

3.12 NOISE AND VIBRATION

3.12.1 ENVIRONMENTAL SETTING

The environmental setting – including acoustical fundamentals and the existing setting related to noise and vibration – has not substantially changed since the 2019 SOIA EIR was drafted. A brief summary is provided below.

Existing major sources of noise in the Project area consist primarily of the Union Pacific Railroad (UPRR) (adjacent to the southern Project site boundary) and nearby roadways (primarily SR 99 and Grant Line Road).

The Project site consists of agricultural land, and is surrounded by agricultural land on the northeast, east, and southeast sides. Vacant land (which is planned for development as part of the Waterman 75 project) is present north of Grant Line Road across the street from most of the Project site. Industrial development is present on the northwest side of Grant Line Road and west of the Project site (west of the UPRR tracks).

Existing sensitive receptors include residential development that is present north of Grant Line Road across from the proposed mixed-use portion of the Project site. There is a rural home site (with several residences) on the Mosher property (which is proposed for future mixed uses), and there are 2–3 rural homesites in the central and southwestern portions of the Project site. The rural residential site on the Mosher property is immediately adjacent to the proposed off-site improvements associated with the northern-most agricultural ditch. Another off-site rural residence is also located approximately 250 feet east of the off-site 15-acre pond where drainage improvements are proposed. The Emerald Lakes Golf Course (on the southeast side of the UPRR tracks) is approximately 215 feet (at the closest point) southeast of the proposed off-site improvements to the agricultural drainage ditch along the UPRR tracks.

The primary source of existing groundborne vibration in the vicinity of the Project site and the off-site improvements is the UPRR.

Following drafting of the 2019 SOIA EIR, the City and Southeast Connector Joint Powers Authority have consulted on a precise roadway plan for the future widening of Grant Line Road to four lanes between Bond Road and Calvine Road. The precise plan will prepare a preliminary level design in accordance with the City of Elk Grove General Plan, Rural Roads Improvement Standards, and Southeast Connector JPA Design Guidelines. At the conclusion of the study period, the City Council will approve a document that can be used by property owners to plan their own site improvements, as well as to guide future design efforts by the City and the Southeast Connector Joint Powers Authority.

3.12.2 REGULATORY FRAMEWORK

City of Elk Grove General Plan

Since the 2019 SOIA EIR was drafted, the City adopted an updated General Plan (City of Elk Grove 2019). Noise-related policies and actions are highlighted below.

- ▶ **Policy LU-1-7:** Encourage disclosure of potential land use compatibility issues including but not limited to noise, dust, and odors, in order to provide potential purchasers with complete information to make informed decisions about purchasing property.

- ▶ **Policy LU-3-4:** Residential land uses in Activity Districts should meet the following guidelines:
 - High Density Residential uses shall be located within one-quarter mile of major intersections and planned or existing transit stops.
 - Housing should be buffered via building designs or other features from uses that produce loud noises that frequently exceed 65 decibels.
- ▶ **Policy AG-1-6:** Limit the siting of projects with land uses that might result in conflicts near existing agriculture due to noise, air quality, or odors.
- ▶ **Policy MOB 6-3:** Work with the UPRR to minimize the impact of train noise on adjacent sensitive land uses through the continued implementation of Quiet Zones.

Policies: Noise Sources and Land Use Compatibility

- ▶ **Policy N-1-1:** New development of the uses listed in Table 8-3 shall conform with the noise levels contained in the 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 N-1-2:** Where noise mitigation measures are required to achieve the standards of Tables 8-3 and 8-4, 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.

Policies: Sensitive Land Uses

- ▶ **Policy N-1-4:** Protect noise-sensitive land uses, identified in Table 8-3, from noise impacts.
- ▶ **Policy N-1-5:** Where noise-sensitive land uses are proposed in areas exposed to existing or projected exterior noise levels exceeding the levels specified in Table 8-3 or the performance standards of Table 8-4, 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 N-1-6:** Where proposed nonresidential land uses are likely to produce noise levels exceeding the performance standards of Table 8-4 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.
- ▶ **Policy N-1-7:** The standards outlined in Table 8-4 shall not apply to transportation- and City infrastructure-related construction activities as long as construction occurs between the hours of 7 a.m. and 7 p.m., Monday through Friday, and 8 a.m. and 5 p.m. on weekends and federally recognized holidays. Work may occur beyond these time frames for construction safety or because of existing congestion that makes completing the work during these time frames infeasible.
- ▶ **Policy N-1-8:** For development projects that are subject to discretionary review, the City may require applicants to assess potential construction noise impacts on nearby sensitive uses and to minimize impacts on those uses.
- ▶ **Policy N-1-9:** For projects involving the use of major vibration-generating equipment (e.g., pile drivers, vibratory rollers) that could generate groundborne vibration levels in excess of 0.2 in/sec peak particle

velocity (ppv), the City may require a project-specific vibration impact assessment to analyze potential groundborne vibrational impacts and may require measures to reduce ground vibration levels.

- ▶ **Policy N-1-10:** For new development involving noise-sensitive receptors that could be exposed to high levels of ground vibration levels generated by freight or transit rail, the City may require a project-specific vibration impact assessment to analyze potential groundborne vibrational impacts and may require measures to reduce ground vibrational levels.

Policies: Noise Reduction Strategies

- ▶ **Policy N-2-1:** Noise created by new proposed non-transportation noise sources shall be mitigated so as not to exceed the noise level standards of Table 8-4 as measured immediately within the property line of lands designated for noise-sensitive uses.
- ▶ **Policy N-2-2:** The following criteria shall be used as CEQA significance thresholds for transportation and stationary noise sources:
 - Where existing ambient noise levels are less than 60 decibel (dB) day-night average sound level (L_{dn}) at the outdoor activity areas of noise-sensitive uses, a +5 dB L_{dn} increase in noise levels shall be considered significant; and
 - Where existing ambient noise levels range between 60 and 65 dB L_{dn} at the outdoor activity areas of noise-sensitive uses, a +3 dB L_{dn} increase in noise levels shall be considered significant; and
 - Where existing ambient noise levels are greater than 65 dB L_{dn} at the outdoor activity areas of noise-sensitive uses, a +1.5 dB L_{dn} increase in noise levels shall be considered significant. Public roadway improvements to alleviate traffic congestion and safety hazards shall utilize Federal Highway Administration (FHWA) noise standards to allow a reasonable dollar threshold per dwelling to be used in the evaluation and abatement of impacts.
 - The standards outlined in Table 8-4 shall not apply to public projects to alleviate traffic congestion and safety hazards.
- ▶ **Policy N-2-3:** Emphasize methods other than installation of sound walls in front yard areas to reduce noise to acceptable levels in residential areas that were originally constructed without sound walls.
- ▶ **Policy N-2-4:** Where sound walls or noise barriers are constructed, strongly encourage and consider requiring a combination of berms and walls to reduce the apparent height of the wall and produce a more aesthetically appealing streetscape.

Table 8-3 from the General Plan establishes the maximum allowable noise exposure levels from transportation noise for different land uses, including:

- ▶ Residential: 60 dB L_{dn} outdoor and 45 dB L_{dn} interior
- ▶ Residential subject to noise from railroad tracks, aircraft overflights, or similar noise sources which produce clearly identifiable, discrete noise events (the passing of a single train, as opposed to relatively steady noise sources as roadways): 60 dB L_{dn} outdoor and 40 dB L_{dn} interior
- ▶ Transient lodging: 60 dB L_{dn} outdoor and 45 dB L_{dn} interior

- ▶ Hospitals, Nursing Homes: 60 dB L_{dn} outdoor and 45 dB L_{dn} interior
- ▶ Theaters, Auditoriums, Music Halls: 35 dB equivalent sound level (L_{eq}) interior
- ▶ Churches, Meeting Halls: 60 dB L_{dn} outdoor and 40 dB L_{eq} interior
- ▶ Office Buildings: 45 dB L_{eq} interior
- ▶ Schools, Libraries, Museums: 45 dB L_{eq} interior

Table 8-4 from the General Plan establishes the maximum allowable noise exposure levels for new projects affected by or including non-transportation noise sources:

- ▶ Performance Standards for Typical Stationary Noise Sources: Daytime, 55 dB L_{eq} ; Nighttime, 45 dB L_{eq}
- ▶ Performance Standards for Stationary Noise Sources Which Are Tonal, Impulsive, Repetitive, or Consist Primarily of Speech or Music: Daytime, 50 dB L_{eq} ; Nighttime, 40 dB L_{eq}

3.12.3 ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

METHODOLOGY

The methodology used for this SEIR analysis is the same as used in the original 2019 SOIA EIR.

THRESHOLDS OF SIGNIFICANCE

Based on Appendix G of the CEQA Guidelines, a noise impact is considered significant if implementation of the proposed Project would result in any of the following:

- ▶ Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies;
- ▶ Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels;
- ▶ A substantial permanent increase in ambient noise levels in the Project vicinity above levels existing without the Project;
- ▶ A substantial temporary or periodic increase in ambient noise levels in the Project vicinity above levels existing without the Project;
- ▶ 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 the project expose people residing or working in the project area to excessive noise levels; or
- ▶ For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels.

ISSUES NOT DISCUSSED FURTHER

The following issues were dismissed from further detailed analysis in the 2019 SOIA EIR because it was determined that no impact would occur; for the reasons explained below, these issues would also result in no impact for the proposed Project as evaluated in this SEIR.

- ▶ **Excessive Noise from an Airport**—Future development would not expose people to excessive noise levels from an airport or private airstrip. Because the Project site and the off-site improvements would not be located in an area exposed to excessive aircraft-generated noise levels (e.g., not within the 60 dB L_{dn} /community noise equivalent level (CNEL) contour of any airport), there would be no impact related to aircraft noise, and therefore this issue is not discussed further in this SEIR.

IMPACT ANALYSIS

Impact 3.12-1: Temporary, Short-Term Exposure of Sensitive Receptors to Construction Noise.

As detailed in the 2019 SOIA EIR, construction within the Project site and off-site improvement areas would require construction activities, including grading, excavation, and installation of infrastructure; and on-site building erection, paving, and landscaping. The highest construction noise levels are typically generated during grading and excavation and lower noise levels typically occur during building construction.

Typical hourly average construction-generated noise levels are about 80 dBA to 85 dBA, measured at a distance of 50 feet from the site during busy construction periods. It is unlikely, but possible that pile-driving could be required for future development. Pile driving could produce very high noise levels of approximately 105 dB at 50 feet. Noise from localized point sources (such as construction sites) typically decreases by 6 dB to 7.5 dB with each doubling of distance from source to receptor. The existing intervening ground type at the Project site is currently soft and attenuates noise due to absorption; therefore, an attenuation rate of 7.5 dB per doubling of distance was assumed and accounted for in construction operation noise level predictions.

Project-generated noise levels could exceed daytime and nighttime noise standards of 55 dB L_{eq} and 50 dB L_{eq} , respectively, at possible future on-site sensitive receptors. Construction of the off-site drainage improvements would require clearing of vegetation, excavating, trenching, installing pipeline, and grading, which could expose existing off-site sensitive receptors to equipment noise levels that exceed the applicable noise standards and/or result in a substantial temporary increase in ambient noise levels.

Residences and businesses located adjacent to areas of construction activity would be exposed to future construction noise from on-site and off-site construction activity. In addition, recreationists in the southeastern portion of the Emerald Lake Golf Course would be exposed to noise from off-site construction activity associated with improvements to the agricultural drainage ditch adjacent to the UPRR tracks. This is considered a **significant impact**.

Mitigation Measure 3.12-1: Implement Noise-Reducing Construction Practices (2019 SOIA EIR Mitigation Measure 3.12-1).

During both on- and off-site Project-related construction, the following measures shall be implemented to reduce construction noise impacts.

- Noise-generating construction in areas that could affect noise-sensitive land uses shall be limited to the hours between 7 a.m. and 7 p.m. Monday through Friday, and between 8 a.m. and 6 p.m. on Saturdays and Sundays.
- Noisy construction equipment and equipment staging areas shall be located as far as possible from nearby noise-sensitive land uses.

- All construction equipment shall be properly maintained and equipped with noise-reduction intake and exhaust mufflers and engine shrouds, in accordance with manufacturers' recommendations. Equipment-engine shrouds shall be closed during equipment operation.
- All motorized construction equipment shall be shut down when not in use to prevent idling.
- Individual operations and techniques shall be replaced with quieter procedures (e.g., using welding instead of riveting, mixing concrete off-site instead of on-site).
- Noise-reducing enclosures shall be used around stationary noise-generating equipment (e.g., compressors and generators) when noise sensitive receptors are located within 250 feet of construction activities.
- Written notification of construction activities shall be provided to all noise-sensitive receptors located within 850 feet of construction activities. The notification shall include anticipated dates and hours during which construction activities are anticipated to occur and contact information, including a daytime telephone number, for the Project representative to be contacted in the event that noise levels are deemed excessive. Recommendations to assist noise-sensitive land uses in reducing interior noise levels (e.g., closing windows and doors) shall also be included in the notification.
- To the extent feasible and necessary to reduce construction noise levels consistent with applicable policies, acoustic barriers (e.g., noise curtains, sound barriers) shall be constructed to reduce construction-generated noise levels at affected noise-sensitive land uses. The barriers shall be designed to obstruct the line of sight between the noise-sensitive land use and on-site construction equipment.
- When future noise sensitive uses are within close proximity to prolonged construction noise, noise-attenuating buffers such as structures, truck trailers, or soil piles shall be located between noise sources and future residences, as feasible, to shield sensitive receptors from construction noise.

Significance after Mitigation

With implementation of Mitigation Measure 3.12-1, on-site and off-site impacts from temporary, short-term exposure of sensitive receptors to increased equipment noise would be reduced because construction would be limited to daytime hours, for which associated noise levels are considered exempt from the provisions of applicable standards established by the City of Elk Grove and the County of Sacramento. Furthermore, as noted in the City's General Plan, "Elk Grove is committed to implementing 'Best Management Practices' for all development and construction in Elk Grove to help reduce noise sources and exposure to noise." These best practices are specifically spelled out in Mitigation Measure 3.12-1 for the proposed Project. For example, when installed properly, acoustic barriers can reduce construction noise levels by approximately 8–10 dB (EPA 1971). However, it is not possible to demonstrate that implementing Mitigation Measure 3.12-1 would avoid significant construction noise impacts in every case. There is no additional feasible mitigation. Therefore, as with the 2019 SOIA EIR, the impact is considered **significant and unavoidable**.

Impact 3.12-2: Temporary, Short-Term Exposure of Sensitive Receptors to Increased Traffic Noise Levels from Project Construction.

As detailed in the 2019 SOIA EIR, on- and off-site construction would result in an increase of traffic volumes due to the addition of construction-generated traffic. Personnel, materials, and equipment would be transported along the local roadway network, thus increasing traffic volumes of affected roadway segments. Construction traffic noise was analyzed in the 2019 SOIA EIR using a very conservative scenario assuming construction-related traffic volume of 500 vehicles daily. Modeling results indicate that Project-generated construction-related traffic increases would result in a 0- to 1-dBA increase in short-term traffic noise levels.

Therefore, implementation of the proposed Project would not result in a substantial temporary or periodic increase in ambient noise levels in the Project vicinity associated with construction traffic. As a result, as with the 2019 SOIA EIR, this impact is considered **less than significant**.

Impact 3.12-3: Temporary, Short-Term Exposure of Sensitive Receptors to Potential Groundborne Noise and Vibration from Project Construction.

As detailed in the 2019 SOIA EIR, construction activities associated with future development in the Project site and the off-site improvement areas would have the potential to result in varying degrees of temporary groundborne vibration, depending on the specific construction equipment used, the location of construction activities relative to sensitive receptors, the operations/activities involved, and the construction material of buildings used for affected vibration-sensitive receptors. There are vibration-sensitive uses and structures within the Project site and adjacent to the off-site improvement areas. There are older structures on the Mosher property, in a building cluster south of the City-owned parcel at 10313 Grant Line Road, and in a house and barn cluster in the southern portion of the Project site at 10351 Grant Line Road. Construction could occur within 25 feet of these properties.

Vibration generated by construction equipment spreads through the ground and diminishes in magnitude with increases in distance. The type and density of soil can also affect the transmission of energy. Table 3.12-1 provides vibration levels for typical construction equipment.

Equipment		PPV at 25 Feet (in/sec)	Approximate L _v at 25 Feet
Pile Driver (Impact)	Upper Range	1.518	112
	Typical	0.644	104
Pile Driver (Sonic)	Upper Range	0.734	105
	Typical	0.170	93
Large Bulldozer		0.089	87
Caisson Drilling		0.089	87
Truck		0.076	86
Jackhammer		0.035	79
Small Bulldozer		0.003	58
Notes: in/sec = inches per second; L _v = the velocity level in decibels referenced to 1 microinch per second and based on the root mean square velocity amplitude; PPV = peak particle velocity			
¹ For normal residential buildings and for buildings more susceptible to structural damage, respectively.			
Sources: FTA 2006: 12-12			

Construction vibration would occur during construction, during equipment operation, and during the transport of construction equipment and materials. Required construction equipment could include loaded trucks and bulldozers and, although very unlikely, could possibly include pile drivers. According to the FTA, vibration levels associated with the use of such equipment would be approximately 0.076 in/sec PPV and 86 vibration decibel (VdB) for trucks, 1.518 in/sec PPV and 112 VdB for upper range impact pile driver, 0.089 in/sec PPV and 87 VdB (referenced to 1 μ in/sec and based on the root mean square velocity amplitude) at 25 feet, as shown in Table 3.12-1.

With respect to human annoyance for residential uses, using FTA's recommended procedure for applying a propagation adjustment to these reference levels, predicted vibration levels of typical construction activities (assuming large bulldozer as the highest vibration generating equipment) would not exceed 80 VdB (FTA's maximum-acceptable vibration standard with respect to human annoyance for residential uses) beyond 45 feet of normal vibration-sensitive receptors. There are no off-site vibration-sensitive uses within 45 feet of the edge of the Project site that would be affected by vibration. However, there would be vibration-sensitive uses within 45 feet of Project-related construction activities within the Project site and potentially adjacent to off-site drainage improvement areas that would be affected by vibration. Although very unlikely, construction activities with the use of a pile driver, vibration levels would not exceed 80 VdB (FTA's maximum-acceptable vibration standard with respect to human annoyance for residential uses) within 285 feet of normal vibration-sensitive receptors. There are vibration-sensitive receptors within 285 feet of Project-related construction activities within the Project site and off-site drainage improvement areas that would be affected by vibration.

With respect to normal buildings damage, using FTA's recommended procedure for applying a propagation adjustment to these reference levels, predicted vibration levels of typical construction activities would not exceed 0.2 in/sec PPV (Caltrans' recommended standard with respect to the prevention of structural damage for normal buildings) beyond 70 feet of normal vibration-sensitive receptors (California Department of Transportation 2009, 2013). Although very unlikely, construction activities could include the use of a pile driver, in which case vibration levels would not exceed 0.2 in/sec PPV beyond 100 feet of historic, older, or potentially sensitive vibration sensitive receptors. There are off-site vibration-sensitive uses within 70 to 100 feet of the Project site that would be affected.

With respect to potential damage to existing older buildings, predicted vibration levels of typical construction activities (assuming a large bulldozer as the highest vibration-generating equipment) would not exceed 0.08 in/sec PPV (Caltrans' recommended standard with respect to the prevention of structural damage for historic buildings) beyond 30 feet of historic structures. There are older buildings that could be within 30 feet of Project-related construction activities within the Project site that would be affected by vibration. Although very unlikely, construction activities could include the use of a pile driver, in which case vibration levels would not exceed 0.08 in/sec PPV beyond 180 feet of historic, older, or potentially sensitive structures.

Vibration-sensitive receptors are located in the vicinity of the off-site drainage improvement areas. Typical construction equipment, loaded trucks, jackhammers, bulldozers, generates vibration levels that decrease quickly over distance. Although very unlikely, if pile driving is required, this generates significantly more vibration energy and requires more distance for it to decrease the vibration levels.

Temporary, short-term vibration levels from construction of off-site improvements could exceed FTA's maximum-acceptable vibration standard of 80 VdB with respect to human response for residential uses (i.e., annoyance) at vibration-sensitive land uses. If construction activities were to occur during more noise-sensitive

hours, vibration from construction sources could annoy and/or disrupt the sleep of occupants of existing and proposed residences and expose persons to excessive groundborne vibration or groundborne noise levels.

Therefore, temporary, construction-related vibration levels could expose sensitive receptors and buildings to levels that exceed applicable standards. Thus, this impact is considered **potentially significant**.

Mitigation Measure 3.12-3: Reduce Groundborne Noise and Vibration Levels at Sensitive Receptors and Buildings (2019 SOIA EIR Mitigation Measure 3.12-3).

During construction of on-site and off-site improvements, the following measures shall be implemented to reduce groundborne noise and vibration within 60 feet of existing non-historical structures and within 25 feet of historic, older, or potentially sensitive structures:

- Route heavily loaded trucks away from residential streets where residences are within 60 feet of the edge of the roadway.
- Operate earthmoving equipment on the construction lot as far away from noise- and vibration-sensitive uses as feasible.
- Phase earthmoving and other construction activities that would affect the ground surface so as not to occur in the same time period.
- Large bulldozers and other construction equipment that would produce vibration levels at or above 86 VdB shall not be operated within 50 feet of adjacent, occupied residences. Small bulldozers shall be used instead of large bulldozers in these areas, if construction activities are required. For any other equipment types that would produce vibration levels at or above 86 VdB, smaller versions or different types of equipment shall be substituted for construction areas within 50 feet of adjacent, occupied residences.
- Construction activities shall not occur on weekends or federal holidays and shall not occur on weekdays between the hours of 7 p.m. of 1 day and 7 a.m. of the following day.

In addition, the following measures shall be implemented to reduce groundborne noise and vibration for pile driving within 200 feet of any vibration-sensitive receptor, if required by the City:

- A disturbance coordinator shall be designated, and this person's contact information shall be posted in a location near the project site that it is clearly visible to the nearby receivers most likely to be disturbed. The director would manage complaints and concerns resulting from activities that cause vibrations. The severity of the vibration concern should be assessed by the disturbance coordinator, and if necessary, evaluated by a professional with construction vibration expertise.
- The existing condition of all buildings within a 180-foot radius within the proposed pile driving activities shall be recorded in the form of a preconstruction survey. The preconstruction survey shall determine conditions that exist before construction begins for use in evaluating damage caused by construction activities.
- Vibration monitoring shall be conducted before and during pile driving operations. Every attempt shall be made to limit construction generated vibration levels in accordance with Caltrans

recommendations during pile driving and impact activities in the vicinity of the historic, older, or potentially sensitive structures.

- Pile driving required within a 285-foot radius of sensitive receptors or within 180 feet of a historic, older, or potentially sensitive structure should use alternative installation methods, where possible (e.g., pile cushioning, jetting, predrilling, cast-in-place systems, resonance-free vibratory pile drivers).

Significance after Mitigation

Implementation of Mitigation Measure 3.12-3 would substantially reduce the effects of groundborne noise and vibration on sensitive receptors because the use of large construction equipment would be restricted in the vicinity of sensitive receptors, a preconstruction survey of buildings potentially subject to vibration damage would be conducted, and vibration monitoring would be conducted in the vicinity of pile-driving activities. The activities would also be temporary. However, it is not possible to determine at this time whether this mitigation would avoid all potentially significant impacts. There is no additional feasible mitigation. As with the 2019 SOIA EIR, the impact is considered **significant and unavoidable**.

Impact 3.12-4: Long-Term Traffic Noise Levels at Existing Noise-Sensitive Receivers.

Development of the land uses proposed at the Project site would result in an increase in long-term operational traffic volumes on the local roadway network, which would generate additional noise in the Project area. To assess the impact of operational Project-generated traffic noise increases, traffic noise levels 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 under existing conditions. Average daily traffic (ADT) volumes and the distribution thereof were obtained from the traffic study prepared to support the 2019 SOIA EIR with updates related to the anticipated mix of trucks associated with development of the Project site (Fehr & Peers 2017, 2020). Refer to Appendix F of this SEIR for modeling inputs and results.

Table 3.12-2 summarizes the modeled traffic noise levels at 100 feet from the centerline of affected roadway segments. Modeled increases that would be considered substantial (i.e., an increase of 3 dBA or more), in comparison to existing no Project conditions are indicated in bold. Modeled roadway noise levels assume no natural or artificial shielding between the roadway and the receptor.

As shown in Table 3.12-2, the modeling conducted shows that full buildout of the Project site would result in traffic noise level increases ranging from + 2 dBA to + 6 dBA L_{dn} , compared to noise levels without full buildout of the Project site.¹ The Project would increase noise levels by at least 3 dB along several roadway segments. There are no existing noise-sensitive uses located along Grant Line Road between SR 99 SB Ramps and SR 99 NB Ramps, Grant Line Road between East Stockton Boulevard and Waterman Road, and Waterman Road between Mosher Road and Grant Line Road. However, there are noise sensitive land uses located along the other segments. Therefore, as also identified for the 2019 SOIA EIR, full buildout of the Project site would result in a substantial permanent increase in ambient noise levels (an increase of 3 dBA or greater). This is a **significant** impact.

¹ Project-related traffic noise increase under future plus project conditions would slightly vary from those under existing plus Project conditions, because adjustment in traffic rerouting to Southeast Connector was taken into account under cumulative plus Project.

Table 3.12-2 Predicted Traffic Noise Levels, Existing Plus Full Buildout of the Project Site					
Roadway	Segment Location	L _{dn} at 100 Feet, dB			
		No Project	Plus Project	Net Change	Significant Impact?
Bradshaw Road	From Elk Grove Boulevard to Grant Line Road	63	67	4	No
Grant Line Road	From SR 99 SB Ramps to SR 99 NB Ramps	68	73	5	No**
Grant Line Road	From SR 99 NB Ramps to East Stockton Boulevard	70	75	5	Yes
Grant Line Road	From East Stockton Boulevard to Waterman Road	68	74	6	No**
Grant Line Road	From Waterman Road to Mosher Road	67	71	4	Yes
Grant Line Road	From Mosher Road to Bradshaw Road	67	71	4	Yes
Grant Line Road	From Bradshaw Road to Elk Grove Boulevard	64	68	4	Yes
Kammerer Road	From Lent Ranch Parkway to Promenade Parkway	65	68	3	Yes
Kammerer Road	From Promenade Parkway to SR 99 SB Ramps	67	70	3	Yes
Mosher Road	From Waterman Road to Grant Line Road	58	67	5	Yes
Waterman Road	From Mosher Road to Grant Line Road	63	68	5	No**
SR 99	From Dillard Road to Grant Line Road	77	79	2	No
SR 99	From Grant Line Road to Elk Grove Boulevard	76	79	3	Yes

Notes: dB = A-weighted decibels; L_{dn} = day-night average noise level, SB = Southbound, NB=Northbound.
* Traffic noise levels are predicted at a standard distance of 100 feet from the roadway centerline and do not account for shielding from existing noise barriers or intervening structures. Traffic noise levels may vary depending on actual setback distances and localized shielding.
** No noise-sensitive uses within 100 feet of the segment.
Source: Data modeled by AECOM 2020

As described in the Tiered Initial Study with Mitigated Negative Declaration for the Capital Southeast Connector – B2 project, future vehicular travel along Grant Line Road would increase noise levels as experienced by sensitive receptors along this corridor (Capital SouthEast Connector Joint Powers Authority 2017). This environmental document provides estimates of existing conditions, future conditions with no mitigation, and future conditions with construction of a sound wall and use of rubberized asphalt for 84 receptors located north of Grant Line Road in the vicinity of the Project site, showing less-than-significant impacts related to transportation noise. The noise mitigation for the Capital Southeast Connector – B2 project would provide benefits for noise sensitive uses in the vicinity of the Project site and located along roadways that would be affected by Project traffic. Table 17 from this Initial Study identifies existing noise conditions, noise levels in 2035 without the road widening project, and noise levels in 2035 with the road widening project, as well as project noise levels with mitigation applied for 84 receptors along the Grant Line Road corridor between Waterman Road on the west and Bradshaw Road on the east (two receptors are just east of Bradshaw Road). For future conditions with the road widening project, noise levels range from 57 to 71 dBA L^{dn}. With mitigation that will include soundwalls and rubberized asphalt, future noise levels would range from 53 to 65 dBA L^{dn}. For all but one noise receptor location (NM-3, 9876 Grant Line Road), mitigation would reduce future plus project noise levels to below future without project conditions. For NM-3, mitigation would result in a noise level of 59 dBA L^{dn} under future plus project with mitigation conditions compared to a noise level of 57 dBA L^{dn} for future without project conditions. As detailed in this Initial Study, mitigation is imposed in the form of both soundwalls and the use of rubberized asphalt or open grade pavement, which would result in less-than-significant impacts for each of the sensitive receptors located north of the Grant Line Road corridor.

Elk Grove Policy MOB-1-1 establishes vehicle miles traveled (VMT) limits for the City's Planning Area, including locations for new growth, such as the East Study Area. The implementation of this policy would reduce travel demand by incorporating density mixing of uses, pedestrian and bike infrastructure, and transit services. Reducing travel demand would reduce traffic volumes and therefore traffic noise levels. Based on direction included in the General Plan, development in the Project site would be designed to minimize potential impacts. However, it is not possible to determine at this time whether this program would avoid all potentially significant impacts. Significant traffic noise impacts at existing and future noise-sensitive areas can be difficult to feasibly mitigate. Some areas may have side of the road with noise barriers that increase noise levels experienced on the other side of the roadway. New noise barriers may have limited effectiveness for traffic noise mitigation, since openings are often required for pedestrian, bicycle, vehicle, and emergency access and visual access for safety. Quiet pavement may be infeasible due to cost. It may not be feasible to reduce traffic noise impacts to a less-than-significant level at all existing and future noise-sensitive land uses along Mosher Road between Waterman Road and Grant Line Road. There is no additional feasible mitigation. As with the 2019 SOIA EIR, the impact is considered **significant and unavoidable**.

Impact 3.12-5: Land Use Compatibility of On-Site Sensitive Receptors with Future Transportation Noise Levels.

As discussed in the 2019 SOIA EIR, proposed uses near the UPRR tracks are not noise sensitive and this impact is **less than significant**.

As detailed in the 2019 SOIA EIR, noise from future vehicle traffic would also affect future on-site noise-sensitive receptors. Noise-sensitive receptors located within future 60 dB L_{dn} noise contours would be exposed to noise levels exceeding the City of Elk Grove General Plan Noise Element standard of 60 dB L_{dn} for residential uses affected by transportation noise sources. Future residential development within the Project site could occur in areas where traffic noise could exceed the City's standard in the mixed-use area adjacent to Grant Line Road. Furthermore, it is possible that there could be high-volume roadways in the mixed-use area that are designed to funnel most traffic onto such roadways, rather than a dispersed transportation network that avoids high volumes on any single roadway. However, it is uncertain as to whether there would be residential development in the mixed-use area and how far from high-volume roadways (including Grant Line Road) this residential development would be located. The same is true in other locations within the Project site – although the predominantly planned uses are not noise sensitive (industrial and commercial), it is possible that there could be ancillary uses, such as day care, that would be noise sensitive. Therefore, impacts related to land use-noise compatibility are considered **potentially significant**.

Mitigation Measure 3.12-5: Improve Land Use Compatibility to Reduce Exposure of On-Site Sensitive Receptors to Traffic Noise (2019 SOIA EIR Mitigation Measure 3.12-5).

Consistent with General Plan Noise Policies N-1-1, N-1-2, N-2-1, N-2-2, N-2-3, and N-2-4, or these policies as they may be updated in the future, feasible strategies to improve land use/transportation noise compatibility will be incorporated into the design of projects, including, but not limited to the following strategies, as feasible:

- incorporate site planning strategies to reduce noise levels within compliance of applicable noise standards, such as building orientation, which can take advantage of shielding provided by the intervening building façade at the outdoor activity area;

- consider setback distances from the noise source. Increasing the setback distance would achieve a natural attenuation of traffic noise levels due to excess ground attenuation and additional noise propagation over distance;
- use of increased noise-attenuation measures for second- and third-story facades in building construction (e.g., dual-pane, sound-rated windows; exterior wall insulation);
- install low-noise pavement, such as open-grade asphalt or rubberized asphalt.

Significance after Mitigation

Implementation of Mitigation Measure 3.12-5 would reduce the significant interior and exterior noise level impacts at affected receptors. However, it is not possible at this time to determine the effectiveness of mitigation with certainty, as there are no development applications or site plans. Significant traffic noise impacts at future noise-sensitive areas can be difficult to feasibly mitigate. Some areas may have noise barriers that increase noise levels experienced on the other side of the roadway. New noise barriers may have limited effectiveness for traffic noise mitigation since openings are often required for pedestrian, bicycle, vehicle, and emergency access and visual access for safety. Quiet pavement may be infeasible due to cost. It may not be feasible to reduce traffic noise impacts to a less-than-significant level at all noise-sensitive land uses. There is no additional feasible mitigation. As with the 2019 SOIA EIR, the impact is considered **significant and unavoidable**.

Impact 3.12-6: Land Use Compatibility of On-Site Sensitive Receptors with or Generation of Non-Transportation Noise Levels in Excess of Local Standards.

Proposed development within the Project site could involve residential uses in the mixed-use area; commercial, office, and industrial uses are proposed over most of the Project site, along with open space and recreation. Institutional and public facilities (e.g., electrical substations, and schools) could also be developed. Future development of noise-sensitive uses (e.g., residential dwellings, schools, hospitals, parks, hotels, places of worship, libraries) could occur in areas that either are currently exposed to or would be exposed to future noise from non-transportation noise sources that could exceed the 55 dB L_{eq} daytime and 45 dB L_{eq} nighttime.

The long-term operation of proposed land uses at the Project site could result in non-transportation operational noise from, but not limited to, the following potential sources:

- ▶ landscape and building maintenance activities (e.g., hand tools, power tools, lawn and garden equipment);
- ▶ mechanical equipment (e.g., pumps, generators heating, ventilation, and cooling systems);
- ▶ garbage collection;
- ▶ parking lots;
- ▶ commercial, office, and industrial activities;
- ▶ other residential, school, and recreation activities and events; and
- ▶ agricultural activities.

For a detailed description of stationary and area noise sources, please refer to pages 3.12-53 through 3.12-55 of the 2019 SOIA EIR.

The impact to future on-site receptors from stationary and area noise sources is considered **significant**.

Mitigation Measure 3.12-6: Implement Measures to Reduce Potential Exposure of Sensitive Receptors to Non-Transportation Source-Generated Noise (2019 SOIA EIR Mitigation Measure 3.12-6).

The City of Elk Grove shall require discretionary projects to reduce potential exposure of on-site sensitive receptors to non-transportation source noise.

To reduce potential long-term exposure of on-site sensitive receptors to noise generated by project-related non-transportation noise sources, the City shall evaluate individual facilities, subdivisions, and other project elements for compliance with the City Noise Ordinance and policies contained in the City's General Plan at the time that tentative subdivision maps and improvements plans are submitted. All project elements shall comply with City noise standards. The project applicants for all project phases shall implement the following measures to assure maximum reduction of project interior and exterior noise levels from operational activities.

- The proposed land uses shall be designed so that on-site mechanical equipment (e.g., heating, ventilation, and air conditioning [HVAC] units, compressors, and generators) and area-source operations (e.g., loading docks, parking lots, and recreational-use areas) are located as far as possible from or shielded from nearby noise-sensitive land uses.
- Residential air conditioning units shall be located a minimum of 10 feet from adjacent residential dwellings, including outdoor entertainment and relaxation areas, or shall be shielded to reduce operational noise levels at adjacent dwellings or designed to meet City noise standards. Shielding may include the use of fences or partial equipment enclosures. To provide effectiveness, fences or barriers shall be continuous or solid, with no gaps, and shall block the line of sight to windows of neighboring dwellings.
- To the extent feasible, residential land uses located within 500 feet of and within the direct line of sight of major noise-generating commercial uses (e.g., loading docks and equipment/vehicle storage repair facilities,) shall be shielded from the line of sight of these facilities by construction of a noise barrier. To provide effectiveness, noise barriers shall be continuous or solid, with no gaps, and shall block the line of sight to windows of neighboring dwellings.
- Dual-pane, noise-rated windows; mechanical air systems; exterior wall insulation; and other noise-reducing building materials shall be used.
- Routine testing and preventive maintenance of emergency electrical generators shall be conducted during the less sensitive daytime hours (i.e., 7:00 a.m. to 6:00 p.m.). All electrical generators shall be equipped with noise control (e.g., muffler) devices in accordance with manufacturers' specifications.
- Prior to issuance of occupancy permits, project applicants shall provide buyer-renter notification for any noise sensitive uses located within 200 feet on ongoing operations of agricultural equipment at adjacent agricultural land uses.

In addition, the City shall seek to reduce potential long-term exposure of sensitive receptors to noise generated by project-related non-transportation noise sources from public activities on school grounds, in neighborhood and community parks, and in open-space areas. Specifically, the City shall encourage the

controlling agencies (i.e., schools and park and recreation districts) to implement measures to reduce project-generated interior and exterior noise levels to within acceptable levels, including but not limited to the following:

- On-site landscape maintenance equipment shall be equipped with properly operating exhaust mufflers and engine shrouds, in accordance with manufacturers' specifications.
- For maintenance areas located within 500 feet of noise-sensitive land uses, the operation of on-site landscape maintenance equipment shall be limited to the least noise-sensitive periods of the day, between the hours of 7 a.m. and 7 p.m.
- Outdoor use of amplified sound systems within 500 feet of noise-sensitive land uses shall be permitted only between 7 a.m. and 10 p.m. Sunday through Thursday, and between 7 a.m. and 11 p.m. on Friday and Saturday.

Significance after Mitigation

Compliance with the City Noise regulations and implementation of additional mitigation measures for the control of non-transportation source noise as identified above in Mitigation Measure 3.12-6 would reduce non-transportation source noise levels at on-site sensitive receptors. Restricting noise-generating activities to daytime hours as outlined in the City's Noise Control regulations and requiring stationary equipment to achieve property line noise limits would reduce the potential for noise impacts at sensitive receptors. Achievable noise reductions from fences or barriers can vary, but typically range from approximately 5 to 10 dBA, depending on construction characteristics, height, and location. With implementation of Mitigation Measure 3.12-6, future development in the Project site would be designed to minimize potential impacts. However, it is not possible to determine at this time whether this mitigation would avoid all potentially significant impacts. There is no additional feasible mitigation. As with the 2019 SOIA EIR, the impact is considered **significant and unavoidable**.

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