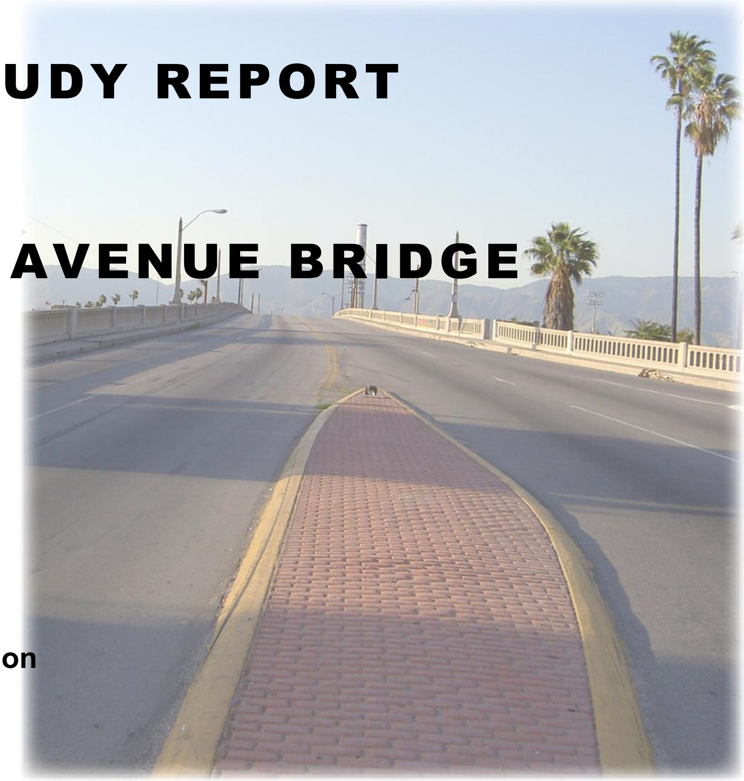
DRAFT NOISE STUDY REPORT

For the

MOUNT VERNON AVENUE BRIDGE PROJECT



June 1, 2006

Prepared for:

California Department of Transportation

Federal Highway Administration

and the

City of San Bernardino

Prepared by:

ATS Consulting

In Association with:

Jones & Stokes

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I. EXECUTIVE SUMMARY

The City of San Bernardino (City), in association with the California Department of Transportation, District 8 (Caltrans), and the Federal Highway Administration (FHWA), proposes to reconstruct the Mount Vernon Avenue Bridge (Caltrans Bridge No. 54C-0066) over the Burlington Northern Santa Fe (BNSF) railroad facility in the City of San Bernardino, County of San Bernardino, State of California. The preferred project alternative (proposed Project) would involve removal of the existing bridge structure, construction of a new replacement bridge structure, and improvements to bridge approaches and roadways in the project vicinity. The proposed Project would correct all structural deficiencies and functional obsolescence resulting from the advanced age (i.e., 70 years) of the existing bridge structure.

Under the National Environmental Policy Act, the purpose of the Draft Noise Study Report (NSR) is to identify potential traffic noise impacts and evaluate noise abatement options. The results of the analysis are presented below. Table 1 includes predictions of future noise levels with the Project, identifies any traffic noise impacts, and lists the abatement options considered (as relevant).

Table 1. Summary of Traffic Noise Impacts and Abatement

Receiver	Existing Leq(h) (dBA)	Future With-Project				
		Leq(h) (dBA)	NAC [1]	Impact	Change [2] (dBA)	Proposed Abatement
1	59	58	67	None	-1.6	N/A
2	57	57	67	None	-0.2	N/A
3	56	56	67	None	-0.3	N/A
4	60	60	67	None	0.4	N/A
5	60	60	67	None	-0.2	N/A

Notes:
[1] Noise Abatement Criteria
[2] Increase is based on comparison of Future With-Project minus Future No-Project noise levels.

Following Federal Highway Administration protocols and criteria, the conclusions of this Draft NSR are:

- Noise-sensitive land uses potentially affected by the proposed Project include single-family residences immediately southwest of the Mount Vernon Avenue Bridge between 2nd Street and 3rd Street, and single-family residences northwest of the Mount Vernon Avenue Bridge between Kingman Street and 5th Street.
- Adjacent railroad operations are the dominant noise source in the local community.
- Existing peak hour traffic noise levels range from 56 to 60 dBA Leq at nearby noise-sensitive receivers.

- Future peak hour noise levels are not predicted to increase as a result of the proposed Project. In fact, noise levels are projected to decrease by a small amount at the nearest receptors (particularly Receiver 1) due to a greater break in the line-of-sight with the roadway.
- Future peak hour traffic noise levels are predicted to be below the Noise Abatement Criteria (NAC).
- Traffic noise impacts are not predicted at any of the representative receivers; therefore, noise abatement was not considered.
- Project construction would result in temporary increases in community noise levels. The contractor will be required to adhere to best management practices to reduce construction noise levels. Also, the contractor will be required to adhere to local ordinances dealing with construction noise.

II. NOISE IMPACT TECHNICAL REPORT

A. Introduction

This Draft Noise Study Report (NSR) summarizes the results of the noise analysis for the proposed Mount Vernon Avenue Bridge Project. The analysis follows protocols established by the California Department of Transportation and Federal Highway Administration. The purpose of the Draft NSR is to identify potential traffic noise impacts and evaluate noise abatement options. Specifically, this report summarizes:

- Measurements of ambient noise levels,
- Predictions of existing peak hour traffic noise levels,
- Predictions of future peak hour traffic noise levels,
- Identification of traffic noise impacts,
- Evaluation of the feasibility and reasonableness of noise abatement (as needed), and
- Analysis of construction noise.

B. Project Description

B.1 Overview

The City of San Bernardino (City), in association with the California Department of Transportation, District 8 (Caltrans), and the Federal Highway Administration (FHWA), proposes to reconstruct the Mount Vernon Avenue Bridge (Caltrans Bridge No. 54C-0066) over the Burlington Northern Santa Fe (BNSF) railroad facility in the City of San Bernardino, County of San Bernardino, State of California.

The Mount Vernon Avenue Bridge (bridge) is located west of downtown San Bernardino, on Mount Vernon Avenue between West 2nd and West 5th Streets, approximately (0.2 miles) south of State Route 66 and (0.7 miles) west of Interstate 215. Figure 1 is a map of the project region and Figure 2 is a map of the project vicinity. The bridge crosses the BNSF railroad mainlines, storage tracks, and intermodal yard, as well as regional commuter rail tracks operated by the Southern California Regional Rail Authority (Metrolink), and rail tracks used by Amtrak.

Reconstruction of the Mount Vernon Avenue Bridge is necessary to address structural and functional deficiencies of the current facility. The existing bridge was constructed in 1934 and incorporated steel girders salvaged from an earlier 1907 structure. A seismic analysis and retrofit study conducted in 1996-97 determined that the bridge could potentially collapse in a seismic event and threaten public safety. In addition to this seismic deficiency, the bridge was placed on the federal Eligible Bridge List (EBL) due to its low Sufficiency Rating (SR). The bridge was found to be Structurally Deficient (SD) because of its poor deck condition, and was also classified as Functionally Obsolete (FO) because of the nonstandard deck geometry, misaligned south approach, nonstandard vertical clearance at West 3rd Street, and nonstandard vertical and horizontal clearances at the BNSF railroad yard. A study of potential retrofit and rehabilitation strategies for the bridge was prepared in March 2004, and concluded that replacement of the bridge would be the only viable option given the advanced deterioration of the bridge structure and the reduced service life of the bridge due to steel fatigue. A biennial bridge inspection by Caltrans Structure Maintenance and Investigations staff in April 2004 found critical girder cracks and connection

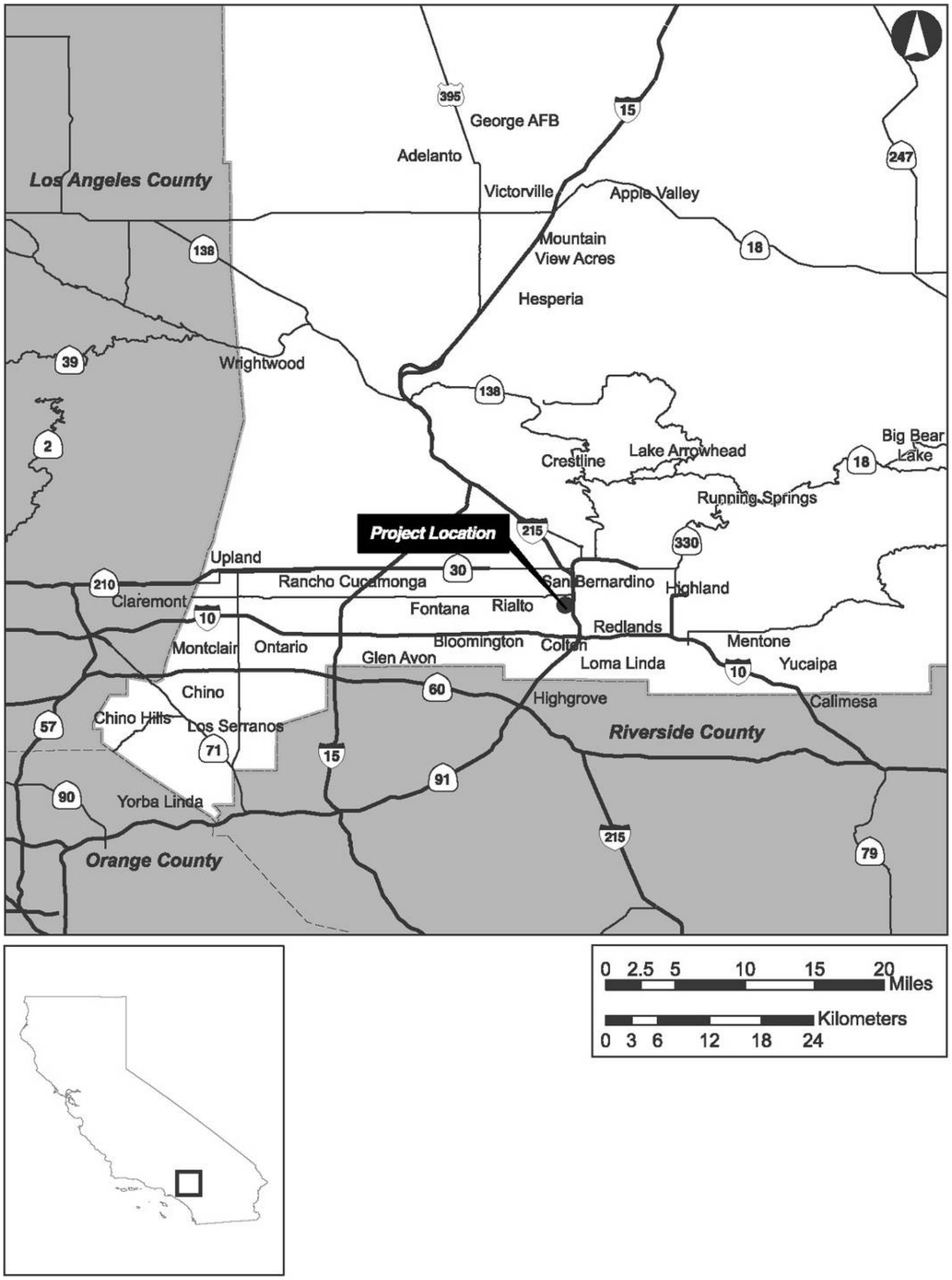
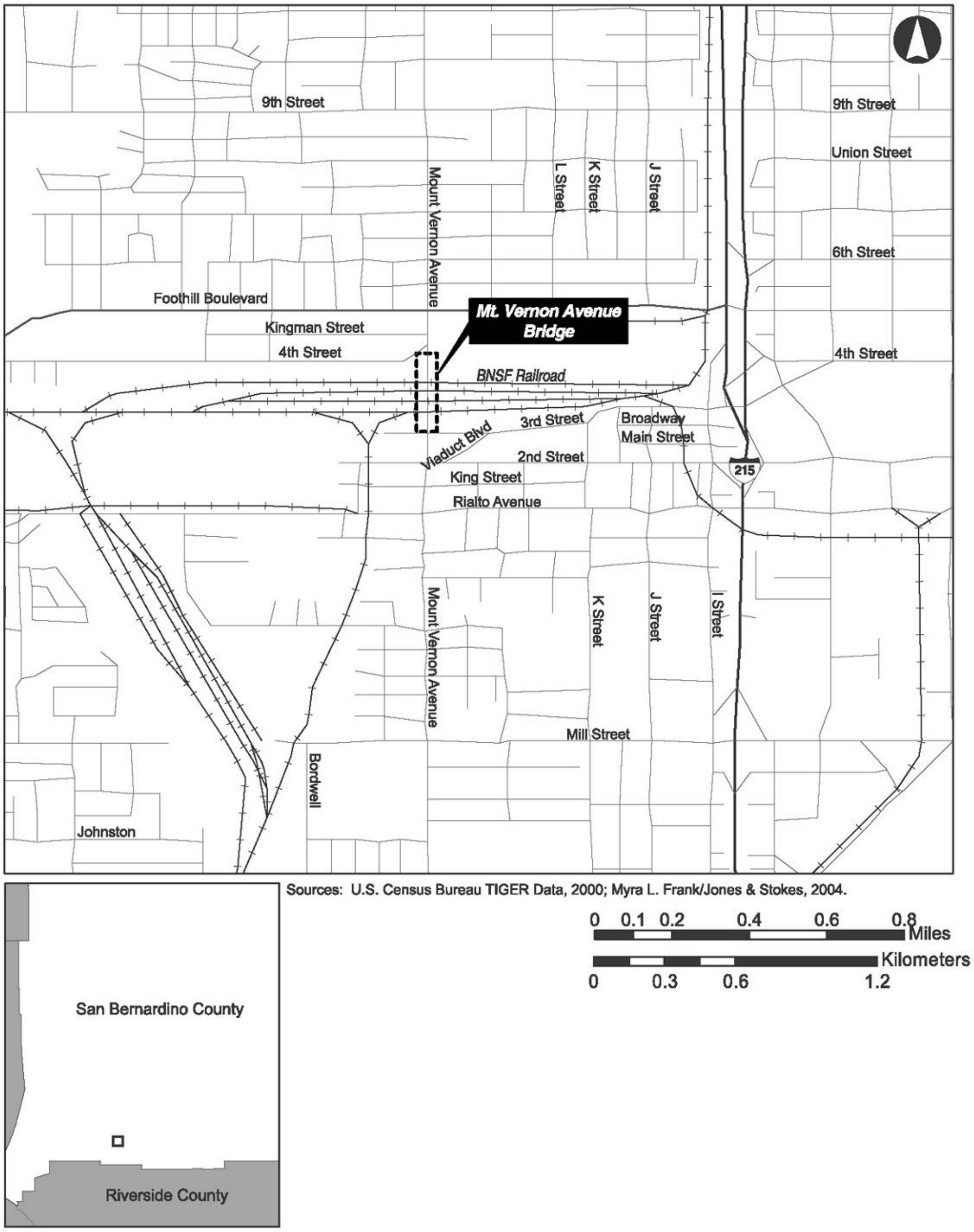


Figure 1. Project Region Map



Sources: U.S. Census Bureau TIGER Data, 2000; Myra L. Frank/Jones & Stokes, 2004.

Figure 2. Project Vicinity Map

failure resulting from fatigue at several locations on the bridge structure. Consequently, the bridge was deemed unsafe and was closed in June 2004 until temporary shoring is installed.

The existing bridge follows a generally north-south alignment along Mount Vernon Avenue, and carries both vehicular and pedestrian traffic. The bridge is approximately 309.7 m (1,016 ft) long and 14.9 m (49 ft) wide, with four 3.1 m (10 ft) traffic lanes (two in each direction) and no median or shoulders. Sidewalks on each side of the existing bridge are 1.1 m (3.5 ft) wide. Concrete barrier railings are located on each side of the bridge, though multiple areas are deteriorated or have been damaged and replaced with steel plates or plywood. Current vertical clearance over West 3rd Street is 4.0 m (13 ft), less than the current 4.6 m (15 ft) standard. Vertical clearance over the BNSF railroad yard is 6.6 m (21.8 ft), which does not meet the current minimum clearance requirements of either the California Public Utilities Commission (CPUC) (minimum 6.9 m [22.5 ft] vertical clearance) or the BNSF railroad (minimum 7.3 m [24 ft] vertical clearance). The existing horizontal clearance between the bridge bents and some of the railroad tracks is only 1.8 to 2.4 m (6 to 8 ft) with no crash walls. Standard minimum horizontal clearances are 6 m (20 ft) without crash walls and 3 m (10 ft) with crash walls. Because the bridge is slightly offset to the east from the centerline of Mount Vernon Avenue at about West 2nd Street , the current south approach is misaligned with the bridge.

The preferred project alternative (proposed Project) would involve removal of the existing bridge structure, construction of a new replacement bridge structure, and improvements to bridge approaches and roadways in the project vicinity. The new replacement bridge would be 317.1 m (1,040 ft) long and 24.4 m (80 ft) wide, with four 3.7 m (12 ft) lanes (two in each direction), a 1.2 m (4 ft) wide median, and 2.4 m (8 ft) wide shoulders. Sidewalks on each side of the new bridge would be 1.5 m (5 ft) wide. Concrete barrier railings (1.1 m [3.5 ft] high) topped with fencing (1.9 m [6.1 ft] high) would be provided on each side of the new bridge. The profile of the new replacement bridge would be raised to at least 7.3 m (24 ft), thereby meeting the minimum vertical clearance required by the BNSF railroad and exceeding the minimum vertical clearance required by the CPUC. Bents for the new bridge would include crash walls, and would meet or exceed the minimum horizontal clearance requirements. To correct the misalignment of the south approach roadway, the bridge would be widened on the west side. This widening would require that the portion of the Mount Vernon Avenue access road between West 2nd and West 3rd Streets be closed. A parallel alleyway behind the residential parcels in this area would be widened to provide a replacement access road for the neighboring residents and railroad facilities. Additional roadway improvements at the south end of the bridge would include minor restriping, repaving, and installation of curbs and gutters. At the north end of the new bridge, similar types of roadway improvements would be provided. Additionally, retaining walls would be constructed along both sides of the north approach between about Kingman Avenue and West 4th Street. It is also anticipated that the intersection of West 4th Street and Mount Vernon Avenue will be reconstructed in a cul-de-sac configuration as part of a separate City public works project.

Construction of the proposed Project would require that two temporary railroad tracks (“shoofly” tracks) be installed within the north side of the BNSF yard, on both sides of the bridge, parallel to the existing BNSF railroad tracks. The temporary shoofly tracks would be required in order to accommodate bridge construction staging and avoid adverse effects to railroad operations during the bridge construction period.

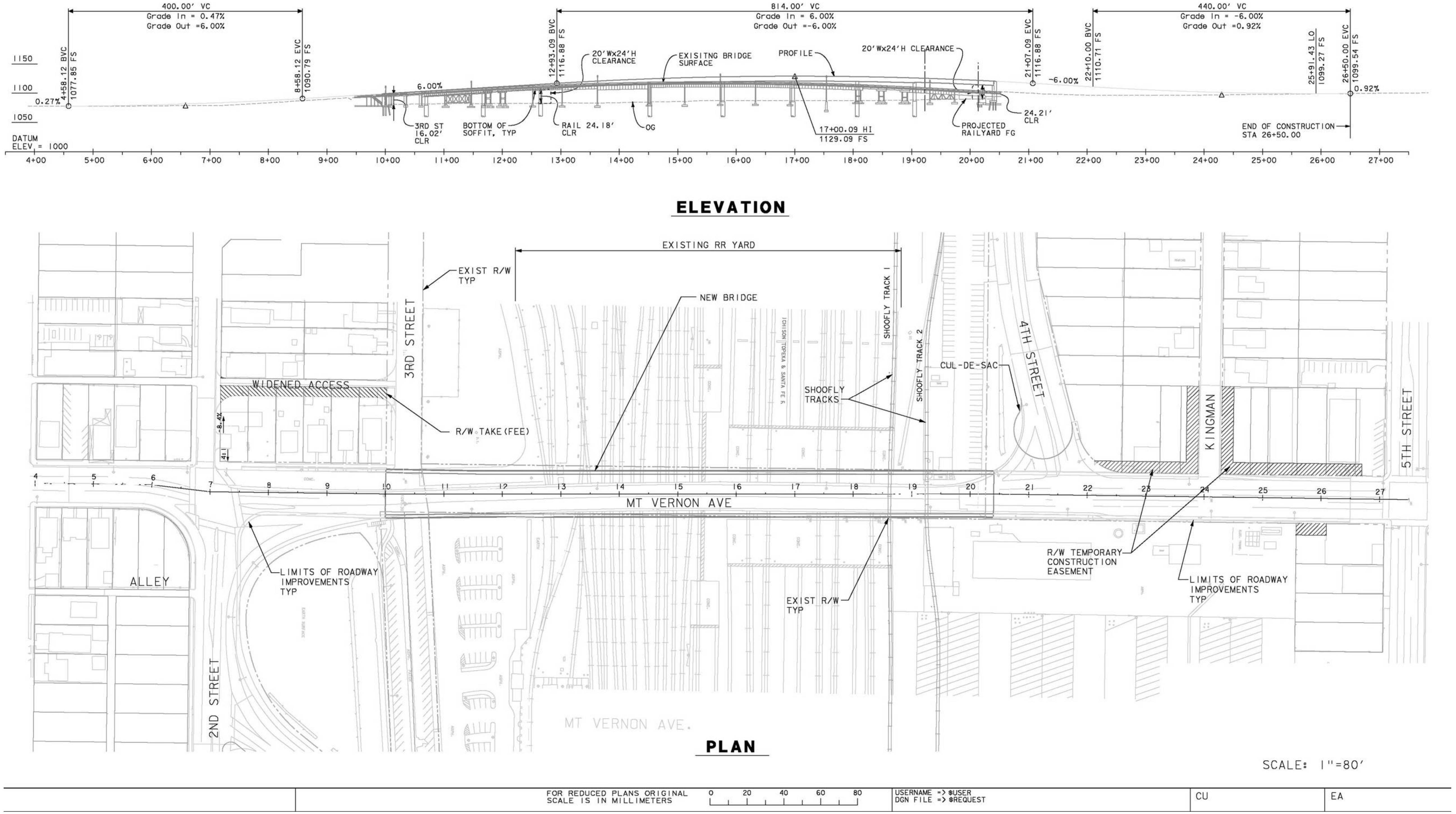


Figure 3. Plan and Profile of Preferred Alternative

Figure 4 is an aerial photograph of the project area. As shown in the photograph, there are single-family residential neighborhoods located at either end of proposed Project on the west side of Mount Vernon Avenue. The majority of other land uses in the project area include railroad and commercial operations. The BNSF facilities include numerous railroad lines and an intermodal yard located on the east side of Mount Vernon Avenue. The Metrolink San Bernardino Station is located on the east side of the bridge, south of the main rail lines. Also, there are several commercial properties located on the west side of Mount Vernon Avenue north of the bridge, including a restaurant and a small hotel.

B.2 Project Alternatives

In addition to the preferred Replacement Alternative, a No Build Alternative and a Retrofit/Rehabilitation Alternative have been considered.

No Build Alternative: Under the No Build Alternative no new or modified bridge, or other physical improvements would be constructed on Mount Vernon Avenue between West 2nd and West 5th Streets. The existing viaduct would be left in its current condition, and no structural or functional deficiencies would be corrected. Ongoing maintenance would continue. The No Build Alternative does not assume that the existing bridge would undergo seismic retrofitting. This option was studied by the City in 1996 and was later discontinued in favor of constructing a new bridge. On June 4th, 2004, Caltrans Structures Maintenance and Investigations staff recommended closure of the existing bridge, concluding that steel beam and girder cracking causes the bridge to be deemed unsafe. The City closed the bridge and has undertaken efforts to install temporarily shoring. However, per an agreement with BNSF for the temporary shoring work, BNSF requires the removal of the shoring before the end of two years. Therefore, at the end of two years the bridge would have to be closed again. Permanent closure of the bridge would result in an unreasonable social and economic burden on the local community. Accordingly, the No Build Alternative has been determined to be imprudent and infeasible.

Retrofit/Rehabilitation Alternative: The Retrofit/Rehabilitation Alternative would seismically retrofit, rehabilitate, and widen the existing bridge to improve its structural safety and functionality. As part of this alternative, new footings would be excavated and new piles drilled. Widening and retrofit of the existing structure would involve improvements to the substructure to meet seismic standards. Anticipated additional work would include complete deck replacement, girder strengthening, removal of lead paint, repainting, installation of new railings and roadway lighting, replacement or rehabilitation of expansion joints, and the addition of crash walls around the bridge piers. The existing roadway configuration and sidewalks would be improved to provide a 21.9 m (72 ft) wide bridge with two 3.7 m (12 ft) lanes in each direction, a 1.2 m (4 ft) median, 1.2 m (4 ft) shoulders, and 1.5 m (5 ft) sidewalks. The sidewalks on the bridge would not meet the Americans with Disabilities Act (ADA) slope requirements following the retrofit/rehabilitation. The modifications associated with this alternative would change the overall visual appearance of the bridge as a result of the materials that would be added to the bridge to bring it into compliance with current seismic standards. These modifications would likely result in an adverse effect to those features that make the bridge eligible for listing on the National Register of Historic Places. Since this alternative would not address the nonstandard vertical and horizontal clearances associated with the viaduct, the BNSF would oppose the Project. In addition, this alternative would not replace all of the existing girders that have been determined to have neared their life span. The bridge would likely have a remaining service life of only 16 years beyond the completion year of 2007. For all of these reasons, the Retrofit/Rehabilitation Alternative has been determined to be imprudent and infeasible.

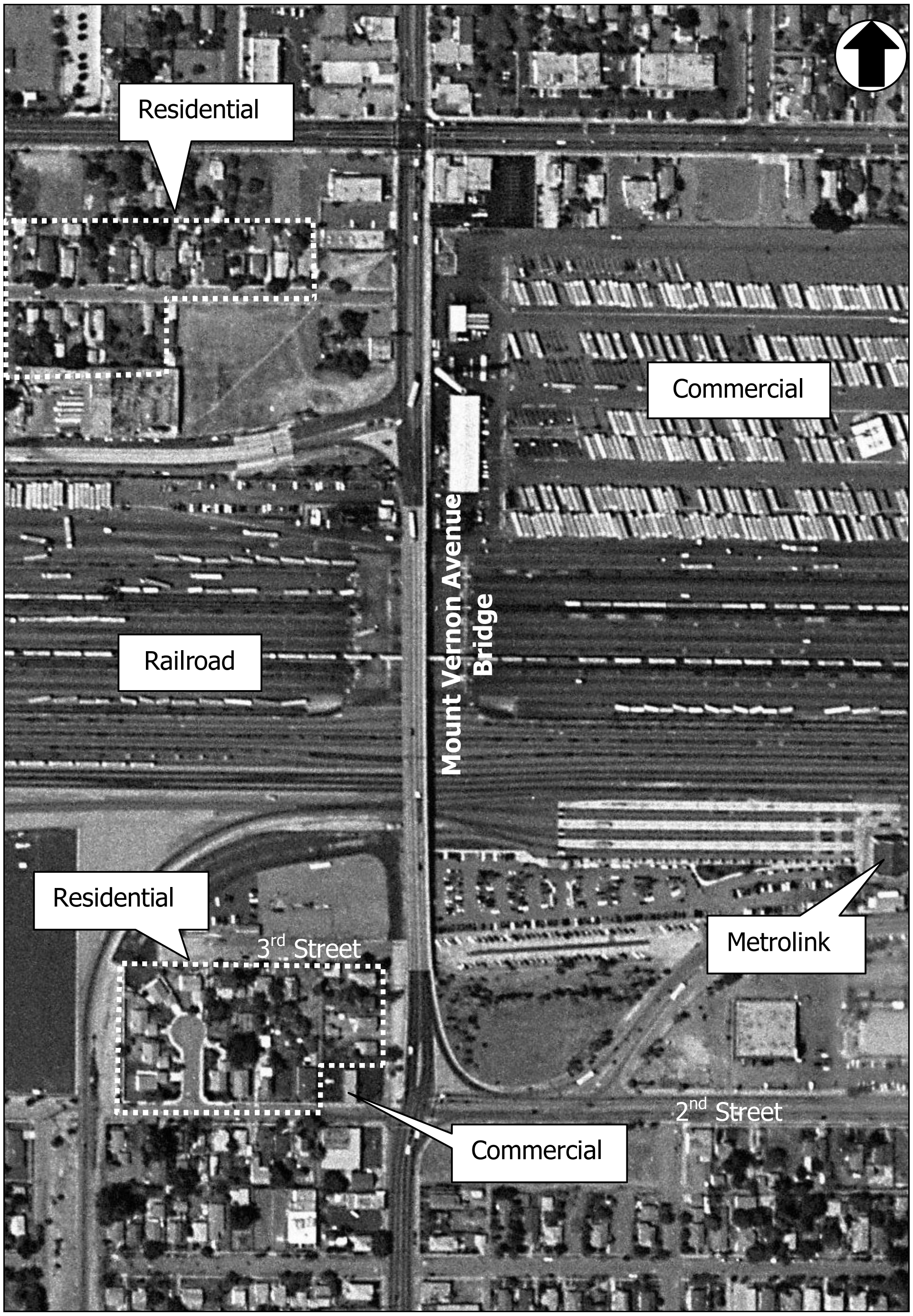


Figure 4. Aerial Photograph and Land Uses

B.3 Project Construction

Construction of the proposed Project is estimated to take approximately seven months to complete. The two major phases of construction include demolition of the existing bridge structure and construction of the new bridge. Demolition activities will begin at the north end of the bridge and would include equipment such as hydraulic rams and bulldozers to remove the concrete deck and steel superstructure and substructures. Trucks will be used to haul debris away from the site. Other equipment needed for this phase of construction include a crane, saws, jackhammers, excavators, generators, and compressors.

Bridge construction would start with construction of the substructure and would be followed by construction of the bridge deck. Pile driving will be required for two of the bridge abutments. Approximately 60 piles will be required for each abutment. In addition to a pile driver, other equipment required for bridge construction includes cranes, boom trucks, haul trucks, cement trucks, compressors, and generators.

C. Fundamentals of Traffic Noise

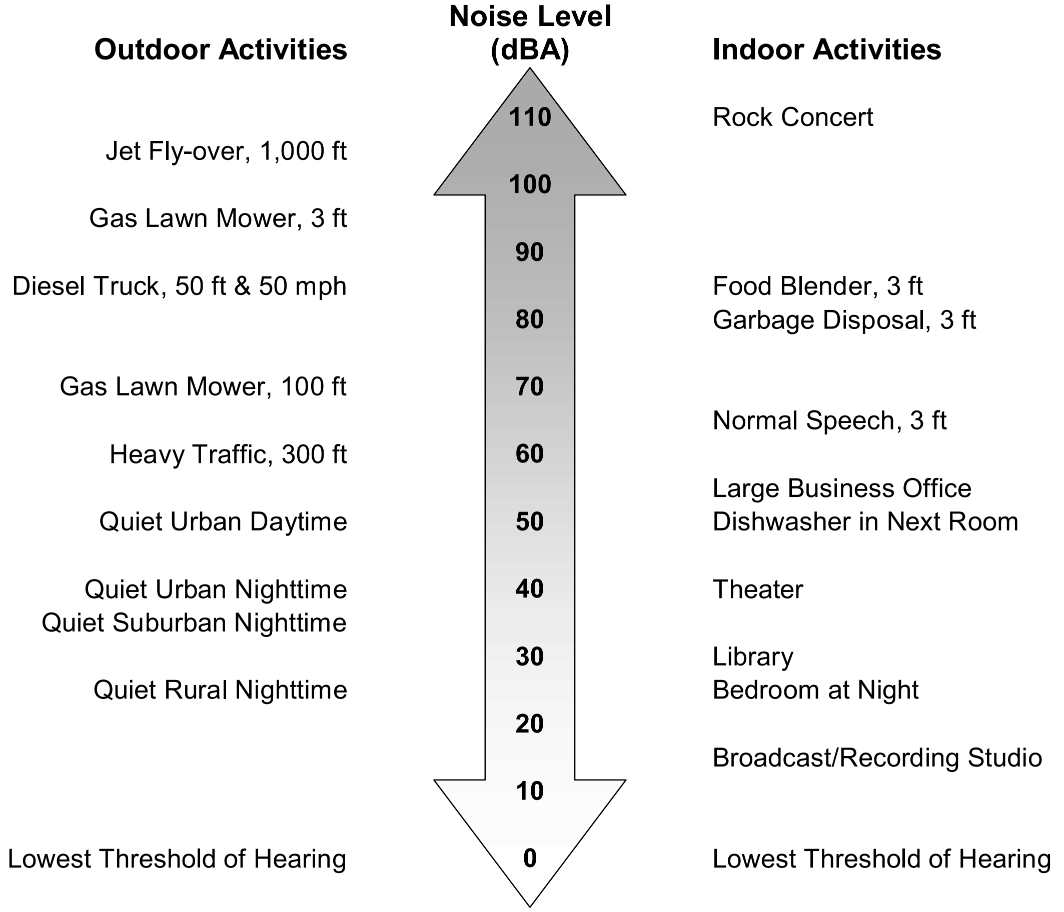
Sound is mechanical energy transmitted by pressure waves in a compressible medium such as air. Noise is generally defined as unwanted or excessive sound. Sound can vary in intensity by over one million times within the range of human hearing. Therefore, a logarithmic scale, known as the decibel scale (dB), is used to provide a more manageable scale of sound intensity.

Sound is characterized by both its amplitude and frequency (or pitch). The human ear does not hear all frequencies equally. In particular, the ear deemphasizes low and very high frequencies. To better approximate the sensitivity of human hearing, the A-weighted decibel scale (dBA) has been developed. On this scale, the human threshold of hearing is approximately 0 dBA and the threshold of pain is around 140 dBA. Figure 5 includes examples of A-weighted noise levels from common indoor and outdoor activities.

Using the decibel scale, sound levels from two or more sources cannot be directly added together to determine the overall sound level. Rather, the combination of two sounds at the same level yields an increase of 3 dBA. The smallest recognizable change in sound levels is approximately 1 dBA. A 3-dBA increase is generally considered perceptible, whereas a 5-dBA increase is readily perceptible. A 10-dBA increase is judged by most people as an approximate doubling of the perceived sound loudness. Relating to traffic noise, traffic volumes must double to generate a 3-dBA increase in sound levels.

Two of the primary factors that reduce levels of environmental sounds, including traffic noise, are increasing the distance between the sound source to the receiver and having intervening obstacles such as walls, buildings or terrain features between the sound source and the receiver. The general rule of thumb is that, when unobstructed, traffic noise levels decrease by 3 dBA with each doubling of distance from the source. In other words, a noise level of 50 dBA at 50 meters will be 47 dBA at 100 meters, 44 dBA at 200 meters, and so on. The amount of attenuation increases to approximately 4.5 dBA for each doubling of distance when the noise travels over soft ground surfaces, such as soft dirt, grass, or other vegetation.

Factors that act to increase the loudness of environmental sounds include moving the sound source closer to the receiver, sound enhancements caused by reflections, and focusing caused by various meteorological conditions. For example, residents in Southern California living within a mile or so from a freeway often notice that traffic noise is higher in the early morning hours when thermal inversion conditions are common. Wind and other atmospheric phenomenon can also have noticeable effects on sound levels, particularly at distances far from the source.



Source: Caltrans, *Technical Noise Supplement*, 1998

Figure 5. Reference Noise Levels

Environment sound fluctuates constantly. The equivalent sound level (Leq), sometimes referred to as the energy average sound level, is the most common means of characterizing time-varying community noise. Leq represents a constant sound that, over the specified period, has the same sound energy as the time-varying sound. The hourly noise level, or Leq(h), is a metric used to predict potential traffic-related noise impacts. All references to existing and future project noise levels are in terms of Leq(h) during the estimated loudest hour.

D. Federal & State Standards and Policies

Caltrans has established noise analysis procedures and abatement policies to meet State and federal environmental requirements, including: the California Environmental Quality Act (CEQA); the National Environmental Policy Act (NEPA); Title 23 of the United States Code of Federal Regulations, Part 772

"Procedures for Abatement of Highway Traffic Noise and Construction Noise"; and Section 216 et seq. of the California Streets and Highways Code. These policies and procedures are outlined in the *Traffic Noise Analysis Protocol for New Highway Construction and Reconstruction Projects*, 1998 (Protocol) and the *Technical Noise Supplement*, 1998 (TeNS manual).

Caltrans identifies a traffic noise impact when either: (1) a substantial noise increase occurs or (2) predicted noise levels with the Project approach (within 1 dBA) or exceed the Noise Abatement Criteria (NAC). A substantial noise increase is defined as when the predicted noise levels with the Project exceed existing noise levels by 12 dBA. The NAC varies depending on land use. The NAC for different activity categories are given in Table 2.

Table 2. Activity Categories and Noise Abatement Criteria (NAC)

Activity Category	NAC, Hourly A-Weighted Noise Level, dBA Leq(h)	Description of Activities
A	**57** Exterior	Lands on which serenity and quiet are of extraordinary significance and serve an important public need and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose.
B	**67** Exterior	Picnic areas, recreation areas, playgrounds, active sport areas, parks, residences, motels, hotels, schools, churches, libraries, and hospitals.
C	**72** Exterior	Developed lands, properties, or activities, not included in Categories A or B above.
D	--	Undeveloped lands.
E	**52** Interior	Residences, motels, hotels, public meeting rooms, schools, churches, libraries, hospitals, and auditoriums

Source: Caltrans, *Traffic Noise Analysis Protocol*, 1998

If a traffic noise impact is predicted, then noise abatement measures must be considered. However, noise abatement is only considered in areas of frequent human use and where lowered noise levels would be beneficial. Since primary consideration is given to exterior areas, such as backyards, exterior NAC are generally applied in traffic noise analyses. If no outside activities would be affected by the traffic noise, or if the exterior areas are far from, or physically shielded from, the traffic noise, then the interior NAC is applied.

Noise abatement generally consists of constructing sound walls along the right-of-way. The preliminary decision to provide abatement for traffic noise impacts depends on the feasibility and reasonableness of the abatement measure. Feasibility is an engineering consideration, which requires that the proposed abatement achieve a minimum reduction of 5 dBA at the affected receiver(s). Reasonableness is determined by considering a number of factors, including the cost of providing the abatement, the benefits of the abatement, and the opinions of affected residents.

For residential areas in activity category B, the reasonableness determination is made according to a single dollar value that encompasses a number of variables. The end result is a maximum allowance ($) for abatement per benefited receiver. For example, if the calculated reasonable allowance (e.g. $17,000) is greater than the estimated actual costs per residence of the abatement (e.g. $15,000), then the abatement is considered reasonable and the preliminary decision will be to provide the abatement. However, if the actual costs exceed the allowance, then the proposed abatement is not considered reasonable.

In terms of NEPA, a traffic noise impact will result in a significant adverse environmental effect if predicted traffic noise impacts are due to a substantial (>12 dBA) noise increase. Note that a significant adverse environmental effect can also result if the proposed noise abatement has a potential for a significant effect on a competing resource. When a significant adverse environmental effect is predicted, noise abatement is considered as mitigation.

E. Study Methods and Procedures

E.1 General Noise Measurements and Prediction Methods

This section summarizes the procedures and model data used to take noise measurements, determine existing noise levels, and predict future noise levels with and without the Project. The methodology follows guidance provided in the Protocol and TeNS manual. Some of the specific procedures and assumptions used for the analysis are:

- **Noise Measurements**. Short- and long-term measurements were taken at three single-family residences between June 18 and June 19, 2002. See section E.2 for more information about the noise measurement sites.
- **Model Calibration**. Model calibration could not be performed for two reasons. First, traffic speeds fluctuated substantially on the Mount Vernon Avenue Bridge due to vehicles stopping and starting at the 2nd Street intersection. Additionally, noise from railroad operations (freight, Metrolink, and Amtrak) affected the measured noise level. See section E.2 for more information about the model calibration.
- **Future Noise Levels**. Estimates of future maximum hourly noise levels from vehicle traffic were made using peak hour traffic volumes. The vehicle mix was based on actual vehicle classification counts during the peak traffic hour and the vehicle speeds were based on observed conditions. See section G.1 for more information regarding future noise levels.
- **Noise Abatement**. No traffic noise impacts were predicted. Therefore, noise abatement options were not considered in the analysis.

E.2 Noise Measurement Sites

Measurements of existing noise levels in the project area were taken by Parsons Brinkerhoff Quade & Douglas (PBQ&D) on June 18, 2002 and June 19, 2002.[1] The purpose of the measurements was to gather traffic and noise data in order to calibrate the traffic noise model, determine the existing peak hour traffic noise level, and to identify non-traffic (background) noise sources and their contribution to the overall levels of noise exposure. A total of three sites were selected for measurement in the residential

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[1] The discussion of noise measurement sites (section E.2) and portions of the existing noise environment (first paragraph under section F.2) are based on information contained in *Traffic Noise Impact Technical Report for the Mount Vernon Avenue Bridge Replacement Project, Technical Study D*, PBQ&D, February 2003.

neighborhood immediately southwest of the Mount Vernon Avenue Bridge. These three locations (Sites 1, 2, and 3) are shown in Figure 6, with summaries of the noise measurements provided in Table 3.[2]

- **Site 1**: 248 Mount Vernon Avenue. A 15-minute noise measurement was taken on the afternoon of June 19, 2002, at this single-family residence. The measurement was taken on the 3rd Street side of the home, approximately 39 meters (129 feet) from the edge of the Mount Vernon Avenue Bridge. Traffic counts for the both the northbound and southbound lanes of Mount Vernon Bridge were taken during the measurement.
- **Site 2.** 1329 3rd Street. A 15-minute measurement was taken in the front yard of this single-family residence around midday on June 18, 2002. The microphone was approximately 49 meters (160 feet) from the edge of the Mount Vernon Avenue Bridge. Traffic counts for both the northbound and southbound lanes of the bridge were taken during the measurement.
- **Site 3**: 1327 West 3rd Street. A 24-hour noise measurement was taken at this single-family residence. Figure 7 is a plot of the one-hour Leq at this location. This measurement was taken to identify the peak hour noise level over the course of an entire day and to determine whether this level is due to traffic on Mount Vernon Avenue or other noise sources, primarily nearby freight and passenger rail activities.

The Sound32 traffic noise model, the Caltrans version of the FHWA Noise Prediction Model (STAMINA 2.0/OPTIMA), could not be calibrated due to erratic traffic conditions on the Mount Vernon Avenue Bridge and noise from nearby rail operations. The signal at the intersection of 2nd Street and Mount Vernon Avenue affects traffic speeds on the bridge in both directions. Southbound vehicles slow as they approach the intersection when the light is red. During periods of heavy traffic, southbound vehicles often queue on the bridge. When the light turns green, northbound vehicles are accelerating up to the posted speed as they climb the bridge north of 2nd Street. When the light is green, both directions of traffic can maintain a speed of 35 mph along the entire project alignment.

Additionally, noise from rail operations, including both freight and passenger rail service, influenced the measured noise levels. This train noise could not be separated from the traffic noise to develop an estimate of the traffic-only noise levels. Therefore, existing and future peak hour traffic noise levels are predicted without using a calibration factor.

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[2] Although no measurements were taken at Site 4, 5, and 6, they are included inFigure 6 for later reference.

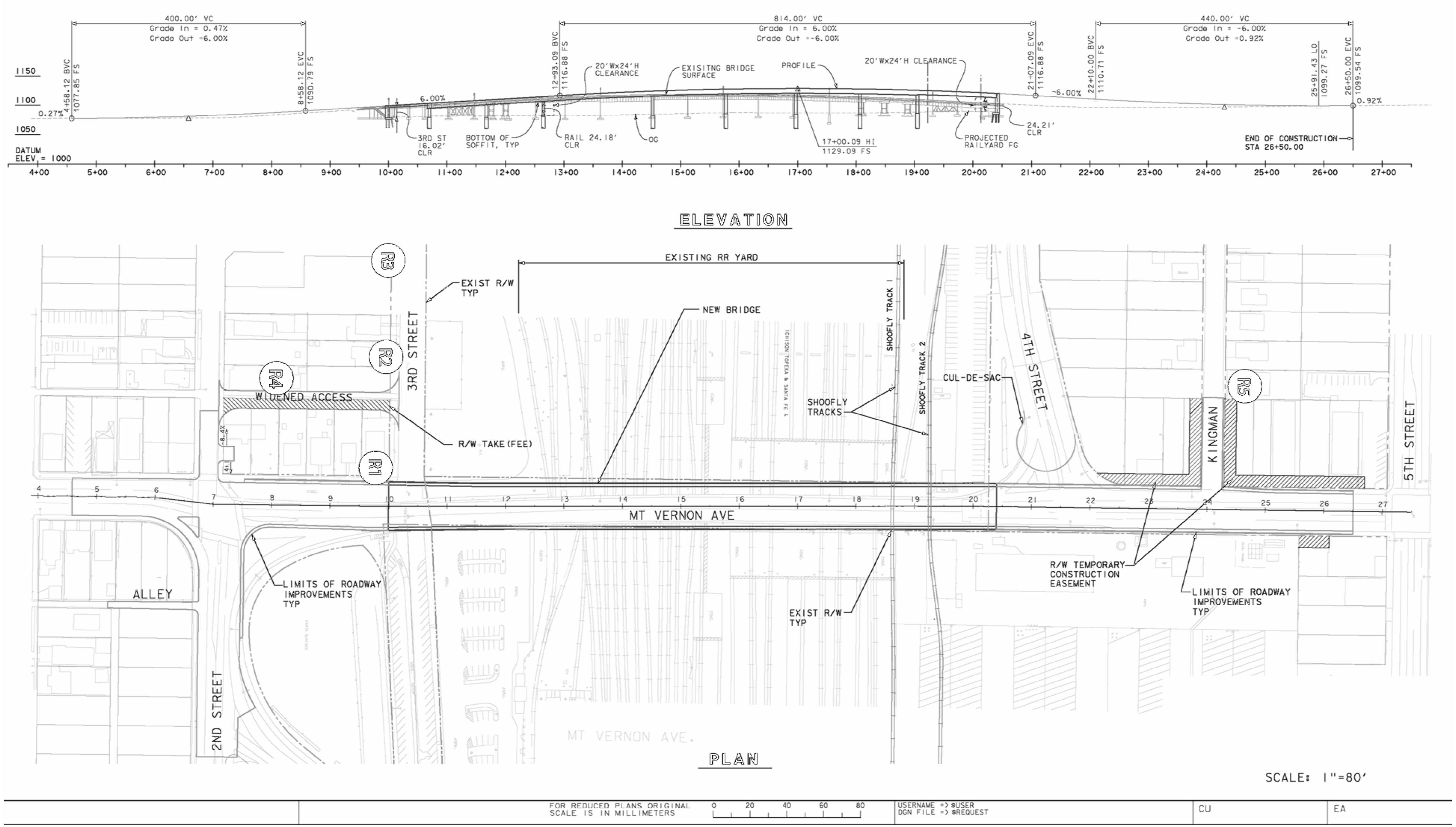


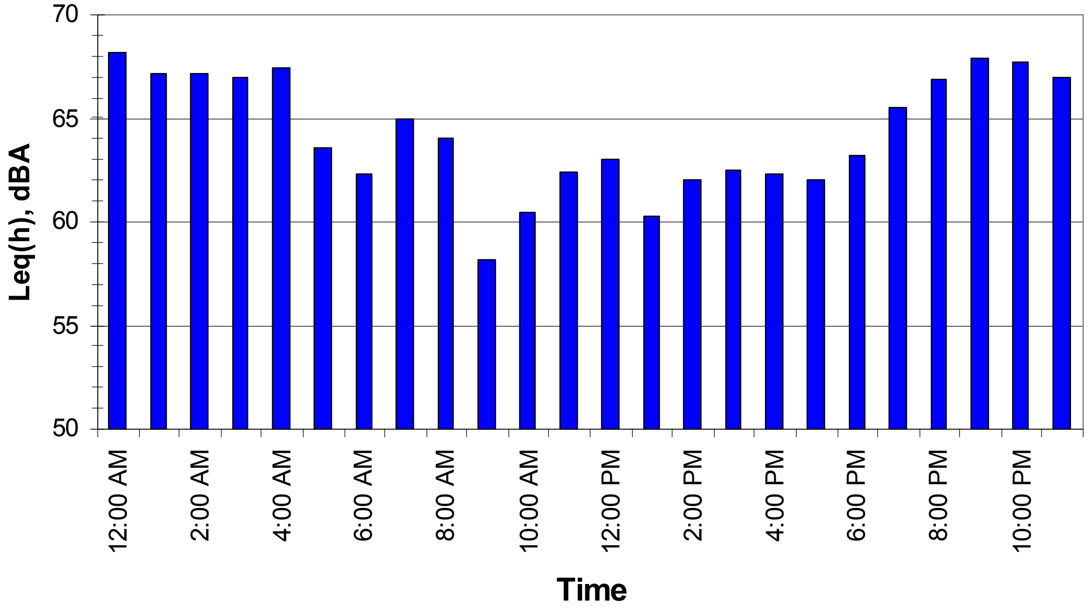
Figure 6. Noise Measurement and Modeling Sites

(note: measurements were taken at sites R1, R2, and R3)

Table 3. Summary of Short-Term Noise Measurements

Parameter	**Site 1**	**Site 2**	**Site 3**
Address	248 Mt. Vernon	1329 3rd West Street	1327 West 3rd Street
Date	6/19/02	6/18/02	6/18/02 – 6/19/02
Start Time	9:45 AM	12:24 PM	N/A
Duration	15 minutes	15 minutes	24 hours
Sound Level	57.4 dBA	56.1 dBA	N/A
Traffic			
Northbound			
Auto	726	702	N/A
Medium Truck	24	12	N/A
Heavy Truck	36	72	N/A
Southbound			
Auto	582	780	N/A
Medium Truck	12	54	N/A
Heavy Truck	36	36	N/A
Speed	20-35 mph	20-35 mph	N/A

Source: PBQ&D, 2003.



Source: PBQ&D, 2003.

Figure 7. Measured 24-Hour Noise Levels, Site 3

F. Existing Noise Environment

F.1 Environmental Setting

As shown in Figure 4 and Figure 6, noise sensitive land uses in the project area include single-family residences immediately to the southwest and northwest of the Mount Vernon Avenue Bridge. To the southwest, the residences are located between 2nd and 3rd Streets. Receivers along 3rd Street and the frontage road that parallels the Mount Vernon Avenue Bridge have a direct view of the bridge. A large rail storage yard and Metrolink/Amtrak railroad is located just north of these residences. Figure 8 is a photograph of the residences along 3rd Street taken from the west side of the bridge looking south. Sites 2 and 3 are shown in the picture. Figure 9 is a photograph looking north towards the bridge from Site 2.

The nearest residences on the north end of the bridge are located on the north side of Kingman Street, immediately east of the Mount Vernon Avenue. The area between 4th Street and the south side of Kingman Street is primarily undeveloped commercial/industrial land. A restaurant is located on Mount Vernon Avenue south of Kingman Street. The hotel located near 5th Street is outside the area where either the horizontal alignment or vertical profile would be changed by the proposed project and therefore was not included in the analysis.

A total of five receivers were selected for the noise analysis. These receivers, which are representative of the various noise-sensitive land uses potentially affected by changes in the horizontal alignment and vertical profile of the Mount Vernon Avenue Bridge, are:

- The three noise measurement locations, which are all single-family residences (Sites 1, 2, and 3).
- A single-family residence north of 2nd Street (Site 4).
- A single-family residence on Kingman Street, just west of Mount Vernon Avenue (Site 5).

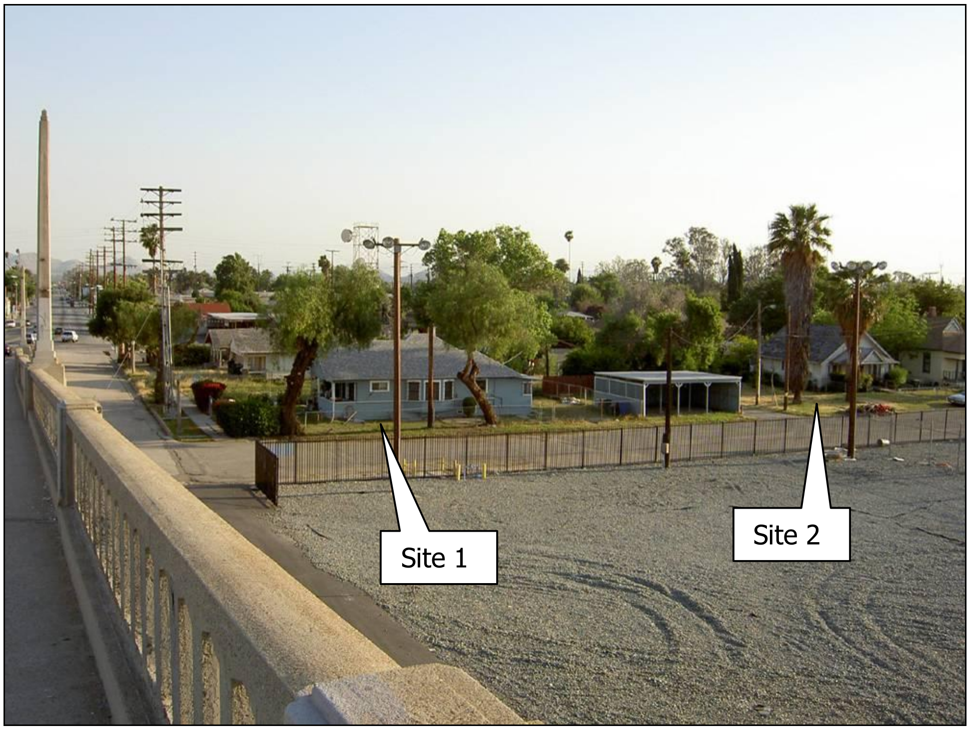


Figure 8. Looking Southwest from Mount Vernon Avenue Bridge

Figure 9. Looking North at Mount Vernon Avenue Bridge from Site 2

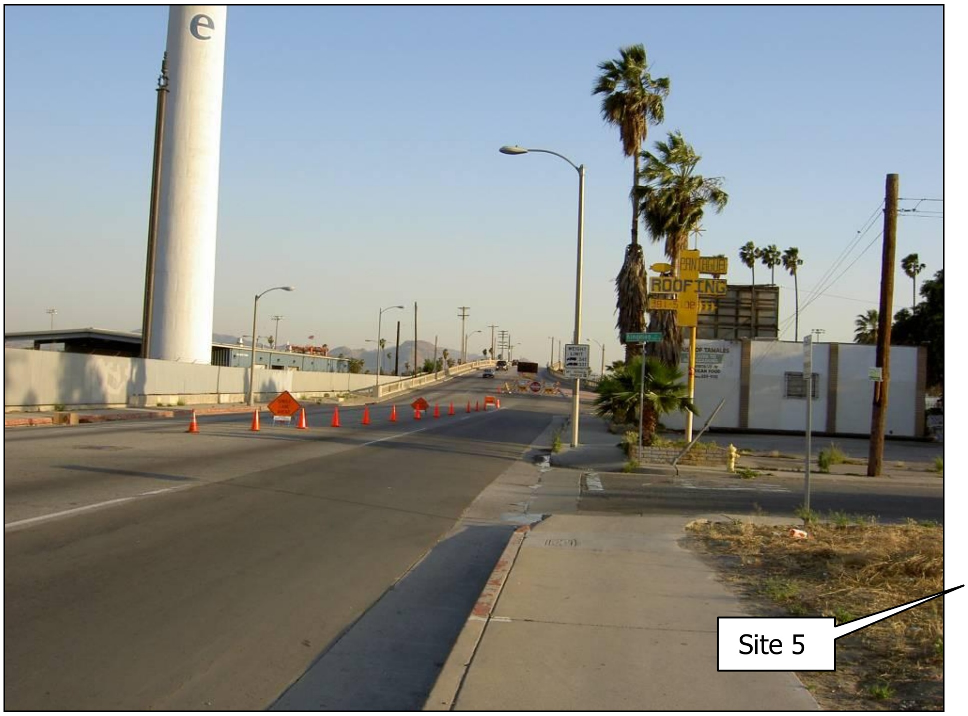


Figure 10. Looking South at Mount Vernon Avenue Bridge.

F.2 Existing Peak Hour Traffic Noise Levels

Noise levels in the project area are due, in part, to automobile and truck traffic on Mount Vernon Avenue. To a much lesser extent, vehicles on other smaller roadways, including 2nd and 3rd Streets, also contribute to the existing noise environment. Noise from adjacent rail operations is the dominant noise source, particularly at those receivers farther from the bridge along 3rd Street. As illustrated in Figure 7, the highest noise levels at Site 4 occurred during off-peak traffic periods, between 8 PM and 6 AM. Railroad activities include commuter rail service (Metrolink and Amtrak), freight train (BNSF) movements, and unloading, loading, storage of freight trains and rail cars at the BNSF intermodal yard. There is also a loud horn on the BNSF stack that can be seen in Figure 10.

Table 4 presents the existing maximum hourly traffic noise levels at the five representative locations. The existing loudest hour was estimated using peak hour traffic volumes collected on March 1, 2004.[3] Peak hour traffic occurred between 4:45 and 5:45 PM and included 697 vehicles in the southbound direction and 819 vehicles in the northbound direction (on average, 750 vehicles per direction per hour). The mix of automobiles, medium trucks, and heavy trucks was determined based on vehicle classification counts taken on Mount Vernon Avenue at 5th Street.[4] Speeds were assumed to be 35 mph for autos and medium trucks and 35 mph for heavy trucks. These speeds are likely to be conservative (high) given that vehicles are often slowing down or have not yet reached the posted speed limit due to the traffic signal at 2nd Street. Table 4 includes the peak hour noise levels predicted by Sound32 for the five representative receivers under the existing peak hour traffic conditions.

Table 4. Predicted Existing Maximum Hourly Traffic Noise Levels, Leq(h)

Receiver				Leq(h) (dBA)
I.D.	**Location**	**Activity Category**	**NAC**	
1	SFR – 1329 West 2nd Street	B	67	59
2	SFR – 248 Mt Vernon Avenue	B	67	57
3	SFR – 1329 West 3rd Street	B	67	56
4	SRF – 1327 West 3rd Street	B	67	60
5	SFR – Kingman Street	B	67	60

Notes:
SFR = single family residence

G. Future Noise Environment, Impacts, and Abatement (NEPA)

G.1 Predicted Future Noise Levels and Traffic Noise Impacts

Future (design year 2025) maximum hourly traffic noise levels were modeled for all five representative receivers. Typically, the peak traffic noise level is associated with Level of Service (LOS) D/E traffic

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[3] LAN Engineering, 2004.
[4] LSA Associates, Inc., 2003.

volumes. For the Mount Vernon Avenue Bridge, LOS D/E would be 1,468 vehicles per direction per hour.[5] As discussed in section F.2, the existing peak traffic volume is 750 vehicles per direction per hour, or roughly half of the LOS D/E volume. According to a recent traffic analysis prepared for the City of San Bernardino, compared to current conditions, future traffic volumes are expected to decrease on Mount Vernon between 2nd Street and 5th Street.[6] This decrease is due to the proposed future construction of a new north-south roadway in the project area. As future traffic volumes are not forecasted to reach LOS D/E levels, the existing peak hour traffic volumes have been used to model future peak hour traffic noise levels. The results of the analysis are summarized in Table 5.

Future peak hour noise levels are predicted to be below the NAC of 67 dBA at all five representative receivers. The changes in the horizontal and vertical re-alignment of the Mount Vernon Avenue Bridge are not predicted to increase traffic noise levels at any of the receiver locations. Also, note that future peak hour noise levels would still be below the NAC even under LOS D/E traffic conditions.

Table 5. Predicted Future Traffic Noise Levels

Receiver		**Future No-Project Leq(h) (dBA)**	**Future With-Project**				
I.D.	**< 1976 or New Highway**		**Leq(h) (dBA)**	**Increase (dBA)**	**Activity Category**	**NAC**	**Impact (S, A/E or None) [1]**
1	Yes	59	58	-1.6	B	67	None
2	Yes	57	57	-0.2	B	67	None
3	Yes	56	56	-0.3	B	67	None
4	Yes	60	60	0.4	B	67	None
5	Yes	60	60	-0.2	B	67	None

Notes:
[1] Impact Type: S=Substantial Increase (12 dBA or more) and A/E=Approach or Exceed NAC

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[5] FDOT, 2002.
[6] LSA Associates, Inc., 2004.

G.2 Noise Abatement

According to the Protocol, noise abatement should be considered where traffic noise impacts are predicted. As no traffic noise impacts are predicted, the feasibility and reasonableness of noise abatement has not been evaluated as part of this analysis. Furthermore, as discussed in section F.2, railroad operations are the primary noise source in the adjacent community. Therefore, even if abatement was considered, it would be difficult to achieve the necessary 5 dBA-reduction in total noise levels using sound barrier walls along the edge of the bridge or in front of the residences.

H. Construction Noise

Construction of the proposed Project would require the use of heavy equipment that could generate high noise levels in the immediate project area. Examples of equipment used for roadway construction include concrete mixers, bulldozers, backhoes, and heavy trucks. Typical noise levels from this type of equipment are provided in Table 6 below.

Based on the types of construction activities and equipment required for the proposed Project, noise levels at 15 meters (50 feet) from the center of most construction activities would generally range from 85 to 90 dBA during construction. Since not all of the equipment would be operating at the same time or for the entire day, the Leq(h) from Project construction would be substantially lower. The highest noise levels would typically be associated with pile driving. Impact pile driving can generate noise levels in excess of 100 dBA at 50 feet, thereby substantially increasing the daily construction noise levels. However, pile driving would be limited to only a week or two out of the entire construction period. In order to minimize noise from pile driving, the contractor will be required to use non impact pile driving methods, such as hydraulic driving of piles or screw piles. If non-impact pile driving is not feasible, then a temporary sound barrier should be erected between the nearest residences and the pile driving activities.

Table 6. Typical Construction Noise Levels

Equipment	**Noise Levels at 15 m**
Front End Loader	85 dBA
Bulldozer	85 dBA
Backhoe	80 dBA
Water Truck (or other heavy truck)	88 dBA
Generator	81 dBA
Concrete Mixer	85 dBA
Tamper/Roller	75 dBA
Paver	87 dBA

Source: FTA, Transit Noise and Vibration Impact Assessment (1995) and EPA, Noise from Construction Equipment and Operations, Building Equipment and Home Appliances (1971)

To minimize potential construction noise impacts, other best-practices to reduce noise levels should be followed by the construction contractor, including:

- Installing and maintaining effective mufflers on construction equipment,
- Locating equipment and staging areas as far from residences as possible, and
- Limiting unnecessary idling of equipment.

The contractor will also be required to adhere to local noise ordinances regarding construction noise (e.g., restricting construct construction activities to certain times of day and days of the week and meeting pre-determined construction noise levels).

I. References

California Department of Transportation, Environmental Program, Environmental Engineering – Noise, Air Quality, and Hazardous Waste Management Office, *Traffic Noise Analysis Protocol for New Highway Construction and Reconstruction Projects*, October 1998.

California Department of Transportation, Environmental Program, Environmental Engineering – Noise, Air Quality, and Hazardous Waste Management Office, *Technical Noise Supplement*, October 1998.

California Department of Transportation, *Highway Design Manual*, July 1995.

U.S. Department of Transportation, Federal Highway Administration, Office of Environment and Planning, Noise and Air Quality Branch, *Highway Traffic Noise Analysis and Abatement – Policy and Guidance*, 1995.

Florida Department of Transportation, *Quality/Level of Service Handbook*, 2002.

LSA Associates, Inc., *Draft Environmental Impact Report, Uptown/Central City North Redevelopment Project Area*, April 2004.

Parsons Brinckerhoff Quade & Douglas, Inc., *Final Traffic Noise Impact Technical Report, Mount Vernon Avenue Bridge Replacement Project*, February 2003.

Report Preparers

Darren Nielson, Principal (7 yrs. experience)
Hugh Saurenman, Principal (25 yrs. experience)
Andrew Somerville, Associate (1 year experience)
ATS Consulting
801 South Grand Avenue, Suite 575
Los Angeles, CA 90017

Persons Contacted

Jack Ottaway, Project Manager
Myra L. Frank / Jones & Stokes
811 W. 7th Street, Suite 800
Los Angeles, CA 90017

Todd Dudley
LAN Engineering
1836 L Commercenter Circle
San Bernardino, CA 92408

Steve Greene, Associate
LSA Associates, Inc.
1650 Spruce Street, Suite 500
Riverside, CA 92507

Tim Porter
City of San Bernardino
Development Services Department
Public Works Division
300 North “D” Street
San Bernardino, CA 92418

J. Appendices

Appendix A: Summary of Measurement Proceedures

Noise level measurements were made using the following equipment [7]

Bruel and Kjaer Model 2231 (Serial No. 1506448) and Model 2238 (Serial No. 2160297) Precision Type 1 Sound Level Meters. This is a type 1 precision instrument that meets or exceeds the requirements for noise measurements equipment used in highway impact analyses, as specified by FHWA.

- Bruel and Kjaer Model 4320 (Serial No. 1330651) Sound Level Calibrator with current certification pursuant to requirements established by the National Institutes of Standards and Technology.
- Larson Davis Model 720 (Serial No. A 0380) Noise Logger. This is a type 2 sound level meter that records and stores sound level data over a 24-hour period.

The sound level meter was placed on a tripod 5 feet above the ground, and at least 10 feet from any reflecting surfaces, such as buildings, walls, parked vehicles, etc. Noise measurements were paused to avoid noise contaminations, such as barking dogs, local traffic, lawn mowers, aircraft over-flights, etc.

Traffic volumes were simultaneously counted as part of the noise survey according to three vehicle classifications: automobiles, medium trucks, and heavy trucks. A medium truck is defined as having six wheels and two axles and is designed for the transportation of cargo. Generally the gross vehicle weight is greater than 4,500 kilograms (10,000 pounds), but less than 11,800 kilograms (26,000 pounds or 13 tons). A heavy truck has three or more axles. Generally, the gross weight is greater than 11,800 kilograms (26,000 pounds). Traffic speeds were measured using a radar speed gun.

The measurement equipment was calibrated before and after, as well as several times during the monitoring surveys.

Noise monitoring was also conducted over a 24-hour period to record a histogram of the hourly existing noise levels.

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[7] PBQ&D, 2003.

Appendix B: Model Input/Output Values

See attached file

```
                        Formatted Input.txt
    **** Sound 2000 (Caltrans Version of Stamina2/Optima) ****


INPUT DATA FILE : U:\4-0060_Mt Vernon_JSA\New Sound2000\Existing_Peak_Hour\Existing
Peak Hour.s32
DATE            : 8/30/2005

MT. VERNON - EXISTING PEAK HOUR

======================================================================
TRAFFIC DATA

LANE        AUTO        MEDIUM TRKS     HEAVY TRKS
 NO.      VPH   MPH       VPH   MPH       VPH   MPH    DESCRIPTION
----------------------------------------------------------------------
   1      725    35        15    35         7    30
   2      725    35        15    35         7    30
======================================================================

LANE DATA

LANE SEG. GRADE                                        SEGMENT
 NO.  NO. COR.          X            Y          Z      DESCRIPTION
----------------------------------------------------------------------
  1   1             -100.0        500.0       0.0
      2              100.0        500.0       0.0
      3              300.0        500.0       0.0
      4              600.0        450.0      12.0
      5              815.0        470.0      20.0
      6             1060.0        475.0      36.0
      7             1300.0        480.0      39.0
      8             1620.0        480.0      34.0
      9             1800.0        475.0      28.0
     10             2000.0        470.0      23.0
     11             2260.0        470.0      23.0
                    2400.0        470.0      23.0
  2   1             -100.0        530.0       0.0
      2              100.0        530.0       0.0
      3              300.0        525.0       0.0
      4              600.0        480.0      12.0
      5              815.0        490.0      20.0
      6             1060.0        495.0      36.0
      7             1300.0        500.0      39.0
      8             1620.0        500.0      34.0
      9             1800.0        500.0      28.0
     10             2000.0        510.0      23.0
     11             2260.0        500.0      23.0
                    2400.0        500.0      23.0
======================================================================

BARRIER DATA


Barrier No.   1           Description: Wall Barrier

Height Increment (DELZ) = 0          No. Height Changes (P)=  0

                                 GROUND      TOP                BARRIER
SEG          X          Y         (ZO)       (Z)                HEIGHTS AT ENDS
----------------------------------------------------------------------
 1        600.0      430.0        12.0      13.0  B1 P1      *    1
 2        815.0      455.0        20.0      21.0  B1 P2      *    1
 3       1060.0      460.0        36.0      37.0  B1 P3      *    1
```

```
 4      1300.0     465.0         39.0     40.0  B1 P4    *   1
 5      1620.0     465.0         34.0     35.0  B1 P5    *   1
 6      1800.0     460.0         28.0     29.0  B1 P6    *   1
        2000.0     455.0         23.0     24.0  B1 P7    *   1


----------------------------------------------------------------------
Barrier No.   2           Description: Wall Barrier

Height Increment (DELZ) = 0            No. Height Changes (P)=  0

                                GROUND     TOP            BARRIER
SEG         X          Y         (ZO)      (Z)            HEIGHTS AT ENDS
----------------------------------------------------------------------
 1      600.0      500.0         12.0     13.0  B2 P1    *   1
 2      815.0      505.0         20.0     21.0  B2 P2    *   1
 3      1060.0     510.0         36.0     37.0  B2 P3    *   1
 4      1300.0     515.0         39.0     40.0  B2 P4    *   1
 5      1620.0     515.0         34.0     35.0  B2 P5    *   1
 6      1800.0     515.0         28.0     29.0  B2 P6    *   1
        2000.0     520.0         23.0     24.0  B2 P7    *   1


----------------------------------------------------------------------
======================================================================

RECEIVER DATA


REC
NO.         X          Y         Z         ID
----------------------------------------------------------------------
   1     805.0      580.0     5.0          R1
   2     805.0      675.0     5.0          R2
   3     810.0      740.0     5.0          R3
   4     600.0      650.0     5.0          R4
   5     2250.0     680.0     28.0         R5
======================================================================

DROP-OFF RATES


 LANE |       RECEIVER NO.
  No. |      1    2    3    4    5
______________________________________________________________________________
   1  |     3.0  3.0  3.0  3.0  3.0
   2  |     3.0  3.0  3.0  3.0  3.0
======================================================================
```

```
                         Formatted Input.txt
   **** Sound 2000 (Caltrans Version of Stamina2/Optima) ****


INPUT DATA FILE : U:\4-0060_Mt Vernon_JSA\New Sound2000\Future Build Peak
Hour\Future Build Peak Hour.s32
DATE            : 8/30/2005

FUTURE BUILD PEAK HOUR

=======================================================================
TRAFFIC DATA

LANE        AUTO       MEDIUM TRKS     HEAVY TRKS
 NO.      VPH  MPH       VPH  MPH        VPH  MPH    DESCRIPTION
-----------------------------------------------------------------------
   1      725   35        15   35          7   30
   2      725   35        15   35          7   30
=======================================================================

LANE DATA

LANE SEG. GRADE                                        SEGMENT
 NO.  NO. COR.        X             Y          Z       DESCRIPTION
-----------------------------------------------------------------------
   1   1           -100.0         490.0       0.0
       2            100.0         490.0       0.0
       3            300.0         480.0       0.0
       4            600.0         480.0      12.0
       5            815.0         480.0      20.0
       6           1060.0         480.0      38.0
       7           1500.0         480.0      51.0
       8           1900.0         480.0      38.0
       9           2000.0         480.0      32.0
      10           2260.0         480.0      23.0
                   2600.0         480.0      21.0
   2   1           -100.0         530.0       0.0
       2            100.0         530.0       0.0
       3            300.0         510.0       0.0
       4            600.0         510.0      12.0
       5            815.0         510.0      20.0
       6           1060.0         510.0      38.0
       7           1500.0         510.0      51.0
       8           1900.0         510.0      38.0
       9           2000.0         510.0      32.0
      10           2260.0         510.0      23.0
                   2600.0         510.0      21.0
=======================================================================

BARRIER DATA


Barrier No.   1          Description: Wall Barrier

Height Increment (DELZ) = 0          No. Height Changes (P)=  0

                                  GROUND     TOP             BARRIER
SEG         X          Y           (ZO)      (Z)             HEIGHTS AT ENDS
-----------------------------------------------------------------------
1       600.0      530.0          12.0      13.0  B1 P1     *   1
2       815.0      530.0          20.0      21.0  B1 P2     *   1
3       1060.0     530.0          38.0      39.0  B1 P3     *   1
4       1500.0     530.0          51.0      52.0  B1 P4     *   1
5       1900.0     530.0          38.0      39.0  B1 P5     *   1
```

```
SOUND32 - RELEASE 07/30/91, MODIFIED 04/22/00

TITLE:
MT. VERNON - EXISTING PEAK HOUR


1
                BARRIER DATA
                ************

BAR                 BARRIER HEIGHTS                    BAR
ELE    0     1     2     3     4     5     6     7     ID        LENGTH   TYPE
-------------------------------------------------------------------------------
 1     -    1.*                                        B1 P1     216.6
 2     -    1.*                                        B1 P2     245.6
 3     -    1.*                                        B1 P3     240.1
 4     -    1.*                                        B1 P4     320.0
 5     -    1.*                                        B1 P5     180.2
 6     -    1.*                                        B1 P6     200.1

 7     -    1.*                                        B2 P1     215.2
 8     -    1.*                                        B2 P2     245.6
 9     -    1.*                                        B2 P3     240.1
10     -    1.*                                        B2 P4     320.0
11     -    1.*                                        B2 P5     180.1
12     -    1.*                                        B2 P6     200.1
-------------------------------------------------------------------------------
       0     1     2     3     4     5     6     7
1
REC REC ID     DNL   PEOPLE   LEQ(CAL)
--------------------------------
 1  R1         67.    500.    59.2
 2  R2         67.    500.    57.0
 3  R3         67.    500.    56.2
 4  R4         67.    500.    60.0
 5  R5         67.    500.    59.7
BARRIER HEIGHT INDEX FOR EACH BARRIER SECTION
  1  1  1  1  1  1  1  1  1  1  1  1
CORRESPONDING BARRIER HEIGHTS FOR EACH SECTION
 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1.
```

```
SOUND32 - RELEASE 07/30/91, MODIFIED 04/22/00

TITLE:
FUTURE BUILD PEAK HOUR


1
            BARRIER DATA
            ************

BAR                    BARRIER HEIGHTS                  BAR
ELE     0    1    2    3    4    5    6    7         ID          LENGTH   TYPE
-------------------------------------------------------------------------------
 1      -    1.*                                     B1  P1       215.1
 2      -    1.*                                     B1  P2       245.7
 3      -    1.*                                     B1  P3       440.2
 4      -    1.*                                     B1  P4       400.2
 5      -    1.*                                     B1  P5       100.2
 6      -    1.*                                     B1  P6       260.2

 7      -    1.*                                     B2  P1       215.1
 8      -    1.*                                     B2  P2       245.7
 9      -    1.*                                     B2  P3       440.2
10      -    1.*                                     B2  P4       400.2
11      -    1.*                                     B2  P5       100.2
12      -    1.*                                     B2  P6       260.2
-------------------------------------------------------------------------------
        0    1    2    3    4    5    6    7
1
REC REC ID    DNL   PEOPLE   LEQ(CAL)
---------------------------------
 1  R1        67.    500.   57.6
 2  R2        67.    500.   56.8
 3  R3        67.    500.   55.9
 4  R4        67.    500.   60.4
 5  R5        67.    500.   59.5
BARRIER HEIGHT INDEX FOR EACH BARRIER SECTION
  1  1  1  1  1  1  1  1  1  1  1  1
CORRESPONDING BARRIER HEIGHTS FOR EACH SECTION
 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1.
```