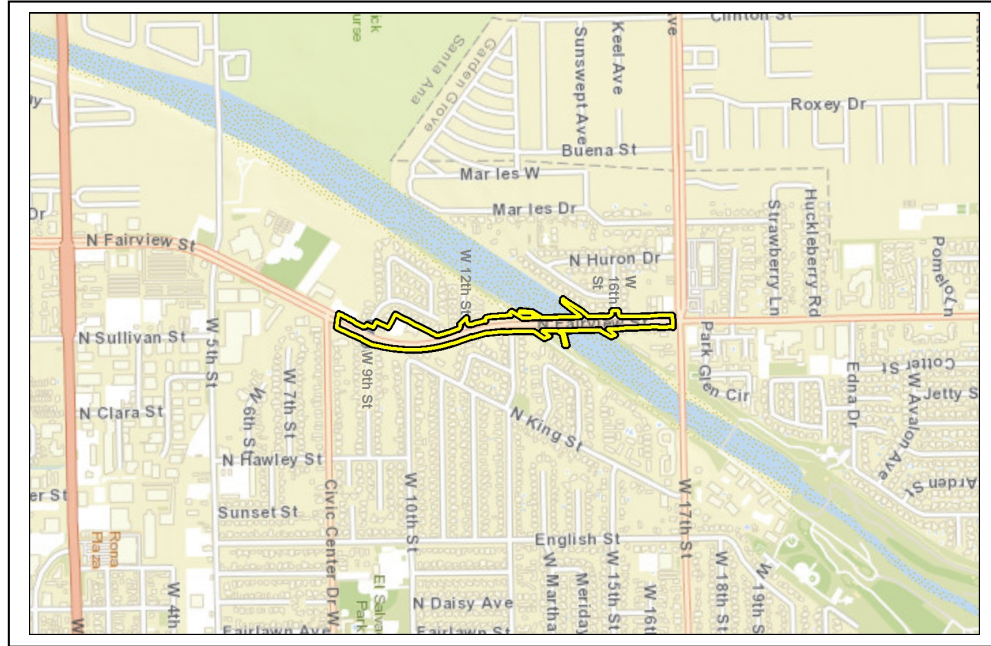


NADR



Noise Abatement Decision Report

Santa Ana, California

Federal Project No. BRLS 5063(184)

June 2019

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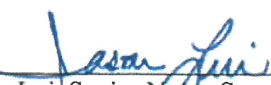
Noise Abatement Decision Report

Fairview Street Improvements from 9th Street to 16th Street
and Bridge Replacement Project

Santa Ana, California
Federal Project No. BRLS 5063(184)


June 2019

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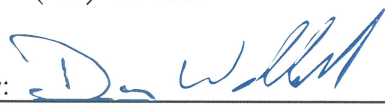
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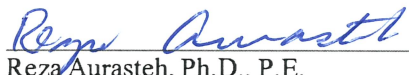
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List of Abbreviated Terms

23 CFR 772	Title 23, Code of Federal Regulations, Part 772
APE	Area of Potential Effect
APN	Assessor's Parcel Number
BMPs	best management practices
Caltrans	California Department of Transportation
CEQA	California Environmental Quality Act
City	City of Santa Ana
dB	decibels
dBA	A-weighted decibels
ED	Environmental Document
EW	Existing Wall
FHWA	Federal Highway Administration
ft	foot/feet
HRER	Historical Resources Evaluation Report
L _{eq}	equivalent continuous sound level
LOS	level(s) of service
LSA	LSA Associates, Inc.
NAC	Noise Abatement Criteria
NADR	Noise Abatement Decision Report
NB	Noise Barrier
NSR	Noise Study Report
PDT	Project Development Team
Protocol	Traffic Noise Analysis Protocol for New Highway Construction, Reconstruction, and Retrofit Barrier Projects
PS&E	Plans, Specifications, and Estimates
SART	Santa Ana River Trail
TNM	Traffic Noise Model
vplph	vehicles per lane per hour

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Chapter 1. Introduction

The Noise Abatement Decision Report (NADR) presents the preliminary noise abatement decision as defined in the California Department of Transportation (Caltrans) *Traffic Noise Analysis Protocol for New Highway Construction, Reconstruction, and Retrofit Barrier Projects* (Protocol). This report has been approved by a California licensed professional civil engineer. The Noise Study Report (NSR) for the Fairview Street Improvements from 9th Street to 16th Street and Bridge Replacement Project, was approved in January 2019 and is hereby incorporated by reference.

1.1. Noise Abatement Assessment Requirements

Title 23, Code of Federal Regulations, Part 772 (23 CFR 772) of the Federal Highway Administration (FHWA) standards and the Protocol require that noise abatement be considered for projects that are predicted to result in traffic noise impacts. A traffic noise impact is considered to occur when future predicted design-year noise levels with the project “approach or exceed” the Noise Abatement Criteria (NAC) defined in 23 CFR 772 or when the predicted design-year noise levels with the project substantially exceed existing noise levels. A predicted design-year noise level is considered to “approach” the NAC when it is within 1 decibel (dB) of the NAC. A substantial increase is defined as being 12 A-weighted decibels (dBA) or more over the corresponding existing noise level.

The FHWA standards (23 CFR 772) require that noise abatement measures that are reasonable and feasible and are likely to be incorporated into the project be identified before completion of the environmental review process.

The Protocol establishes a process for assessing the reasonableness and feasibility of noise abatement. A preliminary noise abatement decision is made based on the feasibility of evaluated abatement and the preliminary reasonableness determination. Noise abatement is considered to be acoustically feasible if it provides a noise reduction of 5 dBA or more at receptors subject to noise impacts. Other non-acoustical factors relating to geometric standards (e.g., sight distances), safety, maintenance, and security can also affect feasibility.

For a noise barrier to be considered reasonable, the noise level reduction design goal of 7 dBA must be achieved at one or more benefited receptors. Once it is determined

that one or more receptors satisfy the minimum noise reduction required, the preliminary reasonableness determination is made by calculating an allowance that is considered to be a reasonable amount of money, per benefited residence, to spend on abatement. This reasonable allowance is then compared to the engineer's cost estimate for the abatement. If the engineer's cost estimate is less than the allowance, the preliminary determination is that the abatement is reasonable. If the cost estimate is higher than the allowance, the preliminary determination is that abatement is not reasonable.

The NADR presents the preliminary noise abatement decision based on acoustical and non-acoustical feasibility factors and the relationship between noise abatement allowances and the engineer's cost estimate. The NADR does not present the final decision regarding noise abatement; rather, it presents key information on abatement to be considered throughout the environmental review process that is based on the best available information at the time. The final overall reasonableness decision will take this information into account, along with other reasonableness factors identified during the environmental review process. These factors may include:

- The noise reduction design goal;
- The cost of noise abatement; and
- The viewpoints of the benefited receptors (including property owners and residents of the benefited receptors).

The preliminary noise abatement decision will become the final noise abatement decision unless compelling information received during the environmental review process indicates that it should be changed.

1.2. Purpose of the Noise Abatement Decision Report

The purpose of the NADR is to:

- Summarize the conclusions of the NSR relating to acoustical feasibility and the reasonable allowances for abatement evaluated;
- Present the engineer's cost estimate for evaluated abatement;
- Present the engineer's evaluation of non-acoustical feasibility issues;
- Present the preliminary noise abatement decision; and
- Present preliminary information on the secondary effects of abatement (impacts on cultural resources, scenic views, hazardous materials, and biological resources, etc.).

The NADR does not address noise barriers or other noise-reducing treatments required as mitigation for significant adverse environmental effects identified under the California Environmental Quality Act (CEQA).

1.3. Project Description

The City of Santa Ana (City), in conjunction with Caltrans District 12 proposes widening Fairview Street between 9th Street and 16th Street, including replacing the Fairview Street bridge crossing over the Santa Ana River (proposed project) in Santa Ana, California. The purpose of the project is to reduce congestion and improve pedestrian and bicyclist safety on Fairview Street between 9th Street and 16th Street, consistent with the Orange County Master Plan of Arterial Highways and the City's General Plan Circulation Element.

South of 9th Street, Fairview Street provides three lanes in each direction that are reduced to two lanes in each direction north of 9th Street, across the existing four-lane bridge, to 16th Street. The Fairview Street segment between 9th Street and 16th Street is the only constraint for Fairview Street to be built out to its planned width of six lanes. This condition causes a traffic "bottleneck" during peak hours. In addition, there are no sidewalks, bikeways, or lighting on the existing bridge. Pedestrians and bicyclists currently use the roadway shoulder to cross the bridge.

Two alternatives, including the No Build Alternative, were developed to meet the identified purpose and need of the proposed project while avoiding or minimizing environmental impacts. The project alternatives are described below.

1.3.1. No Build Alternative

The No Build Alternative assumes that no improvements are made to Fairview Street. The No Build Alternative would maintain the existing conditions and provides a baseline for comparison of the impacts under the Build Alternative. Under the No Build Alternative, the performance of the roadway would continue to deteriorate with the forecasted increase in traffic on the bridge and the non-standard shoulders would remain with no sidewalk.

1.3.2. Build Alternative

The proposed project includes widening Fairview Street between 9th Street and 16th Street, including replacing the Fairview Street bridge crossing over the Santa Ana River. The proposed project would widen Fairview Street from two lanes in each direction to three lanes in each direction, as shown on Figures 1-1 and 1-2. The Fairview Street bridge would be replaced with a new six-lane bridge (three lanes in each direction), including a complete bridge deck with barrier rails, sidewalks, bicycle lanes, a raised median, and lighting.

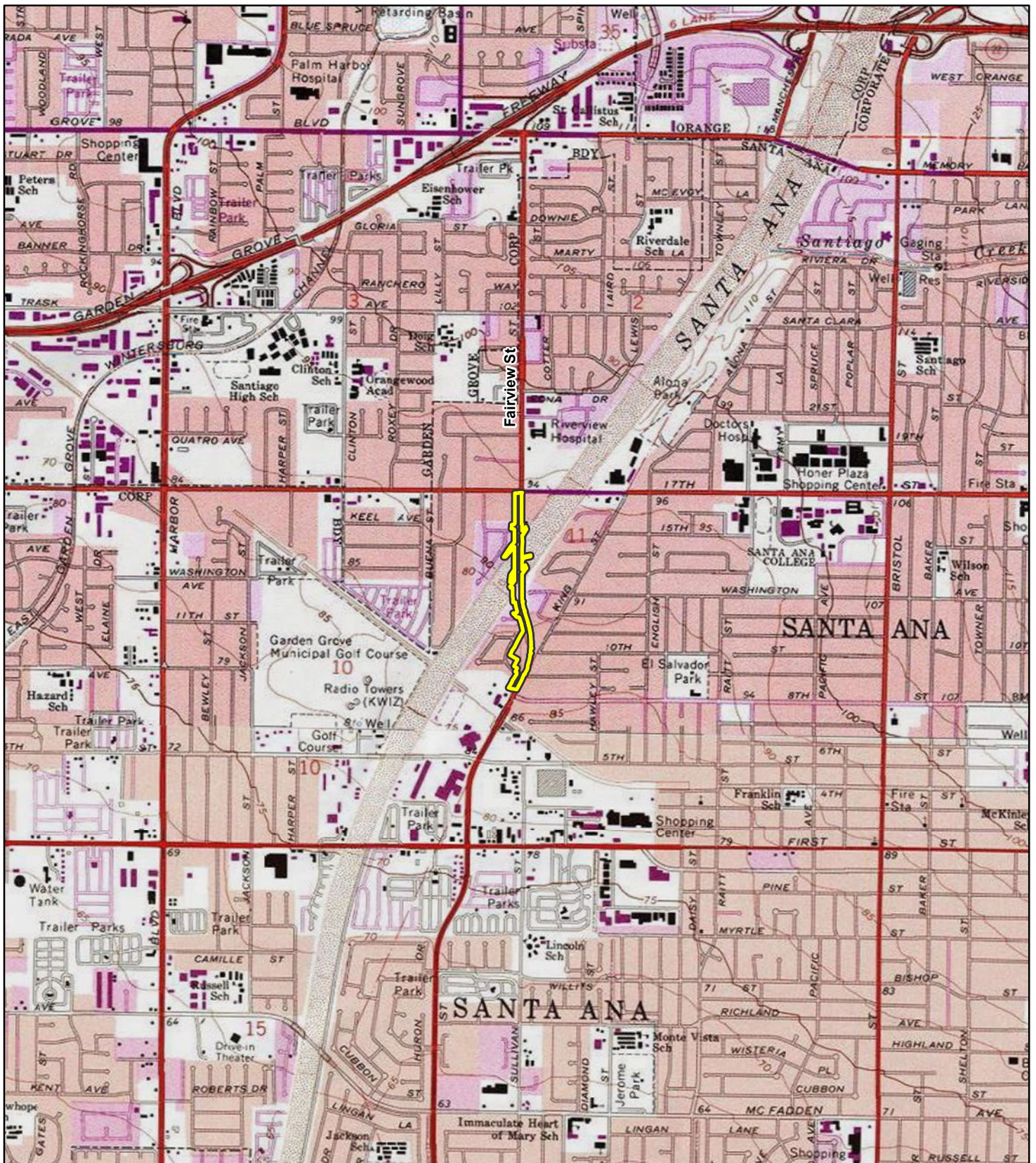
The proposed bridge would be expanded from approximately 52 feet (ft) to 100 ft in width, and would have the same roadway profile as the existing bridge. The eight pier walls that support the existing bridge would be removed, and four new pier walls would be constructed to support the new bridge.

The proposed project would partially acquire right-of-way take from three parcels (two commercial parcels [Assessor's Parcel Numbers (APNs) 405-213-02 and 405-213-01] and one single-family residence [APN 405-213-14]), as shown on Figure 1-2. Although not known at this time, there is the potential for one full take at the single-family residence (APN 405-213-14) if the property owner is concerned about the loss of a portion of the side yard; this will be determined during final design in consultation with the property owner.

An existing 12-inch-diameter water line and a bank of 12 phone conduits are suspended under the deck of the existing bridge and span the Santa Ana River. These utilities would need to be temporarily relocated during construction, after which they would be permanently relocated to the new bridge.

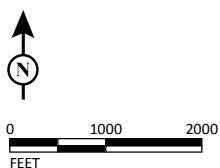
Water quality best management practices (BMPs) would be included to treat stormwater runoff such as a vegetated swale adjacent to Fairview Street in the Fairview Triangle rest area.

Fairview Street would remain open during the construction period with two southbound lanes and one northbound lane, with lanes shifted to one side of the bridge while the other side is replaced. Therefore, no detours would be required for vehicles traveling along Fairview Street. Access to properties would be maintained.



LEGEND

Project Location



SOURCE: USGS 7.5' Quad - Anaheim (1981) & Newport Beach (1981)

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FIGURE 1-1

*Fairview Street Improvements
from 9th Street to 16th Street and
Bridge Replacement Project*
Regional Location and Project Area

Federal Project No.: BRLS 5063(184)

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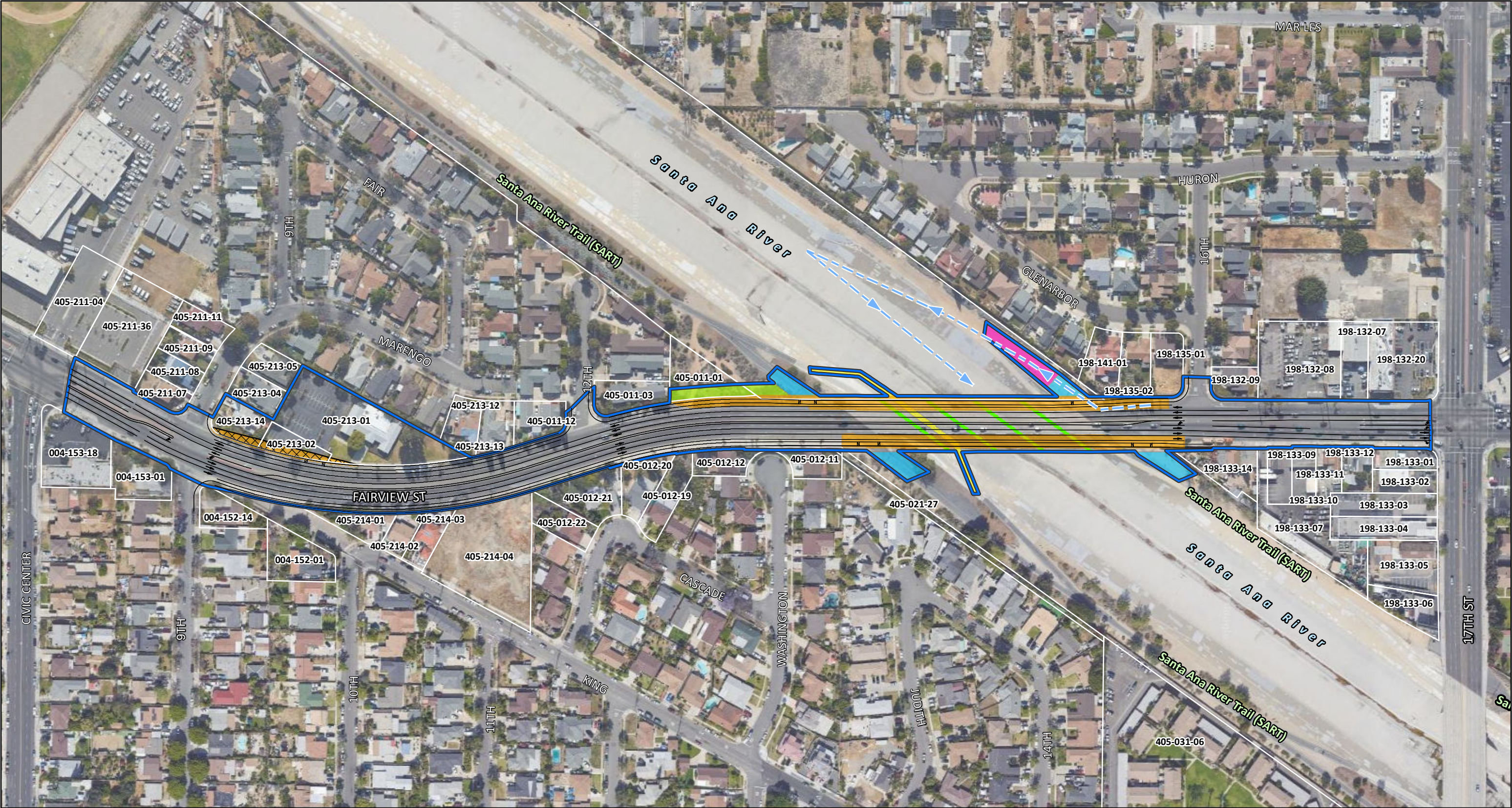


FIGURE 1-2

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Project Area	Reconstruction of Access Road	Proposed Construction Access
Proposed Right of Way	Potential Detour in River	
Proposed Roadway Widening	Grading / Revegetation / BMPs	
Proposed Roadway Modifications	Construction Staging Area	
Proposed Bridge Piers		

SOURCE: WKE (3/2018); Google (2016)

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Fairview Street Improvements
from 9th Street to 16th
Street and Bridge Replacement Project
Proposed Project
Federal Project No.: BRLS 5063(184)

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During construction, pedestrians and bikes would be detoured away from the Fairview Street bridge to the 17th Street bridge to cross the Santa Ana River by way of the Santa Ana River Trail (SART) between the hours of 9:00 a.m. and 7:00 p.m. while the gates to the SART are open and unlocked. After hours, pedestrians and bicyclists who wish to cross the Santa Ana River would be detoured to adjacent city streets such as King Street.

Construction of the proposed Project would require temporary closure of a portion of the SART for the demolition and placement of the bridge superstructure. The SART includes a Class I bike path on the eastern side and a regional riding and hiking trail on the western side. The portion of the SART affected by project construction would need to be temporarily closed four times for approximately 8 hours each during two summer periods for the placement of precast concrete girders. During these periods, SART users would be detoured and signage would be provided to display the dates of the closures and identify the detour routes. Work on the north and south sides of the bridge would be completed during separate periods so that SART users can be detoured to the trail on the opposite side of the Santa Ana River at 5th Street. There are gates and ramps located on both sides of the SART at 5th Street that provide access to bicyclists and pedestrians for these detours. Details regarding the detours are being coordinated with Orange County Parks. Other short-term closures of up to 15 minutes would be allowed with flagmen.

A temporary detour within the river bed may be required as a contingency. This would involve construction of dirt and gravel ramps with asphalt topping to and from the SART and the river bed.

Construction vehicles would access the Santa Ana River from the gate and ramp at the County of Orange access road at the northwest corner of the bridge, and would use the existing concrete access ramp into the river approximately 250 ft west of the project area. All access roads to the SART that are utilized by construction vehicles or for detour routes would be reconstructed and restored to pre-construction conditions or better prior to project completion.

1.4. Affected Land Uses

Developed and undeveloped land uses in the project vicinity were identified through land use maps, aerial photography, and site inspection. Receptors were identified in each land use category. Existing land uses in the project area include single-family and multifamily residences, a medical office, a trailside rest area (Fairview Triangle),

the Santa Ana River Trail (SART), vacant land, and commercial and light industrial uses. Existing land uses in the project area and surrounding vicinity are described in further detail as follows:

- **East of Fairview Street and South of the Santa Ana River (Receptors R-2 through R-7, R-11, R-12, R-13, R-17, R-18, R-24 through R-30, R-37 through R-45, R-48 through R-50, and R-53 through R-67):** Land uses in this area include single-family and multifamily residences, commercial uses, and vacant land. Land uses in this area range from 3 ft higher in elevation than Fairview Street to 7 ft lower in elevation than Fairview Street. Currently, 4 ft to 13.5 ft high existing walls along the private property lines shield the single-family residences.
- **West of Fairview Street and South of the Santa Ana River (Receptors R-1, R-8 through R-10, R-14 through R-16, R-19 through R-23, R-31 through R-36, R-46, R-47, R-51, and R-52):** Land uses in this area include single-family and multifamily residences, a medical office, Fairview Triangle, SART, and office uses. Land uses in this area range from 2 ft higher in elevation than Fairview Street to 5 ft lower in elevation than Fairview Street. Currently, 2.7 ft to 9.3 ft high existing walls along the private property lines shield the single-family and multifamily residences.
- **East of Fairview Street and North of the Santa Ana River (Receptors R-85 through R-92):** Land uses in this area include single-family residences and commercial and light industrial uses. Land uses in this area range from 2 ft higher in elevation than Fairview Street to approximately the same elevation as Fairview Street. Currently, a 6.7 ft high existing wall along the private property line shields the commercial use.
- **West of Fairview Street and North of the Santa Ana River (Receptors R-68 through R-84):** Land uses in this area include single-family residences, vacant land, and commercial and light industrial uses. Land uses in this area range from 2 ft higher in elevation than Fairview Street to 9 ft lower in elevation than Fairview Street. Currently, 6.7 ft to 10.7 ft high existing walls along the private property lines shield the single-family residences.

Chapter 2. Results of the Noise Study Report

The NSR for this project was approved in January 2019.

2.1. Noise Impact Locations

Potential long-term noise impacts associated with project operations are solely from traffic noise. Traffic noise was evaluated for the worst-case traffic condition. Using coordinates obtained from the topographic maps, 92 receptor locations associated with existing single- and multifamily residences, a medical office, Fairview Triangle, SART, vacant land, and commercial and light industrial uses were identified as receptors within the study area. Figure 2-1 shows these receptor locations.

Future traffic noise levels at all 92 receptor locations were determined using either the worst-case traffic operations (prior to speed degradation) or the 2040 a.m. peak-hour traffic volumes, whichever were lower. The worst-case traffic condition is assumed to be level of service (LOS) C and is generally loudest when vehicles on a given roadway travel at free-flowing traffic conditions. Accordingly, the worst-case traffic volume assumptions are based on the maximum number of vehicles that can typically travel in a given lane while still resulting in free-flowing traffic conditions. The worst-case traffic condition is assumed to be 750 vehicles per lane per hour (vplph) on Fairview Street and other local roadways. The a.m. peak-hour traffic volume was selected over the p.m. peak-hour traffic volume because the worst-hour noise levels based on the long-term (24-hour) noise level measurements occur during the a.m. hour. The a.m. and p.m. peak-hour traffic volumes were obtained from the *Traffic Impact Analysis* (LSA 2018).

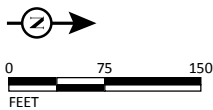
The modeled future noise levels with the project were compared to the modeled existing noise levels (after calibration) from Traffic Noise Model (TNM) 2.5 to determine whether a substantial noise increase would occur. The modeled future noise levels were also compared to the NAC to determine whether a traffic noise impact would occur.

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LEGEND

- ▲ Short-Term Monitoring Locations
- Long-Term Monitoring Locations
- Modeled Receptors
- ▤ Proposed Right of Way Acquisition
- Proposed Improvements
- Existing Right of Way
- Existing Walls



SOURCE: Google Aerial (12/2017); WKE (2017)
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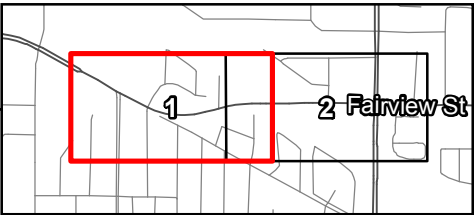
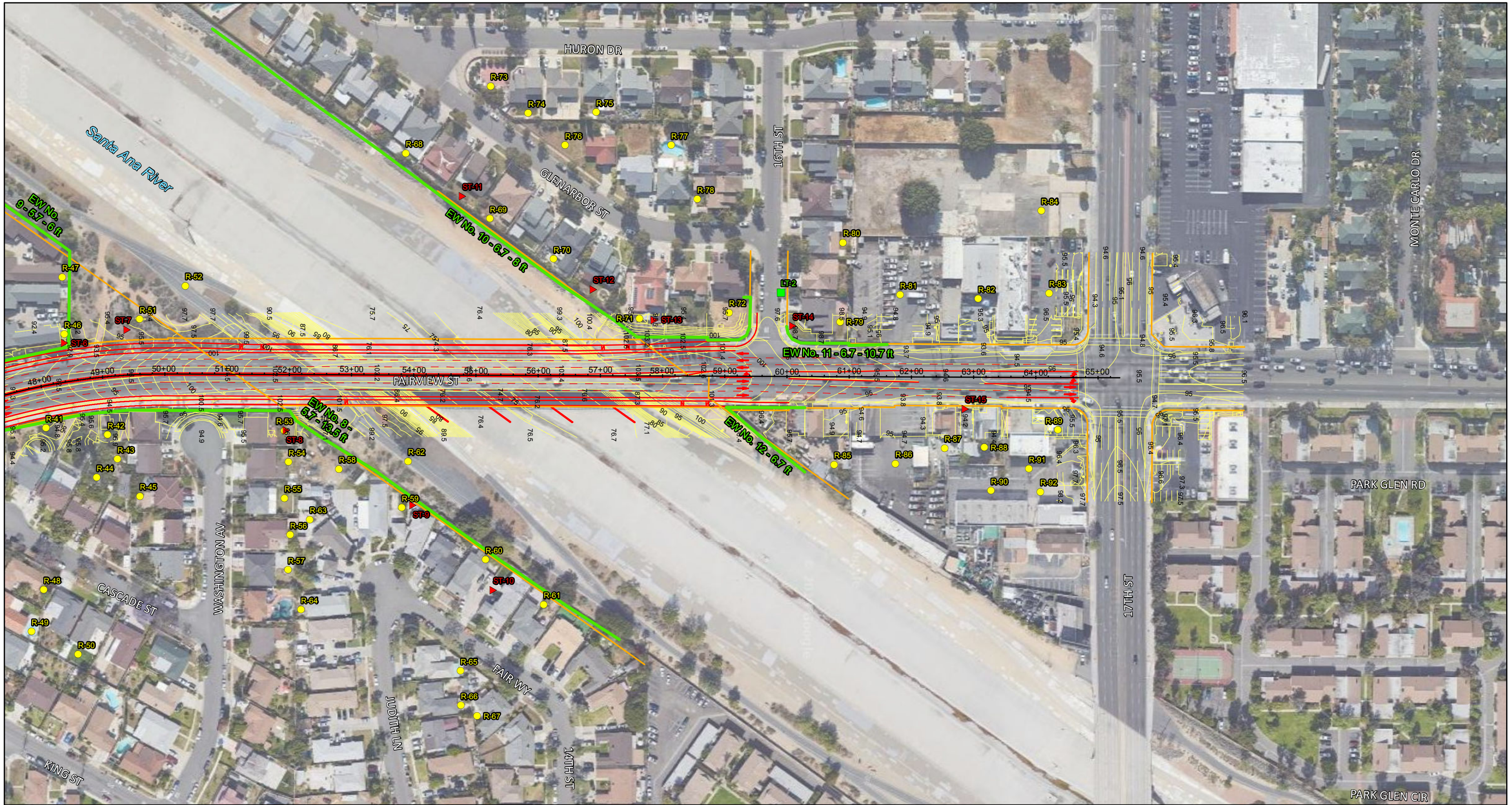


FIGURE 2-1
Sheet 1 of 2

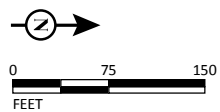
*Fairview Street Improvements
from 9th Street to 16th Street and Bridge Replacement Project
Monitoring and Modeled Receptor Locations*
Federal Project No.: BRLS 5063(184)

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LEGEND

- ▲ Short-Term Monitoring Locations
- Long-Term Monitoring Locations
- Modeled Receptors
- Proposed Right of Way Acquisition
- Proposed Improvements
- Existing Right of Way
- Existing Walls



SOURCE: Google Aerial (12/2017); WKE (2017)

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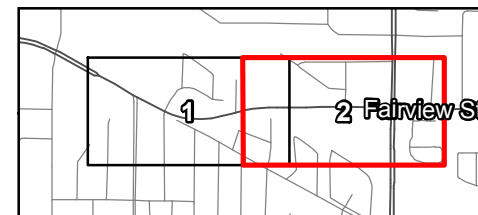


FIGURE 2-1
Sheet 2 of 2

*Fairview Street Improvements
from 9th Street to 16th Street and Bridge Replacement Project*
Monitoring and Modeled Receptor Locations
Federal Project No.: BRLS 5063(184)

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Of the 92 modeled receptors, 9 receptors under the Future Build condition would approach or exceed the NAC. No receptor would experience a substantial noise increase of 12 dBA or more over its corresponding modeled existing noise level under any scenario.

The receptor locations listed below would be or would continue to be exposed to noise levels that either approach or exceed the NAC under Future Build conditions:

- **Receptor R-5:** This receptor location represents an existing single-family residence on the northbound side of Fairview Street between Civic Center Drive and West 9th Street. Currently, a 4.7 ft high existing wall (Existing Wall [EW] No. 1) shields the residence. One noise barrier (NB No. 1) was modeled along the private property line on the northbound side of Fairview Street to shield this residence.
- **Receptor R-8:** This receptor location represents an existing single-family residence on the southbound side of Fairview Street between Civic Center Drive and West 9th Street. Currently, a 2.7 ft to 6 ft high existing wall (EW No. 2) shields this residence. One noise barrier (NB No. 2) was modeled along the private property line on the southbound side of Fairview Street to shield this residence.
- **Receptor R-14:** This receptor location represents an existing single-family residence on the southbound side of Fairview Street between West 9th Street and West 12th Street. Currently, a 5.3 ft high existing wall (EW No. 4) shields this residence. One noise barrier (NB No. 3) was modeled along the private property line on the southbound side of Fairview Street to shield this residence.
- **Receptor R-23:** This receptor location represents existing multifamily residences on the southbound side of Fairview Street between West 9th Street and West 12th Street. Existing wood fences along the private property line would not provide effective noise attenuation at these residences. One noise barrier (NB No. 4) was modeled along the private property line on the southbound side of Fairview Street to shield these residences.
- **Receptors R-24, R-25, and R-40:** These receptor locations represent existing single-family residences on the northbound side of Fairview Street between West 9th Street and West 12th Street. Currently, a 4 ft to 6 ft high wall (EW No. 5) shields these residences. One noise barrier (NB No. 5) was modeled along the private property line on the northbound side of Fairview Street to shield these residences.

- **Receptor R-46:** This receptor location represents an existing single-family residence on the southbound side of Fairview Street between West 12th Street and the Santa Ana River. Currently, a 5.7 ft high existing wall (EW No. 9) shields this residence. One noise barrier (NB No. 6) was modeled along the private property line on the southbound side of Fairview Street to shield this residence.
- **Receptor R-51:** This receptor location represents Fairview Triangle on the southbound side of Fairview Street between West 12th Street and the Santa Ana River. Currently, no wall shields Fairview Triangle. Because there is a driveway and pedestrian access onto Fairview Street, it is not feasible to abate traffic noise from Fairview Street with noise barriers.

2.2. Locations for Evaluated Noise Abatement

Noise abatement measures such as noise barriers were considered in order to shield receptors within the study area that would become or would continue to be exposed to traffic noise levels approaching or exceeding the NAC. Noise barriers were analyzed for each of these receptor locations. Depending on the location of the potential barrier and existing barrier height, noise barrier heights from 6 to 16 ft were analyzed at 2 ft increments. The location of the modeled noise barrier is shown on Figure 2-2.

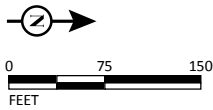
The following noise barriers were analyzed to shield receptor locations that would be exposed to traffic noise levels approaching or exceeding the NAC for the Future Build conditions:

- **NB No. 1:** A 169 ft long barrier along the right-of-way and private property line on the northbound side of Fairview Street between Civic Center Drive and 9th Street was analyzed to shield Receptor R-5.
- **NB No. 2:** A 129 ft long barrier along the right-of-way and private property line on the southbound side of Fairview Street between Civic Center Drive and 9th Street was analyzed to shield Receptor R-8.
- **NB No. 3:** A 113 ft long barrier along the right-of-way and private property line on the southbound side of Fairview Street between West 9th Street and West 12th Street was analyzed to shield Receptor R-14.
- **NB No. 4:** A 171 ft long barrier along the right-of-way and private property line on the southbound side of Fairview Street between West 9th Street and West 12th Street was analyzed to shield Receptor R-23.



LEGEND

- Modeled Receptors
- Proposed Right of Way Acquisition
- Proposed Improvements
- Existing Right of Way
- Existing Walls
- Modeled Noise Barriers



SOURCE: Google Aerial (12/2017); WKE (2017)
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FIGURE 2-2
Sheet 1 of 2

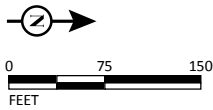
Fairview Street Improvements
from 9th Street to 16th Street and Bridge Replacement Project
Modeled Noise Barrier and Receptor Locations
Federal Project No.: BRLS 5063(184)

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LEGEND

- Modeled Receptors
- Proposed Right of Way Acquisition
- Proposed Improvements
- Existing Right of Way
- Existing Walls
- Modeled Noise Barriers



SOURCE: Google Aerial (12/2017); WKE (2017)
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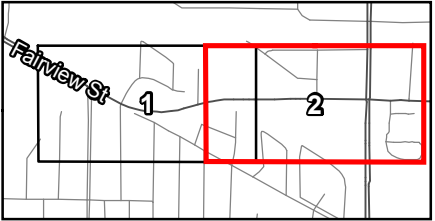


FIGURE 2-2
Sheet 2 of 2

Fairview Street Improvements
from 9th Street to 16th Street and Bridge Replacement Project
Modeled Noise Barrier and Receptor Locations
Federal Project No.: BRLS 5063(184)

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- **NB No. 5:** A 705 ft long barrier along the right-of-way on the northbound side of Fairview Street between West 9th Street and West 12th Street was analyzed to shield Receptors R-24, R-25, and R-40.
- **NB No. 6:** A 184 ft long barrier along the right-of-way and private property line on the southbound side of Fairview Street between West 12th Street and the Santa Ana River was analyzed to shield Receptor R-46.

2.3. Feasible Noise Barriers

Section 3 of the Protocol states that a minimum noise reduction of 5 dBA must be achieved at the impacted receptors in order for the proposed noise abatement measure to be considered feasible. Greater noise reductions are encouraged if they can be reasonably achieved. Feasibility may also be restricted by the following factors: (1) topography, (2) access requirement for driveways, (3) presence of local cross-streets, (4) underground utilities, (5) other noise sources in the area, and (6) safety considerations.

Table 2.1 summarizes the feasibility of the modeled noise barriers and lists the noise barrier heights, approximate lengths, the noise attenuation, the number of benefited units/receptors, the total reasonable allowance, beginning and ending station number, and the beginning and ending top of wall elevation under the Future Build conditions. Of the six modeled noise barriers evaluated for the Future Build conditions, all noise barriers were determined to be feasible.

Table 2.1: Summary of Feasible Noise Barriers from the Noise Study Report

Noise Barrier No.	Height (ft)	Approximate Length (ft)	Noise Attenuation (dBA)	Number of Benefited Receptors/Units ¹	Total Reasonable Allowance ²	Noise Barrier Location	Noise Barrier Station Number		Top of Wall Elevation (ft)	
							Begin	End	Begin	End
1	8	169	5	1	\$95,000	ROW/PL	36+55	37+31	96.97	96.35
	10	169	7	1	\$95,000				98.97	98.35
	12 ³	169	8	1	\$95,000				100.97	100.35
	14	169	9	1	\$95,000				102.97	102.35
	16	169	10	1	\$95,000				104.97	104.35
2	8	129	6	1	\$95,000	ROW/PL	36+30	37+07	96.46	96.00
	10	129	8	1	\$95,000				98.46	98.00
	12 ³	129	9	1	\$95,000				100.46	100.00
	14	129	10	1	\$95,000				102.46	102.00
	16	129	11	1	\$95,000				104.46	104.00
3	8	113	6	1	\$95,000	ROW/PL	38+70	39+22	96.74	98.00
	10 ³	113	7	1	\$95,000				98.74	100.00
	12	113	7	1	\$95,000				100.74	102.00
	14	113	8	1	\$95,000				102.74	104.00
	16	113	8	1	\$95,000				104.74	106.00
4	6	171	7	2	\$190,000	ROW/PL	43+45	45+15	96.23	96.00
	8	171	10	2	\$190,000				98.23	98.00
	10	171	12	2	\$190,000				100.23	100.00
	12 ³	171	14	2	\$190,000				102.23	102.00
	14	171	15	2	\$190,000				104.23	104.00
	16	171	16	2	\$190,000				106.23	106.00
5	6	705	6	2	\$190,000	ROW	40+45	42+14	100.25	95.00
	8	705	9	3	\$285,000				102.25	97.00
	10	705	11	3	\$285,000				104.25	99.00
	12 ³	705	13	5	\$475,000				106.25	101.00
	14	705	14	7	\$665,000				108.25	103.00
	16	705	16	7	\$665,000				110.25	105.00
6	10	184	7	1	\$95,000	ROW/PL	47+16	48+57	103.45	101.01
	12 ³	184	8	1	\$95,000				105.45	103.01
	14	184	9	1	\$95,000				107.45	105.01
	16	184	10	1	\$95,000				109.45	107.01

Source: Compiled by LSA Associates, Inc. (2019).

¹ Number of receptors/units that are attenuated by 5 dBA or more by the modeled barrier.² Calculated by multiplying the number of benefited receptors by \$95,000 (the dollar amount per benefited receptor/unit).³ Denotes the minimum wall height required to break the line-of-sight between the receptor and a truck exhaust stack.

dBA = A-weighted decibels PL = property line

ft = foot/feet ROW = right-of-way

Chapter 3. Preliminary Noise Abatement Decision

3.1. Summary of Key Information

Utilizing the information in Chapter 2, barriers considered to be feasible are analyzed to determine their reasonableness. As stated in Section 5.4 of the NSR, the overall reasonableness of noise abatement is determined by considering factors such as the noise reduction design goal and the construction cost of the barrier. For a noise barrier to be considered reasonable, the noise level reduction design goal of 7 dBA must be achieved at one or more of the benefited receptors. For any noise barrier to be considered reasonable from a cost perspective, the estimated construction cost of the noise barrier would be equal to or less than the total cost allowance calculated for the barrier. The total reasonable allowance was determined based on the number of benefited receptors multiplied by the reasonable allowance per residence. The estimated noise barrier construction costs for each barrier were developed by WKE, Inc. in December 2018 and are shown in Table 3.1 as well as in Appendix A. If the estimated noise barrier construction cost exceeds the total reasonable allowance, the noise barrier is determined to be not reasonable. However, if the estimated noise barrier construction cost is within the total reasonable allowance, the noise barrier is determined to be reasonable.

A summary of abatement information in Table 3.1 lists all the feasible noise barriers under the Future Build conditions, along with their locations, heights, approximate lengths, the noise attenuation levels, the number of benefited units/receptors, the total reasonable allowance per barrier, the estimated construction costs, and whether the barriers are reasonable. As shown in Table 3.1, NB Nos. 2 through 5 were determined to be reasonable and NB Nos. 1 and 6 were determined to be not reasonable because the estimated construction cost exceeded the total reasonable allowance. It should be noted that NB Nos. 2, 3 (at 12 ft and 14 ft high), 4, and 5 require the property owner to donate their right-of-way (permanent and temporary easement) in order to achieve reasonableness.

Table 3.1: Summary of Abatement Key Information for the Build Alternative

Noise Barrier No.	Noise Barrier Location	Height (ft)	Approximate Length (ft)	Noise Attenuation Level (dBA)	Number of Benefited Receptors/Units ¹	Total Reasonable Allowance ²	Estimated Construction Cost (Without ROW Donation) ³	Reasonable ?	Estimated Construction Cost (With ROW Donation) ³	Reasonable ?
1	ROW/PL	8	169	5	1	\$95,000	-- ⁴	No	-	No
		10	169	7	1	\$95,000	\$225,898	No	\$207,758	No
		12 ⁵	169	8	1	\$95,000	\$242,676	No	\$224,536	No
		14	169	9	1	\$95,000	\$261,270	No	\$243,130	No
		16	169	10	1	\$95,000	\$275,138	No	\$256,998	No
2	ROW/PL	8	129	6	1	\$95,000	--	No	-	No
		10	129	8	1	\$95,000	\$103,251	No	\$86,701	Yes
		12 ⁵	129	9	1	\$95,000	\$116,218	No	\$99,668	No
		14	129	10	1	\$95,000	\$129,533	No	\$112,983	No
		16	129	11	1	\$95,000	\$140,126	No	\$123,576	No
3	ROW/PL	8	113	6	1	\$95,000	--	No	-	No
		10 ⁵	113	7	1	\$95,000	\$86,910	Yes	\$69,880	Yes
		12	113	7	1	\$95,000	\$98,299	No	\$81,269	Yes
		14	113	8	1	\$95,000	\$110,192	No	\$93,162	Yes
		16	113	8	1	\$95,000	\$119,492	No	\$102,462	No
4	ROW/PL	6	171	7	2	\$190,000	\$208,301	No	\$184,391	Yes
		8	171	10	2	\$190,000	\$223,396	No	\$199,486	No
		10	171	12	2	\$190,000	\$237,517	No	\$213,607	No
		12 ⁵	171	14	2	\$190,000	\$254,459	No	\$230,549	No
		14	171	15	2	\$190,000	\$273,220	No	\$249,310	No
		16	171	16	2	\$190,000	\$289,097	No	\$265,187	No
5	ROW	6	705	6	2	\$190,000	--	No	-	No
		8	705	9	3	\$285,000	\$461,186	No	\$412,536	No
		10	705	11	3	\$285,000	\$520,938	No	\$472,288	No
		12 ⁵	705	13	5	\$475,000	\$593,082	No	\$544,432	No
		14	705	14	7	\$665,000	\$669,344	No	\$620,694	Yes
		16	705	16	7	\$665,000	\$736,731	No	\$688,081	No
6	ROW/PL	10	184	7	1	\$95,000	\$130,841	No	\$119,941	No
		12 ⁵	184	8	1	\$95,000	\$149,114	No	\$138,214	No
		14	184	9	1	\$95,000	\$169,047	No	\$158,147	No
		16	184	10	1	\$95,000	\$185,990	No	\$175,090	No

Source: Compiled by LSA Associates, Inc. (2019).

¹ Number of receptors/units that are attenuated by 5 dBA or more by the modeled barrier.² Calculated by multiplying the number of benefited receptors by \$95,000 (the dollar amount per benefited receptor/unit).³ Construction cost estimate provided by WKE, Inc. (2018).⁴ Shaded area represents barrier heights that have been determined to be not reasonable because the barrier would not reduce noise levels by 7 dBA or more.⁵ Denotes the minimum wall height required to break the line of sight between the receptor and a truck exhaust stack.

dBA = A-weighted decibels ft = foot/feet ROW = right-of-way

3.2. Non-Acoustical Factors Relating to Feasibility

Nonacoustical factors relating to feasibility that must be considered during the construction of noise barriers include: geometric standards, safety, maintenance, security, drainage, geotechnical considerations, and utility relocations.

3.2.1. Build Alternative

The nonacoustical factors relating to the feasibility of NB Nos. 2 through 5 are:

- **Geometric Standards:** NB Nos. 2 through 5 would not affect the geometric standards of adjacent roadways.
- **Safety:** NB Nos. 2 through 5 would not affect sight distance for vehicular or pedestrian traffic.
- **Maintenance:** Temporary construction easements would be required for NB Nos. 2 through 5. The property owner would be responsible for maintaining the private side of the barrier while the City would be responsible for maintaining the public side of the barrier.
- **Security:** NB Nos. 2 through 5 would be in the same alignment as an existing wall and would not change the security conditions of the site.
- **Drainage:** NB Nos. 2 through 5 would not affect the existing and proposed drainage system.
- **Geotechnical Considerations:** NB Nos. 2 through 5 would be constructed at a similar grade to the existing condition.
- **Utility Relocations:** Construction of NB No. 2 would not have the potential to interfere with existing utilities. However, the construction of NB Nos. 3, 4, and 5 have the potential to interfere with existing utilities because there are overhead electrical lines in the area. Installation of piles during the construction of NB Nos. 3, 4, and 5 may require temporary bypass power lines to be constructed. Although utility relocations are not anticipated, further investigation would be required during the Plans, Specifications, and Estimates (PS&E) phase.

3.3. Preliminary Recommendation and Decision

The preliminary noise abatement decision presented in this report is based on preliminary project alignments and profiles, which may be subject to change. As such, the physical characteristics of noise abatement described herein may also be subject to change. If pertinent parameters change substantially during the final project design, the preliminary noise abatement decision may be changed or eliminated from the final project design. A final decision to construct noise abatement will be made by

the Project Development Team (PDT) upon completion of the project design and public input.

The property owners and non-owner occupants will be sent a noise barrier survey letter during the public review period to request each owner's or occupant's opinion on whether or not they would prefer a noise barrier and what height they would prefer the barrier to be based on the range of feasible and reasonable heights listed in Table 3.1.

Chapter 4. Secondary Effects of Abatement

The secondary effects of noise abatement were considered as part of this NADR. The proposed project includes avoidance, minimization, and/or mitigation measures that lessen potential environmental effects. Noise abatement is a part of the overall project footprint, and most secondary effects would be addressed by these measures. NB Nos. 2 through 5 are feasible and reasonable and do not have any secondary effects that require additional project features or avoidance, minimization, and/or mitigation measures.

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Chapter 5. References

California Department of Transportation (Caltrans). 2011. *Traffic Noise Analysis Protocol for New Highway Construction, Reconstruction, and Retrofit Barrier Projects*. May. Website: http://www.dot.ca.gov/hq/env/noise/pub/ca_tnap_may2011.pdf (accessed May 2019).

LSA Associates, Inc. 2019. *Noise Study Report*. January.

———. 2018. *Fairview Street Improvements from 9th Street to 16th Street and Bridge Replacement Project Traffic Impact Analysis*. June.

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Appendix A. Noise Barrier Construction Cost Estimate

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Table A-1. Noise Barrier Construction Cost Estimate																						
Noise Barrier No.	Noise Barrier Location	Height (ft)	Approximate Length (ft)	Noise Attenuation Level (dBA)	Number of Benefited Units/Receptors	Total Reasonable Allowance	Cost of Demolition	Cost of Sound Wall	Cost of Retaining Wall	Misc Construction Costs ^{1,2}	Job Site Management	Traffic Control Cost	Utility Relocation ^{3,4}	Landscaping for Graffiti Abatement Cost (Arch %5)	Total ROW Costs (TCE)	ROW Support Costs	Mobilization (10%)	Contingency (10%)	Estimated Construction Cost (Without ROW Donation)	Reasonable?	Estimated Construction Cost (With ROW Donation)	Reasonable?
1	ROW/PL	8	169	5	1	\$95,000	-	-	-	-	-	-	-	-	-	-	-	-	-	No	-	No
		10	169	7	1	\$95,000	\$ 8,399	\$ 77,818	\$ -	\$ 5,000			\$ 75,000	\$ 3,891	\$ 18,140		\$ 18,825	\$ 18,825	\$ 225,898	No	\$ 207,758	No
		12	169	8	1	\$95,000	\$ 8,399	\$ 91,134	\$ -	\$ 5,000			\$ 75,000	\$ 4,557	\$ 18,140		\$ 20,223	\$ 20,223	\$ 242,676	No	\$ 224,536	No
		14	169	9	1	\$95,000	\$ 8,399	\$ 105,891	\$ -	\$ 5,000			\$ 75,000	\$ 5,295	\$ 18,140		\$ 21,773	\$ 21,773	\$ 261,270	No	\$ 243,130	No
		16	169	10	1	\$95,000	\$ 8,399	\$ 116,898	\$ -	\$ 5,000			\$ 75,000	\$ 5,845	\$ 18,140		\$ 22,928	\$ 22,928	\$ 275,138	No	\$ 256,998	No
2	ROW/PL	8	129	6	1	\$95,000	-	-	-	-	-	-	-	-	-	-	-	-	-	No	-	No
		10	129	8	1	\$95,000	\$ 6,411	\$ 60,078	\$ -				\$ 3,004	\$ 16,550		\$ 8,604	\$ 8,604	\$ 103,251	No	\$ 86,701	Yes	
		12	129	9	1	\$95,000	\$ 6,411	\$ 70,369	\$ -				\$ 3,518	\$ 16,550		\$ 9,685	\$ 9,685	\$ 116,218	No	\$ 99,668	No	
		14	129	10	1	\$95,000	\$ 6,411	\$ 80,936	\$ -				\$ 4,047	\$ 16,550		\$ 10,794	\$ 10,794	\$ 129,533	No	\$ 112,983	No	
		16	129	11	1	\$95,000	\$ 6,411	\$ 89,343	\$ -				\$ 4,467	\$ 16,550		\$ 11,677	\$ 11,677	\$ 140,126	No	\$ 123,576	No	
3	ROW/PL	8	113	6	1	\$95,000	-	-	-	-	-	-	-	-	-	-	-	-	-	No	-	No
		10	113	7	1	\$95,000	\$ -	\$ 52,757	\$ -				\$ 2,638	\$ 17,030		\$ 7,242	\$ 7,242	\$ 86,910	Yes	\$ 69,880	Yes	
		12	113	7	1	\$95,000	\$ -	\$ 61,796	\$ -				\$ 3,090	\$ 17,030		\$ 8,192	\$ 8,192	\$ 98,299	No	\$ 81,269	Yes	
		14	113	8	1	\$95,000	\$ -	\$ 71,235	\$ -				\$ 3,562	\$ 17,030		\$ 9,183	\$ 9,183	\$ 110,192	No	\$ 93,162	Yes	
		16	113	8	1	\$95,000	\$ -	\$ 78,616	\$ -				\$ 3,931	\$ 17,030		\$ 9,958	\$ 9,958	\$ 119,492	No	\$ 102,462	No	
4	ROW/PL	6	171	7	2	\$190,000	\$ 8,499	\$ 55,405	\$ -	\$ 8,000			\$ 75,000	\$ 2,770	\$ 23,910		\$ 17,358	\$ 17,358	\$ 208,301	No	\$ 184,391	Yes
		8	171	10	2	\$190,000	\$ 8,499	\$ 67,385	\$ -	\$ 8,000			\$ 75,000	\$ 3,369	\$ 23,910		\$ 18,616	\$ 18,616	\$ 223,396	No	\$ 199,486	No
		10	171	12	2	\$190,000	\$ 8,499	\$ 78,593	\$ -	\$ 8,000			\$ 75,000	\$ 3,930	\$ 23,910		\$ 19,793	\$ 19,793	\$ 237,517	No	\$ 213,607	No
		12	171	14	2	\$190,000	\$ 8,499	\$ 92,039	\$ -	\$ 8,000			\$ 75,000	\$ 4,602	\$ 23,910		\$ 21,205	\$ 21,205	\$ 254,459	No	\$ 230,549	No
		14	171	15	2	\$190,000	\$ 8,499	\$ 106,928	\$ -	\$ 8,000			\$ 75,000	\$ 5,346	\$ 23,910		\$ 22,768	\$ 22,768	\$ 273,220	No	\$ 249,310	No
		16	171	16	2	\$190,000	\$ 8,499	\$ 119,529	\$ -	\$ 8,000			\$ 75,000	\$ 5,976	\$ 23,910		\$ 24,091	\$ 24,091	\$ 289,097	No	\$ 265,187	No
5	ROW	6	705	6	2	\$190,000	-	-	-	-	-	-	-	-	-	-	-	-	-	No	-	No
		8	705	9	3	\$285,000	\$ 35,039	\$ 286,317	\$ -				\$ 14,316	\$ 48,650		\$ 38,432	\$ 38,432	\$ 461,186	No	\$ 412,536	No	
		10	705	11	3	\$285,000	\$ 35,039	\$ 333,740	\$ -				\$ 16,687	\$ 48,650		\$ 43,412	\$ 43,412	\$ 520,938	No	\$ 472,288	No	
		12	705	13	5	\$475,000	\$ 35,039	\$ 390,997	\$ -				\$ 19,550	\$ 48,650		\$ 49,424	\$ 49,424	\$ 593,082	No	\$ 544,432	No	
		14	705	14	7	\$665,000	\$ 35,039	\$ 451,522	\$ -				\$ 22,576	\$ 48,650		\$ 55,779	\$ 55,779	\$ 669,344	No	\$ 620,694	Yes	
		16	705	16	7	\$665,000	\$ 35,039	\$ 505,004	\$ -				\$ 25,250	\$ 48,650		\$ 61,394	\$ 61,394	\$ 736,731	No	\$ 688,081	No	
6	ROW/PL	10	184	7	1	\$95,000	\$ 9,145	\$ 84,752	\$ -				\$ 4,238	\$ 10,900		\$ 10,903	\$ 10,903	\$ 130,841	No	\$ 119,941	No	
		12	184	8	1	\$95,000	\$ 9,145	\$ 99,254	\$ -				\$ 4,963	\$ 10,900		\$ 12,426	\$ 12,426	\$ 149,114	No	\$ 138,214	No	
		14	184	9	1	\$95,000	\$ 9,145	\$ 115,074	\$ -				\$ 5,754	\$ 10,900		\$ 14,087	\$ 14,087	\$ 169,047	No	\$ 158,147	No	
		16	184	10	1	\$95,000	\$ 9,145	\$ 128,521	\$ -				\$ 6,426	\$ 10,900		\$ 15,499	\$ 15,499	\$ 185,990	No	\$ 175,090	No	

¹ The Miscellaneous Construction Cost for NB No. 1 is to reconstruct the adjacent trash bin enclosure

² The Miscellaneous Construction Cost for NB No. 4 is for landscape repair to the adjacent property

³ Utility Relocation Cost for NB No. 1 is for the relocation of a power pole with transformer.

⁴ Utility Relocation Cost for NB No. 4 is for the relocation of a power pole and underground conduits.

dBA = A-weighted decibels

ft = feet

Misc = miscellaneous

PL = property line

ROW = right-of-way