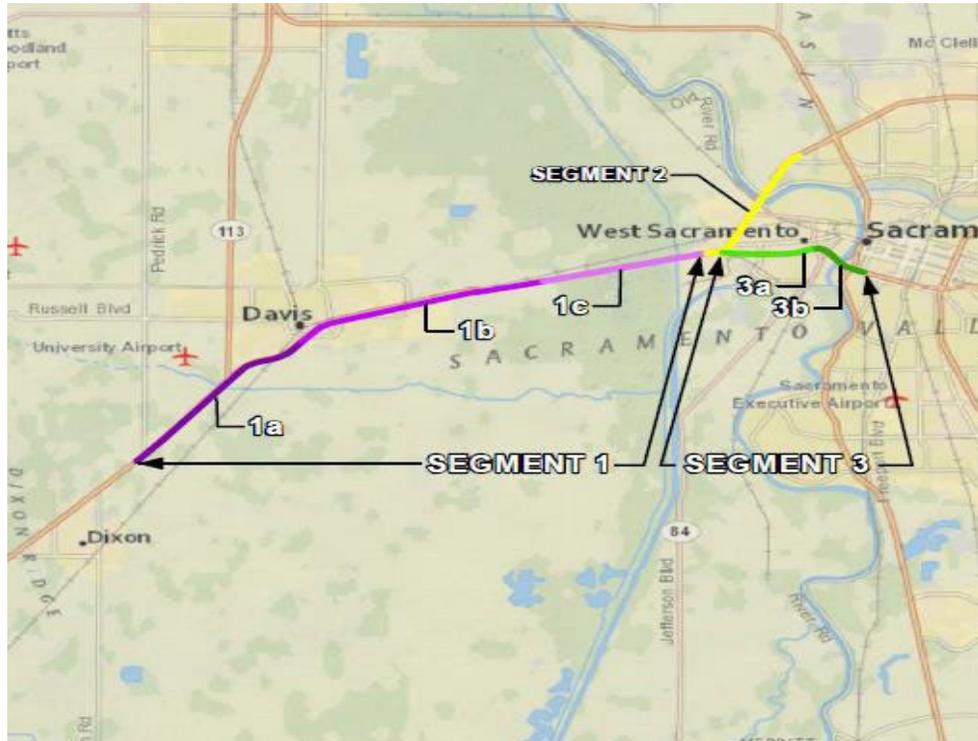


Interstate 80 (I-80) Corridor Improvements Project NADR



Noise Abatement Decision Report

Supplemented by the November 2021 Draft Noise Study Report

INTERSTATE 80 (I-80) CORRIDOR IMPROVEMENTS PROJECT

(EA 03-3H900)

SACRAMENTO, SOLANO, AND YOLO COUNTIES CALIFORNIA

03-SOL-80-PM 40.7/R44.7

03-YOLO-80-PM 0.00/R11.72

03-SAC-80-PM 0.00/M1.36

03-YOLO-50-PM 0.00/3.12

03-SAC-50-PM 0.00/L0.617

03-3H900

DECEMBER 2021



Noise Abatement Decision Report

YOLO 80 (I-80) CORRIDOR IMPROVEMENTS PROJECT

SACRAMENTO, CALIFORNIA

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03-SAC-50-PM 0.00/L0.617

03-3H900

DECEMBER 2021

Approved By: _____



Monika J. Pedigo, Branch Chief
Design M13, District 03
Office of Design (MSVL) C

Date: _____

12/23/2021

List of Abbreviated Terms

[Abbreviation]	
Benefited receptor	A dwelling unit or other equivalent land use expected to receive a noise reduction of at least 5 dBA from the proposed abatement measure
Date of public knowledge	The date of approval of the project CE, FONSI, or ROD.
dBA	A-weighted sound pressure level
ED	Environmental Document
FHWA	Federal Highway Administration
Leq	Equivalent sound level (energy averaged sound level)
Leq[h]	A-weighted, energy average sound level during a 1-hour period
NSR	Noise study report
NADR	Noise Abatement Decision Report
NAC	Noise abatement criteria
Noise reduction design goal	7 dB (decibel) of noise reduction at one or more benefited receptors.
Reasonable allowance	A single dollar value—a reasonable allowance per benefited receptor

1. Introduction

The Noise Abatement Decision Report (NADR) presents the preliminary noise abatement decision as defined in the Caltrans Traffic Noise Analysis Protocol (Protocol). This report has been approved by a California licensed professional civil engineer. The project level noise study report (NSR), prepared for this project is hereby incorporated by reference.

The NADR was prepared by Joey Morrision and Monika Pedigo, a licensed California professional civil engineer.

1.1. Noise Abatement Assessment Requirements

Title Title 23, Code of Federal Regulations (CFR), Part 772 of the Federal Highway Administration (FHWA) standards (23 CFR 772), and the Caltrans Traffic Noise Analysis Protocol (Protocol) requires 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” 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 dB of the NAC. A substantial increase is defined as being a 12-dB increase above existing conditions.

23 CFR 772 requires that noise abatement measures that are reasonable and feasible and are likely to be incorporated into the project be identified before the adoption of the final environmental document (ED).

The Protocol establishes a process for assessing the reasonableness and feasibility of noise abatement. Before publication of the draft ED, a *preliminary noise abatement decision* is made. The preliminary noise abatement decision is based on the *feasibility* of evaluated abatement and the *preliminary reasonableness determination*. Noise abatement is considered to be acoustically feasible if it is predicted to provide noise reduction of at least 5 dBA at an impacted receptor. Other nonacoustical factors relating to geometric standards (e.g., sight distances), safety, maintenance, and security can also affect feasibility.

The overall reasonableness of noise abatement is determined by the following factors:

- the viewpoints of benefited receptors,
- the cost of noise abatement, and

- the noise reduction design goal.

The preliminary reasonableness determination reported in this document is based on the noise reduction design goal and abatement cost. The viewpoints of benefited receptors are determined by a survey generally conducted during the public review period for the project ED.

Caltrans' noise reduction design goal is that a barrier must be predicted to provide at least 7 dB of noise reduction at one or more benefited receptors. The cost reasonableness of abatement is determined by calculating a cost allowance that is considered to be a reasonable amount of money 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 and the abatement will provide at least 7 dB of noise reduction at one or more benefited receptors, then the preliminary determination is that the abatement is reasonable. If the cost estimate is higher than the allowance or the design goal cannot be achieved, the initial finding is that abatement is inappropriate.

The NADR presents the preliminary noise abatement decision based on acoustical and nonacoustical feasibility factors, the design goal, and the relationship between noise abatement allowances and the engineer's cost estimate. The NADR does not present the final decision regarding noise abatement; instead, it offers critical information on abatement to be considered throughout the environmental review process, based on the best available information when the draft ED is published. The final overall reasonableness decision will take this information into account, along with the survey of benefited receptors conducted during the environmental review process..

At the end of the public review process for the ED, the final noise abatement decision is made and is indicated in the last ED. The preliminary noise abatement decision will become the absolute noise abatement unless compelling information received during the environmental review process suggests 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, the design goal, 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 secondary effects of abatement (impacts on cultural resources, scenic views, hazardous materials, biology, 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

This project proposes to make improvements on the I-80 corridor in Solano County between Kidwell Road and the Solano/Yolo County line; on I-80 in Yolo County between Solano/Yolo County line and the I-80/Sacramento River Bridge, and between I-80/Sacramento River Bridge and West El Camino Avenue in Sacramento County; and US-50 between the I-80/US 50 interchange and the US 50/ Sacramento River Bridge in Yolo County and between the US 50/ Sacramento River Bridge and the US 50/ I-5 interchange in Sacramento County. Each of the Build Alternatives would include a managed lane. Managed lanes are highway facilities or a set of lanes where operational strategies are implemented to manage overall traffic congestion or in response to changing conditions (FHWA 2008). Managed lane options include pricing, vehicle eligibility, or access control concepts. The lanes have the flexibility to be used by different types of vehicles, depending on the need, and can be actively managed to accommodate peak travel demands. The project would add managed lanes on I-80 and US-50 by widening the existing roadway through a combination of lane conversion, restriping, shoulder widening, and median reconstruction with a concrete barrier. The reconstruction of the median would require widening or replacing existing structures and drainage modifications within the project area.

The project also offers modification of ramp meters, fiber-optic conduit, cables, overhead signs, existing Intelligent Transportation System elements, and infrastructure. Utility relocation would also occur.

The Project proposes thirteen alternatives, one no-build alternative and 12 different build alternatives. While each Build Alternative offers another managed lane type, a single geometric footprint is suggested for all alternatives. Build Alternative seven would not construct new lanes but would repurpose the inside lane as a managed lane. Build alternative eight would create an I-80 Managed Lane connector structure at the Us 50? I-80 interchange. This Project has several standardized Project Features employed on most, if not all, Caltrans projects. The PDT did not consider these features in response to any specific environmental impacts resulting from the proposed scope of work.

The alternatives consider different managed lane types, strategies, and project limits:

Alternative 1: No Build

Alternative 2a: Add 1 Managed Lane (Type: HOV 2+) in each direction

Alternative 2b: Add 1 Managed Lane (Type: HOV 2+) in each direction, and build an I-80 connector structure.

Alternative 3a: Add 1 Managed Lane (Type: HOT 2+) in each direction

Alternative 3b: Add 1 Managed Lane (Type: HOT 2+) in each direction, and build an I-80 connector structure.

Alternative 4a: Add 1 Managed Lane (Type: HOT 3+) in each direction for free use by vehicles with two or more riders (HOT 2+), while single occupied vehicles pay for the lane usage.

Alternative 4b: Add 1 Managed Lane (Type: HOT 3+) in each direction, and build an I-80 connector structure.

Alternative 5a: Add 1 Managed Lane (Type: Express Lane) in each direction

Alternative 5b: Add 1 Managed Lane (Type: Express Lane) in each direction, and build an I-80 connector structure.

Alternative 6a: Add 1 Managed Lane (Type: Transit Only) in each direction

Alternative 6b: Add 1 Managed Lane (Type: Transit Only) in each direction, and build an I-80 connector structure.

Alternative 7a: Repurpose existing #1 lane to a managed lane (Type: HOV 2+)

Alternative 7b: Repurpose existing #1 lane to a managed lane (Type: HOV 2+), and build an I-80 connector structure.

Additional viable congestion relief strategies associated with these alternatives include:

- adding extra lane storage at select metered on-ramps

- adding new ramp metering at on-ramps
- adding auxiliary lanes
- enhancing intelligent transportation information systems
- improved infrastructure freeway monitoring
- traveler information capabilities / improving signage

1.4. Affected Land Uses

Existing land uses in the Project area were categorized by their Activity Category. The activity Category A land uses (lands on which serenity and quiet are of extraordinary significance and serve an essential public need and where the preservation of those qualities is essential if the area continues to serve its intended purpose) were not identified in the Project area. The following noise-sensitive land uses were identified in the Project area:

- Activity Category B - Residential
- Activity Category C – Schools, Parks, Trails, Medical Facility, Picnic Area, Place of Worship
- Activity Category D (Interior) – Schools, Medical Facility, Place of Worship; and
- Activity Category E – Restaurants, Hotels, Offices
- Activity Category F – Agriculture, Airport, Ports, Rail Yard, Retail Facilities, Utilities, Warehousing

Activity Category F land uses in the Project area are not noise sensitive. Although all developed land uses are evaluated in this analysis, noise abatement is only considered for areas of frequent human use that would benefit from a lowered noise level. Accordingly, this impact analysis focuses on locations with defined outdoor activity areas, such as residential backyards, everyday exterior use areas for multi-family development, and parks.

Land uses in the project area have been grouped into a series of numbered analysis areas that are:

- **Segment 1a:** Segment 1a is located from Kidwell Road to Solano County/Yolo County Line. Agriculture (Activity Category F), University of California Davis (Activity Category C), and single-family residential uses (Activity Category B) are located in this area. This segment does not currently include existing sound walls.

• **Segment 1b:** Segment 1b is located from the Solano/Yolo County Line to the west end of the Yolo Causeway. Eight multi-family properties (Activity Category B) and three residential subdivisions (Activity Category B) are located in this area. An existing sound barrier with a nominal height of 6 feet is located along the I-80 westbound off-ramp at Richards Boulevard. This sound wall is currently shielding a multi-family residential development west of a storage facility. Another 6-foot sound wall shielding additional multi-family residences is East of the storage facility. Two medical facilities (Activity Category D), a hotel (Activity Category E), offices (Activity Category E), a sports facility (Activity Category C), and a school (Activity Category D) are also located within this segment. Agricultural areas (Activity Category F) are located just west of the Yolo Causeway. There are no outdoor areas associated with the offices and medical facilities that are considered areas of frequent human use.

• **Segment 1c:** Segment 1c is located from the start of the Yolo Causeway to the East of Enterprise Boulevard. Agriculture (Activity Category F), undeveloped lands that are not permitted (Activity Category F), and a wildlife trail crossing (Activity Category C) are located in this area.

• **Segment 2:** Segment 2 is located just East of Enterprise Boulevard and continues north on I-80 to West El Camino Avenue. Single-family residential (Activity Category B), an RV Park (Activity Category C), a mobile home park (Activity Category B), and a medical facility (Activity Category D) are located within this area. South of I-80, between Enterprise Boulevard and the US 50/ I-80 interchange, in this area there are some reclamation district 900 flood control channels and Sacramento Port areas (Activity Category F). There are existing retail facilities on either side of I-80 (Activity Category F). There are agricultural areas (Activity Category F) located west and east I-80. This area is generally flat. An existing sound wall runs parallel to I-80 between the eastbound lanes and Thor Drive, shielding a mobile home park. This wall is about 12 feet tall. An existing sound wall adjacent to I-80 eastbound, just south of West El Camino Avenue, is approximately 12 feet tall and shields the single-family residential housing development. No outdoor areas considered to be areas of frequent human use are associated with the medical facility.

• **Segment 3a:** Segment 3a is between the I-80/US-50 Separation to Jefferson Boulevard Undercrossing. Three residential subdivisions (Activity Category B), two multi-family properties (Activity Category B), two medical facilities (Activity Category C and D), two hotels (Activity Category E), a school (Activity Category C and D), a park (Activity Category C), and a place of worship (Activity Category D) are located within this segment. On either side of US 50 there are existing retail facilities (Activity Category F). An existing

sound wall, located north of US-50 just east of the I-80/US-50 interchange, is approximately 13.5 feet tall and shields multi-family and single-family developments. Another 12-foot-tall sound wall is located south of the US-50 eastbound lanes at the off-ramp at Harbor Boulevard. This wall is shielding a Motel 6 and Radisson hotel. The Sacramento Valley Charter School, single-family housing area, Westacre Park, and Yolo High School, which are located north of the US-50 westbound lanes west of the Jefferson Boulevard interchange, are shielded by 6-12 feet tall sound walls. The single-family houses south of the US-50 eastbound lanes, which are also west of the Jefferson Boulevard interchange, are also currently shielded by 6-12 feet tall sound walls.

- **Segment 3b:** Segment 3b is located from the Jefferson Boulevard Undercrossing to just east I-5. Parks (Category C) and residential (Activity Category B) land uses adjoin this segment. On either side of US 50 there are existing retail facilities (Activity Category F).

A field investigation was conducted from Friday, March 24, 2021, to Thursday, July 8, 2021, to identify land uses that could be subject to traffic and construction noise impacts from the proposed Project. Existing land uses in the Project area were categorized by land use type and Activity Category, and the extent of frequent human use areas was documented. Noise receptor locations in the Project area were identified through a review of Project mapping, aerial photos, and field reconnaissance. Activity Category B, C, D, E, and F land uses border the Project. Although all land uses are evaluated in this analysis, the focus is on locations of frequent human use that would benefit from a lowered noise level. Accordingly, this impact analysis focuses on locations with defined outdoor activity areas, including residential backyards, everyday use areas at multi-family residences, common use areas at hotels and motels, places of worship, schools, parks, restaurants, offices, and retail.

As required by the Protocol (Caltrans, 2020), noise abatement is only considered for areas of frequent human use that would benefit from a lowered noise level. The impact analysis focuses on locations with defined outdoor activity areas such as residential backyards, patios, balconies, and everyday use areas at residences.

2. Results of the Noise Study Report

The NSR for this Project was prepared by Heather A. Bruce on December 15, 2021, and approved by Saeid Zandian-Jazi on December 15, 2021. Noise abatement is considered where noise impacts are predicted in areas of frequent human use that would benefit from a lowered noise level. Noise abatement must be predicted to provide at least a 5 dB minimum reduction at an impacted receptor to be considered feasible by Caltrans (i.e., the barrier would provide a noticeable noise reduction). The Protocol's acoustical design goal states that the noise barrier must provide at least 7 dB of noise reduction at one or more benefited receptors.

Noise barriers are the only form of noise abatement considered for exterior land uses in the Project area. Each noise barrier has been evaluated for feasibility based on achievable noise reduction. Preliminary noise barriers were evaluated at the most acoustically effective locations within the State right-of-way.

One new noise barrier was studied as potential noise abatement. The noise barrier would not feasibly abate traffic noise or meet the 7 dB noise reduction goal, and will not be considered for construction.

The outdoor use area at the residential property located at 9460 W Chiles Road (represented by Receptor R150) was identified for noise abatement using 2049 modeled Build Alternative for three noise levels that would approach or exceed the NAC.

Of the eight barriers evaluated in the NSR, only one evaluated barrier, Barrier 1, was feasible and achieved the Caltrans noise reduction design goal (minimum of 7 dB reduction for at least one receptor). Barrier 1 was Evaluated and modeled along the I-80 eastbound travel lanes, extending approximately 970 feet (see figure below). Table 2-1 shows the 2049 Build noise levels and insertion loss Evaluated for Barrier 1 at various design heights. heights.



Table 2-1. Summary of Barrier 1 Evaluation from Noise Study Report

Barrier	Location	Station	Noise Level w/o Barrier at Benefited Receptors (Leq[1h])	Height (feet)	Insertion Loss (dBA)	Acoustically Feasible?	Number of Benefited Residences	Design Goal Achieved?	Reasonable Monetary Allowance
B1	EP	Sta. 269+41 to 278+22	72	6	5	No	1	No	\$107,000
			72	8	6	No	1	No	\$107,000
			72	10	7	Yes	1	Yes	\$107,000
			72	12	8	Yes	1	Yes	\$107,000
			72	14	8	Yes	1	Yes	\$107,000
			72	16	8	Yes	1	Yes	\$107,000

¹ I.L. = Insertion Loss
 Lengths may differ slightly due to barrier curvature, etc.
 EP = edge of pavement

As shown in Table 2-1, Barrier 1 would feasibly abate traffic noise at a minimum height of six feet but would not meet the 7 dB design goal. Evaluated Barrier 1 would feasibly abate traffic noise and meet the 7 dB noise reduction goal at a minimum height of 10 feet. The reasonable allowance calculated for a barrier height of 10 feet or more is \$107,000.

3. Preliminary Noise Abatement Decision

3.1. Summary of Key Information

The NSR analyzes noise barriers with heights from 8 to 16 feet to determine the feasibility of noise abatement. Table 3-1 summarizes the preliminary noise abatement decision for the Build Alternative by investigating acoustical feasibility, the number of benefited residences, total reasonableness allowance, engineer's cost estimate for the abatement, comparison of the estimated construction cost versus allowance, and if the 7 dB reduction design goal is met.

Table 3-1. Summary of Abatement Key Information

Barrier	Height (feet)	Acoustically Feasible?	Number of Benefited Residences	Design Goal Achieved?	Total Reasonable Allowance	Estimated Construction Cost	Cost Less than Allowance?
NB1	6	No	1	No	NA	\$496,000	NA
	8	No	1	No	\$107,000	\$565,000	No
	10	Yes	1	Yes	\$107,000	\$634,000	No
	12	Yes	1	Yes	\$107,000	\$707,000	No
	14	Yes	1	Yes	\$107,000	\$776,000	No
	16	Yes	1	Yes	\$107,000	\$848,000	No

* Barrier based on 970 feet at highway edge of pavement.

Wall construction cost estimates are based on Caltrans's standard plans and specifications on masonry walls. Cost estimates are based on the Caltrans Cost Database (CCD), which tabulates average unit costs of construction-related items from recent state transportation projects. Cost calculations for sound walls include the cost of the masonry wall, piles, and concrete barrier. The final cost estimate also includes a 10 percent contingency and 10 percent mobilization and other miscellaneous costs associated with construction.

The tables in Appendix A summarize the engineer's cost estimate for constructing these walls. Costs of related activities, such as clearing and grubbing, vine landscaping, and typical aesthetic treatments, have not been estimated because these items are variable and could change substantially.

3.2. Non-acoustical Factors Relating to Feasibility

Based on the preliminary Project and abatement design, the non-acoustical factors related to feasibility are primarily associated with geometric standards, including maintenance, security, geotechnical issues, which are not anticipated. These nonacoustical factors, including utilities and geotechnical issues, will have to be investigated later in the design phase.

3.3. Preliminary Recommendation and Decision

Several factors were considered in making the soundwall recommendation:

- line-of-sight break between a receptor and an 11.5-foot-high truck stack (per Chapter 1100 of the Highway Design Manual),
- number of benefited receptors,
- cost per benefited receptor
- degree of noise reduction (a barrier that provides only 1 dB of improved noise reduction over a lower barrier and costs substantially more, and may not be favored over the lower barrier)
- 15-year minimum life cycle

Based upon the information provided in Table 3-1, the cost of the proposed sound walls is estimated to be significantly higher than the reasonable monetary allowance that they would be allocated. One new noise barrier was studied as potential noise abatement. The noise barrier would not feasibly abate traffic noise or meet the 7 dB noise reduction goal and will not be considered for construction.

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 also may 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 upon completion of the project design.

The preliminary noise abatement decision presented here will be included in the draft environmental document (ED), which will be circulated for public review.

4. References

Caltrans Draft 3H900 Environmental Document: Land Use

-10/5/2021 DED, Chapter 2-1_human_env_rev2.docx, mentions Yolo County's Revised Draft 2030 Countywide General Plan for land uses

Caltrans Final Interstate 80 (I-80) Corridor Improvements Project (3H900) Noise Study Report, dated December 2021

Caltrans Standard Environmental Reference (SER), Volume 1: Guidance for Compliance, Chapter 12- Noise (<https://dot.ca.gov/programs/environmental-analysis/standard-environmental-reference-ser/volume-1-guidance-for-compliance/ch-12-noise>)

Highway Traffic Noise: Analysis and Abatement Guidance, Dec 2011 (pdf)
(https://www.fhwa.dot.gov/environment/noise/regulations_and_guidance/analysis_and_abatement_guidance/revguidance.pdf)

Memo to Designers, Section 22: Soundwalls, Section 22-1 Soundwall Design Criteria, 22-50: Soundwall -Concrete Masonry Blocks, 22-55: Soundwall-Design Weight-Concrete Masonry Block

Yolo County General Plan

-for specific locations of land uses
<https://www.yolocounty.org/government/general-government-departments/county-administrator/general-plan/draft-2030-countywide-general-plan/>

Sacramento County General Plan

<https://planning.saccounty.net/PlansandProjectsIn-Progress/Pages/GeneralPlan.aspx>
land use diagram:
https://planning.saccounty.net/LandUseRegulationDocuments/Documents/General-Plan/GPLU2030_UPDATED_FINAL_0918.pdf

Caltrans unit price estimating tool