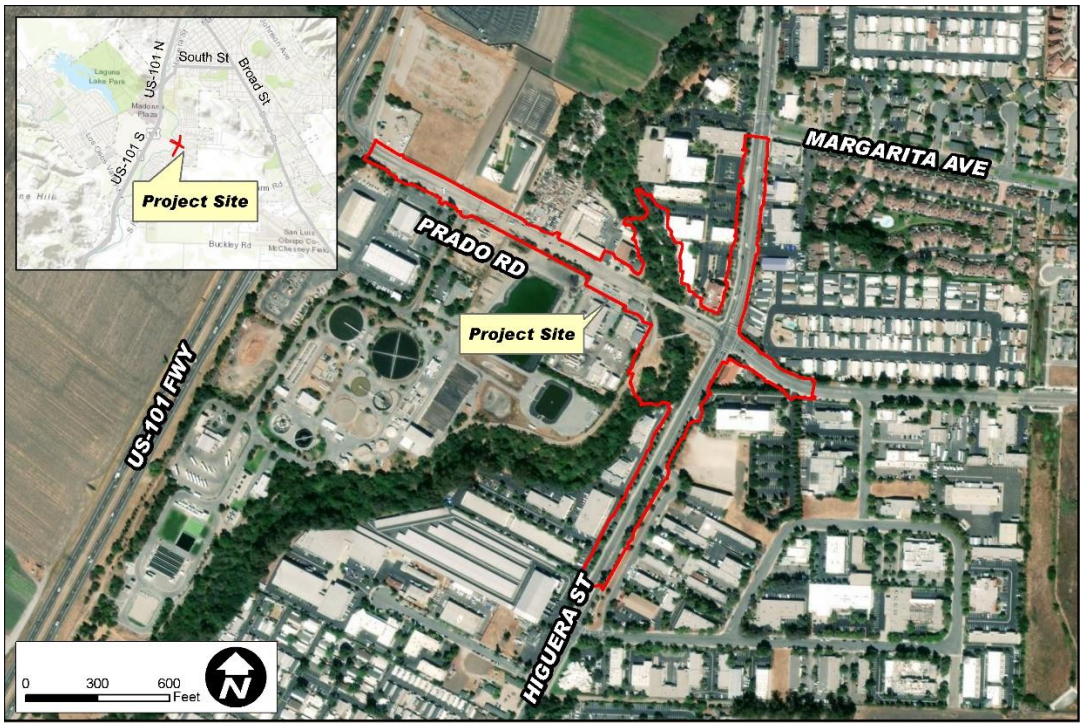
Prado Road Bridge Replacement Project ***NADR***



Noise Abatement Decision Report

Prado Road Bridge Replacement Project Noise Study Report

San Luis Obispo County

District 5-0-SLO

BRLS-5016(056)

October 2020

Caltrans

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Approved By: _____ Date: 10/22/2020

Rajvi Koradia, Caltrans Engineer
Environmental Engineering
District 5/San Luis Obispo County

List of Abbreviated Terms

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.
CEQA	California Environmental Quality Act
CFR	Code of Federal Regulations
dB	Decibel
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 of noise reduction at one or more benefited receptors.
Protocol	Traffic Noise Analysis Protocol
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 appoved by a Calfornia licensed professional civil engineer. The project level noise study report (NSR) (Prado Road Bridge Replaement Project NSR, June 16, 2020) prepared for this project is hereby incorporated by reference.

1.1. Noise Abatement Assessment Requirements

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) 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" 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 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 three 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 the cost of abatement. The viewpoints of benefited receptors are determined by a survey that is normally conducted during the public review period for the project ED.

The California Department of Transportation (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 *reasonble 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 if the design goal cannot be achieved, the preliminary determination is that abatement is not reasonable.

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; rather, it presents key information on abatement to be considered throughout the environmental review process, based on the best available information at the time the draft ED is published. The final overall reasonableness decision will take this information into account, along with the results of 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 final ED. 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, 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 nonacoustical 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

The existing Prado Road Bridge over San Luis Obispo Creek has been classified as structurally deficient. The City proposes to increase the total bridge width from 26.5 feet to 114 feet through installation of a replacement structure that would widen the existing bridge location on both the north and south sides. The north side will be widened to accommodate a sidewalk while all lanes and a new sidewalk will be accomodated by the widening to the south. Replacing the existing bridge with a new simple span precast concrete I girder bridge (Alternative 3) is the recommended preferred alternative. The project also includes widening to the north and south along Prado Road between the bridge and the Prado Road/South Higuera intersection to conform with the replacement bridge section and widening along the west side of South Higuera at the Prado Road/South Higuera intersection to accommodate a second northbound-to-westbound left-turn lane and improve bicycle/pedestrian facilities.

1.4. Affected Land Uses

A field investigation was conducted to identify land uses that could be subject to traffic and construction noise impacts from the project. The following land uses were identified in the project area:

- Single-family residences and multi-family residences: Activity Category B
- Bob Jones Trail: Activity Category C (exterior)
- Music Motive and teVelde Conservatory of Music: Activity Category D (interior)
- Commercial, retail, and civic uses: Activity Category E
- Industrial uses: Activity Category F

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 and common use areas at multi-family residences.

Land uses in the project area have been grouped into a series of lettered analysis areas (Refer to NSR Figure 5-1). Each of these analysis areas is considered to be acoustically equivalent.

- **Area A:** Area A is located on the west side of the Prado Road Bridge. Industrial uses (Activity Category F) and one residential building (Activity Category B) are located in this area. This area is generally flat. As stated in TeNs, Activity Category F uses need not be considered for further analysis.

- **Area B:** Area B is located on the south side of Prado Road Bridge west of S. Higuera Street. The Bob Jones Trail and Bob Jones Bike Trail (Activity Category C) are located in this area. The trail and bike trial are generally level with Prado Road. The area steeply slopes from the trail down into the San Luis Obispo Creek channel. No sound barriers or topographical shielding occur between the roadway and the outdoor uses.

- **Area C:** Area C is located south of Prado Road west of S. Higuera Street. Music Motive and teVelde Conservatory of Music (Activity Category D) are located in this area. No outdoor uses have been identified, so Area C has been classified solely as Activity Category D. A dense tree zone is located between Prado Road and this area.

- **Area D:** Area D is located south of Prado Road, on both sides of S. Higuera St. and south of Area C. Commercial and retail uses (Activity Category E) are located in this area. No sound barrier or topographical shielding occurs between the roadways and this area. All of the outdoor uses areas are parking lots. Therefore, no exterior areas of frequent human use occur in this area and Area D is not considered for further analysis.

- **Area E:** Area E is located south of Prado Road east of S. Higuera St. Commercial and civic uses (Activity Category E) are located in this area. No sound barrier or topographical shielding occurs between the roadways and this area. All of the outdoor uses areas are parking lots. Therefore, no exterior areas of frequent human use occur in this area and Area E is not considered for further analysis.

- **Area F:** Area F is located north of Prado Road, on both sides of S. Higuera St. Commercial, civic, and retail uses (Activity Category E) are located in this area. No sound barrier or topographical shielding occurs between the roadways and this area. All

of the outdoor uses areas are parking lots. Therefore, no exterior areas of frequent human use occur in this area and Area F is not considered for further analysis.

- **Area G:** Area G is located north of Prado Road east of S. Higuera Street. Residential uses (Activity Category B) are located in this area. No sound barrier or topographical shielding occurs between the roadways and this area.

- **Area H:** Area H is located north of Prado Road east of S. Higuera Street. Residential uses (Activity Category B) are located in this area. No sound barrier or topographical shielding occurs between the roadways and this area.

2. Results of the Noise Study Report

The NSR for this project was prepared by Kieran Bartholow on June 16, 2020 and approved by Rajvi Koradia on June 23, 2020.

Areas A and G were the only areas evaluated for a noise barrier. Additional considerations include the ability of a given barrier and height to meet the design goal of 7 decibels (dB) noise reduction and if the barrier breaks the line-of-sight between a 11.5-foot truck stack and the first row of receptors. The line-of-sight break is important to reduce visual and noise intrusiveness of truck exhaust stacks at first row receivers.

Noise Barrier NB-1 was found to be feasible starting at a barrier height of 8-feet. The design goal of 7 dB of noise reduction was not met for any barrier height (see NSR Table 7-1). A 12-foot noise barrier would break the line-of-sight between a 11.5-foot truck stack and first row receptors. The total reasonable allowance for an 8-foot barrier would be $107,000, which would benefit one receptor. Noise Barrier NB-2 was found to be feasible and meet the design goal of 7 dB for Area G for all barrier heights. A 12-foot noise barrier would break the line-of-sight between a 11.5-foot truck stack and first row receptors. The total reasonable allowance for a 12-foot barrier would be $1.2 million, which would benefit 12 receptors. A 6-foot barrier would benefit nine receptors and all four impacted receivers (7 impacted receptors) would be reduced below the exterior NAC of 67 dBA-L_{eq}(h). The total reasonable allowance for a 6-foot barrier would be $963,000.

The proposed length of the barrier NB-1 is 143 linear feet and the proposed length of barrier NB-2 is 432 feet. A summary of the barrier evaluation is included in Table 1.

Table 1. Summary of Barrier Evaluation from Noise Study Report

Barrier	Location	Height (feet)	Acoustically Feasible?	Number of Benefited Residences	Design Goal Achieved?	Reasonable Allowance per Residence	Total Reasonable Allowance
NB-1	Private Property (70 Prado Rd.)	6	No	0	No	$107,000	$0
		8	Yes	1	No	$107,000	$107,000
		10	Yes	1	No	$107,000	$107,000
		12	Yes	1	No	$107,000	$107,000
		14	Yes	1	No	$107,000	$107,000
		16	Yes	1	No	$107,000	$107,000
NB-2	Private Property (3395 Higuera St.)	6	Yes	9	Yes	$107,000	$963,000
		8	Yes	9	Yes	$107,000	$963,000
		10	Yes	9	Yes	$107,000	$963,000
		12	Yes	12	Yes	$107,000	$1,200,000
		14	Yes	15	Yes	$107,000	$1,600,000
		16	Yes	15	Yes	$107,000	$1,600,000

3. Preliminary Noise Abatement Decision

3.1. Summary of Key Information

Noise abatement must be considered for reasonableness and feasibility as required by 23 CFR 772 if predicted noise levels with project implementation exceed existing noise levels by 12 dBA or more or when the predicted sound levels approach or exceed the NAC level of the applicable activity category.

Feasibility Criteria

According to the Protocol, abatement measures are considered acoustically feasible if a minimum noise reduction of 5 dB at impacted receptor locations is predicted with implementation of the abatement measures. In addition, barriers should be designed to intercept the line-of-sight from the exhaust stack of a truck to the first tier of receptors, as required by the Highway Design Manual, Chapter 1100. Other factors that affect feasibility include topography, access requirements for driveways and ramps, presence of local cross streets, utility conflicts, other noise sources in the area, and safety considerations.

Reasonableness Criteria

The Protocol defines the procedure for assessing reasonableness of noise barriers from a cost perspective. Based on 2019 construction costs an allowance of $107,000 is provided for each benefited receptor (i.e., receptors that receive at least 5 dB of noise reduction from a noise barrier). The total allowance for each barrier is calculated by multiplying the number of benefited receptors by $107,000. If the estimated construction cost of a barrier is less than the total calculated allowance for the barrier and the abatement meets the design goal of at least a 7 dB reduction, the barrier is considered reasonable from a cost perspective.

3.2. Nonacoustical Factors Relating to Feasibility

Nonacoustical factors include geometric standards, safety, maintenance, security, geotechnical considerations, and utility relocations. Noise Barrier NB-1 would be located on the southern and eastern side of the private property located at 70 Prado Road. The eastern portion of Noise Barrier NB-1 would be located on slope of the adjacent San Luis Obispo Creek and may be subject to creek overtopping based on creek's 10-year flow pattern. This presents a geotechnical and hydraulic risk to the noise barrier. Noise Barrier NB-2 would be located along the western and southwestern edge of the private property located at 3395 S.

Higuera Street. It is not anticiapted that any of the above metiontioned non-acoustical factors would affect the feasibility of Noise Barrier NB-2.

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 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.

Table 2 show the key information for noise abatement decision including number of benefited receptors, total reasonable allowance, and estimated construction cost of each barrier. The NSR analyzed barriers of heights 6 feet to 16 feet for each location, however, only those that would meet requirements were included in this report.

Table 2. Summary of Abatement Key Information

Barrier	Location	Height (feet)	Acoustically Feasible?	Number of Benefited Residences	Design Goal Achieved?	Reasonable Allowance per Residence	Total Reasonable Allowance	Estimated Construction Cost	Cost Less than Allowance
NB-1	Private Property (70 Prado Rd.)	6	No	0	No	$107,000	$0	N/A	N/A
		8	Yes	1	No	$107,000	$107,000	$188,760	No
		10	Yes	1	No	$107,000	$107,000	$235,950	No
		12	Yes	1	No	$107,000	$107,000	$283,140	No
		14	Yes	1	No	$107,000	$107,000	$330,330	No
		16	Yes	1	No	$107,000	$107,000	$377,520	No
NB-2	Private Property (3395 Higuera St.)	6	Yes	9	Yes	$107,000	$963,000	$249,480	Yes
		8	Yes	9	Yes	$107,000	$963,000	$380,160	Yes
		10	Yes	9	Yes	$107,000	$963,000	$712,800	Yes
		12	Yes	12	Yes	$107,000	$1,200,000	$855,360	Yes
		14	Yes	15	Yes	$107,000	$1,600,000	$997,920	Yes
		16	Yes	15	Yes	$107,000	$1,600,000	$1,140,480	Yes

The engineer's cost estimate includes costs required to construct the abatement, including the materials for the wall as well as the barriers or piles on which the noise walls would be constructed. Noise Barrier NB-1's wall construction costs were based on masonry block wall with pile footings due to hydraulic and goetechnical considerations. Noise Barrier NB-2's wall construction costs were based on masonry block wall with trench footing for lower heights (6'-8') and pile footings for heights greater than 8'.

Noise Barrier NB-1

Noise Barrier NB-1 in Area A would be acoustically feasible starting at a barrier height of 8 feet and would provide at least a 5 dBA or greater reduction. The design goal of a 7 dBA reduction would not be achieved. An 8-foot barrier would be the least expensive wall that would meet both the reasonable and feasible criteria. A 12-foot noise barrier would break the line-of-sight between a 11.5-foot truck stack and first row receptors. An 8-foot barrier would benefit one receptor with a reasonable allowance of $107,000 and an estimated construction cost of $188,760, which is greater than the reasonable cost allowance. Furthermore, Noise Barrier NB-1 would be at risk to creek overtopping based on the San Luis Obispo Creek's 10-year flow pattern. Therefore, Noise Barrier NB-1 is not recommended for further analysis.

Noise Barrier NB-2

Noise Barrier NB-2 in Area G would be acoustically feasible at all barrier heights and would provide at least a 5 dBA or greater reduction. The design goal of a 7 dBA reduction would be achieved starting at a barrier height of 6 feet. A 6-foot barrier would be the least expensive wall that would meet both the reasonable and feasible criteria. A 12-foot noise barrier would break the line-of-sight between a 11.5-foot truck stack and first row receptors. A 6-foot barrier would benefit nine receptors and all four impacted receivers (7 impacted receptors) with a reasonable allowance of $963,000 and an estimated construction cost of $249,480, which is less than the reasonable cost allowance. Therefore, Noise Barrier NB-2 is recommended at a height of 6 feet.

4. Secondary Effects of Abatement

The noise abatement recommended in the preliminary noise abatement decision may have the potential to result in secondary effects to other resources, such as visual impacts or additional short-term noise or air quality impacts associated with construction of the noise barriers. Noise Barrier NB-2 is the only noise barrier recommended for further analysis and consideration. Noise Barrier NB-2 would be similar to the exsting wood fence on the property line of 3395 Higuera Street and would not block views to a significantly greater degree. No scenic views are located nearby and the proposed noise barrier would not result in a secondary visual impact.

5. References

Caltrans. 2013. Technical Noise Supplement. September. Sacramento, CA: Environmental Program, Noise, Air Quality, and Hazardous Waste Management Office. Sacramento, CA. Available: (http://www.dot.ca.gov/hq/env/noise/pub/TeNS_Sept_2013B.pdf).

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