off-Ramp	Elk Grove Off-Ramp to On-Ramp	Elk Grove On-Ramp	I-5 north of Elk Grove Blvd
Define Freeway Segment					
Type	Basic	Diverge	Basic	Merge	Basic
Length (ft)	6,900	1,500	3,100	1,500	500
Accel Length				750	
Decel Length		160			
Mainline Volume	2,598	2,598	2,360	2,360	3,128
On Ramp Volume				768	
Off Ramp Volume		238			
Express Lane Volume					
EL On Ramp Volume					
EL Off Ramp Volume					
Calculate Flow Rate in General Purpose Lanes (GP)					
GP Volume (vph)	2,598	2,598	2,360	3,128	3,128
PHF	0.92	0.97	0.92	0.97	0.92
GP Lanes	2	2	2	2	2
Terrain	Level	Level	Level	Level	Level
Grade %	0.0%	0.0%	0.0%	0.0%	0.0%
Grade Length (mi)	0.00	0.00	0.00	0.00	0.00
Truck & Bus %	18.0%	5.0%	18.0%	5.0%	18.0%
RV %	0.0%	0.0%	0.0%	0.0%	0.0%
E_T	1.5	1.5	1.5	1.5	1.5
E_R	1.2	1.2	1.2	1.2	1.2
f_{HV}	0.917	0.976	0.917	0.976	0.917
f_P	1.00	1.00	1.00	1.00	1.00
GP Flow (pcph)	3,078	2,745	2,796	3,305	3,706
GP Flow (pcphpl)	1,539	1,373	1,398	1,653	1,853
Calculate Speed in General Purpose Lanes					
Lane Width (ft)	12	12	12	12	12
Shoulder Width	>6	>6	>6	>6	>6
TRD	1.2	1.2	1.2	1.2	1.2
f_{LW}	0.0	0.0	0.0	0.0	0.0
f_{LC}	0.0	0.0	0.0	0.0	0.0
Calc'd FFS	71.7	71.7	71.7	71.7	71.7
Measured FFS	70.0	70.0	70.0	70.0	70.0
FFS	70	70	70	70	70
Calculate Operations in General Purpose Lanes					
v/c ratio	0.64	0.57	0.58	0.69	0.77
Speed (mph)	68.7	69.7	69.5	67.6	65.1
Density (pcphpl)	22.4	19.7	20.1	24.4	28.5
LOS	C	C	C	C	D
Calculate Operations for Entering GP Lanes					
GP_{IN} Vol (pcph)				2,494	
GP_{IN} Cap (pcph)				4,800	
GP_{IN} v/c ratio				0.52	
Calculate Operations for Exiting GP Lanes					
GP_{OUT} Vol (pcph)		2,494			
GP_{OUT} Cap (pcph)		4,800			
GP_{OUT} v/c ratio		0.52			

Location	1	2	3	4	5



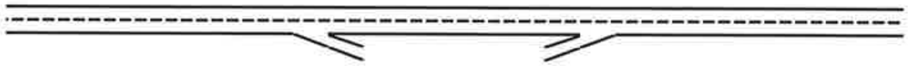
Key

<> Express Lane (HOV)

No Trucks

Name	I-5 south of Elk Grove B lvd	Elk Grove Blvd Off-Ramp	Elk Grove Off-Ramp to On-Ramp	Elk Grove On-Ramp	I-5 north of Elk Grove Blvd
Calculate On Ramp Flow Rate					
On Volume (vph)				768	
PHF				0.97	
Total Lanes				1	
Terrain				Level	
Grade %				0.0%	
Grade Length (mi)				0.00	
Truck & Bus %				5.0%	
RV %				0.0%	
E_T				1.5	
E_R				1.2	
f_{HV}				0.976	
f_P				1.00	
On Flow (pcph)				812	
On Flow (pcphpl)				812	
Calculate On Ramp Roadway Operations					
On Ramp Type				Right	
On Ramp Speed (mph)				45	
On Ramp Cap (pcph)				2,100	
On Ramp v/c ratio				0.39	

Location	1				



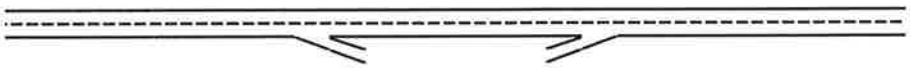
Key

<> Express Lane (HOV)

No Trucks

Name	I-5 south of Elk Grove B lvd	Elk Grove Blvd Off-Ramp	Elk Grove Off-Ramp to On-Ramp	Elk Grove On-Ramp	I-5 north of Elk Grove Blvd
Calculate Off Ramp Flow Rate					
Off Volume (vph)		238			
PHF		0.97			
Total Lanes		1			
Terrain		Level			
Grade %		0.0%			
Grade Length (mi)		0.00			
Truck & Bus %		5.0%			
RV %		0.0%			
E_T		1.5			
E_R		1.2			
f_{HV}		0.976			
f_P		1.00			
Off Flow (pcph)		251			
Off Flow (pcphpl)		251			
Calculate Off Ramp Roadway Operations					
Off Ramp Type		Right			
Off Ramp Speed		35			
Off Ramp Cap (pcph)		2,000			
Off Ramp v/c ratio		0.13			
Determine Adjacent Ramp for Three-Lane Mainline Segments with One-Lane Ramps					
Up Type					
Up Distance					
Up Flow (pcph)					
Down Type					
Down Distance					
Down Flow (pcph)					
Calculate Merge Influence Area Operations					
Effective v_P (pcph)				2,494	
Up Ramp L_{EQ}					
Down Ramp L_{EQ}					
P_{FM} (Eqn 13-3)				0.599	
P_{FM} (Eqn 13-4)					
P_{FM} (Eqn 13-5)					
P_{FM}				1.000	
v_{12} (pcph)				2,494	
v_3 (pcph)					
v_{34} (pcph)					
v_{12a} (pcph)				2,494	
v_{R12a} (pcph)				3,305	
Merge Speed Index				0.36	
Merge Area Speed				59.9	
Outer Lanes Volume					
Outer Lanes Speed					
Segment Speed				59.9	
Merge v/c ratio				0.72	
Merge Density				26.2	
Merge LOS				C	

Location	1			4	



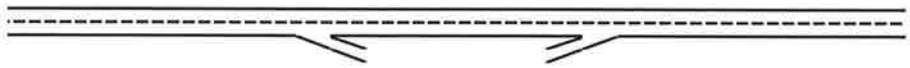
Key

<> Express Lane (HOV)

No Trucks

Name	I-5 south of Elk Grove B lvd	Elk Grove Blvd Off-Ramp	Elk Grove Off-Ramp to On-Ramp	Elk Grove On-Ramp	I-5 north of Elk Grove Blvd
Calculate Diverge Influence Area Operations					
Effective v_p (pcph)		2,745			
Up Ramp L_{EQ}					
Down Ramp L_{EQ}					
P_{FD} (Eqn 13-9)		0.680			
P_{FD} (Eqn 13-10)					
P_{FD} (Eqn 13-11)					
P_{FD}		1.000			
v_{12} (pcph)		2,745			
v_3 (pcph)					
v_{34} (pcph)					
v_{12a} (pcph)		2,745			
Diverge Speed Index		0.45			
Diverge Area Speed		57.4			
Outer Lanes Volume					
Outer Lanes Speed					
Segment Speed		57.4			
Diverge v/c ratio		0.62			
Diverge Density		26.4			
Diverge LOS		C			

Location					
		2			



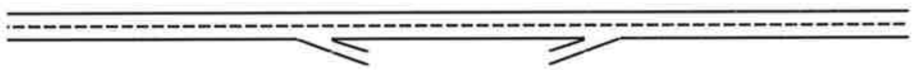
Key

<> Express Lane (HOV)

No Trucks

Name	I-5 south of Elk Grove B lvd	Elk Grove Blvd Off-Ramp	Elk Grove Off-Ramp to On-Ramp	Elk Grove On-Ramp	I-5 north of Elk Grove Blvd
Summarize Segment Operations					
Segment v/c ratio	0.64	0.62	0.58	0.72	0.77
Segment Density	22.4	26.4	20.1	26.2	28.5
Segment LOS	C	C	C	C	D
Over Capacity					

Project:	**Elk Grove Civic Center**		**Alternative:**	**Cumulative + Project**
Freeway Corridor:	**Interstate 5 SB**		**Time Period:**	**Wkdy PM Peak Hour**



Key

<> Express Lane (HOV)

No Trucks

Location	1	2	3	4	5
Name	I-5 north of Elk Grove Blvd	Elk Grove Off-Ramp	Elk Grave Off-Ramp to On-Ramp	Elk Grove Loop On-Ramp	I-5 south of Elk Grove Blvd
Define Freeway Segment					
Type	Basic	Diverge	Basic	Merge	Basic
Length (ft)	2,500	1,500	1,450	1,500	7,750
Accel Length				750	
Decel Length		160			
Mainline Volume	4,436	4,436	2,990	2,990	3,129
On Ramp Volume				139	
Off Ramp Volume		1,446			
Express Lane Volume					
EL On Ramp Volume					
EL Off Ramp Volume					
Calculate Flow Rate in General Purpose Lanes (GP)					
GP Volume (vph)	4,436	4,436	2,990	3,129	3,129
PHF	0.94	0.95	0.94	0.95	0.94
GP Lanes	2	2	2	2	2
Terrain	Level	Level	Level	Level	Level
Grade %	0.0%	0.0%	0.0%	0.0%	0.0%
Grade Length (mi)	0.00	0.00	0.00	0.00	0.00
Truck & Bus %	18.0%	5.0%	18.0%	5.0%	18.0%
RV %	0.0%	0.0%	0.0%	0.0%	0.0%
E_T	1.5	1.5	1.5	1.5	1.5
E_R	1.2	1.2	1.2	1.2	1.2
f_{HV}	0.917	0.976	0.917	0.976	0.917
f_P	1.00	1.00	1.00	1.00	1.00
GP Flow (pcph)	5,144	4,786	3,467	3,376	3,628
GP Flow (pcphpl)	2,572	2,393	1,734	1,688	1,814
Calculate Speed in General Purpose Lanes					
Lane Width (ft)	12	12	12	12	12
Shoulder Width	>6	>6	>6	>6	>6
TRD	1.2	1.2	1.2	1.2	1.2
f_{LW}	0.0	0.0	0.0	0.0	0.0
f_{LC}	0.0	0.0	0.0	0.0	0.0
Calc'd FFS	71.7	71.7	71.7	71.7	71.7
Measured FFS	70.0	70.0	70.0	70.0	70.0
FFS	70	70	70	70	70
Calculate Operations in General Purpose Lanes					
v/c ratio	1.07	1.00	0.72	0.70	0.76
Speed (mph)	-	53.5	66.7	67.2	65.6
Density (pcphpl)	-	44.7	26.0	25.1	27.6
LOS	F	E	C	C	D
Calculate Operations for Entering GP Lanes					
GP_{IN} Vol (pcph)				3,226	
GP_{IN} Cap (pcph)				4,800	
GP_{IN} v/c ratio				0.67	
Calculate Operations for Exiting GP Lanes					
GP_{OUT} Vol (pcph)		3,226			
GP_{OUT} Cap (pcph)		4,800			
GP_{OUT} v/c ratio		0.67			

Location	1	2	3	4	5

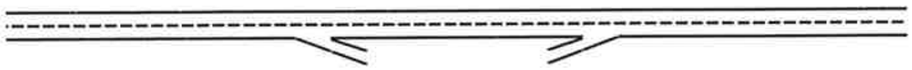
Key

<> Express Lane (HOV)

No Trucks

Name	I-5 north of Elk Grove Blvd	Elk Grove Off-Ramp	Elk Grove Off-Ramp to On-Ramp	Elk Grove Loop On-Ramp	I-5 south of Elk Grove Blvd
Calculate On Ramp Flow Rate					
On Volume (vph)				139	
PHF				0.95	
Total Lanes				1	
Terrain				Level	
Grade %				0.0%	
Grade Length (mi)				0.00	
Truck & Bus %				5.0%	
RV %				0.0%	
E_T				1.5	
E_R				1.2	
f_{HV}				0.976	
f_P				1.00	
On Flow (pcph)				150	
On Flow (pcphpl)				150	
Calculate On Ramp Roadway Operations					
On Ramp Type				Right	
On Ramp Speed (mph)				45	
On Ramp Cap (pcph)				2,100	
On Ramp v/c ratio				0.07	

Location	1	2		4	



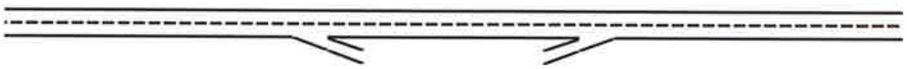
Key

<> Express Lane (HOV)

No Trucks

Name	I-5 north of Elk Grove Blvd	Elk Grove Off-Ramp	Elk Grove Off-Ramp to On-Ramp	Elk Grove Loop On-Ramp	I-5 south of Elk Grove Blvd
Calculate Off Ramp Flow Rate					
Off Volume (vph)		1,446			
PHF		0.95			
Total Lanes		1			
Terrain		Level			
Grade %		0.0%			
Grade Length (mi)		0.00			
Truck & Bus %		5.0%			
RV %		0.0%			
E_T		1.5			
E_R		1.2			
f_{HV}		0.976			
f_P		1.00			
Off Flow (pcph)		1,560			
Off Flow (pcphpl)		1,560			
Calculate Off Ramp Roadway Operations					
Off Ramp Type		Right			
Off Ramp Speed		35			
Off Ramp Cap (pcph)		2,000			
Off Ramp v/c ratio		0.78			
Determine Adjacent Ramp for Three-Lane Mainline Segments with One-Lane Ramps					
Up Type					
Up Distance					
Up Flow (pcph)					
Down Type					
Down Distance					
Down Flow (pcph)					
Calculate Merge Influence Area Operations					
Effective v_F (pcph)				3,226	
Up Ramp L_{EQ}					
Down Ramp L_{EQ}					
P_{FM} (Eqn 13-3)				0.599	
P_{FM} (Eqn 13-4)					
P_{FM} (Eqn 13-5)					
P_{FM}				1.000	
v_{12} (pcph)				3,226	
v_3 (pcph)					
v_{34} (pcph)					
v_{12a} (pcph)				3,226	
v_{R12a} (pcph)				3,376	
Merge Speed Index				0.37	
Merge Area Speed				59.7	
Outer Lanes Volume					
Outer Lanes Speed					
Segment Speed				59.7	
Merge v/c ratio				0.73	
Merge Density				27.0	
Merge LOS				C	

Location	[illegible]	2	[illegible]	[illegible]	[illegible]



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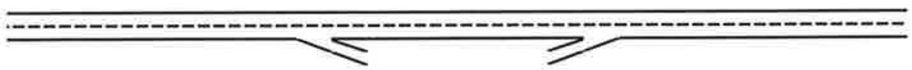
<> Express Lane (HOV)

No Trucks

Name	I-5 north of Elk Grove Blvd	Elk Grove Off-Ramp	Elk Grave Off-Ramp to On-Ramp	Elk Grove Loop On-Ramp	I-5 south of Elk Grove Blvd
Calculate Diverge Influence Area Operations					
Effective v_P (pcph)		4,786			
Up Ramp L_{EQ}					
Down Ramp L_{EQ}					
P_{FD} (Eqn 13-9)		0.569			
P_{FD} (Eqn 13-10)					
P_{FD} (Eqn 13-11)					
P_{FD}		1.000			
v_{12} (pcph)		4,786			
v_3 (pcph)					
v_{34} (pcph)					
v_{12a} (pcph)		4,786			
Diverge Speed Index		0.57			
Diverge Area Speed		54.1			
Outer Lanes Volume					
Outer Lanes Speed					
Segment Speed		54.1			
Diverge v/c ratio		1.09			
Diverge Density		44.0			
Diverge LOS		F			



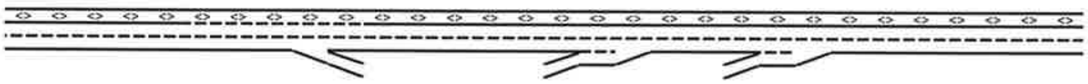
Key

<> Express Lane (HOV)

No Trucks

Location	1	2	3	4	5
Name	I-5 north of Elk Grove Blvd	Elk Grove Off-Ramp	Elk Grave Off-Ramp to On-Ramp	Elk Grove Loop On-Ramp	I-5 south of Elk Grove Blvd
Summarize Segment Operations					
Segment v/c ratio	1.07	1.09	0.72	0.73	0.76
Segment Density	-	-	26.0	27.0	27.6
Segment LOS	F	F	C	C	D
Over Capacity	Segment GP Lanes	Diverge			

Project:	**Elk Grove Civic Center**			**Alternative:**	**Cumulative + Project**	
Freeway Corridor:	**State Route 99 NB**			**Time Period:**	**Sat. AM Peak Hour**	



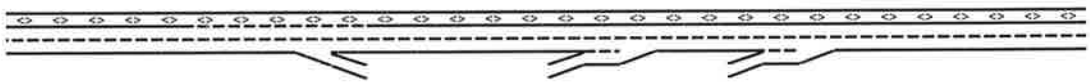
Key

<> Express Lane (HOV)

No Trucks

Location	1	2	3	4	5	6
Name	SR 99 south of Elk Grove Blvd	East Stockton Loop Off-Ramp	E Stockton Off to Elk Grove On	Elk Grove Loop On-Ramp	Elk Grove Blvd On-Ramp	SR 99 north of Elk Grove
Define Freeway Segment						
Type	Basic	Diverge	Basic	Merge	Merge	Basic
Length (ft)	1,050	1,500	1,700	850	1,500	180
Accel Length				175	1,200	
Decel Length		170				
Mainline Volume	3,033	3,033	2,730	2,730	3,864	4,184
On Ramp Volume				1,134	320	
Off Ramp Volume		303				
Express Lane Volume	910	910	819	819	1,159	1,255
EL On Ramp Volume						
EL Off Ramp Volume						
Calculate Flow Rate in General Purpose Lanes (GP)						
GP Volume (vph)	2,123	2,123	1,911	3,045	3,025	2,929
PHF	0.92	0.92	0.92	0.92	0.93	0.92
GP Lanes	2	2	2	2	2	2
Terrain	Level	Level	Level	Level	Level	Level
Grade %	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Grade Length (mi)	0.00	0.00	0.00	0.00	0.00	0.00
Truck & Bus %	15.0%	5.0%	10.0%	5.0%	5.0%	10.0%
RV %	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
E_T	1.5	1.5	1.5	1.5	1.5	1.5
E_R	1.2	1.2	1.2	1.2	1.2	1.2
f_{HV}	0.930	0.976	0.952	0.976	0.976	0.952
f_P	1.00	1.00	1.00	1.00	1.00	1.00
GP Flow (pcph)	2,481	2,365	2,181	3,393	3,334	3,343
GP Flow (pcphpl)	1,240	1,183	1,091	1,696	1,667	1,671
Calculate Speed in General Purpose Lanes						
Lane Width (ft)	12	12	12	12	12	12
Shoulder Width	>6	>6	>6	>6	>6	>6
TRD	1.8	1.8	1.8	1.8	1.8	1.8
f_{LW}	0.0	0.0	0.0	0.0	0.0	0.0
f_{LC}	0.0	0.0	0.0	0.0	0.0	0.0
Calc'd FFS	70.1	70.1	70.1	70.1	70.1	70.1
Measured FFS	70.0	70.0	70.0		70.0	70.0
FFS	70	70	70	70	70	70

Location	1	2	3	4	5	6



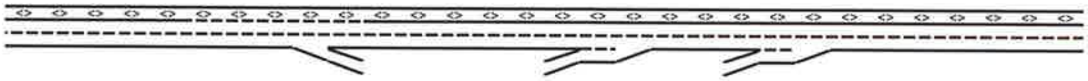
Key

<> Express Lane (HOV)

No Trucks

Name	SR 99 south of Elk Grove Blvd	East Stockton Loop Off-Ramp	E. Stockton Off to Elk Grove On	Elk Grove Loop On-Ramp	Elk Grove Blvd On-Ramp	SR 99 north of Elk Grove
Calculate Operations in General Purpose Lanes						
v/c ratio	0.52	0.49	0.45	0.71	0.69	0.70
Speed (mph)	70.0	70.0	70.0	67.1	67.5	67.4
Density (pcphpl)	17.7	16.9	15.6	25.3	24.7	24.8
LOS	B	B	B	C	C	C
Calculate Operations for Entering GP Lanes						
GP_{IN} Vol (pcph)				2,129	2,981	
GP_{IN} Cap (pcph)				4,800	4,800	
GP_{IN} v/c ratio				0.44	0.62	
Calculate Operations for Exiting GP Lanes						
GP_{OUT} Vol (pcph)		2,028				
GP_{OUT} Cap (pcph)		4,800				
GP_{OUT} v/c ratio		0.42				
Calculate On Ramp Flow Rate						
On Volume (vph)				1,134	320	
PHF				0.92	0.93	
Total Lanes				1	1	
Terrain				Level	Level	
Grade %				0.0%	0.0%	
Grade Length (mi)				0.00	0.00	
Truck & Bus %				5.0%	5.0%	
RV %				0.0%	0.0%	
E_T				1.5	1.5	
E_R				1.2	1.2	
f_{HV}				0.976	0.976	
f_P				1.00	1.00	
On Flow (pcph)				1,263	353	
On Flow (pcphpl)				1,263	353	
Calculate On Ramp Roadway Operations						
On Ramp Type				Right	Right	
On Ramp Speed (mph)				45	45	
On Ramp Cap (pcph)				2,100	2,100	
On Ramp v/c ratio				0.60	0.17	

Location	1	2	3	4	5	6



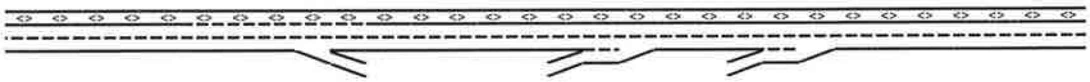
Key

<> Express Lane (HOV)

No Trucks

Name	SR 99 south of Elk Grove Blvd	East Stockton Loop Off-Ramp	E. Stockton Off to Elk Grove On	Elk Grove Loop On-Ramp	Elk Grove Blvd On-Ramp	SR 99 north of Elk Grove
Calculate Off Ramp Flow Rate						
Off Volume (vph)		303				
PHF		0.92				
Total Lanes		1				
Terrain		Level				
Grade %		0.0%				
Grade Length (mi)		0.00				
Truck & Bus %		5.0%				
RV %		0.0%				
E_T		1.5				
E_R		1.2				
f_{HV}		0.976				
f_P		1.00				
Off Flow (pcph)		338				
Off Flow (pcphpl)		338				
Calculate Off Ramp Roadway Operations						
Off Ramp Type		Right				
Off Ramp Speed		35				
Off Ramp Cap (pcph)		2,000				
Off Ramp v/c ratio		0.17				
Determine Adjacent Ramp for Three-Lane Mainline Segments with One-Lane Ramps						
Up Type						
Up Distance						
Up Flow (pcph)						
Down Type						
Down Distance						
Down Flow (pcph)						

Location	1	2	3	4	5	6



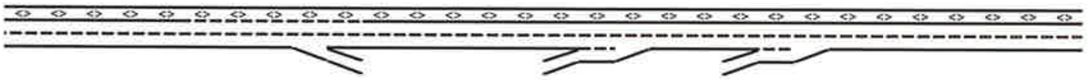
Key

<> Express Lane (HOV)

No Trucks

Name	SR 99 south of Elk Grove Blvd	East Stockton Loop Off-Ramp	E. Stockton Off to Elk Grove On	Elk Grove Loop On-Ramp	Elk Grove Blvd On-Ramp	SR 99 north of Elk Grove
Calculate Merge Influence Area Operations						
Effective v_P (pcph)				2,129	2,981	
Up Ramp L_{EQ}						
Down Ramp L_{EQ}						
P_{FM} (Eqn 13-3)				0.582	0.611	
P_{FM} (Eqn 13-4)						
P_{FM} (Eqn 13-5)						
P_{FM}				1.000	1.000	
v_{12} (pcph)				2,129	2,981	
v_3 (pcph)						
v_{34} (pcph)						
v_{12a} (pcph)				2,129	2,981	
v_{R12a} (pcph)				3,393	3,334	
Merge Speed Index				0.42	0.32	
Merge Area Speed				58.2	61.0	
Outer Lanes Volume						
Outer Lanes Speed						
Segment Speed				58.2	61.0	
Merge v/c ratio				0.74	0.72	
Merge Density				30.3	23.8	
Merge LOS				D	C	
Calculate Diverge Influence Area Operations						
Effective v_P (pcph)		2,365				
Up Ramp L_{EQ}						
Down Ramp L_{EQ}						
P_{FD} (Eqn 13-9)		0.685				
P_{FD} (Eqn 13-10)						
P_{FD} (Eqn 13-11)						
P_{FD}		1.000				
v_{12} (pcph)		2,365				
v_3 (pcph)						
v_{34} (pcph)						
v_{12a} (pcph)		2,365				
Diverge Speed Index		0.46				
Diverge Area Speed		57.2				
Outer Lanes Volume						
Outer Lanes Speed						
Segment Speed		57.2				
Diverge v/c ratio		0.54				
Diverge Density		23.1				
Diverge LOS		C				

Location	1	2	[illegible]	4	5	[illegible]



Key

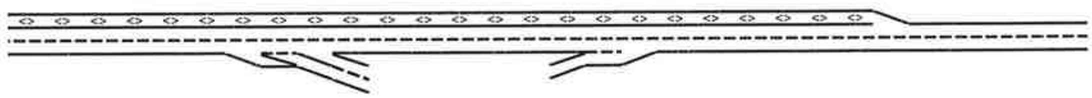
<> Express Lane (HOV)

No Trucks

Name	SR 99 south of Elk Grove Blvd	East Stockton Loop Off-Ramp	E. Stockton Off to Elk Grove On	Elk Grove Loop On-Ramp	Elk Grove Blvd On-Ramp	SR 99 north of Elk Grove
Summarize Segment Operations						
Segment v/c ratio	0.52	0.54	0.45	0.74	0.72	0.70
Segment Density	17.7	23.1	15.6	30.3	23.8	24.8
Segment LOS	B	C	B	D	C	C
Over Capacity						

Project:	**Elk Grove Civic Center**		**Alternative:**	**Cumulative + Project**
Freeway Corridor:	**State Route 99 SB**		**Time Period:**	**Sat. AM Peak Hour**

Location	1	2	3	4	5	6



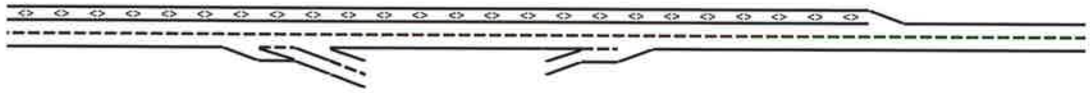
Key

<> Express Lane (HOV)

No Trucks

Name	SR 99 north of Elk Grove Blvd	Elk Grove Off-Ramp	Elk Grove Off-Ramp to On-Ramp	Elk Grove On-Ramp	SR 99 south of Elk Grove Blvd	SR 99 south of Elk Grove Blvd
Define Freeway Segment						
Type	Basic	Diverge	Basic	Merge	Basic	Basic
Length (ft)	250	1,500	2,250	1,500	400	8,050
Accel Length				300		
Decel Length		1,500				
Mainline Volume	3,430	3,430	1,770	1,770	2,099	2,099
On Ramp Volume				329		
Off Ramp Volume		1,660				
Express Lane Volume	1,029	1,029				
EL On Ramp Volume						
EL Off Ramp Volume						
Calculate Flow Rate in General Purpose Lanes (GP)						
GP Volume (vph)	2,401	2,401	1,770	2,099	2,099	2,099
PHF	0.92	0.92	0.92	0.92	0.92	0.92
GP Lanes	2	2	2	2	2	2
Terrain	Level	Level	Level	Level	Level	Level
Grade %	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Grade Length (mi)	0.00	0.00	0.00	0.00	0.00	0.00
Truck & Bus %	10.0%	5.0%	10.0%	5.0%	15.0%	15.0%
RV %	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
E_T	1.5	1.5	1.5	1.5	1.5	1.5
E_R	1.2	1.2	1.2	1.2	1.2	1.2
f_{HV}	0.952	0.976	0.952	0.976	0.930	0.930
f_P	1.00	1.00	1.00	1.00	1.00	1.00
GP Flow (pcph)	2,740	2,675	2,020	2,339	2,453	2,453
GP Flow (pcphpl)	1,370	1,338	1,010	1,169	1,226	1,226
Calculate Speed in General Purpose Lanes						
Lane Width (ft)	12	12	12	12	12	12
Shoulder Width	>6	>6	>6	>6	>6	>6
TRD	1.8	1.8	1.8	1.8	1.8	1.8
f_{LW}	0.0	0.0	0.0	0.0	0.0	0.0
f_{LC}	0.0	0.0	0.0	0.0	0.0	0.0
Calc'd FFS	70.1	70.1	70.1	70.1	70.1	70.1
Measured FFS	70.0	70.0	70.0	70.0	70.0	70.0
FFS	70	70	70	70	70	70

Location	1		3	4		6



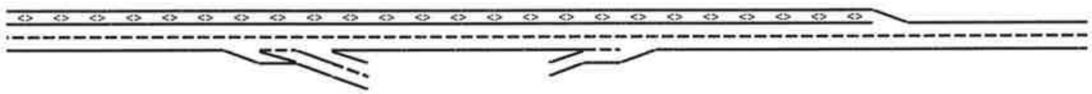
Key

<> Express Lane (HOV)

No Trucks

Name	SR 99 north of Elk Grove Blvd	Elk Grove Off-Ramp	Elk Grove Off-Ramp to On-Ramp	Elk Grove On-Ramp	SR 99 south of Elk Grove Blvd	SR 99 south of Elk Grove Blvd
Calculate Operations in General Purpose Lanes						
v/c ratio	0.57	0.56	0.42	0.49	0.51	0.51
Speed (mph)	69.7	69.8	70.0	70.0	70.0	70.0
Density (pcphpl)	19.7	19.2	14.4	16.7	17.5	17.5
LOS	C	C	B	B	B	B
Calculate Operations for Entering GP Lanes						
GP_{IN} Vol (pcph)				1,972		
GP_{IN} Cap (pcph)				4,800		
GP_{IN} v/c ratio				0.41		
Calculate Operations for Exiting GP Lanes						
GP_{OUT} Vol (pcph)		826				
GP_{OUT} Cap (pcph)		4,800				
GP_{OUT} v/c ratio		0.17				
Calculate On Ramp Flow Rate						
On Volume (vph)				329		
PHF				0.92		
Total Lanes				1		
Terrain				Level		
Grade %				0.0%		
Grade Length (mi)				0.00		
Truck & Bus %				5.0%		
RV %				0.0%		
E_T				1.5		
E_R				1.2		
f_{HV}				0.976		
f_P				1.00		
On Flow (pcph)				367		
On Flow (pcphpl)				367		
Calculate On Ramp Roadway Operations						
On Ramp Type				Right		
On Ramp Speed (mph)				60		
On Ramp Cap (pcph)				2,200		
On Ramp v/c ratio				0.17		

Location	1	2	3	[illegible]	[illegible]	[illegible]



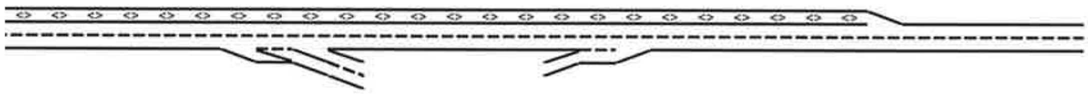
Key

<> Express Lane (HOV)

No Trucks

Name	SR 99 north of Elk Grove Blvd	Elk Grove Off-Ramp	Elk Grove Off-Ramp to On-Ramp	Elk Grove On-Ramp	SR 99 south of Elk Grove Blvd	SR 99 south of Elk Grove Blvd
Calculate Off Ramp Flow Rate						
Off Volume (vph)		1,660				
PHF		0.92				
Total Lanes		2				
Terrain		Level				
Grade %		0.0%				
Grade Length (mi)		0.00				
Truck & Bus %		5.0%				
RV %		0.0%				
E_T		1.5				
E_R		1.2				
f_{HV}		0.976				
f_P		1.00				
Off Flow (pcph)		1,849				
Off Flow (pcphpl)		925				
Calculate Off Ramp Roadway Operations						
Off Ramp Type		Right				
Off Ramp Speed		35				
Off Ramp Cap (pcph)		4,000				
Off Ramp v/c ratio		0.46				
Determine Adjacent Ramp for Three-Lane Mainline Segments with One-Lane Ramps						
Up Type						
Up Distance						
Up Flow (pcph)						
Down Type						
Down Distance						
Down Flow (pcph)						

Location	1	2	3	4	5	6



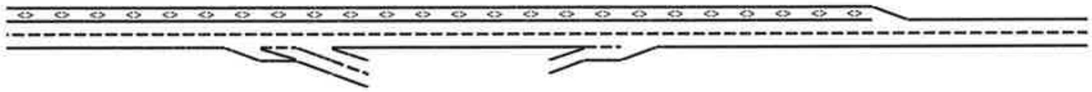
Key

<> Express Lane (HOV)

No Trucks

Name	SR 99 north of Elk Grove Blvd	Elk Grove Off-Ramp	Elk Grove Off-Ramp to On-Ramp	Elk Grove On-Ramp	SR 99 south of Elk Grove Blvd	SR 99 south of Elk Grove Blvd
Calculate Merge Influence Area Operations						
Effective v_P (pcph)				1,972		
Up Ramp L_{EQ}						
Down Ramp L_{EQ}						
P_{FM} (Eqn 13-3)				0.586		
P_{FM} (Eqn 13-4)						
P_{FM} (Eqn 13-5)						
P_{FM}				1.000		
v_{12} (pcph)				1,972		
v_3 (pcph)						
v_{34} (pcph)						
v_{12a} (pcph)				1,972		
v_{R12a} (pcph)				2,339		
Merge Speed Index				0.33		
Merge Area Speed				60.9		
Outer Lanes Volume						
Outer Lanes Speed						
Segment Speed				60.9		
Merge v/c ratio				0.51		
Merge Density				21.7		
Merge LOS				C		
Calculate Diverge Influence Area Operations						
Effective v_P (pcph)		2,675				
Up Ramp L_{EQ}						
Down Ramp L_{EQ}						
P_{FD} (Eqn 13-9)		0.608				
P_{FD} (Eqn 13-10)						
P_{FD} (Eqn 13-11)						
P_{FD}		1.000				
v_{12} (pcph)		2,675				
v_3 (pcph)						
v_{34} (pcph)						
v_{12a} (pcph)		2,675				
Diverge Speed Index		0.59				
Diverge Area Speed		53.4				
Outer Lanes Volume						
Outer Lanes Speed						
Segment Speed		53.4				
Diverge v/c ratio		0.61				
Diverge Density		13.8				
Diverge LOS		B				

Location	[illegible]	[illegible]	3	4	5	6



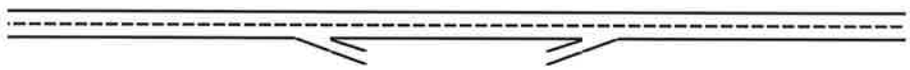
Key

<> Express Lane (HOV)

No Trucks

Name	SR 99 north of Elk Grove Blvd	Elk Grove Off-Ramp	Elk Grove Off-Ramp to On-Ramp	Elk Grove On-Ramp	SR 99 south of Elk Grove Blvd	SR 99 south of Elk Grove Blvd
Summarize Segment Operations						
Segment v/c ratio	0.57	0.61	0.42	0.51	0.51	0.51
Segment Density	19.7	13.6	14.4	21.7	17.5	17.5
Segment LOS	C	B	B	C	B	B
Over Capacity						

Project:	Elk Grove Civic Center	Alternative:	Cumulative + Project
Freeway Corridor:	Interstate 5 NB	Time Period:	Sat. AM Peak Hour



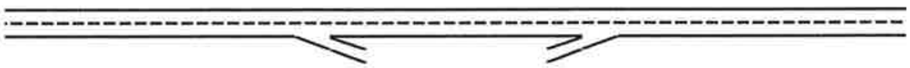
Key

<> Express Lane (HOV)

No Trucks

Location	1	2	3	4	5
Name	I-5 south of Elk Grove B lvd	Elk Grove Blvd Off-Ramp	Elk Grove Off-Ramp to On-Ramp	Elk Grove On-Ramp	I-5 north of Elk Grove Blvd
Define Freeway Segment					
Type	Basic	Diverge	Basic	Merge	Basic
Length (ft)	6,900	1,500	3,100	1,500	500
Accel Length				750	
Decel Length		160			
Mainline Volume	2,171	2,171	2,030	2,030	2,939
On Ramp Volume				909	
Off Ramp Volume		141			
Express Lane Volume					
EL On Ramp Volume					
EL Off Ramp Volume					
Calculate Flow Rate in General Purpose Lanes (GP)					
GP Volume (vph)	2,171	2,171	2,030	2,939	2,939
PHF	0.92	0.97	0.92	0.97	0.92
GP Lanes	2	2	2	2	2
Terrain	Level	Level	Level	Level	Level
Grade %	0.0%	0.0%	0.0%	0.0%	0.0%
Grade Length (mi)	0.00	0.00	0.00	0.00	0.00
Truck & Bus %	18.0%	5.0%	18.0%	5.0%	18.0%
RV %	0.0%	0.0%	0.0%	0.0%	0.0%
E_T	1.5	1.5	1.5	1.5	1.5
E_R	1.2	1.2	1.2	1.2	1.2
f_{HV}	0.917	0.976	0.917	0.976	0.917
f_P	1.00	1.00	1.00	1.00	1.00
GP Flow (pcph)	2,572	2,294	2,405	3,106	3,482
GP Flow (pcphpl)	1,286	1,147	1,203	1,553	1,741
Calculate Speed in General Purpose Lanes					
Lane Width (ft)	12	12	12	12	12
Shoulder Width	>6	>6	>6	>6	>6
TRD	1.2	1.2	1.2	1.2	1.2
f_{LW}	0.0	0.0	0.0	0.0	0.0
f_{LC}	0.0	0.0	0.0	0.0	0.0
Calc'd FFS	71.7	71.7	71.7	71.7	71.7
Measured FFS	70.0	70.0	70.0	70.0	70.0
FFS	70	70	70	70	70
Calculate Operations in General Purpose Lanes					
v/c ratio	0.54	0.48	0.50	0.65	0.73
Speed (mph)	69.9	70.0	70.0	68.6	66.6
Density (pcphpl)	18.4	16.4	17.2	22.7	26.1
LOS	C	B	B	C	D
Calculate Operations for Entering GP Lanes					
GP_{IN} Vol (pcph)				2,145	
GP_{IN} Cap (pcph)				4,800	
GP_{IN} v/c ratio				0.45	
Calculate Operations for Exiting GP Lanes					
GP_{OUT} Vol (pcph)		2,145			
GP_{OUT} Cap (pcph)		4,800			
GP_{OUT} v/c ratio		0.45			

Location	1	2			



Key

<> Express Lane (HOV)

No Trucks

Name	I-5 south of Elk Grove B lvd	Elk Grove Blvd Off-Ramp	Elk Grove Off-Ramp to On-Ramp	Elk Grove On-Ramp	I-5 north of Elk Grove Blvd
Calculate On Ramp Flow Rate					
On Volume (vph)				909	
PHF				0.97	
Total Lanes				1	
Terrain				Level	
Grade %				0.0%	
Grade Length (mi)				0.00	
Truck & Bus %				5.0%	
RV %				0.0%	
E_T				1.5	
E_R				1.2	
f_{HV}				0.976	
f_P				1.00	
On Flow (pcph)				961	
On Flow (pcphpl)				961	
Calculate On Ramp Roadway Operations					
On Ramp Type				Right	
On Ramp Speed (mph)				45	
On Ramp Cap (pcph)				2,100	
On Ramp v/c ratio				0.46	

Location	1				

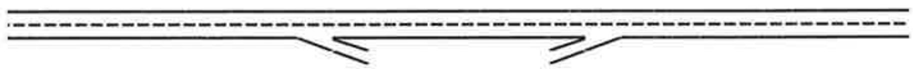
Key

<> Express Lane (HOV)

No Trucks

Name	I-5 south of Elk Grove B lvd	Elk Grove Blvd Off-Ramp	Elk Grove Off-Ramp to On-Ramp	Elk Grove On-Ramp	I-5 north of Elk Grove Blvd
Calculate Off Ramp Flow Rate					
Off Volume (vph)		141			
PHF		0.97			
Total Lanes		1			
Terrain		Level			
Grade %		0.0%			
Grade Length (mi)		0.00			
Truck & Bus %		5.0%			
RV %		0.0%			
E_T		1.5			
E_R		1.2			
f_{HV}		0.976			
f_P		1.00			
Off Flow (pcph)		149			
Off Flow (pcphpl)		149			
Calculate Off Ramp Roadway Operations					
Off Ramp Type		Right			
Off Ramp Speed		35			
Off Ramp Cap (pcph)		2,000			
Off Ramp v/c ratio		0.07			
Determine Adjacent Ramp for Three-Lane Mainline Segments with One-Lane Ramps					
Up Type					
Up Distance					
Up Flow (pcph)					
Down Type					
Down Distance					
Down Flow (pcph)					
Calculate Merge Influence Area Operations					
Effective v_P (pcph)				2,145	
Up Ramp L_{EQ}					
Down Ramp L_{EQ}					
P_{FM} (Eqn 13-3)				0.599	
P_{FM} (Eqn 13-4)					
P_{FM} (Eqn 13-5)					
P_{FM}				1.000	
v_{12} (pcph)				2,145	
v_3 (pcph)					
v_{34} (pcph)					
v_{12a} (pcph)				2,145	
v_{R12a} (pcph)				3,106	
Merge Speed Index				0.34	
Merge Area Speed				60.5	
Outer Lanes Volume					
Outer Lanes Speed					
Segment Speed				60.5	
Merge v/c ratio				0.68	
Merge Density				24.6	
Merge LOS				C	

Location	1	-	-	4	-



Key

<> Express Lane (HOV)

No Trucks

Name	I-5 south of Elk Grove B lvd	Elk Grove Blvd Off-Ramp	Elk Grove Off-Ramp to On-Ramp	Elk Grove On-Ramp	I-5 north of Elk Grove Blvd
Calculate Diverge Influence Area Operations					
Effective v_P (pcph)		2,294			
Up Ramp L_{EQ}					
Down Ramp L_{EQ}					
P_{FD} (Eqn 13-9)		0.696			
P_{FD} (Eqn 13-10)					
P_{FD} (Eqn 13-11)					
P_{FD}		1.000			
v_{12} (pcph)		2,294			
v_3 (pcph)					
v_{34} (pcph)					
v_{12a} (pcph)		2,294			
Diverge Speed Index		0.44			
Diverge Area Speed		57.6			
Outer Lanes Volume					
Outer Lanes Speed					
Segment Speed		57.6			
Diverge v/c ratio		0.52			
Diverge Density		22.5			
Diverge LOS		C			

Location	1	2	3	4	5

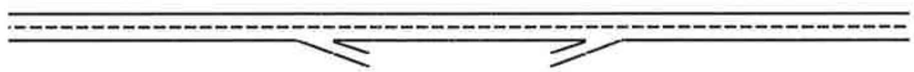
Key

<> Express Lane (HOV)

No Trucks

Name	I-5 south of Elk Grove B lvd	Elk Grove Blvd Off-Ramp	Elk Grove Off-Ramp to On-Ramp	Elk Grove On-Ramp	I-5 north of Elk Grove Blvd
Summarize Segment Operations					
Segment v/c ratio	0.54	0.52	0.50	0.68	0.73
Segment Density	18.4	22.5	17.2	24.6	26.1
Segment LOS	C	C	B	C	D
Over Capacity					

Project:	**Elk Grove Civic Center**	**Alternative:**	**Cumulative + Project**
Freeway Corridor:	**Interstate 5 SB**	**Time Period:**	**Sat. AM Peak Hour**



Key

<> Express Lane (HOV)

No Trucks

Location	1	2	3	4	5
Name	I-5 north of Elk Grove Blvd	Elk Grove Off-Ramp	Elk Grave Off-Ramp to On-Ramp	Elk Grove Loop On-Ramp	I-5 south of Elk Grove Blvd
Define Freeway Segment					
Type	Basic	Diverge	Basic	Merge	Basic
Length (ft)	2,500	1,500	1,450	1,500	7,750
Accel Length				750	
Decel Length		160			
Mainline Volume	2,443	2,443	1,940	1,940	2,130
On Ramp Volume				190	
Off Ramp Volume		503			
Express Lane Volume					
EL On Ramp Volume					
EL Off Ramp Volume					
Calculate Flow Rate in General Purpose Lanes (GP)					
GP Volume (vph)	2,443	2,443	1,940	2,130	2,130
PHF	0.92	0.92	0.92	0.92	0.92
GP Lanes	2	2	2	2	2
Terrain	Level	Level	Level	Level	Level
Grade %	0.0%	0.0%	0.0%	0.0%	0.0%
Grade Length (mi)	0.00	0.00	0.00	0.00	0.00
Truck & Bus %	18.0%	5.0%	18.0%	5.0%	18.0%
RV %	0.0%	0.0%	0.0%	0.0%	0.0%
E_T	1.5	1.5	1.5	1.5	1.5
E_R	1.2	1.2	1.2	1.2	1.2
f_{HV}	0.917	0.976	0.917	0.976	0.917
f_P	1.00	1.00	1.00	1.00	1.00
GP Flow (pcph)	2,894	2,722	2,298	2,373	2,524
GP Flow (pcphpl)	1,447	1,361	1,149	1,187	1,262
Calculate Speed in General Purpose Lanes					
Lane Width (ft)	12	12	12	12	12
Shoulder Width	>6	>6	>6	>6	>6
TRD	1.2	1.2	1.2	1.2	1.2
f_{LW}	0.0	0.0	0.0	0.0	0.0
f_{LC}	0.0	0.0	0.0	0.0	0.0
Calc'd FFS	71.7	71.7	71.7	71.7	71.7
Measured FFS	70.0	70.0	70.0	70.0	70.0
FFS	70	70	70	70	70
Calculate Operations in General Purpose Lanes					
v/c ratio	0.60	0.57	0.48	0.49	0.53
Speed (mph)	69.3	69.7	70.0	70.0	70.0
Density (pcphpl)	20.9	19.5	16.4	17.0	18.0
LOS	C	C	B	B	C
Calculate Operations for Entering GP Lanes					
GP_{IN} Vol (pcph)				2,161	
GP_{IN} Cap (pcph)				4,800	
GP_{IN} v/c ratio				0.45	
Calculate Operations for Exiting GP Lanes					
GP_{OUT} Vol (pcph)		2,161			
GP_{OUT} Cap (pcph)		4,800			
GP_{OUT} v/c ratio		0.45			

Location	1	2	3	4	5

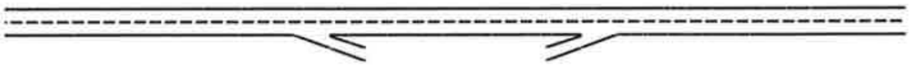
Key

<> Express Lane (HOV)

No Trucks

Name	I-5 north of Elk Grove Blvd	Elk Grove Off-Ramp	Elk Grave Off-Ramp to On-Ramp	Elk Grove Loop On-Ramp	I-5 south of Elk Grove Blvd
Calculate On Ramp Flow Rate					
On Volume (vph)				190	
PHF				0.92	
Total Lanes				1	
Terrain				Level	
Grade %				0.0%	
Grade Length (mi)				0.00	
Truck & Bus %				5.0%	
RV %				0.0%	
E_T				1.5	
E_R				1.2	
f_{HV}				0.976	
f_P				1.00	
On Flow (pcph)				212	
On Flow (pcphpl)				212	
Calculate On Ramp Roadway Operations					
On Ramp Type				Right	
On Ramp Speed (mph)				45	
On Ramp Cap (pcph)				2,100	
On Ramp v/c ratio				0.10	

Location	1	[illegible]	[illegible]	[illegible]	5



Key

<> Express Lane (HOV)

No Trucks

Name	I-5 north of Elk Grove Blvd	Elk Grove Off-Ramp	Elk Grove Off-Ramp to On-Ramp	Elk Grove Loop On-Ramp	I-5 south of Elk Grove Blvd
Calculate Off Ramp Flow Rate					
Off Volume (vph)		503			
PHF		0.92			
Total Lanes		1			
Terrain		Level			
Grade %		0.0%			
Grade Length (mi)		0.00			
Truck & Bus %		5.0%			
RV %		0.0%			
E_T		1.5			
E_R		1.2			
f_{HV}		0.976			
f_P		1.00			
Off Flow (pcph)		560			
Off Flow (pcphpl)		560			
Calculate Off Ramp Roadway Operations					
Off Ramp Type		Right			
Off Ramp Speed		35			
Off Ramp Cap (pcph)		2,000			
Off Ramp v/c ratio		0.28			
Determine Adjacent Ramp for Three-Lane Mainline Segments with One-Lane Ramps					
Up Type					
Up Distance					
Up Flow (pcph)					
Down Type					
Down Distance					
Down Flow (pcph)					
Calculate Merge Influence Area Operations					
Effective v_P (pcph)				2,161	
Up Ramp L_{EQ}					
Down Ramp L_{EQ}					
P_{FM} (Eqn 13-3)				0.599	
P_{FM} (Eqn 13-4)					
P_{FM} (Eqn 13-5)					
P_{FM}				1.000	
v_{12} (pcph)				2,161	
v_3 (pcph)					
v_{34} (pcph)					
v_{12a} (pcph)				2,161	
v_{R12a} (pcph)				2,373	
Merge Speed Index				0.30	
Merge Area Speed				61.7	
Outer Lanes Volume					
Outer Lanes Speed					
Segment Speed				61.7	
Merge v/c ratio				0.52	
Merge Density				19.2	
Merge LOS				B	

Location	[illegible]	2	3	[illegible]	[illegible]

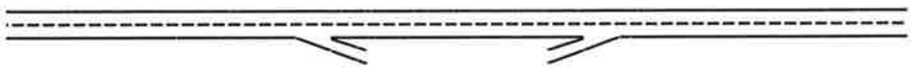
Key

<> Express Lane (HOV)

No Trucks

Name	I-5 north of Elk Grove Blvd	Elk Grove Off-Ramp	Elk Grove Off-Ramp to On-Ramp	Elk Grove Loop On-Ramp	I-5 south of Elk Grove Blvd
Calculate Diverge Influence Area Operations					
Effective v_P (pcph)		2,722			
Up Ramp L_{EQ}					
Down Ramp L_{EQ}					
P_{FD} (Eqn 13-9)		0.666			
P_{FD} (Eqn 13-10)					
P_{FD} (Eqn 13-11)					
P_{FD}		1.000			
v_{12} (pcph)		2,722			
v_3 (pcph)					
v_{34} (pcph)					
v_{12a} (pcph)		2,722			
Diverge Speed Index		0.48			
Diverge Area Speed		56.6			
Outer Lanes Volume					
Outer Lanes Speed					
Segment Speed		56.6			
Diverge v/c ratio		0.62			
Diverge Density		26.2			
Diverge LOS		C			

Location	1	2	3	4	5



Key

<> Express Lane (HOV)

No Trucks

Name	I-5 north of Elk Grove Blvd	Elk Grove Off-Ramp	Elk Grave Off-Ramp to On-Ramp	Elk Grove Loop On-Ramp	I-5 south of Elk Grove Blvd
Summarize Segment Operations					
Segment v/c ratio	0.60	0.62	0.48	0.52	0.53
Segment Density	20.9	26.2	16.4	19.2	18.0
Segment LOS	C	C	B	B	C
Over Capacity					

Appendix K – Natural Gas consumption Calculations

PEAK SEASON

Use	Days of Operation	Hours of Operation	Total Hours of Operation	Rate (CFH)	Total CF	Btu
Restaurant/Main Kitchen	119	8	952	160	152,320	152,320,000
Commissary	119	8	952	850	809,200	809,200,000
Ancillary Grille	119	8	952	567	539,784	539,784,000
Restrooms #1	119	12	1,428	300	428,400	428,400,000
Restrooms #2	119	12	1,428	300	428,400	428,400,000
Ancillary Restrooms	119	12	1,428	300	428,400	428,400,000
Ancillary Snack Bar	119	8	952	380	361,760	361,760,000
Restroom/Administrative	119	12	1,428	240	342,720	342,720,000
Changing and Concessions Building	119	12	1,428	920	1,313,760	1,313,760,000
FEC Building	119	12	1,428	1,700	2,427,600	2,427,600,000
TOTAL PER DAY					**7,232,344**	**7,232,344,000**

OFF SEASON

Use	Days of Operation[1]	Hours of Operation	Total Hours of Operation	Rate (CFH)	Total CF	Btu
Restaurant/Main Kitchen	105	4	420	160	67,200	67,200,000
Commissary	105	4	420	850	357,000	357,000,000
Ancillary Grille	0	0	0	567	0	0
Restrooms #1	139	8	1,112	300	333,600	333,600,000
Restrooms #2	139	8	1,112	300	333,600	333,600,000
Ancillary Restrooms	0	0	0	300	0	0
Ancillary Snack Bar	0	0	0	380	0	0
Restroom/Administrative	139	8	1,112	240	266,880	266,880,000
Changing and Concessions Building	139	8	1,112	920	1,023,040	1,023,040,000
FEC Building	139	8	1,112	1,700	1,890,400	1,890,400,000
TOTAL PER DAY					**4,271,720**	**4,271,720,000**

Notes: 1 - Number of days in operation reduced to account for reduced attendance/use during the off season

POOLS

Use	Days of Operation	Hours of Operation	Total Hours of Operation	Rate (CFH)	Total CF	Btu
Competitive Pool					6,789	6,789,375
Dive Pool					3,390	3,390,188
TOTAL PER DAY					**10,179**	**10,179,563**
					11,514,243	$\boxed{\textbf{11,514,243,563}}$

EXHIBIT B

CITY OF ELK GROVE

CIVIC CENTER AQUATICS COMPLEX PROJECT

FINAL SUBSEQUENT ENVIRONMENTAL IMPACT REPORT

SCH# 2000082139

Prepared for:

CITY OF ELK GROVE
8401 LAGUNA PALMS WAY
ELK GROVE, CA 95758

Prepared by:

PMC®

2729 PROSPECT PARK DRIVE, SUITE 220
RANCHO CORDOVA, CA 95670

AUGUST 2014

City of Elk Grove Civic Center Aquatics Complex Project

Final Subsequent Environmental Impact Report

SCH No. 200082139

Prepared by:
City of Elk Grove
8401 Laguna Palms Way
Elk Grove, CA 95758

August 2014

1.0 INTRODUCTION

1.1 PURPOSE AND BACKGROUND

This document contains public comments received on the Draft Subsequent Environmental Impact Report (Draft SEIR; SCH# 200082139) for the City of Elk Grove Civic Center Aquatics Complex Project (Project). Written comments were received by the City of Elk Grove during the public comment period from June 27, 2014, through August 13, 2014. This Final SEIR includes written responses to environmental issues raised in comments on the Draft SEIR. The responses in the Final SEIR clarify the text in the Draft SEIR, as appropriate. This document has been prepared in accordance with the California Environmental Quality Act (CEQA; Public Resources Code Sections 21000–21177).

In accordance with CEQA regulations, the City released a Notice of Preparation (NOP) on September 6, 2013, with a comment period from September 6, 2013, to October 7, 2013. The City distributed the NOP to responsible agencies and private organizations and individuals that have stated an interest in the Project. The purpose of the NOP was to provide notification that an EIR for the Project was being prepared and to solicit guidance on the scope and content of the document. A copy of the NOP is included in Appendix B of the Draft SEIR. Public and agency responses to the NOP are included in Appendix C of the Draft SEIR in accordance with CEQA. The City held two scoping meetings for the Project: September 19, 2013 at 6:00PM and September 26, 2013 at 11:00AM. No public or agency comments were submitted at the scoping meetings.

The Draft SEIR was circulated for public review and comment for a period of 45 days from June 27, 2014, through August 13, 2014. A public hearing was held on the Draft SEIR for this Project on July 22, 2014. Two residents attended the meeting; neither provided questions or comments on the adequacy of the Draft SEIR.

1.2 PROJECT UNDER REVIEW

1.2.1 PROJECT ANALYZED IN THE DRAFT SEIR

The Project analyzed in the Draft SEIR is the City's Civic Center Aquatics Complex Project, which consists of a competition venue and a water and adventure park. The 30-acre Project site is located east of the intersection of Civic Center Drive and Big Horn Boulevard within the Laguna Ridge Specific Plan area.

The Project includes the construction and operation of a competition/training swim facility (competition venue) and a water and adventure park, as well as ancillary uses, parkland, and parking. Following is a detailed description of each Project component:

Competition Venue

The competition venue would consist of a competition swimming pool (50 meters by 25 yards, 2-meter depth) and a dive pool (25 meters by 25 yards, 17-foot depth) with a signature 10-meter diving tower (33 feet in height), a 3-meter springboard, and a 1-meter springboard. Additional facility components would include:

- Bleacher seating for approximately 1,100 people under a shade canopy
- Therapy spa seating for 12 to 20 athletes
- Team prep area

- Restrooms/showers
- Team equipment storage space
- Spectator restrooms
- Concessions and additional restrooms
- Scoreboard and flag display

The competition venue is anticipated to be home to multiple collegiate, high school, and regional club teams for practices and meets as well as recreational use. The Project also includes the potential for expansion into the team prep area.

WATER AND ADVENTURE PARK

The proposed water park component of the Project would include, but would not be limited to, a lazy/adventure river, wave pool, slide attractions, a possible future children's aquatic play system, a family activity pool, and various water feature elements.

The proposed adventure park component of the Project would be woven throughout the water park and would include, but would not be limited to, adult and child ropes courses, zip lines, a family adventure sky trail, and various challenge and team building elements and activities. In addition, the adventure park would include a two-story, approximately 40,000-square-foot family entertainment center to include an arcade, laser tag, bowling alley, main kitchen/commissary, food and beverage service, group entertainment stage, rental lockers, and party rooms. **Table 1-1** provides heights of key amenities.

TABLE 1-1
WATER AND ADVENTURE PARK STRUCTURE HEIGHTS

Structure	Height (in feet)
SK-1 Slide Complex	73
SK-2 Slide Complex	53
SK-4 Slide Complex	70
Zip Line Tower 1	79
Zip Line Tower 2	79
Zip Line Tower 3	79
Ropes Course Pod 1	58
Ropes Course Pod 2	58

The proposed water and adventure park would also include support buildings including restrooms and food and beverage service areas as well as shade amenities/cabanas/pavilions and event staging areas.

ANCILLARY COMPONENTS

In addition to the above, the Project is anticipated to include the following ancillary components:

- Administration office
- Staff break room

- Lifeguard station
- First aid station
- Storage rooms
- Mechanical rooms (described further below)
- Service road and loading/delivery area
- Drop-off/arrival plaza
- Pathways and trails
- Kiosks
- Wetland/nature area overlook
- Hardscape/landscape elements
- Screening and fencing
- Trash enclosures
- Parking

Facility Capacity and Hours of Operation

Competition Venue

The competition venue would operate year-round Monday through Saturday with anticipated hours of 7:00 a.m. to 9:00 p.m., as well as on Sundays during the months of May through July from 7:00 a.m. to 7:00 p.m. The competition venue would have a capacity of up to 3,100 competitors and spectators over the course of an entire day for a large special event, such as a regional swim meet. Typical operation would be substantially less, with practices that would have fewer than 100 people and smaller competitions with 300 to 1,000 competitors and spectators, based on the Civic Center Aquatics Complex Schematic Design dated May 30, 2014.

Water and Adventure Parks

The water park would operate approximately 120 days per year (May through October), and the adventure park would be open on a year-round basis. Both parks would operate from 10:00 a.m. to 10:00 p.m. with occasional overnight functions (corporate events, high school lock-ins). The City anticipates that the facility would attract up to 250,000 guests annually. On a peak summer weekend day, maximum daily capacity, including both the water and adventure parks, is expected to be 4,000 over the 12-hour operating day. Non-warm weather weekend days and weekdays would be less.

The City has established the following objectives for the Project for purposes of CEQA:

1) Develop an aquatics complex in the Laguna Ridge Specific Plan area with competitive swimming and diving components, including an Olympic-size competition swimming pool, a warm-up pool, and a diving tower, that can host up to 2,000 swimmers for each meet and seating for approximately 1,100 spectators under a shaded structure.
2) Develop a facility that can support multiple aquatic team programs for schools and a variety of regional club teams for practices and meets and for regional, state, and national events.

3) Provide necessary amenities to support athletes and spectators, such as concessions, hot tub, locker rooms, meeting room, office space, and storage.
4) Develop a commercial recreation facility to entertain 250,000 guests annually with outdoor activities such as a water park, adventure theme park, and fun center with a family focus, targeted at both youth and adult guests.
5) Provide dining/concessions component including meals, snacks, and beverages.
6) Provide landscaping, parking, lighting, and security, as required by City code.

1.3 TYPE OF DOCUMENT

The CEQA Guidelines identify several types of EIRs, each applicable to different project circumstances. As described in CEQA Guidelines Section 15162(a), "when an EIR has been certified . . . no subsequent EIR shall be prepared for that project unless the lead agency determines, on the basis of substantial evidence in the light of the whole record, that substantial changes are proposed in the project which will require major revisions of the previous EIR or negative declaration due to the involvement of new significant environmental effects or a substantial increase in the severity of previously identified significant effects." This EIR has been prepared as a Subsequent EIR to the Laguna Ridge Specific Plan (LRSP) EIR, pursuant to CEQA Guidelines Section 15162.

1.4 RELATIONSHIP TO THE CITY OF ELK GROVE GENERAL PLAN

The City adopted the City of Elk Grove General Plan in November 2003. The General Plan is the City's overall guide for the use of the City's resources, expresses the development goals of the community, and is the foundation upon which all land use decisions are made. The General Plan EIR (SCH No. 2002062082) analyzed the environmental impacts associated with buildout of the City under the land uses and densities allowed by the General Plan. Where feasible, the City has adopted mitigation measures to reduce impacts to an acceptable level of significance. In addition, the City addressed significant and unavoidable impacts identified in the General Plan EIR, and a Statement of Overriding Considerations was adopted with the approval of the General Plan EIR.

The Project site is located within the Laguna Ridge Specific Plan area. The LRSP EIR (SCH No. 2000082139) assessed the environmental impacts resulting from the construction and operation of the Laguna Ridge Specific Plan. The City approved the Laguna Ridge Specific Plan and certified the Final EIR on June 16, 2004. The Laguna Ridge Specific Plan encompasses approximately 1,900 acres and consists of the development of residential, commercial, park, public school, and mixed-use land uses. The LRSP EIR identified significant and unavoidable impacts related to agricultural resources, transportation and circulation, air quality, noise, and visual resources, and a Statement of Overriding Considerations was adopted for these significant and unavoidable impacts. The LRSP EIR also identified impacts to hazards and hazardous materials, public services and utilities, hydrology and water quality, biological resources, geology and geotechnical hazards, and cultural resources. These impacts were reduced to a less than significant level with implementation of the LRSP EIR mitigation measures. A Mitigation Monitoring and Reporting Program (MMRP) was prepared and adopted with the Specific Plan. The MMRP is a binding document that runs with the land and would be applicable to the proposed Project. The Laguna Ridge Specific Plan MMRP is included as Appendix A of the DSEIR.

Existing zoning and the Specific Plan designation provide for Community Park (CP) use on the 30-acre portion of the Project site located south of Civic Center Drive. The LRSP identified the approximately 27.3-acre parcel north of Civic Center Drive as the site for Civic Center land uses. See Section 3.0 of the DEIR, Land Use and Planning, for further discussion of the site's existing land use designations and zoning.

1.5 ORGANIZATION OF THIS DOCUMENT

For this Final EIR, comments and responses are grouped by comment letter. As the subject matter of one topic may overlap between letters, the reader must occasionally refer to one or more responses to review all the information on a given subject. To assist the reader, cross-references are provided. The comments and responses that make up the Final EIR, in conjunction with the Draft SEIR, as amended by the text changes, constitute the EIR that will be considered for certification by the City of Elk Grove.

The Final EIR is organized as follows:

Section 1 – Introduction: This section includes a summary of the Project description and the process and requirements of a Final SEIR.

Section 2 – List of Agencies and Persons Commenting: This section contains a list of all of the agencies or persons who submitted comments on the Draft SEIR during the public review period.

Section 3 – Comments and Responses: This section contains the comment letters received on the Draft SEIR and the corresponding response to each comment. Public agency letters are given a letter designation, while private organizations and individuals are given a number designation, and each comment on an environmental issue in the letter is given a number designation. Responses are provided after the letter in the order in which the comments appear. Where appropriate, responses are cross-referenced between letters. The responses following each comment letter are intended to supplement, clarify, or amend information provided in the Draft SEIR or refer the commenter to the appropriate place in the document where the requested information can be found. Those comments not directly related to environmental issues may be discussed or noted for the record.

1.6 PUBLIC PARTICIPATION AND REVIEW PROCESS

The City of Elk Grove notified responsible and trustee agencies and interested groups, organizations, and individuals that the Draft SEIR on the proposed Project was available for review. The following list of actions took place during the preparation, distribution, and review of the Draft SEIR:

NOTICE OF PREPARATION

In accordance with Section 15082 of the CEQA Guidelines, the City prepared a Notice of Preparation of an EIR for the Project on September 6, 2013. This notice was circulated to the public, local, state, and federal agencies, and other interested parties to solicit comments on the Project. The NOP is presented in Appendix B of the Draft SEIR. The City held two scoping meetings for the Project: September 19, 2013 at 6:00PM and September 26, 2013 at 11:00AM.

DRAFT SEIR PUBLIC NOTICE/PUBLIC REVIEW

The Draft SEIR was circulated for public review and comment for a period of 45 days from June 27, 2014, through August 13, 2014. A public hearing was held on the Draft SEIR for this Project on July 22, 2014.

Copies of the Draft SEIR were available for review at the following locations:

- The City of Elk Grove City Hall, Planning Division, 8401 Laguna Palms Way
- The Elk Grove Branch of the Sacramento Public Library at 8962 Elk Grove Boulevard
- The City's Planning Department website at www.egplanning.org/environmental/

2.0 List of Agencies and Persons Commenting

2.1 LIST OF COMMENTERS

The following representatives of organizations and agencies and individuals submitted comments on the Draft EIR:

Letter	Individual or Signatory	Affiliation	Date
A	Trevor Cleak	Central Valley Regional Water Quality Control Board	July 15, 2014
B	Erik Frederick	California Department of Transportation	August 11, 2014
C	Rob Ferrera	Sacramento Municipal Utilities District	August 13, 2014
D	Charlene McGhee	Sacramento Metropolitan Air Quality Management District	August 13, 2014
E	Scott Morgan	Office of Planning and Research, State Clearinghouse	August 12, 2014
1	Craig Richey	Resident	August 13, 2014

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3.0 COMMENTS AND RESPONSES

3.1 REQUIREMENTS FOR RESPONDING TO COMMENTS ON A DRAFT EIR

CEQA Guidelines Section 15088 requires the lead agency to evaluate all comments on environmental issues received on the Draft Environmental Impact Report (EIR) and prepare a written response. The written response must address the significant environmental issue raised and must provide a detailed response, especially when specific comments or suggestions (e.g., additional mitigation measures) are not accepted. In addition, the written response must be a good faith and reasoned analysis. However, lead agencies need only to respond to significant environmental issues associated with the project and do not need to provide all the information requested by a comment, as long as a good faith effort at full disclosure is made in the EIR (CEQA Guidelines Section 15204).

CEQA Guidelines Section 15204 recommends that commenters provide detailed comments that focus on the sufficiency of the Draft EIR in identifying and analyzing the possible impacts on the environment and ways in which the significant effects of the project might be avoided or mitigated. CEQA Guidelines Section 15204 also notes that commenters should provide an explanation and evidence supporting their comments. Pursuant to CEQA Guidelines Section 15064, an effect shall not be considered significant in the absence of substantial evidence.

CEQA Guidelines Section 15088 also recommends that where the response to comments results in revisions to the Draft EIR, those revisions be noted as a revision to the Draft EIR or in a separate section of the Final EIR.

3.2 COMMENTS RECEIVED AT THE HEARING FOR THE DRAFT SEIR

The City of Elk Grove Planning Commission held a public hearing on the Draft EIR for the Project on July 22, 2014. No oral or written comments were received related to the adequacy of the Draft SEIR during the public hearing.

3.3 RESPONSES TO COMMENT LETTERS

Written comments on the Draft SEIR are reproduced on the following pages, along with responses to those comments. To assist in referencing comments and responses, the following coding system is used:

Public agency comment letters are coded by letters and each issue raised in the comment letter is assigned a number (e.g., Comment Letter A, comment 1: A-1).

Individual and interest group comment letters are coded by numbers and each issue raised in the comment letter is assigned a number (e.g., Comment Letter 1, comment 1: 1-1).

Where changes to the Draft SEIR text result from responding to comments, those changes are included in the response and demarcated with revision marks (<u>underline</u> for new text, ~~strikeout~~ for deleted text). Comment-initiated text revisions to the Draft EIR and minor staff-initiated changes are also provided and are demarcated with revision marks in Section 2.0, Errata, of this Final SEIR.

Letter A

CALIFORNIA
Water Boards

Edmund G. Brown Jr.
Governor

Matthew Rodriquez
Secretary for
Environmental Protection

Central Valley Regional Water Quality Control Board

15 July 2014

RECEIVED
JUL 16 2014
CITY OF ELK GROVE
PLANNING

Christopher Jordan
City of Elk Grove
8401 Laguna Palms Way
Elk Grove, CA 95758

CERTIFIED MAIL
7013 1710 0002 3644 7259

COMMENTS TO REQUEST FOR REVIEW FOR THE SUPPLEMENT/SUBSEQUENT ENVIRONMENTAL IMPACT REPORT, CIVIC CENTER AQUATICS COMPLEX PROJECT, SCH NO. 2000082139, SACRAMENTO COUNTY

Pursuant to the State Clearinghouse's 27 June 2014 request, the Central Valley Regional Water Quality Control Board (Central Valley Water Board) has reviewed the *Request for Review for the Supplement/Subsequent Environmental Impact Report* for the Civic Center Aquatics Complex Project, located in Sacramento County. **A-1**

Our agency is delegated with the responsibility of protecting the quality of surface and groundwaters of the state; therefore our comments will address concerns surrounding those issues.

Construction Storm Water General Permit

Dischargers whose project disturb one or more acres of soil or where projects disturb less than one acre but are part of a larger common plan of development that in total disturbs one or more acres, are required to obtain coverage under the General Permit for Storm Water Discharges Associated with Construction Activities (Construction General Permit), Construction General Permit Order No. 2009-009-DWQ. Construction activity subject to this permit includes clearing, grading, grubbing, disturbances to the ground, such as stockpiling, or excavation, but does not include regular maintenance activities performed to restore the original line, grade, or capacity of the facility. The Construction General Permit requires the development and implementation of a Storm Water Pollution Prevention Plan (SWPPP). **A-2**

For more information on the Construction General Permit, visit the State Water Resources Control Board website at:
http://www.waterboards.ca.gov/water_issues/programs/stormwater/constpermits.shtml.

Letter A Continued

Civic Center Aquatics Complex Project - 2 - 15 July 2014
Sacramento County

Phase I and II Municipal Separate Storm Sewer System (MS4) Permits[1]
The Phase I and II MS4 permits require the Permittees reduce pollutants and runoff flows from new development and redevelopment using Best Management Practices (BMPs) to the maximum extent practicable (MEP). MS4 Permittees have their own development standards, also known as Low Impact Development (LID)/post-construction standards that include a hydromodification component. The MS4 permits also require specific design concepts for LID/post-construction BMPs in the early stages of a project during the entitlement and CEQA process and the development plan review process. A-3

For more information on which Phase I MS4 Permit this project applies to, visit the Central Valley Water Board website at:
http://www.waterboards.ca.gov/centralvalley/water_issues/storm_water/municipal_permits/.

For more information on the Phase II MS4 permit and who it applies to, visit the State Water Resources Control Board at:
http://www.waterboards.ca.gov/water_issues/programs/stormwater/phase_ii_municipal.shtml

Industrial Storm Water General Permit
Storm water discharges associated with industrial sites must comply with the regulations contained in the Industrial Storm Water General Permit Order No. 97-03-DWQ.

For more information on the Industrial Storm Water General Permit, visit the Central Valley Water Board website at: A-4
http://www.waterboards.ca.gov/centralvalley/water_issues/storm_water/industrial_general_permits/index.shtml.

Clean Water Act Section 404 Permit
If the project will involve the discharge of dredged or fill material in navigable waters or wetlands, a permit pursuant to Section 404 of the Clean Water Act may be needed from the United States Army Corps of Engineers (USACOE). If a Section 404 permit is required by the USACOE, the Central Valley Water Board will review the permit application to ensure that discharge will not violate water quality standards. If the project requires surface water drainage realignment, the applicant is advised to contact the Department of Fish and Game for information on Streambed Alteration Permit requirements. A-5

If you have any questions regarding the Clean Water Act Section 404 permits, please contact the Regulatory Division of the Sacramento District of USACOE at (916) 557-5250.

[1] Municipal Permits = The Phase I Municipal Separate Storm Water System (MS4) Permit covers medium sized Municipalities (serving between 100,000 and 250,000 people) and large sized municipalities (serving over 250,000 people). The Phase II MS4 provides coverage for small municipalities, including non-traditional Small MS4s, which include military bases, public campuses, prisons and hospitals.

Letter A Continued

Clean Water Act Section 401 Permit – Water Quality Certification
If an USACOE permit, or any other federal permit, is required for this project due to the disturbance of waters of the United States (such as streams and wetlands), then a Water Quality Certification must be obtained from the Central Valley Water Board prior to initiation of project activities. There are no waivers for 401 Water Quality Certifications. A-6

Waste Discharge Requirements
If USACOE determines that only non-jurisdictional waters of the State (i.e., "non-federal" waters of the State) are present in the proposed project area, the proposed project will require a Waste Discharge Requirement (WDR) permit to be issued by Central Valley Water Board. Under the California Porter-Cologne Water Quality Control Act, discharges to all waters of the State, including all wetlands and other waters of the State including, but not limited to, isolated wetlands, are subject to State regulation. A-7

For more information on the Water Quality Certification and WDR processes, visit the Central Valley Water Board website at:
http://www.waterboards.ca.gov/centralvalley/help/business_help/permit2.shtml.

Low or Limited Threat General NPDES Permit
If the proposed project includes construction dewatering and it is necessary to discharge the groundwater to waters of the United States, the proposed project will require coverage under a National Pollutant Discharge Elimination System (NPDES) permit. Dewatering discharges are typically considered a low or limited threat to water quality and may be covered under the General Order for *Dewatering and Other Low Threat Discharges to Surface Waters* (Low Threat General Order) or the General Order for *Limited Threat Discharges of Treated/Untreated Groundwater from Cleanup Sites, Wastewater from Superchlorination Projects, and Other Limited Threat Wastewaters to Surface Water* (Limited Threat General Order). A complete application must be submitted to the Central Valley Water Board to obtain coverage under these General NPDES permits. A-8

For more information regarding the Low Threat General Order and the application process, visit the Central Valley Water Board website at:
http://www.waterboards.ca.gov/centralvalley/board_decisions/adopted_orders/general_orders/r5-2013-0074.pdf

For more information regarding the Limited Threat General Order and the application process, visit the Central Valley Water Board website at:
http://www.waterboards.ca.gov/centralvalley/board_decisions/adopted_orders/general_orders/r5-2013-0073.pdf

Letter A Continued

Civic Center Aquatics Complex Project - 4 - 15 July 2014
Sacramento County

If you have questions regarding these comments, please contact me at (916) 464-4684 or tcleak@waterboards.ca.gov.

Trevor Cleak
Environmental Scientist

cc: State Clearinghouse Unit, Governor's Office of Planning and Research, Sacramento

LETTER A – TREVOR CLEAK, CENTRAL VALLEY REGIONAL WATER QUALITY CONTROL BOARD

Response A-1:

The commenter provides information regarding the Central Valley Regional Water Quality Control Board's responsibility in protecting the quality of surface water and groundwater of the State of California.

Comment noted.

Response A-2:

The commenter discusses the Construction Storm Water General Permit and identifies what projects are required to obtain coverage under the General Permit for Storm Water Discharges.

This requirement is discussed on Draft EIR page 4.0-6.

Response A-3:

The commenter discusses the Phase I and II Municipal Separate Storm Sewer System (MS4) Permit requiring permittees to reduce pollutants and runoff flows from new development and redevelopment using best management practices (BMPs).

The City of Elk Grove would fall under the Phase I, as a medium municipality (between 100,000 and 25,000 population). As discussed on Draft EIR page 4.0-6, the City of Elk Grove's storm drainage system is subject to the requirements of NPDES Stormwater Permit No. CA0082597 issued and enforced by the Central Valley Regional Water Quality Control Board.

Response A-4:

The commenter discusses the Industrial Storm Water General Permit and identifies that industrial projects are required to comply with this permit.

The proposed Project is not an industrial use, so the Industrial Storm Water General Permit would not apply to the Project.

Response A-5:

The commenter discusses the requirements of Section 404 of the Clean Water Act.

This requirement is defined in the Draft EIR on pages 4.3-11 and 12 and discussed under Impact 4.3.9 on Draft EIR page 4.3-25.

Response A-6:

The commenter discusses the requirements of the Clean Water Act Section 401 permit.

This requirement is defined in the Draft EIR on page 4.3-12 and discussed under Impact 4.3.9 on Draft EIR page 4.3-25.

Response A-7:

The commenter discusses the Waste Discharge Requirements permit issued by the Central Valley Regional Water Quality Control Board.

This requirement is discussed in the Draft EIR on page 4.3-16.

Response A-8:

The commenter provides information related to the required permits if the Project were to require construction dewatering and if the Project would discharge groundwater to waters of the United States.

It is not anticipated at this time that dewatering would be required for Project construction; however, if dewatering is required, the appropriate application would be submitted to the Central Valley Water Board to obtain the necessary coverage.

Letter B

STATE OF CALIFORNIA—BUSINESS, TRANSPORTATION AND HOUSING AGENCY EDMUND G. BROWN Jr., Governor

DEPARTMENT OF TRANSPORTATION
2379 Gateway Oaks Drive, Suite #150
Sacramento, CA 95833
PHONE (916) 274-0635
FAX (916) 263-1796
TTY 711

Flex your power!
Be energy efficient!

August 11, 2014

032014-SAC-0137
03-SAC-99 / 12.75
SCH# 2000082139

Mr. Christopher Jordan
Planning Division
City of Elk Grove
8401 Laguna Palms Way
Elk Grove, CA 95758

Civic Center Aquatics Complex – Draft Subsequent Environmental Impact Report (DSEIR)

Dear Mr. Jordan:

Thank you for including the California Department of Transportation (Caltrans) in the environmental review process for the project referenced above. Caltrans previously sent comments for the project on October 7, 2013, at the Notice of Preparation for a Draft Environmental Impact Report. The proposed Civic Center Aquatics Complex consists of approximately 57.3 acres (approximately 30 acres for the facility and 27 acres for parking) and includes the construction and operation of a competition swim venue and training facility with bleacher seating for 1,100 spectators. The proposed project also includes a water/adventure park, a family entertainment center, as well as ancillary uses. The project site is located on both sides of Civic Center Drive, which is approximately one mile west of the State Route (SR) 99/Elk Grove Boulevard (Blvd.) Interchange (IC). Parking will be accommodated at the competition venue/adventure park on the south side of Civic Center Drive, and in two adjacent overflow lots on the north side of Civic Center Drive. The following comments are based on the DSEIR.

Traffic Impact Study/Mitigations

The cumulative scenario in Table 8 on Page 37 of Appendix J indicates several intersections along Elk Grove Blvd. will suffer a drop in LOS due to the project. Impact 4.9.5 (on page ES 27), corresponds with the data in Table 8 and identifies the impacts as significant and unavoidable with no required mitigation. Meanwhile, in Appendix J on page 40, the last paragraph suggests that construction of both the nearly completed SR 99 /Elk Grove Blvd. northbound loop on-ramp, and programmed SR 99/Whitelock Parkway IC would reduce traffic delays at most of the intersections along Elk Grove Blvd. Therefore, these impacts should not be left as significant and unavoidable in the DSEIR, and Caltrans recommends that the project proponents provide a fair share contribution toward the construction of the SR 99/Whitelock Parkway IC. The lead agency should also continue to improve operations on the Elk Grove Blvd. by adjusting signal timing and coordination. **B-1**

"Caltrans improves mobility across California"

Letter B Continued

Mr. Christopher Jordan / City of Elk Grove, Planning Division
August 11, 2014
Page 2

Regarding Impact 4 as seen on page 29 of Appendix J, the project will increase congestion on SR 99. Caltrans recommends that the project proponent commit to providing fair share contribution toward the extension of the bus/carpool lanes on SR 99 from .5 miles south of Elk Grove Blvd. to .5 miles south of the Grantline Rd./Kammerer Rd. IC. **B-2**

On page 46, Appendix J discusses the poor operation of the southbound (SB) Interstate 5 (I-5) mainline as a result of the proposed project, and suggests extending the third SB lane from its current terminus at Laguna Blvd. to just south of Elk Grove Blvd. to improve I-5 in that area to a LOS D or better. For this impact Caltrans recommends project proponents be required to pay its fair share toward the I-5 Bus/Carpool Lane project. **B-3**

In lieu of the mitigations suggested above, Caltrans would accept payment into the I-5 Subregional Fee Program, or a fee program that used the parameters of said program, as adequately addressing cumulative impacts to the State Highway System (SHS). Currently the I-5 Subregional Fee Program has not been officially implemented. However, a Memorandum of Understanding (MOU) for the Implementation Plan for the program has been adopted by all local agencies involved, including the City of Elk Grove, and may soon be approved by the Sacramento Area Council of Governments. Once the MOU is approved, it is expected that the parties involved will move forward for environmental clearance of the program. Although the program is not officially adopted, Caltrans encourages payment of fair share fees for cumulative impacts to the SHS through some mechanism until the program is officially adopted. **B-4**

Parking

Page 36 of the May 2014 Traffic Impact Assessment (Appendix J) notes that significant vehicle queuing near the SR 99/Elk Grove Blvd intersection was observed during field observations of existing conditions. Also, on page 40 of Appendix J, Impact 7 indicates that project traffic will worsen unacceptable operations at and near the SR 99/Elk Grove Blvd IC. Due to these existing congested conditions, Caltrans recommends that no access to the proposed project be permitted from anywhere along Elk Grove Blvd. **B-5**

Transportation Management Plan (TMP)

If it is determined that traffic restrictions and detours are needed on or affecting State highways for the removal of construction debris, a TMP or construction Traffic Impact Study may be required of the developer for approval by Caltrans prior to construction. TMPs must be prepared in accordance with Caltrans' *Manual on Uniform Traffic Control Devices.* Further information is available for download at the following web address: **B-6**
http://www.dot.ca.gov/hq/traffops/signtech/mutcdsupp/pdf/camutcd2012/Part6.pdf

Please provide our office with copies of any further actions regarding this project. We would appreciate the opportunity to review and comment on any changes related to this development.

"Caltrans improves mobility across California"

Letter B Continued

Mr. Christopher Jordan / City of Elk Grove, Planning Division
August 11, 2014
Page 3

If you have any questions regarding these comments or require additional information, please contact Arthur Murray, Intergovernmental Review Coordinator at (916) 274-0616 or by email at: arthur.murray@dot.ca.gov.

Sincerely,

Eric Fredericks

ERIC FREDERICKS, Chief
Office of Transportation Planning – South

c: Scott Morgan, State Clearinghouse

"Caltrans improves mobility across California"

LETTER B – ERIK FREDERICKS, CALIFORNIA DEPARTMENT OF TRANSPORTATION (CALTRANS)

Response B-1:

The comment refers to Table 8 in the Traffic Impact Study for the Draft SEIR (see Draft SEIR Table 4.9-11) which depicts level of service on local roads in the cumulative condition with the Project. The commenter states that with the completion of SR99/ Elk Grove Boulevard northbound loop on-ramp and the programmed SR99/ Whitelock Parkway interchange, the impact would be reduced to less than significant. The commenter further recommends payment of fair share fees toward the SR99/ Whitelock Parkway interchange.

The City's Capital Facilities Fee, to which the Project would contribute, includes the SR99/ Whitelock Parkway interchange.

Response B-2:

The commenter states the Project would increase congestion on SR 99 and should, therefore, pay a fair share contribution toward the extension of bus/carpool lanes on SR 99.

As discussed on Draft SEIR page 4.9-3, because of the hours of operation for the Project, it would not generate substantial traffic during the typical peaks hours. Because the bus/carpool lanes on SR 99 are intended to reduce congestion during peak hours, these lanes would not reduce Project-related impacts. Therefore, because there is not a nexus between Project impacts and the mitigation suggested in the comment, payment of fees toward bus/carpool lanes, is not included in the EIR.

Response B-3:

The commenter recommends payment of fair share fees toward the I-5 Bus/Carpool Lane project.

As discussed of Draft SEIR page 4.9-36, the Project would add approximately 16 trips to SB I-5 under cumulative conditions, which represents approximately 0.37 percent of cumulative traffic volumes. Because the Project contribution to volumes on this portion of I-5 would result in minimal increases in density on I-5, it was determined that the Project's contribution to this impact was less than cumulatively considerable. In addition, as discussed in response to Comment B-2, the Project would not generate substantial traffic during the typical peaks hours so the bus/carpool lanes would not reduce Project-related impacts. Therefore, payment of fees toward bus/carpool lanes is not included in the EIR.

Response B-4:

The commenter suggests payment of the I-5 Subregional Fee Program.

As discussed on page 4.9-36 of the Draft SEIR and as acknowledged in the comment, the I-5 Subregional Fee Program has not been officially implemented. Because the fee program has not yet been adopted, payment of fees without a program in place to implement improvements would not be considered adequate mitigation under CEQA. In addition, as discussed of Draft SEIR page 4.9-36, the Project would add approximately 16 trips to SB I-5 under cumulative conditions, which represents approximately 0.37 percent of cumulative traffic volumes. Because the Project contribution to volumes on this portion of I-5 would result in minimal increases in density on I-5, it was determined that the Project's contribution to this impact was less than cumulatively considerable. Nonetheless, should the fee be in effect prior to Project construction, the City will pay the fee if it reaches the threshold established by the I-5 Subregional Fee Program.

Response B-5:

The commenter states that access to the overflow parking areas from Elk Grove Boulevard would worsen operations at and near the SR99/ Elk Grove Boulevard interchange.

The Project does not propose access to the overflow parking from Elk Grove Boulevard. Therefore, there would be no impact related to access from Elk Grove Boulevard.

Response B-6:

The commenter provides information related to Transportation Management Plans for projects that result in traffic restrictions or detours on State highways.

The Project would not include any construction that would require detours or result in restrictions on a State highway.

Letter C

Powering forward. Together.

SMUD

August 13, 2014

Mr. Christopher Jordan
City of Elk Grove Planning Department
8401 Laguna Palms Way
Elk Grove, CA 95758
cjordan@elkgrovecity.org

Subject: Draft Subsequent Environmental Impact Report for the Civic Center Aquatics Complex

Dear Mr. Jordan,

The Sacramento Municipal Utility District (SMUD) appreciates the opportunity to provide comments on the Draft Subsequent Environmental Impact Report (Draft SEIR) for the Civic Center Aquatics Complex. SMUD is the primary energy provider for Sacramento County and the proposed project location. SMUD's vision is to empower our customers with solutions and options that increase energy efficiency, protect the environment, reduce global warming, and lower the cost to serve our region. As a Responsible Agency, SMUD aims to ensure that the proposed project limits the potential for significant environmental effects on SMUD facilities, employees, and customers. C-1

SMUD appreciates that the comments included in its NOP comment letter were acknowledged and incorporated into the Draft SEIR. To reiterate, SMUD's Savings By Design program can assist with integration of renewable generation (solar PV, in-conduit hydro, for example) and energy storage to offset load, particularly during peak summer use. C-2

SMUD would like to be kept apprised of the planning, development, and completion of this project. We aim to be partners in the efficient and sustainable delivery of the proposed project. Please ensure that the information included in this response is conveyed to the project planners and the appropriate project proponents. C-3

Environmental leadership is a core value of SMUD and we look forward to collaborating with you on this project. Again, we appreciate the opportunity to provide input on the NOP. If you have any questions regarding this letter, please contact Rob Ferrera, SMUD Environmental

SMUD HQ | 6201 S Street | P.O. Box 15830 | Sacramento, CA 95852-0830 | 1.888.742.7683 | smud.org

Letter C Continued

Specialist at (916) 732-6676. Rob will be the primary environmental point of contact for SMUD on this project.

Sincerely,

Rob Ferrera
Environmental Specialist
Environmental Management
Legislative & Regulatory Affairs
Sacramento Municipal Utility District

Cc: Pat Durham
Steve Johns
Susan Oto
Kathleen Ave
Greg Hribar

LETTER C – ROB FERRERA, SACRAMENTO MUNICIPAL UTILITY DISTRICT (SMUD)

Response C-1:

The commenter provides information regarding Sacramento Municipal Utility District. The commenter describes its aim as a responsible agency for the proposed Project to limit potential for significant environmental effects on SMUD facilities, employees, and customers.

Comment noted.

Response C-2:

The commenter expresses appreciation that the comments provided in SMUD's comments on the Notice of Preparation were incorporated into the Draft SEIR. The commenter describes SMUD's Savings By Design program as a way to integrate renewable energy generation into the proposed Project.

Comment noted. Project energy use and conservation measures are described on pages 5.0-3 through 5.0-11 of the Draft SEIR. As described on these pages, a number of energy conservation measures would be incorporated into the design, construction, and operational aspects of the Project. The Draft SEIR determined that the Project would not result in a significant impact to energy resources as it would not use energy in an inefficient, wasteful, or unnecessary manner.

Response C-3:

The commenter requests to be kept apprised of the Project's progress and completion.

Comment noted. As a responsible agency for the proposed Project, SMUD will receive all public notifications related to the proposed Project.

Letter D

SACRAMENTO METROPOLITAN
AIR QUALITY
MANAGEMENT DISTRICT

Larry Greene
AIR POLLUTION CONTROL OFFICER

August 13, 2014

SENT VIA EMAIL

Mr. Christopher Jordan, Planning Manager
City of Elk Grove – Planning
8401 Laguna Palms Way
Elk Grove, CA 95758

RE: Civic Center Aquatics Complex Draft Subsequent Environmental Impact Report
SMAQMD# SAC201301467

Dear Mr. Jordan:

Thank you for the opportunity for the Sacramento Metropolitan Air Quality Management District (SMAQMD) to review and comment on the Civic Center Aquatics Complex Draft Subsequent Environmental Impact Report (DSEIR).

In addition to all the mitigation that will be applied due the location of this project in the Laguna Ridge Specific Plan (LRSP) area, which should include what we now call *Basic Construction Emission Control Practices* and *Enhanced Exhaust Control Practices*, feasible construction mitigation also includes an off-site mitigation fee to reduce NOx emissions that remain over the 85 pounds per day threshold after on-site mitigation is applied. Based upon emissions shown in Table 4.2-6 this project will not be able to mitigate to the threshold by applying on-site mitigation alone. By the payment of the mitigation fee the significant and unavoidable finding for Impact 4.2.1 can be changed to less than significant. **D-1**

As of July 1, 2014 the Carl Moyer Program cost effectiveness value for a ton of NOx is $17,720. In addition, an administrative fee of 5% will also be assessed. These fees should be included as mitigation and be part of the Mitigation and Monitoring Reporting Plan (MMRP) for the Civic Center Aquatics Complex. SMAQMD staff is available to consult with the applicant regarding the calculation and payment of fees.

All projects are subject to all applicable SMAQMD rules in effect at the time of construction. A complete list of all rules can be found on our website at www.airquality.org or by calling 916-874-4800. However, a list of specific rules that apply to construction activities or building design is attached for your reference. **D-2**

Please contact me at cmcghee@airquality.org or 916-874-4883 if there are questions regarding these comments.

Regards,

Charlene McGhee

Charlene McGhee
Associate Air Quality Planner/Analyst

Attachment

c: Larry Robinson, Sacramento Metropolitan AQMD

777 12th Street, 3rd Floor ▪ Sacramento, CA 95814-1908
916/874-4800 ▪ 916/874-4899 fax
www.airquality.org

Letter D Continued

ATTACHMENT

SMAQMD Rules & Regulations Statement (revised 3/12)

*The following statement is recommended as standard condition of approval or construction document language for **all** development projects within the Sacramento Metropolitan Air Quality Management District (SMAQMD):*

All projects are subject to SMAQMD rules in effect at the time of construction. A complete listing of current rules is available at www.airquality.org or by calling 916.874.4800. Specific rules that may relate to construction activities or building design may include, but are not limited to:

Rule 201: General Permit Requirements. Any project that includes the use of equipment capable of releasing emissions to the atmosphere may require permit(s) from SMAQMD prior to equipment operation. The applicant, developer, or operator of a project that includes an emergency generator, boiler, or heater should contact the SMAQMD early to determine if a permit is required, and to begin the permit application process. Portable construction equipment (e.g. generators, compressors, pile drivers, lighting equipment, etc.) with an internal combustion engine over 50 horsepower are required to have a SMAQMD permit or a California Air Resources Board portable equipment registration. Other general types of uses that require a permit include, but are not limited to dry cleaners, gasoline stations, spray booths, and operations that generate airborne particulate emissions.

Rule 403: Fugitive Dust. The developer or contractor is required to control dust emissions from earth moving activities, storage or any other construction activity to prevent airborne dust from leaving the project site.

Rule 414: Water Heaters, Boilers and Process Heaters Rated Less Than 1,000,000 BTU PER Hour. The developer or contractor is required to install water heaters (including residence water heaters), boilers or process heaters that comply with the emission limits specified in the rule.

Rule 417: Wood Burning Appliances. This rule prohibits the installation of any new, permanently installed, indoor or outdoor, uncontrolled fireplaces in new or existing developments.

Rule 442: Architectural Coatings. The developer or contractor is required to use coatings that comply with the volatile organic compound content limits specified in the rule.

Rule 460: Adhesives and Sealants. The developer or contractor is required to use adhesives and sealants that comply with the volatile organic compound content limits specified in the rule.

Rule 902: Asbestos. The developer or contractor is required to notify SMAQMD of any regulated renovation or demolition activity. Rule 902 contains specific requirements for surveying, notification, removal, and disposal of asbestos containing material.

Naturally Occurring Asbestos: The developer or contractor is required to notify SMAQMD of earth moving projects, greater than 1 acre in size in areas "Moderately Likely to Contain Asbestos" within eastern Sacramento County. Asbestos Airborne Toxic Control Measures, Section 93105 & 93106 contain specific requirements for surveying, notification, and handling soil that contains naturally occurring asbestos.

777 12th Street, 3rd Floor ▪ Sacramento, CA 95814-1908
916/874-4800 ▪ 916/874-4899 fax
www.airquality.org

LETTER D – CHARLENE MCGHEE, SACRAMENTO METROPOLITAN AIR QUALITY MANAGEMENT DISTRICT (SMAQMD)

Response D-1:

The commenter notes that based on the emissions shown in Draft SEIR Table 4.2-6, the Project's emissions NO_x emissions would exceed the District threshold of 85 pounds per day, even after implementation of mitigation identified in the Draft SEIR. The commenter states that in addition to the air quality mitigation provided for the proposed Project in the Draft SEIR and the Laguna Ridge Specific Plan EIR, the payment of the District's off-site mitigation fee to reduce NO_x emissions that remain over the threshold after mitigation is applied would reduce project impacts to less than significant.

The assumptions used in the air quality modeling performed for the proposed Project were conservative in order assure disclosure of potential air emissions resulting from the proposed Project implementation. As such, the emissions estimates provided in Draft SEIR Table 4.2-6 (page 4.2-16) are likely greater than what would actually occur should the Project be approved and constructed. For instance, the modeling assumed construction of the competition venue and water/adventure park would be constructed concurrently, but it is likely the two facilities would be constructed separately or at least with some staggered schedule. In addition, the modeling assumed paving of the entire overflow parking areas, when all or a portion of the overflow parking could be surfaced with gravel. For these reasons, it cannot be determined at this time if such fees would be necessary to address Project air quality impacts and the payment of an offsite mitigation fee was not added as a mitigation measure to the Draft SEIR.

The extent to which construction of Project components would exceed applicable standards would be determined at the time construction is proposed and details regarding the type and extent of construction are known. If any offsite fees to address Project emissions exceeding the District's applicable thresholds are required, those would be determined at the time each phase is initiated and remitted as appropriate.

Response D-2:

The commenter states that all projects are subject to all applicable SMAQMD rules in effect at the time of construction.

Comment noted. SMAQMD regulations applicable to the proposed Project are discussed on pages 4.2-10 and -11 of the Draft SEIR.

Letter E

STATE OF CALIFORNIA
Governor's Office of Planning and Research
State Clearinghouse and Planning Unit

Edmund G. Brown Jr.
Governor

Ken Alex
Director

August 12, 2014

Christopher Jordan
City of Elk Grove
8401 Laguna Palms Way
Elk Grove, CA 95758

Subject: Civic Center Aquatics Complex Project
SCH#: 2000082139

Dear Christopher Jordan:

The State Clearinghouse submitted the above named Supplemental EIR to selected state agencies for review. The review period closed on August 11, 2014, and no state agencies submitted comments by that date. This letter acknowledges that you have complied with the State Clearinghouse review requirements for draft environmental documents, pursuant to the California Environmental Quality Act. **E-1**

Please call the State Clearinghouse at (916) 445-0613 if you have any questions regarding the environmental review process. If you have a question about the above-named project, please refer to the ten-digit State Clearinghouse number when contacting this office.

Sincerely,

Scott Morgan
Director, State Clearinghouse

1400 TENTH STREET P.O BOX 3044 SACRAMENTO, CALIFORNIA 95812-3044
TEL (916) 445-0613 FAX (916) 323-3018 www.opr.ca.gov

LETTER E – SCOTT MORGAN, CALIFORNIA OFFICE OF PLANNING AND RESEARCH, STATE CLEARINGHOUSE

Response E-1:

The commenter notes no agencies submitted comments to the State Clearinghouse within the 45-day public review period.

The comment does not address any issues related to the adequacy of the DEIR. No response is required.

Letter 1

Patrick Hindmarsh

From: Christopher Jordan <cjordan@elkgrovecity.org>
Sent: Wednesday, August 13, 2014 11:27 PM
To: Rebecca Craig; Darren Wilson; Jennifer Alves; Patrick Hindmarsh
Subject: FW: Civic Center Aquatics Complex

Sent from my Windows Phone

From: Craig Richey<mailto:ctrichey@yahoo.com>
Sent: 8/13/2014 11:15 PM
To: Christopher Jordan<mailto:cjordan@elkgrovecity.org>
Subject: Re: Civic Center Aquatics Complex

Re: Civic Center Aquatics Complex

I live on Suarez Way, just west of Big Horn Boulevard near the proposed parking lot entrance/exit for the proposed Civic Center Aquatics Complex and family entertainment center. 1-1

First of all, I am not in favor of the building of this project in its entirety. My main concerns are with the family entertainment center and water adventure park.

I understand that the surrounding area that I live in is expected to grow with nearby shopping and a new civic center. I also understand that this type of growth will bring certain impacts to this area. However, those expected impacts are minor in comparison with the water park / entertainment center. 1-2

In the Draft SEIR it describes significant environmental effects with regard to noise, transportation, air quality, public utilities and aesthetics.

Regarding the noise impacts, I don't feel that residences in my area have been represented properly. In the SDEIS (pg 4.7-5) it states that "residences are shielded by an approximate 8-foot high noise barrier." While true, that barrier doesn't do a whole lot of good deeper into the neighborhood. In the fall, most Friday and Saturday nights, we can hear the football games being played (cheering of the crowd, the bands, and the public address announcer). With the water and adventure park I will expect to hear the constant screaming patrons, the roar of a wave machine and a constant humming of distant music. 1-3

The SDEIS claims that noise impacts are significant and I agree. I don't want to be living within earshot of 120 days worth of this type of noise.

I also have an issue with the parking lot exit/entrance on Big Horn. A lot of people in my neighborhood would be affected by this location as they come and go from their homes. An entrance/exit on Civic Center Drive would be beneficial and would affect less residences as the vehicles (in theory) would not affect residents. 1-4

I am a little surprised that public safety was not addressed. Over the years, the Strikes bowling alley and surrounding businesses have been a violent place to be on a Friday and Saturday night. My fear is that the same element gravitates to the new complex and starts the same type of trouble. What is being discussed for the public safety with regard to this giant entertainment center to keep patrons safe as well as surrounding neighbors? 1-5

1

Letter 1 Continued

Currently, I am happy with the plans for ONLY the aquatics complex. I think that's something that City of Elk Grove could and would use.

Without further and substantial mitigation I am not in favor of this project going forward. If I had a choice I would accept Alternatives 1 and 3. **1-6**

Thank you for your time.

Craig Richey
8130 Suarez Way
650-291-8853

From: Christopher Jordan <cjordan@elkgrovecity.org>
To: 'Craig Richey' <ctrichey@yahoo.com>
Sent: Monday, August 11, 2014 3:52 PM
Subject: RE: Civic Center Aquatics Complex

Yes, please. Thank you.

Christopher Jordan, AICP
Planning Manager

City of Elk Grove
8401 Laguna Palms Way
Elk Grove, CA 95758

cjordan@elkgrovecity.org

916.478.2222 (office)
916.691.3175 (fax)

www.elkgrovecity.org<http://www.elkgrovecity.org/>

From: Craig Richey [mailto:ctrichey@yahoo.com]
Sent: Monday, August 11, 2014 3:47 PM
To: Christopher Jordan
Subject: Civic Center Aquatics Complex

Is this email address that I would send comments to regarding the Civic Center Aquatics Complex?

Thank you.

Craig Richey
8130 Suarez Way
650-291-8853

2

LETTER 1 – CRAIG RICHEY, RESIDENT

Response 1-1:

The commenter states that he lives near the Project site and expresses his opposition to construction of the proposed Project in its entirety.

Comment noted.

Response 1-2:

The commenter states that impacts of the proposed Project would exceed the impacts of development that had been previously planned for the area, specifically in the areas of noise, transportation, air quality, public utilities, and aesthetics.

The Draft SEIR identifies increases in severity of impacts in each of those areas, as compared to the impacts disclosed in the Laguna Ridge Specific Plan EIR. Because no specific comments are provided by the commenter about the EIR analysis, no response can be provided.

Response 1-3:

The commenter states that the Draft SEIR analysis does not adequately represent conditions in the area because the 8-foot noise barrier does not "do a whole lot of good deeper in the neighborhood."

The text to which the comment refers is the physical setting, which describes the physical environment in the Project vicinity. The referenced text does not provide any information regarding the ability of the wall to reduce noise near the wall or farther into the neighborhood. Impact 4.7.4, on Draft SEIR pages 4.7-25 through 30 discusses noise generated by the combined activities from the competition venue and the water/adventure park. The wall and the existing residences along Big Horn Boulevard would attenuate noise generated at the Project site. While the modeling for the Project shows that noise levels west of the sound wall along Big Horn Boulevard would not exceed City standards, it was not meant to imply that noise from the Project would not be audible in that area. Because noise levels generated by the Project would exceed noise levels previously assumed for the site, the Draft SEIR determined that this impact would be significant and unavoidable.

Response 1-4:

The commenter states that Project access along Big Horn Boulevard would affect residents in the neighborhood to the west, but does not provide information on how the parking access would affect neighbors.

The Project includes parking access at two locations on the Big Horn Boulevard frontage (see Figure 2-3 on Draft SEIR page 2-9). Consequently, the potential impacts of that configuration are analyzed in the Draft SEIR.

Response 1-5:

The commenter refers to his concern for a safety issue at the Project site based on his perception of a negative element at another entertainment center in the City.

The proposed Project would provide recreation facilities that would be family oriented, which differs substantially from a facility that operates into the late evening hours that includes a bar, to which the commenter refers. In addition, the proposed Project would include its own security; with provision of security as one of the Project objectives (see Draft SEIR page 2-2). Given the nature of the proposed Project as a family-oriented use with its most prevalent use occurring in the middle of the day, the provision of private security, as well as police services provided by the City of Elk Grove Police Department, the safety issues raised in the comment are not anticipated.

Response 1-6:

The commenter expresses support for the No Project Alternative and the Competition Venue Alternative.

Comment noted.

EXHIBIT C

THE CITY OF ELK GROVE FINDINGS REQUIRED UNDER THE CALIFORNIA ENVIRONMENTAL QUALITY ACT (Public Resources Code Section 21000 et seq.)

I. Introduction

The City of Elk Grove (City) prepared a Final Environmental Impact Report (Final EIR) for the proposed Civic Center Aquatics Complex Project (Project).

The Final EIR addresses the potential environmental effects associated with the development of the Project site, including a competition venue with a competition swimming pool, a dive pool, and other components, such as bleacher seating for approximately 1,100 people under a shade canopy, a therapy spa, team prep area, restrooms/showers, team equipment storage space, spectator restrooms, concessions and additional restrooms, and a scoreboard and flag display. The competition venue is anticipated to be home to multiple collegiate, high school, and regional club teams for practices and meets as well as recreational use. The Project also includes the potential for expansion into the team prep area.

The Project analyzed in the EIR would also include development of a water and adventure park. The water park component of the Project would include, but would not be limited to, a lazy/adventure river, wave pool, slide attractions, a possible future children's aquatic play system, a family activity pool, and various water feature elements. The adventure park component of the Project would be woven throughout the water park and would include, but would not be limited to, adult and child ropes courses, zip lines, a family adventure sky trail, and various challenge and team building elements and activities. The adventure park would also include a two-story, approximately 40,000-square-foot family entertainment center to include an arcade, laser tag, bowling alley, main kitchen/commissary, food and beverage service, group entertainment stage, rental lockers, and party rooms.

The City Council has elected to adopt the Competition Venue Only Alternative, which was identified as the Environmentally Superior Alternative in the Draft EIR. The Competition Venue Only Alternative would consist of the competition venue identical to the proposed Project in terms of its location, features, and related amenities. The competition venue would consist of a competition swimming pool (50 meters by 25 yards, 2-meter depth) and a dive pool (25 meters by 25 yards, 17-foot depth) with a signature 10-meter diving tower (33 feet in height), a 3-meter springboard, and a 1-meter springboard, and seating for approximately 1,100 spectators. There would be no water and adventure park. The competition venue would operate year-round Monday through Saturday with anticipated hours of 7:00 a.m. to 9:00 p.m., as well as on Sundays during the months of May through July from 7:00 a.m. to 7:00 p.m. This alternative would require less parking than the proposed Project because there would be fewer visitors than would be generated by the competition venue and water and adventure parks combined.

The Findings and Statement of Overriding Considerations set forth below (Findings) are presented for adoption by the City Council, as the City's findings under the California Environmental Quality Act (CEQA) (Public Resources Code Section 21000 et seq.) and the CEQA Guidelines (California Code of Regulations, Title 14, Section 15000 et seq.) relating to the Competition Venue Only Alternative. The Findings provide the written analysis and conclusions of this Council regarding the Competition Venue Only Alternative's environmental impacts, mitigation measures, and the overriding considerations, which in this Council's view, justify approval of the Competition Venue Only Alternative, despite environmental effects.

II. General Findings and Overview

A. Relationship to the City of Elk Grove General Plan and Laguna Ridge Specific Plan

The Competition Venue Only Alternative is located in the Laguna Ridge Specific Plan (LRSP) area as designated in the City's General Plan. The General Plan provides the long-term vision or blueprint for development of the City; all subsequent land use approvals are required to be consistent with the goals, objectives, and policies embodied in the General Plan. Existing zoning and the Specific Plan designation provide for Community Park (CP) use on the 30-acre portion of the Project site located south of Civic Center Drive. The LRSP identified the approximately 27.3-acre parcel north of Civic Center Drive as the site for Civic Center land uses. Therefore, the land uses included in the Project are consistent with the land use designations in the Laguna Ridge Specific Plan.

B. Procedural Background

The City prepared a Notice of Preparation (NOP) on September 6, 2013, stating that an EIR for the Project would be prepared. This notice was circulated to the public, local, state, and federal agencies, and other interested parties to solicit comments on the Project. Concerns raised in response to the NOP were considered during preparation of the Draft Environmental Impact Report (Draft EIR, DEIR). The Notice of Availability for the DEIR was published on June 19, 2014. The DEIR was published for public review and comment on June 19, 2014, and was filed with the California Office of Planning and Research under State Clearinghouse No. 2000082139. The review period for the DEIR ended on August 4, 2014.

The City prepared written responses to the comments received during the comment period and included these responses in a separate volume entitled Civic Center Aquatics Complex Project Final Environmental Impact Report. The Final EIR provides a list of those who commented on the DEIR, copies of written comments (coded for reference), and written responses to comments regarding the environmental review. The Final EIR was made available for public review on August 22, 2014.

C. Project History

The Project is located in the Laguna Ridge Specific Plan area. The LRSP EIR was certified and the LRSP approved by the City Council on June 16, 2004. The LRSP EIR (SCH #2000082139) assessed the expected environmental impacts resulting from the construction and operation of the LRSP and identified mitigation measures to minimize potential adverse environmental impacts. The EIR identified significant and unavoidable impacts related to agricultural resources, transportation and circulation, air quality, noise, public utilities, and visual resources. A Statement of Overriding Considerations (SCH #2000082139) was adopted for these significant and unavoidable impacts. A Mitigation Monitoring and Reporting Program was prepared and adopted with the LRSP. The Mitigation Monitoring and Reporting Program is a binding document that runs with the land.

The City Council solicited qualified entities to design, build, operate, and finance an aquatics complex. A Notice of Preparation of a Draft Environmental Impact Report was prepared and circulated. The City Council awarded P3 International ("Developer") a Phase I contract in October 2013 and the City issued the Notice to Proceed on November 26, 2013. Phase I work provided in June 2014 included the feasibility study, schematic design, and job costing. The City then proceeded with environmental review as described in Section B above.

D. Record of Proceedings and Custodian of Record

For purposes of CEQA and the findings set forth herein, the record of proceedings for the City's findings and determinations consists of the following documents and testimony, at a minimum:

- The NOP, comments received on the NOP, and all other public notices issued by the City in relation to the Civic Center Aquatics Complex Project EIR (e.g., Notice of Availability).
- The 2003 General Plan Draft EIR, associated appendices to the Draft EIR, and technical materials cited in the Draft EIR.
- The 2003 General Plan Final EIR, associated appendices to the Final EIR, and technical materials cited in the Final EIR.
- The Laguna Ridge Specific Plan Draft EIR associated appendices to the Draft EIR, and technical materials cited in the Draft EIR.
- The Laguna Ridge Specific Plan Final EIR associated appendices to the Final EIR, and technical materials cited in the Final EIR.
- The Civic Center Aquatics Complex Project Draft EIR, associated appendices to the Draft EIR, and technical materials cited in the Draft EIR.
- The Civic Center Aquatics Complex Project Final EIR, including comment letters, and technical materials cited in the Final EIR.
- All non-draft and/or non-confidential reports and memoranda prepared by the City and consultants related to the Project or any of the above associated environmental documents.
- Minutes and transcripts of the discussions regarding the Project and/or Project components at public hearings held by the City of Elk Grove Planning Commission and City Council.
- Staff reports associated with Planning Commission and City Council meetings on the Project.
- Those categories of materials identified in Public Resources Code Section 21167.6.

The City Clerk is the custodian of the administrative record. The documents and materials that constitute the administrative record are available for review at the City of Elk Grove offices located at 8401 Laguna Palms Way, Elk Grove, California, 95758.

E. Consideration of the Environmental Impact Report

In adopting these Findings, the City Council finds that the Final EIR was presented to this Council, the decision-making body of the lead agency, which reviewed and considered the information in the Final EIR prior to approving the Competition Venue Only Alternative. By these findings, the Council ratifies, adopts, and incorporates the analysis, explanations, findings, responses to comments, and conclusions of the Final EIR. The City Council finds that the Final EIR was completed in compliance with CEQA. The Final EIR represents the independent judgment of the City.

F. Severability

If any term, provision, or portion of these Findings or the application of these Findings to a particular situation is held by a court to be invalid, void, or unenforceable, the remaining provisions of these Findings, or their application to other actions related to the Civic Center Aquatics Complex Project, shall continue in full force and effect unless amended or modified by the City.

G. Summary of Environmental Findings

The City Council has determined that based on all of the evidence presented, including, but not limited to, the EIR, written and oral testimony given at meetings and hearings, and submission of comments from the public, organizations, and regulatory agencies, and the responses prepared to the public comments, the following environmental impacts associated with the Competition Venue only Alternative are:

1. **Potentially Significant and Cannot be Avoided or Reduced to a Less Than Significant Level**

    Project-Specific

    - Increases in light and glare
    - Short-term increase in criteria air pollutants due to construction activities
    - Decline in service at the Elk Grove Boulevard/Interstate 5 (I-5) SB ramps intersection and Elk Grove Boulevard Corridor
    - Addition of traffic to existing unacceptable conditions along State Route (SR) 99

    Cumulative

    - Contribution to wastewater flows requiring conveyance and treatment
    - Contribution of traffic to Elk Grove Boulevard near SR 99/Elk Grove Boulevard interchange
    - Contribution of traffic to Civic Center Boulevard/Big Horn Boulevard intersection
    - Contribution of traffic to existing unacceptable conditions along SR 99 and I-5

2. **Potentially Significant Impacts That Are Avoided by Adopting the Competition Venue Only Alternative or Do Not Require Mitigation Identified for the Proposed Project**

    Project-Specific

    - Changes to visual character
    - Increased noise levels due to non-transportation sources
    - Exposure of sensitive receptors to construction vibration

    Cumulative

- Contribution to cumulative noise levels from non- transportation sources
- Contribution to cumulative construction noise levels at nearby sensitive receptors

3. Impacts Addressed Adequately in the Previously Certified Laguna Ridge Specific Plan EIR

Project-Specific

- Effects on mineral resources or important mineral recovery sites
- Effects on airports, airstrips, or air traffic patterns
- Effects related to septic systems
- Effects on scenic vistas and State scenic highways
- Conversion of Prime Farmland, Unique Farmland, or Farmland of Statewide Importance; conflicts with agricultural zoning or a Williamson Act contract
- Conflicts with forest zoning; loss of forest land
- Long-term increases in criteria air pollutants or carbon monoxide; exposure of sensitive receptors to toxic air contaminants; exposure of people to substantial pollutant concentrations or odors
- Effects on special-status species, riparian habitat or sensitive natural communities, wetlands, or migratory fish or wildlife species
- Adverse effects on historical resources; adverse effects on archaeological resources; disturbance of human remains
- Exposure to hazards related to rupture of a known earthquake fault, seismic ground shaking, seismic-related ground failure, liquefaction, soil erosion, unstable soils, or expansive soils
- Significant risk of loss, injury, or death involving wildland fires
- Exposure of the public, including schools, to hazardous materials through routine use or due to accident or upset, or due to being located on a listed hazardous site
- Violations of water quality standards
- Effects on groundwater supplies or groundwater recharge; erosion, siltation, or flooding due to alteration of drainage patterns; polluted runoff
- Placement of housing or structures in a 100-year floodplain
- Exposure to risk due to inundation by seiche, tsunami, or mudflow, or failure of a levee or dam
- Conflicts with land use plans or policies

- Exposure of sensitive receptors to construction noise or traffic noise
- Inducement of population growth
- Impacts related to water supply; wastewater treatment or conveyance; or solid waste collection and disposal services
- Requirements for new or expanded water, wastewater, or stormwater facilities
- Effects associated with the construction of new electric, natural gas, and telephone services
- Adverse effects associated with the construction of new or altered governmental facilities for fire protection, police protection, schools, parks, or other public facilities
- Deterioration of park or recreation facilities
- Conflicts with measures established for the performance of the circulation system, public transit, bicycle, or pedestrian facilities, or applicable congestion management program
- Increases in traffic hazards or effects on emergency access or an adopted emergency response plan or emergency evacuation plan

Cumulative

- Contribution to cumulative changes in character of the City
- Contribution to pollutants in the air basin
- Contribution of greenhouse gases
- Contribution to cumulative traffic noise
- Contribution to cumulative demand for water supply or solid waste collection and disposal services
- Contribution to effects associated with the construction of new electric, natural gas, and telephone services

III. Findings and Recommendations Regarding Significant and Unavoidable and Cumulatively Considerable Impacts

A. Aesthetics

1. Light and Glare (EIR Impact 4.1.3)

(a) Potential Impact. Impacts related to light and glare were identified in the LRSP EIR as significant and unavoidable. Lighting of the competition venue and water and adventure park entryways, lighted signage, lighting of the recreational features (slides, zip lines, etc.), safety and wayfinding lighting throughout the Project site, lighting of the parking lot, and light from cars would add new sources of light and glare in the Project vicinity. This lighting would occur during evening operational hours, which would include weekdays and weekends until 10 p.m. and occasional overnight functions. The proposed Project would regularly operate until 10 p.m. in the summer and would occasionally operate overnight. These overnight operations with nighttime lighting were not considered in the LRSP EIR. Therefore, the proposed Project would result in an increase in the severity of this impact, which was previously identified in the LRSP EIR as significant and unavoidable. See DEIR pages 4.1-6 and 4.1-7. The Competition Venue Only Alternative would include nighttime lighting that would be visible to off-site residential areas. However, compared to the proposed Project, the real and perceived amount of light emanating from the site would be reduced and would be limited to the northernmost part of the Project site. This alternative would contribute to sky glow effects because there would be fewer sources of nighttime lighting, but not to same extent as the proposed Project. Unlike the proposed Project, this alternative would not result in an increase in the severity of significant and unavoidable light and glare impacts identified in the LRSP EIR, but light and glare impacts would still be significant and unavoidable. See DEIR page 6.0-10.

(b) Mitigation Measures. There are no feasible mitigation measures to mitigate this impact. Because development would permanently alter the existing visual character of the Project area from undeveloped land with open views to urban and developed, no mitigation measures are available. Therefore, mitigation is considered infeasible.

(c) Findings. Based on the EIR and the entire record before this City Council, this City Council finds that:

(1) Mitigation is infeasible.

(2) Remaining Impacts. Project lighting would be visible from nearby residences and other land uses, but it would be less intense than assumed in the LRSP EIR. All overhead lighting has been designed with cut-off lenses to avoid light spill and glare on adjacent properties. Therefore, the Competition Venue Only Alternative would result in a significant impact related to light and glare, which was previously identified in the LRSP EIR as significant and unavoidable. This impact would remain significant and unavoidable with the Competition Venue Only Alternative.

(3) Overriding Considerations. The environmental, economic, social, and other benefits of the Competition Venue Only Alternative override any remaining significant adverse impacts resulting from an increase in light and glare in the Project area, as more fully stated in the Statement of Overriding Considerations in Section VIII, below.

B. Air Quality

1. Construction-Related Air Quality Impacts (EIR Impact 4.2.1)

(a) Potential Impact. Impacts related to construction emissions were identified in the LRSP EIR as significant and unavoidable. Project emissions resulting from construction would not exceed the maximum projected construction emissions for the entire LRSP as identified in the LRSP EIR, but construction-generated emissions from the Project would surpass the Sacramento Metropolitan Air Quality Management District (SMAQMD) significance threshold of 85 pounds per day of NO_x emissions during construction. Implementation of SMAQMD-recommended construction mitigation measures (LRSP EIR MM 4.3.1a through MM 4.3.1g) would reduce Project impacts, but not to a level of less than significant. See DEIR pages 4.2-14 through 4.2-17. The Competition Venue Only Alternative would result in fewer construction emissions because of the smaller site footprint (competition venue and parking only), but would still require a substantial amount of grading and paving, which would generate NO_x emissions. Implementation of SMAQMD-recommended construction mitigation measures (LRSP EIR MM 4.3.1a through MM 4.3.1g) would reduce impacts of the Competition Venue Only Alternative, but not to a level of less than significant. See DEIR page 6.0-13.

(b) **Mitigation Measures.** There are no additional feasible mitigation measures to mitigate this impact.

(c) **Findings**. Based on the DEIR and the entire record before this City Council, this City Council finds that:

(1) **Mitigation is infeasible**.

(2) **Remaining Impacts**. Implementation of SMAQMD-recommended construction mitigation measures would reduce construction-generated pollutant emissions associated with the Competition Venue Only Alternative, but not to a level that is less than significant. Therefore, construction-generated emissions of air pollutants would exceed the SMAQMD's significance threshold for NO_x. This impact is considered significant and unavoidable.

(3) **Overriding Considerations**. The environmental, economic, social, and other benefits of the Competition Venue Only Alternative override any remaining significant adverse impacts resulting from construction-related air quality impacts, as more fully stated in the Statement of Overriding Considerations in Section VIII, below.

C. Public Utilities

1. Cumulative Wastewater Impacts (EIR Impact 4.8.2.2)

(a) **Potential Impact**. The LRSP EIR did not identify a downstream deficiency in the wastewater system. The Project is projected to generate 5.85 million gallons annually or approximately 0.016 million gallons of wastewater per day. Implementation of the Project, in combination with other development in the Sacramento Regional County Sanitation District (SRCSD) service area, would generate significant new wastewater flows requiring conveyance. While the Sacramento Regional Wastewater Treatment Plant's (SRWTP) existing capacity of 207 million gallons per day (mgd) would not meet the 2020 projected average dry weather flow of 218 mgd, the plant has been master planned to accommodate 350 mgd average dry weather flow and would be expanded and upgraded to respond to future growth. Similarly, the SRCSD has prepared a master plan for the district's regional interceptors that would ensure adequate capacity for future growth to 2035.

However, Sacramento Area Sewer District (SASD) staff identified a downstream deficiency from the 2010 Sewer Capacity Study, which will require improvements in the future to accommodate development in the LRSP shed, but the precise improvements necessary to address the deficiency are not known at this time. In addition, the location of any future improvements is unknown, so this analysis cannot adequately assess the potential impacts. See DEIR page 4.8-17. The Competition Venue Only Alternative would generate wastewater that would be conveyed through SASD systems. The volume would be less than the proposed Project, but it would still contribute to the cumulative significant and unavoidable impact identified for the proposed Project regarding conveyance to the SRWTP. See DEIR page 6.0-13.

(b) **Mitigation Measures.** There are no feasible mitigation measures to mitigate this impact at this time. The location of any future improvements to accommodate future development is unknown, so the analysis cannot adequately assess the potential impacts. Therefore, no mitigation can be provided at this time.

(c) **Findings**. Based on the DEIR and the entire record before this City Council, this City Council finds that:

(1) **Mitigation is infeasible.**

(2) **Remaining Impacts**. The location of any future improvements is unknown; therefore, the analysis included in the DEIR cannot adequately assess the potential impacts. For this reason, this impact is significant and unavoidable and the Competition Venue Only Alternative's contribution to the impact would be cumulatively considerable.

(3) **Overriding Considerations**. The environmental, economic, social, and other benefits of the Competition Venue Only Alternative override any remaining significant adverse impact related to cumulative wastewater impacts, as more fully stated in the Statement of Overriding Considerations in Section VIII, below.

D. Transportation

1. Intersection Operations (EIR Impact 4.9.1)

(a) **Potential Impact**. The addition of the Project would result in or contribute to unacceptable operations at the Elk Grove Boulevard/I-5 SB ramps intersection and Elk Grove Boulevard corridor. The controlled eastbound and westbound movements at the intersection operate at level of service (LOS) F due to the much higher volume uncontrolled southbound off-ramp left-turn movement from I-5. The Project would add traffic to the uncontrolled on-ramp movements at the intersection, which would increase delay for the controlled eastbound and westbound movements at the intersection. Significant vehicle queuing was observed during the PM peak hour near the SR 99/Elk Grove Boulevard intersection and the Project would add traffic to the Elk Grove

Boulevard corridor near the SR 99 interchange. See DEIR pages 4.9-22 through 4.9-26. The number of vehicle trips generated by the Competition Venue Only Alternative would be less than that generated by the proposed Project because there would be no water and adventure park guests. However, it is assumed that the number of trips may not be reduced to levels that would eliminate the significant and unavoidable impacts identified for the proposed Project. See DEIR page 6.0-13.

(b) **Mitigation Measures.** There are no feasible mitigation measures to mitigate these impacts at this time. No mitigation is recommended at the Elk Grove Boulevard/I-5 ramps intersection because the west leg of the intersection is and will remain undeveloped; volumes are low on the controlled movements and will remain low without development; there were no reported collisions at the intersection indicating need for modified intersection traffic control; and traffic volumes on the controlled movements would not warrant installation of traffic signal control. There is limited right-of-way for physical (i.e., capacity) improvements along the Elk Grove Boulevard corridor and the corridor is largely constructed to its General Plan designation as a six-lane arterial.

(c) **Findings**. Based on the DEIR and the entire record before this City Council, this City Council finds that:

(1) **Mitigation is infeasible**.

(2) **Remaining Impacts**. The Competition Venue Only Alternative would contribute to volumes at these locations, which operate at an unacceptable level of service and would remain unacceptable. Therefore, this impact is significant and unavoidable.

(3) **Overriding Considerations**. The environmental, economic, social, and other benefits of the Competition Venue Only Alternative override any remaining significant adverse impact related to intersection operations, as more fully stated in the Statement of Overriding Considerations in Section VIII, below.

2. **Freeway Facility Operations (EIR Impact 4.9.2)**

(a) **Potential Impact**. The analysis in the LRSP EIR determined that operations along the SR 99 and I-5 corridors through the City would operate at acceptable levels of service. With the Project, peak period operations on SR 99 may be worse than reported due to reoccurring bottlenecks, which cause congested conditions (i.e., vehicle speed of 35 miles per hour or less). These bottlenecks on southbound SR 99 in the evening meter traffic on SR 99 through Elk Grove. The Project would add approximately 16 trips to southbound SR 99, which is an already impacted segment. See DEIR pages 4.9-26 through 4.9-28. The Competition Venue Only Alternative would also add traffic to an impacted segment of SR 99, so the Competition Venue Only Alternative's impact would also be significant. See DEIR page 6.0-13.

(b) **Mitigation Measures.** There are no feasible mitigation measures to mitigate this impact. Because SR 99 is under the jurisdiction of the California Department of Transportation (Caltrans), these facilities are outside the City's jurisdiction to implement improvements that would mitigate impacts. Therefore, no mitigation can be provided.

(c) Findings. Based on the DEIR and the entire record before this City Council, this City Council finds that:

(1) Mitigation is infeasible.

(2) Resulting Impacts. The addition of traffic from the Competition Venue Only Alternative would exacerbate congestion conditions on SR 99 during the AM and PM peak hours. No mitigation measures are available to the City to mitigate this impact since SR 99 is under the jurisdiction of Caltrans and these facilities are outside the City's jurisdiction to implement improvements that would mitigate the impacts. Therefore, this impact would be significant and unavoidable.

(3) Overriding Considerations. Mitigation measures that would reduce the impacts are outside the City's jurisdiction to implement improvements. The environmental, economic, social, and other benefits of the Competition Venue Only Alternative override any remaining significant adverse impacts related to freeway facility operations, as more fully stated in the Statement of Overriding Considerations in Section VIII, below.

3. Cumulative Intersection Operations (EIR Impact 4.9.5)

(a) Potential Impact. Implementation of the proposed Project, in combination with other recently constructed, planned, approved, and reasonably foreseeable projects, would result in a decline of service at Elk Grove Boulevard near SR 99/Elk Grove Boulevard interchange and the Civic Center Drive/Big Horn Boulevard intersection. The addition of Project traffic would worsen unacceptable operations near the SR 99/Elk Grove Boulevard interchange. The addition of Project traffic would worsen weekday PM and Saturday peak-hour operations at the Civic Center Drive/Big Horn Boulevard intersection by increasing the delay by more than 5 seconds. See DEIR pages 4.9-30 through 4.9-36. The Competition Venue Only Alternative would generate fewer trips than the proposed Project, but would still worsen weekday PM and Saturday peak-hour operations at the Civic Center Drive/Big Horn Boulevard intersection. The Competition Venue Only Alternative's impact would also be significant. See DEIR page 6.0-13.

(b) Mitigation Measures. There are no feasible mitigation measures to mitigate this impact.

(c) Findings. Based on the DEIR and the entire record before this City Council, this City Council finds that:

(1) Mitigation is infeasible.

(2) Remaining Impacts. There is limited right-of-way for physical (i.e., capacity) improvements along the Elk Grove Boulevard corridor and the corridor is largely constructed to its General Plan designation as a six-lane arterial. There is limited right-of-way for physical (i.e., capacity) improvements along Big Horn Boulevard, which is constructed to its General Plan designation as a four-lane arterial.

(3) **Overriding Considerations.** The environmental, economic, social, and other benefits of the Competition Venue Only Alternative override any remaining significant adverse impacts related to cumulative intersection operations, as more fully stated in the Statement of Overriding Considerations in Section VIII, below.

4. **Cumulative Freeway Facility Operations (EIR Impact 4.9.6)**

(a) **Potential Impact**. Peak period operations on SR 99 may be worse than reported due to reoccurring bottlenecks that cause congested conditions (i.e., vehicle speed of 35 miles per hour or less) and vehicle queuing on northbound SR 99 during the AM peak period. Bottlenecks on southbound SR 99 in the evening meter traffic on SR 99 through Elk Grove. The Project would add traffic to the SB I-5 mainline and off-ramp diverge, which would operate unacceptably at LOS F under cumulative conditions. The addition of Project traffic would increase the density of the I-5 mainline (north of Elk Grove Boulevard) and the I-5 SB off-ramp diverge influence area to Elk Grove Boulevard. See DEIR page 4.9-36 through 4.9-39. The number of vehicle trips generated by the Competition Venue Only Alternative would be less than that generated by the proposed Project because there would be no water and adventure park guests. However, it is assumed that the number of trips may not be reduced to levels that would eliminate the significant and unavoidable impacts identified for the proposed Project. The Competition Venue Only Alternative's contribution to the cumulative impact would be cumulatively considerable. See DEIR page 6.0-13.

(b) **Mitigation Measures.** There are no feasible mitigation measures to mitigate this impact. Because SR 99 is under the jurisdiction of Caltrans, these facilities are outside the City's jurisdiction to implement improvements that would mitigate impacts. Therefore, no mitigation can be provided.

(c) **Findings**. Based on the DEIR and the entire record before this City Council, this City Council finds that:

(1) **Mitigation is infeasible.**

(2) **Remaining Impacts**. Poor operation of the SB I-5 mainline (north of Elk Grove Boulevard) and the SB I-5 off-ramp diverge influence area to Elk Grove Boulevard is due to capacity constraints on southbound I-5. Extending the third southbound lane on I-5 from its current terminus just south of Laguna Boulevard to just south of Elk Grove Boulevard would improve operations of these facilities to LOS D or better. The extension of high-occupancy vehicle (HOV) lanes from their current terminus just south of Elk Grove Boulevard to south of Grant Line Road would ensure additional capacity on SR 99 through the City. These facilities are outside the City's jurisdiction to implement improvements that would mitigate impacts. Therefore, this impact would be cumulatively considerable and significant and unavoidable.

(3) **Overriding Considerations.** Mitigation measures that would reduce the impacts are outside the City's jurisdiction to implement improvements. The environmental, economic, social, and other benefits of the Project override any remaining significant adverse impacts related to cumulative freeway facility operations, as more fully stated in the Statement of Overriding Considerations in Section VIII, below.

IV. Findings and Recommendations Regarding Significant Impacts Which Are Avoided by Adopting the Competition Venue Only Alternative or Do Not Require Mitigation Identified for the Proposed Project

A. Aesthetics

1. Change in Existing Visual Character (EIR Impact 4.1.2)

(a) **Potential Impact.** Impacts related to changes in the character of the area were identified in the LRSP EIR as significant and unavoidable. Development of the proposed Project would convert the visual character of the site from undeveloped in nature to a developed character with a large-scale competition venue and water/adventure park. Views of open areas would be replaced by views of a large-scale competition venue and water/adventure park. The LRSP EIR recognized that the change in character of the Project site would result in a significant and unavoidable impact, but because of the scale of the proposed Project, it would exceed the impact disclosed in the LRSP EIR. See DEIR pages 4.1-3 and 4.1-6. The Competition Venue Only Alternative would also include development of the site. However, because the tallest component of this alternative is only 33 feet tall and these components would be located in a central portion of the site, the appearance of these features would not be out of scale or inconsistent with surrounding development when viewed from off-site locations. Therefore, this impact would be less than significant for the Competition Venue Only Alternative. See DEIR page 6.0-10.

(b) **Mitigation Measures.** There are no mitigation measures required.

(c) **Findings.** Based on the EIR and the entire record before this City Council, this City Council finds that:

(1) **Mitigation is not required.**

(2) **Remaining Impacts.** The remaining impact would be less than significant for the Competition Venue Only Alternative.

(3) **Overriding Considerations.** This impact would be less than significant for the Competition Venue Only Alternative, so overriding considerations are not required.

B. Noise

1. Average-hourly Non-transportation Noise Impacts (EIR Impact 4.7.4)

(a) **Potential Impact.** The LRSP EIR concluded that operational noise would be less than significant with implementation of mitigation measure MM 4.4.3b.

Combined operational noise levels associated with on-site non-transportation noise sources, including the competition venue, the water park, adventure park, and parking lots, would range from approximately 59 dBA L_{eq}, without the use of amplified PA/sound systems, to approximately 64 dBA L_{eq} with the use of amplified PA/sound systems at the nearest residential land use. Therefore, predicted nighttime noise levels would exceed the City's nighttime noise standard of 40 dBA L_{eq}. See DEIR pages 4.7-25 through 4.7-29. The Competition Venue Only Alternative would be located on the central portion of the Project site, so it would avoid the impact with respect to residential uses on the east side of the Project site and mitigation measure MM 4.7.4, which would require tall sound barriers and landscaping, would not be required. See DEIR page 6.0-13.

(b) **Mitigation Measures.** There are no mitigation measures required.

(c) **Findings**. Based on the DEIR and the entire record before this City Council, this City Council finds that:

(1) **Mitigation is not required**.

(2) **Remaining Impacts**. The remaining impact would be less than significant for the Competition Venue Only Alternative.

(3) **Overriding Considerations**. This impact would be less than significant for the Competition Venue Only Alternative, so overriding considerations are not required.

2. **Instantaneous Non-transportation Noise Impacts (EIR Impact 4.7.5)**

(a) **Potential Impact**. The LRSP EIR did not evaluate maximum instantaneous operational noise impacts associated with non-transportation noise sources. Predicted maximum instantaneous noise levels at the nearest residential land uses located along the eastern Project site property line would range from approximately 68 to 81 dBA L_{max}. Noise levels would be greatest at planned residential land uses located nearest the wave pool and elevated ride platforms (within the water park) generally located in the southeastern portion of the Project site. See DEIR pages 4.7-37 through 4.7-39. The Competition Venue Only Alternative would not include the wave pool or elevated ride platforms, so there would be no impact from these features under this alternative. Mitigation measure MM 4. 7.4, identified to reduce impacts for the proposed project, would not be required. See DEIR page 6.0-13.

(b) **Mitigation Measures**. There are no mitigation measures required.

(c) **Findings**. Based on the DEIR and the entire record before this City Council, this City Council finds that:

(1) **Mitigation is not required.**

(2) **Remaining Impacts**. The remaining impact would be less than significant for the Competition Venue Only Alternative.

(3) **Overriding Considerations.** This impact would be less than significant for the Competition Venue Only Alternative, so overriding considerations are not required.

3. **Expose Nearby Sensitive Receptors to Construction Vibration (EIR Impact 4.7.2)**

(a) **Potential Impact.** The proposed Project could generate construction vibration at sensitive receptors. See DEIR pages 4.7-21 and 4.7-22. Because of the distance between components of the Competition Venue Only Alternative and the nearest residential uses, there would be no construction adjacent to residential uses and this alternative would avoid the construction vibration impact of the proposed Project (Impact 4.7.2). In addition, because special methods would not be needed to install the pool and related facilities and amenities, mitigation measure MM 4.7.2 would not be required.

(b) **Mitigation Measures.** There are no mitigation measures required.

(c) **Findings.** Based on the EIR and the entire record before this City Council, this City Council finds that:

(1) **Mitigation is not required.**

(2) **Remaining Impacts.** The remaining impact would be less than significant for the Competition Venue Only Alternative.

4. **Cumulative Non-transportation Noise Impacts (EIR Impact 4.7.7)**

(a) **Potential Impact**. The LRSP EIR did not evaluate cumulative non-transportation noise levels. Existing non-transportation noise sources in the Project vicinity are not projected to exceed applicable noise standards at the nearest residential land uses and are largely masked by existing traffic noise levels. Based on the surrounding land uses, no other major stationary noise sources are anticipated in the immediate vicinity of the Project site. However, the proposed Project would result in increases in non-transportation noise levels that would exceed the City's noise standards and would contribute to existing non-transportation noise levels in the Project area. See DEIR pages 4.7-48 and 4.7-49. Because the Competition Venue Only Alternative would include a less intensive use and would not be located immediately adjacent to residential uses, the Competition Venue Only Alternative's contribution to cumulative non-transportation noise would not be cumulatively considerable. See DEIR page 6.0-13.

(b) **Mitigation Measures.** There are no mitigation measures required.

(c) **Findings**. Based on the DEIR and the entire record before this City Council, this City Council finds that:

(1) **Mitigation is not required**.

(2) **Remaining Impacts**. The remaining impact would be less than significant for the Competition Venue Only Alternative.

(3) **Overriding Considerations.** The Competition Venue Only Alternative's contribution to this impact would be less than cumulatively considerable, so overriding considerations are not required.

5. **Cumulative Construction Noise Impacts (EIR Impact 4.7.8)**

(a) **Potential Impact.** The LRSP EIR concluded that simultaneous construction activities could potentially occur in various areas of the LRSP, which could adversely affect nearby noise-sensitive land uses and was considered significant. The Project's contribution to the cumulative construction noise effects would be cumulatively considerable. See DEIR pages 4.7-37 through 4.7-39. The Competition Venue Only Alternative would not require construction adjacent to residential uses, so mitigation measure MM 4.7.2 would not be required and the potential effects of construction noise from this alternative would not negatively affect adjacent residents or contribute substantially to construction noise at more distant locations. The Competition Venue Only Alternative's contribution to cumulative construction noise would be less than considerable. See DEIR page 6.0-13.

(b) **Mitigation Measures.** There are no mitigation measures required.

(c) **Findings.** Based on the DEIR and the entire record before this City Council, this City Council finds that:

(1) **Mitigation is not required.**

(2) **Remaining Impacts.** The remaining impact would be less than significant for the Competition Venue Only Alternative.

(3) **Overriding Considerations.** The Competition Venue Only Alternative's contribution to this impact would be less than cumulatively considerable, so overriding considerations are not required.

V. Other Impacts and Considerations

1. Growth-Inducing Impacts of the Competition Venue Only Alternative

CEQA Guidelines Section 15126.2(d) requires that an EIR evaluate the growth-inducing impacts of a proposed action.

(a) **Findings.** Based on the DEIR and the entire record before this City Council, the Project would result in the development of a recreation facility that would generate some employment growth and development in the City that has been anticipated in the City's General Plan and the LRSP. The Project would not result in substantial growth inducement. The Competition Venue Only Alternative would result in development of a portion of the Project analyzed in the EIR, which would generate only a portion of the employment opportunities of the proposed Project and would not induce substantial growth.

(b) **Explanation.** As identified on DEIR pages 6.0-1 through -2, the Project area has been identified for development of recreational uses in the City's General Plan and the LRSP. The Project would create new employment opportunities in the City, but it would not substantially increase employment opportunities such that the City's population would be significantly increased beyond that anticipated by the General Plan or LRSP EIR or result in the need for housing beyond that assumed in the LRSP EIR.

2. Significant Irreversible Environmental Changes Involved if the Competition Venue Only Alternative is Implemented

CEQA Sections 21100(b)(2) and 21100.1(a) require that an EIR prepared for the adoption of a plan, policy, or ordinance of a public agency must include a discussion of significant irreversible environmental changes of project implementation.

(a) Findings. Based on the DEIR and the entire record before this City Council, the Project could consume more energy and natural resources and result in significant irreversible impacts slightly greater than those discussed in the LRSP EIR. The Competition Venue Only Alternative would develop only a portion of the Project analyzed in the EIR, so the energy and natural resources consumed by the alternative would be less than that of the proposed Project and would not be substantially more than that of those discussed in the LRSP EIR.

(b) Explanation. As identified on DEIR pages 5.0-3 through -11, the Project would be consistent with existing plans and would result in significant irreversible impacts similar to those discussed in the LRSP EIR. The Competition Venue Only Alternative is an allowed use in the LRSP, but would result in some of the more intensive uses that were not considered in the LRSP EIR. Therefore, the proposed Project could consume more energy and natural resources and result in significant irreversible impacts slightly greater than those discussed in the LRSP EIR.

VI. Project Alternatives

A. Background – Legal Requirements

CEQA requires that EIRs assess feasible alternatives or mitigation measures that may substantially lessen the significant effects of a project prior to approval (Public Resources Code Section 21002). With the exception of the No Project Alternative, the specific alternatives or types of alternatives that must be assessed are not specified. CEQA "establishes no categorical legal imperative as to the scope of alternatives to be analyzed in an EIR. Each case must be evaluated on its own facts, which in turn must be reviewed in light of the statutory purpose" (*Citizens of Goleta Valley v. Board of Supervisors*, 52 Cal.3d. 553, 556 [1990]). The legislative purpose of CEQA is to protect public health, welfare, and the environment from significant impacts associated with all types of development, by ensuring that agencies regulate activities so that major consideration is given to preventing environmental damage while providing a decent home and satisfying living environment for every Californian (Public Resources Code Section 21000). In short, the objective of CEQA is to avoid or mitigate environmental damage associated with development. This objective has been largely accomplished in the Project through the inclusion of Project modifications and mitigation measures that reduce the potentially significant impacts to an acceptable level. The courts have held that a public agency "may approve a developer's choice of a project once its significant adverse environment effects have been reduced to an acceptable level—that is, all avoidable significant damage to the environment has been eliminated and that which remains is otherwise acceptable" (*Laurel Hills Homeowners Assoc. v. City*, 83 Cal.App.3d 515, 521 [1978]).

B. Identification of Project Objectives

The CEQA Guidelines state that the "range of potential alternatives to the project shall include those that could feasibly accomplish most of the basic purposes of the project and could avoid or substantially lessen one of more of the significant effects" of the project (CEQA Guidelines Section 15126.6(c)). Thus, consideration of the Project objectives is important to determining which alternatives should be assessed in the EIR.

The DEIR identified the following objectives for the Civic Center Aquatics Complex Project:

1) Develop an aquatics complex in the Laguna Ridge Specific Plan area with competitive swimming and diving components, including an Olympic-size competition swimming pool, a warm-up pool, and a diving tower, that can host up to 2,000 swimmers for each meet and seating for approximately 1,100 spectators under a shaded structure.
2) Develop a facility that can support multiple aquatic team programs for schools and a variety of regional club teams for practices and meets and for regional, state, and national events.
3) Provide necessary amenities to support athletes and spectators, such as concessions, hot tub, locker rooms, meeting room, office space, and storage.
4) Develop a commercial recreation facility to entertain 250,000 guests annually with outdoor activities such as a water park, adventure theme park, and fun center with a family focus, targeted at both youth and adult guests.
5) Provide dining/concessions component including meals, snacks, and beverages.
6) Provide landscaping, parking, lighting, and security, as required by City code.

VII. Alternatives Analysis in the DEIR

1. Alternatives Considered But Rejected

An alternative that considered an alternative location (off-site alternative) was considered but rejected from further consideration in the EIR.

(a) Findings. An alternative location/off-site alternative was rejected from further consideration because there are limited sites in the City that would be designated and zoned to accommodate the Project. One location in the Southeast Policy Area Strategic Plan area under consideration by the City at the time of preparation of the DEIR includes a Sports Complex Overlay, which would accommodate the recreational use of the Project. Because the location of the Sports Complex Overlay was not defined in the Southeast Policy Area Strategic Plan EIR, the potential effects on adjacent land uses were not considered and additional environmental review would be required. Therefore, it cannot be ascertained which impacts, if any, it would avoid or reduce, and it is unknown whether the Project proponent could reasonably acquire, control, or otherwise have access to the alternative site.

(b) Explanation. The Sports Complex Overlay would provide the option to develop a portion of the Southeast Policy Area with a regional complex with tournament-type sports fields and/or a stadium, on-site parking, associated lighting, and support facilities for facility maintenance, concessions, and player support facilities. A specific location or possible locations for a sports complex was not identified as part of that project. An aquatics complex with a water and adventure park, competition venue, and parking is a type of use that could be generally consistent with a Sports Complex Overlay. However, the City has not received any specific development proposals for a sports complex facility. The Southeast Community Plan provides the facility as a future option, but it is not certain whether such a facility will be developed. It is also unknown what land uses it could displace. The Southeast Policy Area Strategic Plan EIR addresses the potential for the development of a regional sports complex to the greatest extent feasible, but if an application for a sports complex is received, additional environmental review would be required. Because it cannot be ascertained which impacts, if any, development on this site as opposed to the Project site would avoid or reduce, the alternative site was not considered as an alternative to the proposed Project.

Alternatives Analyzed in the DEIR

The CEQA Guidelines state that the "range of potential alternatives to the project shall include those that could feasibly accomplish most of the basic purposes of the project and could avoid or substantially lessen one or more of the significant effects" of the project. The City evaluated the alternatives listed below.

2. No Project Alternative

The DEIR considers the potential effects of a No Project Alternative on pages 6.0-4 through 6.0-6. The No Project Alternative assumes the site would be developed according to the land use designations as adopted under the LRSP: Community Park (CP) – approximately 48 acres, and Open Space (OS) – 7.7 acres. This alternative assumes the Community Park (CP) portion of the Project site would be developed with softball, baseball, and soccer fields, restrooms/concession buildings, on-site parking per City requirements, and security and sports facility lighting. Under the No Project Alternative, the Open Space (OS) area would remain a wetland preserve, unless the US Army Corps of Engineers restrictions are removed, at which time this area could be developed for parkland usage.

(a) Findings. The No Project Alternative is rejected as a feasible alternative because although it would result in fewer impacts compared to the proposed Project, it would not achieve any of the Project objectives, as discussed on pages 6.0-4 through 6.0-6 of the DEIR.

(b) Explanation. This alternative would not realize the benefits of the Project or achieve the Project objectives. This alternative would not develop an aquatics complex in the LRSP area with competitive swimming and diving components that support multiple aquatic team programs for schools and regional club teams. This alternative would not develop a commercial recreation facility to entertain 250,000 guests annually with outdoor activities such as a water park, adventure theme park, and fun center with a family focus, targeted at both youth and adult guests.

3. Modified Project Design Alternative

The Modified Project Design Alternative is discussed on pages 6.0-7 through 6.0-8 of the DEIR. The Modified Project Design Alternative would relocate the two easternmost water slides and zip line recreational features to the center and northern part of the complex. The aquatic competition venue would be situated in the eastern part of the site. Lighting in the water and adventure park and the competition venue would be the same as with the proposed Project.

(a) Findings. The Modified Project Design Alternative is rejected as a feasible alternative because although it meets the Project objectives and is consistent with the LRSP, it would still result in significant and unavoidable impacts related to nighttime lighting and noise levels that exceed City standards, as discussed on pages 6.0-7 through 6.0-8 of the DEIR.

(b) Explanation. The Modified Project Design Alternative would reduce aesthetics and noise impacts. However, aesthetic impacts related to the height of the water and adventure park recreational features relative to adjacent residential development and nighttime lighting would still be significant and unavoidable. With regard to non-transportation noise, the sound barrier proposed in mitigation measure MM 4.7.4 may provide additional attenuation of noise levels relative to off-site residences because there would be more separation between the water and adventure park features and the residences to the east. However, because the competition venue amplification system and spectator seating would be relocated to the eastern part of the site, the levels may be less than estimated for the proposed Project, but noise levels at the eastern property boundary could still exceed City standards.

4. Reduced Project Alternative

The Reduced Project Alternative would include a water and adventure park, but at a reduced scale to fit within a smaller site footprint, and situated in the central portion of the Project site. This alternative would include fewer water slides and zip line towers. There would be no development between a line extended south of the water treatment facility and the eastern project boundary adjoining residential development. The western edge of undeveloped portion would be landscaped as described for the proposed Project. This alternative would include the competition venue identical to the proposed Project in terms of its features and location and related amenities. This alternative would require less overflow parking because there would be fewer guests.

(a) Findings. The Reduced Project Alternative is rejected as a feasible alternative because although it meets the Project objectives and is consistent with the LRSP, it would result in fewer amenities for guests and diminish the guest experience. In addition, it would still result in significant and unavoidable impacts related to nighttime lighting and the height of the water and adventure park recreational features relative to adjacent residential development, as discussed on pages 6.0-8 through 6.0-10 of the DEIR.

(b) Explanation. The Reduced Project Alternative would reduce aesthetics and noise impacts. This alternative would situate the slide complexes and zip line farther from the eastern boundary, but the aesthetic impacts related to the height of the slide complexes and zip line relative to adjacent residential development and nighttime lighting would still be significant and unavoidable. Relocation of the water and adventure park to the center of the Project site with fewer features and the competition venue to the north would be expected to generate reduced hourly and maximum non-transportation noise levels compared to the proposed Project because there would be fewer guests. The noise impact could be reduced in magnitude, but the EIR conservatively concluded this would still be a significant and unavoidable impact.

5. Competition Venue Only Alternative

The Competition Venue Only Alternative would consist of the competition venue identical to the proposed Project in terms of its location, features, and related amenities. The competition venue would consist of a competition swimming pool (50 meters by 25 yards, 2-meter depth) and a dive pool (25 meters by 25 yards, 17-foot depth) with a signature 10-meter diving tower (33 feet in height), a 3-meter springboard, and a 1-meter springboard, and seating for approximately 1,100 spectators. There would be no water and adventure park. The competition venue would operate year-round Monday through Saturday with anticipated hours of 7:00 a.m. to 9:00 p.m., as well as on Sundays during the months of May through July from 7:00 a.m. to 7:00 p.m. This alternative would require less parking than the proposed Project because there would be fewer visitors than would be generated by the competition venue and water and adventure parks combined.

(a) Findings. The City Council has elected to adopt the Competition Venue Only Alternative because it would eliminate the significant and unavoidable impacts related to changes in visual character and operational and construction noise and would achieve all the Project objectives except objective 4 (commercial recreation facility). Although significant and unavoidable impacts related to the light and glare, construction air emissions (NO_x), wastewater, and traffic would remain with the Competition Venue Only Alternative, this alternative would reduce the severity of most impacts compared to the proposed Project. The reduction in the amount of land disturbed for construction and the reduced intensity of the operations compared to the proposed Project would result in reductions in the following issue areas: light and glare, changes in visual character due to structure height and location, construction emissions, operational emissions (including transportation-related emissions), construction noise and vibration, transportation- and stationary-source noise, water demand, wastewater generation, and traffic increases. The Competition Venue Only Alternative is discussed on pages 6.0-10 through 6.0-14 of the DEIR.

(b) Explanation. The Competition Venue Only Alternative would eliminate the significant and unavoidable aesthetic impact related to height because the tallest components of this alternative would be the 10-meter (approximately 33 feet) dive platform and light poles (20 feet tall). Therefore, the appearance of these features when viewed from off-site locations would not be out of scale or inconsistent with surrounding development. Light and glare impacts under this alternative would still be significant and unavoidable, though they would not result in an increase in the severity of significant and unavoidable light and glare impacts identified in the LRSP EIR. The reduced footprint of this alternative would result in corresponding decreases in construction emissions of criteria pollutants, as well as less exposure of sensitive receptors to construction-related noise and vibration. The reduced intensity of the use under this alternative would result in a reduction in traffic on area roadways compared to the proposed Project, and a corresponding reduction in traffic-related air emissions and noise. The reduction in intensity would also result in reduced water demand, wastewater generation, and stationary-source noise because there would be fewer visitors and less noise-generating equipment and features. This alternative would reduce, but not to a level of insignificance, the light and glare, construction air emissions (NO_x), wastewater, and traffic impacts.

5. Environmentally Superior Alternative

The environmentally superior alternative is discussed on pages 6.0-14 through 6.0-15 of the DEIR. Under CEQA Guidelines Section 15126.6(e)(2), if the environmentally superior alternative is the No Project Alternative, another environmentally superior alternative must be identified. For the DEIR analysis, Competition Venue Only Alternative is the environmentally superior alternative. It would reduce (but not avoid) the significant and unavoidable aesthetics impact of the proposed Project; it would lessen other environmental impacts; and it would meet all of the Project objectives, with the exception of objective 4 (commercial recreation facility).

VIII. Statements of Overriding Considerations Related to the Civic Center Aquatics Complex Project Findings

A. **Consistency with the City's General Plan and Laguna Ridge Specific Plan.** The General Plan designates the LRSP area with specific land use categories and requires that the Specific Plan be used to implement General Plan policies for the area. General Plan Policy LU-28 requires land uses in the Laguna Ridge Policy Area to conform to the general layout of land uses shown in Figure LU-5 of the General Plan. General Plan Policy LU-31 requires the LRSP and any related implementation plans to be consistent with the General Plan and to be used to implement the land use and other policies of the General Plan. The LRSP zones the site of the Competition Venue Only Alternative as Community Park (CP), meaning that the LRSP and the LRSP EIR contemplated development of the site with active recreation uses and the City adopted a Statement of Overriding Considerations for the LRSP. The Competition Venue Only Alternative is consistent with the intent of the LRSP for community park sites to provide recreational uses intended to serve the needs of the LRSP area and the residents of Elk Grove. According to the LRSP, the purpose of the larger parks is to encourage multiple uses and allow active recreation. The Competition Venue Only Alternative would be considered consistent with General Plan and the LRSP.

B. **Employment Opportunities.** The Competition Venue Only Alternative would generate a combination of part-time and full-time jobs totaling approximately 125 positions. Construction jobs to develop the Project are approximately 90 positions.

C. **Benefits to the Community.** The Competition Venue Only Alternative would provide community benefits by providing water competition facilities that would offer a new venue for local swim clubs as well as provide the opportunity to attract competitions for collegiate and national meets that would provide revenue to the City.

Based on the objectives identified for the Project, review of the Project, review of the EIR, and consideration of public and agency comments, the City has determined that the Competition Venue Only Alternative should be approved and that any remaining unmitigated environmental impacts attributable to the Competition Venue Only Alternative have been minimized to the extent feasible through the mitigation measures identified herein, and, where mitigation is not feasible, have been outweighed and counterbalanced by the significant social, environmental, and land use benefits to the City.

Sources

City of Elk Grove. 2003. *Elk Grove General Plan Draft Environmental Impact Report*. SCH# 2002062082.

———. 2003. *Laguna Ridge Specific Plan*.

———. 2003. *Laguna Ridge Specific Plan Draft Environmental Impact Report*. SCH# 2000082139.

EXHIBIT D

Civic Center Aquatics Complex
Mitigation Monitoring and Reporting Program

I. Introduction

The California Environmental Quality Act (CEQA) Guidelines, Section 15091(d), requires public agencies, as part of the certification of an environmental impact report, to adopt a reporting and monitoring program to ensure that changes made to the project as conditions of project approval to mitigate or avoid significant environmental effects are implemented. The Mitigation Monitoring and Reporting Program (MMRP) contained herein is intended to satisfy the requirements of CEQA as they relate to the Civic Center Aquatics Complex Project (Project) in the City of Elk Grove (City). The MMRP is intended to be used by City staff and mitigation monitoring personnel during implementation of the Project.

The MMRP will provide for monitoring of construction activities as necessary, in-the-field identification and resolution of environmental concerns, and reporting to City staff. The MMRP will consist of the components described below.

The Project site is located within the Laguna Ridge Specific Plan (LRSP) area. The LRSP EIR (SCH No. 2000082139) assessed the environmental impacts resulting from the construction and operation of the Laguna Ridge Specific Plan. The City approved the LRSP and certified the Final EIR on June 16, 2004. A MMRP was prepared and adopted with the LRSP. The LRSP MMRP is a binding document that runs with the land and would, therefore, be applicable to the proposed Project.

II. Compliance Checklist

Table 1 contains a compliance-monitoring checklist that identifies all adopted mitigation measures, identification of agencies responsible for enforcement and monitoring, and timing of implementation.

III. Field Monitoring of Mitigation Measure Implementation

During construction of the Project, the City of Elk Grove's designated construction inspector will be responsible for monitoring the implementation of mitigation measures. The inspector will report to the City of Elk Grove Department of Public Works, and will be thoroughly familiar with all plans and requirements of the project. In addition, the inspector will be familiar with construction contract requirements, construction schedules, standard construction practices, and mitigation techniques. Aided by Table 1, the inspector will typically be responsible for the following activities:

1. On-site, day to day monitoring of construction activities;
2. Reviewing construction plans to ensure conformance with adopted mitigation measures;
3. Ensuring contractor knowledge of and compliance with all appropriate conditions of project approval;
4. Evaluating the adequacy of construction impact mitigation measures, and proposing improvements to the contractors and City staff;
5. Requiring correction of activities that violate project mitigation measures, or that represent unsafe or dangerous conditions. The inspector shall have the ability and authority to secure compliance with the conditions or standards through the City of Elk Grove Public Works Department, if necessary;
6. Acting in the role of contact for property owners or any other affected persons who wish to register observations of violations of project mitigation measures, or unsafe or dangerous conditions. Upon receiving any complaints, the inspector shall immediately contact the

construction representative. The inspector shall be responsible for verifying any such observations and for developing any necessary corrective actions in consultation with the construction representative and the City of Elk Grove Public Works Department;

7. Maintaining prompt and regular communication with City staff;
8. Obtaining assistance as necessary from technical experts, such as archaeologists and wildlife biologists, to develop site-specific procedures for implementing the mitigation measures adopted by the City for the Project. For example, it may be necessary at times for a wildlife biologist to work in the field with the inspector and construction contractor to explicitly identify and mark areas to be avoided during construction; and
9. Maintaining a log of all significant interactions, violations of permit conditions or mitigation measures, and necessary corrective measures.

IV. Plan Check

Many mitigation measures will be monitored via plan check during Project implementation. City staff will be responsible for monitoring plan check mitigation measures.

Mitigation Monitoring and Reporting Program

MM Number	Mitigation Measure	Timing/ Implementation	Enforcement/ Monitoring	Verification (date and Signature)
4.7.2	Prior to the commencement of the use of vibratory rollers/compactors within 25 feet of adjacent land uses, an assessment of vibrations induced by vibratory rollers/compactors at the site shall be completed. During indicator vibratory rollers/compactor activities, vibrations shall be measured at regular intervals to determine the levels of vibration at various distances from vibratory rollers/compactor activities. The indicator vibratory rollers/compactor activities shall be conducted at locations at least 50 feet from any existing structures. After monitoring, methods of reducing the peak ground velocities to less than 0.2 inches per second shall be determined and implemented. Methods to reduce vibrations, if needed, could include the use of alternative equipment. The vibration reduction techniques to be used shall be described in the construction plans for the Project to be reviewed and approved by the City prior to issuance of building permits. This requirement shall be included in all Project construction plans.	Prior to construction activities	City of Elk Grove Development Services	
4.7.4	The following mitigation measures shall be implemented to mitigate non-transportation noise levels associated with the proposed Project: a. Solid barriers shall be installed, at a minimum, on the east-facing sides of the elevated slide and zip line towers and sufficient to block line-of-sight of patrons located on stairways and upper platform areas to adjacent residential land uses located along the eastern property line. Barriers on elevated structures shall be constructed of wood, or material of similar density, with no visible gaps between construction materials. b. The use of amplified public address/sound systems on elevated slide and zip line towers shall be prohibited. c. The installation of amplified public address/sound system speakers shall be prohibited within 50 feet of the eastern property line. Amplified public address/sound system speakers located within 200 feet of the eastern property line shall be installed to a maximum height not to exceed 12 feet and directed away from the eastern	Included as part of final design	City of Elk Grove Planning Department	

MM Number	Mitigation Measure	Timing/ Implementation	Enforcement/ Monitoring	Verification (date and Signature)
	property line. d. A sound barrier shall be constructed to a minimum height of 12 feet above ground level along the eastern Project site property line. The sound barrier shall also extend along the southern Project site property line, to a distance of 360 feet from the eastern property line. The barrier constructed along the southern property line shall be constructed to a minimum height of 12 feet at the eastern property line and to a minimum height of 8 feet at the western terminus. Reductions in barrier height along the southern property line shall occur gradually. The sound barrier shall be constructed of masonry block, or material of similar density, with no visible gaps between adjoining barriers, construction materials, or at the base of the barrier. **e.** The use of stationary noise-generating equipment (e.g., public address/sound systems) shall be prohibited during the hours of 10 p.m. to 7 a.m.			
4.9.5	Elk Grove Blvd/Laguna Springs Dr intersection. Provide right-turn overlap phasing for the northbound right-turn movement at the intersection or Elk Grove Boulevard and Laguna Springs Drive and prohibit westbound U-turn movements at the intersection.	Prior to Project operation	City of Elk Grove Development Services	

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CERTIFICATION
ELK GROVE CITY COUNCIL RESOLUTION NO. 2014-206

STATE OF CALIFORNIA)
COUNTY OF SACRAMENTO) ss
CITY OF ELK GROVE)

I, Jason Lindgren, City Clerk of the City of Elk Grove, California, do hereby certify that the foregoing resolution was duly introduced, approved, and adopted by the City Council of the City of Elk Grove at a regular meeting of said Council held on September 10, 2014 by the following vote:

AYES :	***COUNCILMEMBERS:***	***Davis, Cooper, Detrick, Hume, Trigg***
NOES:	***COUNCILMEMBERS:***	***None***
ABSTAIN :	***COUNCILMEMBERS:***	***None***
ABSENT:	***COUNCILMEMBERS:***	***None***

Jason Robert Lindgren

Jason Lindgren, City Clerk
City of Elk Grove, California