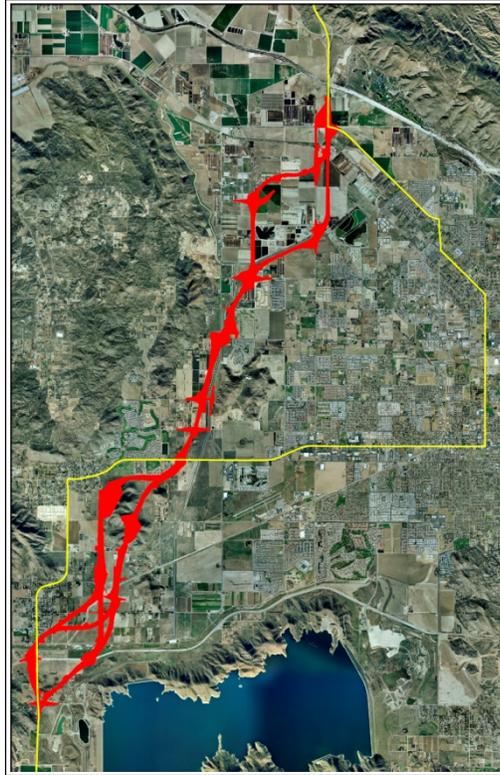


**State Route 79 Realignment Project:
Domenigoni Parkway to Gilman Springs Road**



**Technical Memorandum Addendum
Supplemental Noise Study Report and Noise
Abatement Decision Report**

Realign State Route 79
between Domenigoni Parkway and Gilman Springs Road
in the Cities of Hemet and San Jacinto and the County of Riverside

Riverside County, California

District 8-RIV-79-KP R25.4/R54.4 (PM R15.78/R33.80)

08-494000

July 2016

The environmental review, consultation, and any other action required in accordance with applicable Federal laws for this project is being, or has been, carried out by Caltrans under its assumption of responsibility pursuant to 23 U.S.C. 327.



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The intent of this Technical Memorandum Addendum to the Supplemental Noise Study Report and Noise Abatement Decision Report is to provide additional clarification.

Chapter 1 from the Noise Technical Memorandum (March 2016) addressed how Build Alternative 1br will affect the traffic noise impacts and recommendations previously reported in the Project Record.

Additional clarification (double underline) has been included below to Chapter 1. No revisions have been made to the figures, tables, or appendices.

In support of the SR 79 Realignment Project traffic noise impacts were evaluated. Through a Noise Study Report (NSR) and a Noise Abatement Decision Report (NADR). The purpose of these studies were to evaluate noise impacts and abatement under the requirements of Title 23, Part 772 of the Code of Federal Regulations (23 CFR 772) “Procedures for Abatement of Highway Traffic Noise.” 23 CFR 772 provides procedures for preparing operational and construction noise studies and evaluating noise abatement considered for federal and Federal-aid highway projects. According to 23 CFR 772.3, all highway projects that are developed in conformance with this regulation are deemed to be in conformance with Federal Highway Administration (FHWA) noise standards. The Caltrans Traffic Noise Analysis Protocol for New Highway Construction, Reconstruction, and Retrofit Barrier Projects (Protocol) (Caltrans 2013) provides Caltrans policy for implementing 23 CFR 772 in California. The Protocol outlines the requirements for preparing noise documents.

1.1 Introduction to the Existing Noise Analysis

The discussion of noise is based on the analysis and conclusions presented in the Noise Study Report (NSR) of April 2010 and Noise Abatement Decision Report (NADR) of June 2010. This work was in accordance with the Caltrans Traffic Noise Analysis Protocol (Protocol) of August 2006. This supplemental technical memorandum addendum will also refer to the 2006 Protocol (Caltrans 2006).

The potential for noise impacts was investigated for each alternative. Because the build alternatives are on new alignment, traffic noise impacts are widespread. Not only are conditions created where future noise levels will approach the Noise Abatement Criteria (NAC), but impacts resulting from substantial noise increases will also occur. Because many areas currently have virtually no traffic noise, Project-related increases can be substantial.

In the NSR, 60 noise barriers were evaluated for the four build alternatives (15 for Build Alternative 1a, 16 for Build Alternative 1b, 13 for Build Alternative 2a, and 16 for Build Alternative 2b). All barriers, except two (2B-D2 and 2B-D4), were found to be feasible, providing a minimum of 5 decibels (dB) of insertion loss. Figure 2.1-1 presents the locations of the NSR barriers.

The NADR presented a preliminary noise abatement decision based on acoustical and nonacoustical feasibility factors and the relationship between noise abatement allowances and the engineer's cost estimate. As a result of this process, the following barriers were recommended for further consideration:

- Noise barriers 1A-E1 and 2A-F1
- Noise barriers 1A-G1/1B-G2 and 2A-H1/2B-H1
- Noise barriers 1A-L3/2A-L3
- Noise barriers 1A-J2/2B-J2 and 1B-K3/2A-K3
- Noise barriers 1B-M3/2B-M3 and 1A-L2/2A-L2
- Noise barriers 1B-M4/2B-M4
- Noise barriers 1B-N1/2B-N1
- Noise barriers 1B-N2/2B-N2

See Figure 2.1-2 for the locations of the NADR barriers.

1.2 Traffic Projections – Original (2035) vs. Current (2040)

The traffic projections used in the original traffic noise analysis are reported in Appendix A of the NSR (see Appendix A1). In 2012, Riverside County Transportation Commission and Caltrans agreed that an opening-year analysis should be completed for the anticipated opening year of 2020; therefore, the horizon year (20 years after anticipated Project opening) should be updated to 2040. A supplemental traffic report was prepared to provide an update to existing conditions (from 2004 to 2014) and to provide a new revalidation of traffic projections using the same approach used in the 2009 revalidation. The most current Project-related traffic projections are contained in the *SR 79 Realignment Project – Final Supplemental Traffic Report* (CH2MHILL, August 21, 2014). The pertinent sections are contained in Appendix A2.

In general, the two projections are very similar. Similar enough to reject the notion that updating the traffic projections will result in changes to the recommendation in the NSR/NADR. According to FHWA Highway Traffic Noise Analysis and Abatement Policy and Guidance (website 2016) because decibels are logarithmic units doubling of the noise source (such as doubling the total traffic volumes) produces only a 3 dB increase in the sound pressure level. Studies have shown that this increase is barely detectable by the human ear. Consequently, the differences between the original projections and the current projections will have negligible impacts.

The balance of this section will compare some of the important traffic projections.

1.2.1 SR 79 Traffic Projections

The NSR/NADR used 2035 traffic projections. All the traffic zones used the same peak-hour traffic volume distribution. Northbound/Southbound and a.m./p.m. distributions are identical:

Total: 3,800

Autos: 3,420 (90 percent)

Medium Trucks: 266 (7 percent)

Heavy Trucks: 114 (3 percent)

The current Project’s 2040 peak-hour volumes use seven different distributions across the corridor. Additionally, northbound/southbound and a.m./p.m. distributions are unique. These volumes vary from 1,450 to 3,900. The average is 2,454 vehicles.

With the maximum being about 3,800 to 3,900 in both cases, the two projections are considered roughly equivalent.

1.2.2 Local Road Projections

SR 79 traffic is dominant; the local road traffic volumes are much lower. The NSR/NADR used 2035 traffic projections. Each of the intersecting roads and many of the ramps had unique values. The p.m. condition was considered the peak hour. Where applicable, northbound/southbound distributions were unique. The current 2040 projections have more detailed breakouts of ramp movements. In general, the current projection are somewhat lower than the volumes used in the NSR/NADR. The Sanderson Avenue interchange is typical:

- NSR/NADR (2035) - Sanderson Avenue (northbound) 2,010
- Current (2040) - Sanderson Avenue (northbound) 1,320

- NSR/NADR (2035) - Sanderson Avenue (southbound) 2,680
- Current (2040) - Sanderson Avenues (southbound) 1,450

- NSR/NADR (2035) - Interchange On-Ramp 1,000
- Current (2040) - Interchange On-Ramp 890

The two projections should be considered roughly equivalent.

1.2.3 Vehicle Distributions and Speed

Coordination with the Traffic Report team concluded that there is no reason to believe that truck percentage or vehicle speeds will be significantly different between the NSR/NADR and current projections.

1.3 Alignment Changes - Original vs. Current

As discussed in Section 1.4, the Preferred Alternative (1br) is different than the alternatives investigated in the NSR/NADR. These changes were evaluated to determine whether there was a strong likelihood that the changes would affect the barrier determinations.

1.3.1 Access to Winchester

At the southern termini of the Project, the treatment at Newport Road was altered. Under Build Alternative 1br, the Newport Road overpass was changed to an at-grade traffic signal. Newport Road will also be realigned to Winchester Road to provide direct access to the community of Winchester. The noise analysis examined noise barriers at two locations in this area (1B-B1 and 1B-B2) and are shown on Figure 2.3-1.

The NSR/NADR concluded that neither noise barrier would be reasonable. The changes proposed will not affect the noise analysis in this area:

- Relative to 1B-B2 (two single-family residences in the southwest quadrant of the Newport Road/Winchester Road intersection), the only change will be the removal of the Newport Road overpass. This change will tend to reduce traffic noise in the area. Further, the original noise-sensitive land uses appear to have been abandoned.
- Relative to 1B-B1 (five farmsteads along Patterson Avenue), the change at the Newport Road overpass will not occur within 500 feet of the nearest residence. This change is not expected to affect the traffic noise levels in this area.

Consequently, under Build Alternative 1br, the abatement decision associated with noise barriers 1B-B1 and 1B-B2 will not be affected. Neither deserve to be recommended for further consideration.

1.3.2 Increased Loop Ramp Radii at Domenigoni Parkway

This revision is limited to small increases to the radii of the horizontal alignments of the interchange ramps. There are no noise-sensitive land uses within 500 feet of this location, as illustrated on Figure 2.3-1.

1.3.3 Shift in Interchange Location from Ranchland Road to Grand Avenue

To be in closer conformance with the Hemet General Plan, the Ranchland Road interchange was relocated about 600 feet south to Grand Avenue. The area is very sparsely developed. The NSR/NADR concluded that a noise barrier would be feasible but not reasonable. Consequently, noise barriers 1B-C1 and 1B-C2 were not recommended for further consideration. Figure 2.3-2 depicts the location of the interchange relocation and noise barriers.

Because of the minor nature of the change and minimal number of benefited dwelling units, this change will not affect the noise recommendations for 1B-C1 and 1B-C2. To confirm this, TNM modeling was conducted to examine the effects of the interchange relocation.

Between Simpson Road and Stowe Road (nearly a mile), there are 9 farmstead complexes adjacent to the proposed alignment of SR-79. Each represents a single dwelling unit. The original modeling had 7 receivers (the relocation of the interchange reduces the number of acquisition).

Barrier 1B-C1 is located along the west side of SR 79. The distances between the receivers results in very long barriers. While some would benefit from a noise barrier, there is no configuration that will be cost effective. The NSR estimated that the construction estimates would be an order of magnitude higher than the Reasonable Allowances. The reevaluation came to the same conclusion. The results discussed here (and contained in Appendix B and Appendix F) utilize a barrier along SR 79 up to Grand Avenue and then a barrier adjacent to the southbound off-ramp merge on to SR 79, until past the last receiver. Other configurations are possible, but result in similar conclusions. As depicted in Table 2.3-1, the cost to construct a noise barrier in this area, would be 1.7 to 2.2 million dollars per benefitted unit. The most interesting change in the noise analysis is that the interchange relocation to Grand Avenue, will result in higher noise levels for those farmsteads along that road. There will be noise impacts to these Grand Avenue receivers even those that are relatively far from SR 79. Also the receivers representing the farmsteads that would avoid acquisition, are very close to SR 79 and would experience a traffic noise impact.

Table 2.3-1 – Noise Barrier 1B-C1 and 1B-C2 Revaluation Summary

Barrier Height (feet)	Barrier Length (feet)	Barrier Area (SF)	Estimated Cost (per SF)	Total Cost	Benefited Dwelling Units	Reasonable Allowance per Dwelling Unit	Total Reasonable Allowance	Cost per Benefitted Unit
Barrier C1								
8	6,928	55,424	\$92	\$5,099,008	3	\$54,000	\$162,000	\$1,699,669
10	6,928	69,280	\$81	\$5,611,680	3	\$54,000	\$162,000	\$1,870,560
12	6,928	83,136	\$74	\$6,152,064	3	\$56,000	\$168,000	\$2,050,688
14	6,928	96,992	\$69	\$6,692,448	3	\$56,000	\$168,000	\$2,230,816
Barrier C2								
8	1,800	14,400	84	\$1,209,600	1	\$54,000	\$54,000	\$1,209,600
10	1,800	18,000	84	\$1,512,000	1	\$54,000	\$54,000	\$1,512,000
12	1,800	21,600	77	\$1,663,200	1	\$54,000	\$54,000	\$1,663,200
14	1,800	25,200	71	\$1,789,200	1	\$54,000	\$54,000	\$1,789,200

The reevaluation of noise barriers utilized the Reasonable Allowance and the Barrier Cost data in the NSR/NADR. In the original NSR/NADR (2010), the Reasonable Allowances for Noise Barriers 1B-C1 and 1B-C2 varied between \$54,000 and \$56,000. The original NSR/NADR also presented barrier construction cost estimates developed by a licensed civil engineers. These cost estimates were used to develop a cost per square foot that the reevaluation barriers can use to compare with the Reasonable Allowances to see if the new barrier is feasible/cost effective. The signed barrier cost estimates from the original NSR/NADR is contained in Appendix G.

Barrier 1B-C2 is located along the east side of SR 79, north of Stowe Road. There is a single farmstead (dwelling unit) within 500 feet of SR 79. Like in the NSR/NADR, the reevaluated barrier would benefit this receiver (provide a 5 dBA insertion loss). However, the cost of construction would exceed any reasonable allowance.

1.3.4 Westerly Shift of Alignment around West Hemet Hills

The alignment has been shifted west to reduce the cut to West Hemet Hills and to reduce impacts to the TCP. The revised alignment would include a retaining wall along the west and north side of the alignment and would eliminate the need to relocate the existing communication towers. The shift would also lessen the impact to the West Hemet Hills by reducing the amount of cut. This change would also bring the alignment of SR 79 closer to the residential homes in the vicinity of Calvert Avenue and El Centro Avenue. This sparsely populated residential area fell outside of the study area of the original alignment. The new alignment would move as much as 450 feet closer to the noise-sensitive land uses. The nearest noise barrier is 1B-G2, which is located at California Avenue and Florida Avenue, as shown on Figure 2.3-3.

An evaluation of the traffic noise consequences of the new alignment was conducted. Noise levels at the existing residences are predicted to be low. Except for receivers along Florida Avenue, none of the receivers is expected to approach or exceed the NAC. However, because of the low ambient noise levels in this area, substantial noise increases are reasonably likely to occur, at the receivers closest to Alternative 1br.

A noise barrier (1B-G2a) that is over 3,000 feet long was modeled¹. None of the receivers are expected to achieve a 5 dBA insertion loss. The Predicted Future Noise and Barrier Analysis (Table B) is contained in Appendix B.

¹ As stated in the TeNS, modeling results are rounded to the nearest decibel before comparisons are made. In some cases, this can result in relative changes that may not appear intuitive. An example would be a comparison between sound levels of 64.4 and 64.5 dBA. The difference between these two values is 0.1 dB. However, after rounding, the difference is reported as 1 dB.

With no benefitted dwelling units, a noise barrier at this location is not feasible or reasonable. Consequently, noise barrier 1B-G2a should not be recommended for continued consideration. Appendix D contains the pertinent Traffic Noise Model (TNM) output for noise barrier 1B-G2a.

1.3.5 Increased Loop Ramp Radii at Florida Avenue

This revision is limited to small increases to the radii of the horizontal alignments of the interchange ramps. The noise-sensitive land uses at this location are the Roseland Mobile Home Park and an adjacent single-family subdivision.

The NADR recommends continued consideration of noise barrier 1B-G2. This barrier is located along SR 79 and extends from Florida Avenue to past the Donald Street subdivision. Noise barrier 1B-G2 curves close to the sensitive receivers, increasing traffic noise impacts and the efficiency of barriers. When optimized, 10-, 12-, and 14-foot barriers would balance reasonable allowances and estimated construction costs. The optimized barrier includes a barrier along SR 79 and a barrier along Florida Avenue.

Figure 2.3-3 depicts the location of the ramp refinements and noise barrier 1B-G2. Adjacent to the noise sensitive receptors, the alterations are minimal. The ramp is approximately 50 feet closer.

Because of the minor nature of the change and distance between the elements, this change is not expected to affect the noise recommendations for 1B-G2.

1.3.6 Removal of Tres Cerritos Avenue Interchange

This interchange has been removed in response to public and agency comments and coordination. This will eliminate the need to realign Warren Road and will eliminate the bridge crossing over the San Diego Canal. A cul-de-sac will be added at Tres Cerritos Avenue along the west side of SR 79.

The NSR studied the use two noise barriers in this area. Noise barrier 1B-I1 focused on abatement in the southwestern quadrant of the interchange. Noise barrier 1B-I2 focused on abatement along Warren Road. Neither barrier was recommended for further consideration. Noise barrier 1B-I1 was acoustically feasible but had costs far in excess of the reasonable allowance. Noise barrier 1B-I2 protected a residential community under development. When finished, it had a tall shielding wall that reduced noise levels to a point where a traffic noise impact no longer existed. Figure 2.3-4 depicts the location of the Tres Cerritos Avenue Interchange and noise study areas I-1 and I-2.

The removal of the interchange from the Project will remove vehicles from the local roadways. This change will not affect the noise analysis and does not change the conclusion of the Draft EIR/EIS.

1.3.7 Esplanade Avenue Interchange Revisions

The Esplanade Avenue interchange configuration will be revised under Build Alternative 1br. The proposed alternations include the removal of realigned Maze Stone Court and a slightly revised ramp configuration, as shown on Figure 2.3-5.

The NSR/NADR examined a noise barrier at the single-family subdivision at Maze Stone Court (1B-K2). A cost-effective noise barrier could not be configured. The proposed changes at the interchange will not affect noise in this area. Consequently, Build Alternative 1br will not affect the abatement decision for noise barrier 1B-K2.

1.3.8 Increased Loop Ramp Radii at Cottonwood Avenue Interchange

This revision is located at the Cottonwood Avenue Interchange. This revision is limited to small increases to the radii of the horizontal alignments of the interchange ramps. The only noise-sensitive land uses at this location is an existing single-family residential development in the southeastern quadrant. A small park is also in this quadrant.

The NADR recommends continued consideration of noise barrier 1B-M3. This barrier is located along SR 79 and Cottonwood Avenue. Under noise barrier 1B-M3, the 12- and 14-foot barriers have a reasonable allowance that is higher than the estimated construction cost. Up to 66 dwelling units are benefited by this barrier. Figure 2.3-6 depicts the location of the ramp refinements and noise barrier 1B-M3. Adjacent to the noise-sensitive receptors, the ramp alterations are minimal—approximately 750 feet of the northbound off-ramp is moved closer to the receivers—by a maximum of about 100 feet.

Because of the minor nature of the change and distance between the elements, this change is not expected to affect the noise recommendations for 1B-M3.

1.3.9 Sanderson Avenue Interchange Revisions

The interchange configuration has been revised. The southbound ramps have been reconfigured to avoid the EMWD water treatment facility. The main reconfiguration affecting noise (the profile of SR 79) has been modified to bridge over Sanderson Avenue instead of Sanderson Avenue bridging over SR 79.

Because this is a fundamental rearrangement of the three-dimensional configuration of the interchange, the TNM noise models were recreated for the areas affected by the interchange. There are two areas: 1B-M4 (southwestern quadrant) and 1B-M5 (southeastern quadrant), as shown on Figure 2.3-7.

1.3.9.1 NOISE BARRIER 1B-M4

The NADR recommends continued consideration of noise barrier 1B-M4. This barrier is located along SR 79 and Sanderson Avenue. There is a pending/proposed single-family residential subdivision in this quadrant of the interchange. Under noise barrier 1B-M4, up to 84 dwelling units are benefited by this barrier. All height iterations were economically reasonable.

Using the new interchange configuration, barriers were examined along Sanderson Avenue and along SR 79. Expected noise levels in the vicinity of M4, under the revisions associated with Build Alternative 1br, are lower than the predictions in the NSR/NADR. In some cases, as much as 10 dBA lower. Nevertheless, most of the receivers are still expected to experience noise levels approaching the NAC. The major change is the higher elevation of SR 79, over the previous configuration, as it overpasses Sanderson Avenue. The Predicted Future Noise and Barrier Analysis (Table B) is contained in Appendix B.

Looking at the noise barrier under the revised Build Alternative 1br geometrics, the analysis indicates that the effectiveness of the noise barrier is somewhat lower but still within the limits for continued consideration. Using the same barrier configuration allowed for the retention of the NSR/NADR construction cost and Reasonable Allowance per benefitted residence, the changes in the alignment effect the number of benefitted dwelling units. Table 2.3-2 summarizes the barrier analysis. The number of benefitted dwelling units is lower, but high enough to result in a Reasonable Allowance equivalent to or lower than the construction cost, at-least at one barrier height. Modest changes to the barrier configuration will allow for a cost-effective barrier at every barrier height. Use of the updated 2014 Reasonable Allowance (\$64,000) would also increase the cost-effectiveness of these barriers. Consequently, the noise barrier abatement decision is unaffected by the alignment changes associated with Build Alternative 1br. Noise barrier 1B-M4 should continue to be recommended for continued consideration.



Reasonable Allowance and Barrier Construction Costs

The reevaluation of noise barriers utilized the Reasonable Allowance and the Barrier Cost data in the NSR/NADR.

In the original NSR/NADR (2010), the Reasonable Allowances for Noise Barriers 1B-M4 and 1B-M5 varied between \$58,000 and \$62,000.

The original NSR/NADR also presented barrier construction cost estimates developed by a licensed civil engineers. These cost estimates were used to develop a cost per square foot that the reevaluation barriers can use to compare with the Reasonable Allowances to see if the new barrier is feasible/cost effective. The signed barrier cost estimates from the original NSR/NADR is contained in Appendix G.

Table 2.3-2 – Noise Barrier 1B-M4 Reevaluation Summary

Barrier Height (feet)	Barrier Length (feet)	Reasonable Allowance per Dwelling Unit	Benefitted Dwelling Units	Total Reasonable Allowance	Total NSR/NADR Construction Cost	Is Reasonable Allowance Higher than Cost?
8	3,589	\$58,000	5	\$290,000	\$2,880,000	No
10	3,589	\$60,000	50	\$3,000,000	\$3,179,000	No
12	3,589	\$60,000	55	\$3,300,000	\$3,506,000	No
14	3,589	\$62,000	65	\$4,030,000	\$3,797,000	Yes

1.3.9.2 NOISE BARRIER 1B-M5

The NADR did not recommend continued consideration of noise barrier 1B-M5. There is a pending/proposed single-family residential subdivision in the southeastern quadrant of the interchange. Located further from SR 79, relatively few dwelling units benefited from a proposed barrier. In fact, the distance from SR 79 led to the most reasonable/feasible barrier being located along Sanderson Avenue only. Even this barrier could not achieve the reasonableness standard. The cost of the barriers were 146 to 193 percent higher than their corresponding Reasonable Allowances.

Using the new interchange configuration, barriers were examined along Sanderson Avenue and along SR 79. Expected noise levels in the vicinity of M5, under the revisions associated with Build Alternative 1br, are modestly lower than the predictions in the NSR/NADR. This is likely the result of the shielding of Sanderson Avenue as it goes under SR 79. The first row receptors are still expected to experience noise levels approaching the NAC.

Looking at noise barriers, again the cost of the barriers are far in excess of the Reasonable Allowance associated with the benefited dwelling units. Noise barriers were modeled both along Sanderson Avenue and SR 79. The effectiveness of the barriers are roughly the same as presented previously in the NSR/NADR. The SR 79 barrier is not very effective because of the distance from SR 79. The most reasonable/feasible barrier is along Sanderson Avenue only. Using the average construction costs and the Reasonable Allowances used in the NADR, the construction costs are much higher than the corresponding total Reasonable Allowances. Consequently, the noise barrier abatement decision is unaffected by the alignment changes associated with Build Alternative 1br. Noise barrier 1B-M5 should not be recommended for continued consideration. Table 2.3-3 summarizes the barrier analysis.

Table 2.3-3 – Noise Barrier 1B-M5 Reevaluation Summary (Sanderson Only)

Barrier Height (feet)	Barrier Length (feet)	Barrier Area (SF)	Estimated Cost (per SF)	Total Cost	Benefited Dwelling Units	Reasonable Allowance per Dwelling Unit	Total Reasonable Allowance	Cost per Benefitted Unit
8	1,071	8,568	\$95	\$813,960	4	\$58,000	\$232,000	\$203,490
10	1,071	10,710	\$85	\$910,350	10	\$60,000	\$600,000	\$91,035
12	1,071	12,852	\$80	\$1,028,160	10	\$60,000	\$600,000	\$102,816
14	1,071	14,994	\$75	\$1,124,550	10	\$60,000	\$600,000	\$112,455

Appendix E contains the pertinent TNM output for noise barriers 1B-M4 and M5.

1.3.10 Increased Loop Ramp Radii at Ramona Expressway

This revision is located at the northern termini of the Project. The revision at this location would be limited to a small increase in the loop ramp radii that would allow northbound traffic onto SR 79 (from Ramona Expressway). No other roadways would be affected.

There are no noise-sensitive land uses at the Ramona Expressway interchange. However, the NADR does recommend continued consideration of noise barriers 1B-N1 and 1B-N2. These barriers are located approximately 1,000 feet south of Ramona Expressway. They are designed to abate noise at proposed residential subdivisions on either side of the proposed SR 79. There is no evidence of work progressing on the subdivisions. Figure 2.3-8 depicts the location of the loop ramp refinement and noise barriers 1B-N1 and 1B-N2.

Because of the minor nature of the change and distance between the elements, this change is not expected to affect the noise recommendations for 1B-N1 and 1B-N2.

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