

1    **4.7       NOISE**

2    Potential noise impacts from disposal and reuse of NSTI are discussed in this section. Existing  
3    and future noise levels along roadways in the reuse plan area were projected using data from  
4    the traffic analysis (see section 4.5). Noise impacts were analyzed considering a full build-out  
5    condition for each reuse alternative. Technical terms used in this section are defined in section  
6    3.7. Noise level calculations are indicated in tables to tenths of a dB; noise levels in the text are  
7    rounded to the nearest whole dB.

8    Factors considered in determining whether an alternative would have significant noise impacts  
9    included the extent or degree to which its implementation would:

- 10    1. Expose sensitive receptors to noise above standards or guidelines;
- 11    2. Permanently and noticeably increase ambient noise in a manner that could affect the use  
12    and enjoyment of adjacent areas or facilities;
- 13    3. Locate a noise sensitive reuse such that it is negatively affected by existing or projected  
14    noise levels; or
- 15    4. Result in temporary noise levels in excess of limits set by San Francisco's Noise  
16    Ordinance.

17    Residences, schools, libraries, hospitals, and recreational areas generally are considered to be  
18    noise sensitive receptors. New development within the reuse plan area would include noise  
19    sensitive receptors, such as residences, schools, and recreation areas.

20    **4.7.1       Alternative 1**

21    *Not Significant Impacts*

22    Noise generated by traffic associated with reuse (Factors 1 and 2). Implementation of Alternative 1  
23    would result in minor additional vehicular noise from traffic generated by new development.  
24    Projected vehicle noise levels along major roadways on Yerba Buena Island are summarized in  
25    Table 4.7-1 and assume the existing SFOBB configuration.

26    As indicated in Table 4.7-1, traffic added to the SFOBB by Alternative 1 would not cause a  
27    noticeable change in freeway noise levels; compared to future baseline conditions without the  
28    project, noise levels would increase by less than one-tenth of an A-weighted decibel. Predicted  
29    traffic volumes on most Treasure Island and Yerba Buena Island roadways would not generate  
30    CNEL levels above 60 dB for locations approximately 50 feet (15 m) from the edge of the road  
31    because traffic speeds generally would be low (25 mph [40 km/hour]). Even along major collector  
32    road segments where traffic speeds would be about 35 mph (56 km/hour) with substantial shuttle  
33    bus traffic, CNEL levels generally would be less than 61 dB at a distance of approximately 50 feet  
34    (15 m) from the edge of the road. Predicted noise levels do not exceed any adopted land use  
35    compatibility thresholds (see Table 3.7-1); therefore, the noise impact from on-site traffic would be  
36    less than significant, and no mitigation is proposed.

37    Ferry service to and from Treasure Island would not be a significant noise source. Boat engines  
38    and boat horns would be a minor localized noise source. Based on observations at the San

Table 4-7-1. Summary of Traffic Noise Modeling 24-hour Results for Yerba Buena Island (page 1 of 2)

Location and Distance From SFOBB	MODELED CNEL LEVELS (dBA) FOR WEEKDAY CONDITIONS							Change due to Project	Alternative 3	Change due to Project
	Existing Baseline	Future Baseline Without Project	Baseline Change from Existing	Alternative 1	Alternative 2	Change due to Project	Alternative 3			
NEAR MACALLA ROAD AT EASTERN END OF YERBA BUENA ISLAND										
100 ft N of I-80	81.1	81.4	+0.3	81.5	81.5	+0.1	81.5	+0.1	81.3	-0.1
200 ft N of I-80	75.9	76.2	+0.3	76.3	76.3	+0.1	76.3	+0.1	76.1	-0.1
300 ft N of I-80	72.9	73.3	+0.3	73.3	73.3	+0.1	73.3	+0.1	73.1	-0.1
500 ft N of I-80	69.1	69.5	+0.3	69.5	69.5	+0.1	69.5	+0.1	69.3	-0.1
750 ft N of I-80	66.0	66.3	+0.3	66.4	66.4	+0.1	66.4	+0.1	66.2	-0.1
1000 ft N of I-80	63.7	64.1	+0.3	64.1	64.1	+0.1	64.1	+0.1	63.9	-0.1
100 ft S of I-80	81.1	81.4	+0.3	81.5	81.5	+0.1	81.5	+0.1	81.3	-0.1
200 ft S of I-80	76.3	76.6	+0.3	76.7	76.7	+0.1	76.7	+0.1	76.5	-0.1
300 ft S of I-80	73.5	73.9	+0.3	73.9	73.9	+0.1	73.9	+0.1	73.7	-0.1
500 ft S of I-80	70.0	70.4	+0.3	70.4	70.4	+0.1	70.4	+0.1	70.2	-0.1
750 ft S of I-80	67.1	67.5	+0.3	67.5	67.5	+0.1	67.5	+0.1	67.3	-0.1
1,000 ft S of I-80	65.0	65.3	+0.3	65.3	65.3	+0.1	65.3	+0.1	65.1	-0.1
ABOUT 300 FEET EAST OF EASTERN TUNNEL OPENING, YERBA BUENA ISLAND										
100 ft N of I-80	80.9	81.2	+0.3	81.3	81.3	+0.1	81.3	+0.1	81.1	-0.1
200 ft N of I-80	75.8	76.2	+0.3	76.2	76.2	+0.1	76.2	+0.1	76.0	-0.1
300 ft N of I-80	72.8	73.2	+0.3	73.2	73.2	+0.1	73.2	+0.1	73.0	-0.1
500 ft N of I-80	69.1	69.4	+0.3	69.5	69.5	+0.1	69.4	+0.1	69.2	-0.1
750 ft N of I-80	66.0	66.3	+0.3	66.4	66.4	+0.1	66.4	+0.1	66.2	-0.1
1,000 ft N of I-80	63.8	64.1	+0.3	64.2	64.2	+0.1	64.2	+0.1	64.0	-0.1
100 ft S of I-80	80.9	81.2	+0.3	81.3	81.3	+0.1	81.3	+0.1	81.1	-0.1
200 ft S of I-80	75.9	76.2	+0.3	76.2	76.2	+0.1	76.2	+0.1	76.0	-0.1
300 ft S of I-80	72.8	73.2	+0.3	73.2	73.2	+0.1	73.2	+0.1	73.0	-0.1
500 ft S of I-80	69.1	69.4	+0.3	69.5	69.5	+0.1	69.5	+0.1	69.3	-0.1
750 ft S of I-80	66.1	66.4	+0.3	66.5	66.5	+0.1	66.5	+0.1	66.3	-0.1
1,000 ft S of I-80	64.0	64.3	+0.3	64.4	64.4	+0.1	64.4	+0.1	64.2	-0.1

**Table 4.7-1. Summary of Traffic Noise Modeling 24-hour Results for Yerba Buena Island (Page 2 of 2)**

Location and Distance From SFOBB	MODELED CNEL LEVELS (dBA) FOR WEEKDAY CONDITIONS								
	Existing Baseline	Future Baseline Without Project	Baseline Change from Existing	Alternative 1	Change due to Project	Alternative 2	Change due to Project	Alternative 3	Change due to Project
ABOUT 160 FEET WEST OF WESTERN TUNNEL OPENING, YERBA BUENA ISLAND									
100 ft N of I-80	80.5	80.9	+0.3	81.0	+0.1	81.0	+0.1	80.7	-0.1
200 ft N of I-80	75.1	75.5	+0.3	75.6	+0.1	75.5	+0.1	75.3	-0.1
300 ft N of I-80	72.1	72.4	+0.3	72.5	+0.1	72.4	+0.1	72.2	-0.1
500 ft N of I-80	68.3	68.6	+0.3	68.7	+0.1	68.7	+0.1	68.5	-0.1
750 ft N of I-80	65.5	65.8	+0.3	65.8	+0.1	65.8	+0.1	65.6	-0.1
1,000 ft N of I-80	63.4	63.7	+0.3	63.8	+0.1	63.8	+0.1	63.6	-0.1
100 ft S of I-80	80.6	80.9	+0.3	81.0	+0.1	81.0	+0.1	80.7	-0.1
200 ft S of I-80	75.1	75.5	+0.3	75.5	+0.1	75.5	+0.1	75.3	-0.1
300 ft S of I-80	72.0	72.4	+0.3	72.4	+0.1	72.4	+0.1	72.2	-0.1
500 ft S of I-80	68.3	68.6	+0.3	68.7	+0.1	68.7	+0.1	68.5	-0.1
750 ft S of I-80	65.4	65.8	+0.3	65.8	+0.1	65.8	+0.1	65.6	-0.1
1,000 ft S of I-80	63.4	63.7	+0.3	63.8	+0.1	63.8	+0.1	63.6	-0.1

Noise dBA = A-weighted decibels.

CNEL = Community noise equivalent level (a 24-hour weighted average noise level, with evening noise weighted by 5 dBA and nighttime noise weighted by 10 dBA). Noise modeling performed using a spreadsheet version of the Federal Highway Administration Traffic Noise Prediction Model (FHWA 1978) to model a full 24-hour pattern of traffic volumes. Noise contributions from trucks modeled using Caltrans data (Caltrans 1984).

Modeled CNEL values are about 1.3 dBA greater than the maximum 1-hour dBA value.

Upper and lower decks of the SFOBB modeled as separate roadways; tunnel sections were treated as being completely shielded.

Hourly traffic volumes were extrapolated from 1994 patterns, making adjustments to match traffic analysis predictions of peak period volumes, and total daily traffic based on future No Action volumes plus weekday vehicle traffic added by reuse alternatives.

Modeled vehicle speeds adjusted according to estimated hourly volume/capacity ratios. Truck volumes set as fractions of the hourly total volume. Daily medium truck volume averages about 2%; daily heavy truck volume averages about 2.4%.

Noise drop-off rate for the lower deck modeled as 4.5 dBA per doubling of distance; noise drop-off rate for the upper deck modeled as 5 dBA per doubling of distance.

1 Francisco Ferry Building, boat engine noise is about 70 to 75 dBA at approximately 50 feet (15  
2 m) when boats are maneuvering away from the dock during ferry departures (Tetra Tech 2001).  
3 Boat engine noise levels are lower while arriving ferry boats dock. Boat horn noise is about 85  
4 dBA at approximately 50 feet (15 m), but this is a brief noise event. The ferry dock area on  
5 Treasure Island would not contain noise-sensitive land uses, and these noise conditions would  
6 not be a significant impact. No mitigation is proposed.

7 Noise-related land use compatibility on Treasure Island (Factor 3). The proposed themed attraction  
8 would be a potential source of locally high noise levels. Potential impacts on nearby noise-  
9 sensitive land uses, such as persons engaged in recreational activities, would be avoided by  
10 appropriate site design. Reasonable attention to site planning and building design would  
11 minimize the potential for noise problems in mixed-use zones. Future noise-sensitive uses on  
12 Treasure Island would be developed in accordance with applicable regulations and would have  
13 adequate noise protection. For example, the San Francisco Building Code includes standards  
14 for noise insulation that would be met by new residential construction. In addition, the San  
15 Francisco Noise Ordinance is an enforcement mechanism that would limit noise impacts from  
16 construction activities and stationary sources. Existing on-site housing units planned for reuse  
17 are separated from proposed uses that would be sources of high noise levels by approximately  
18 0.25 mile and, therefore, are not anticipated to experience noise levels greater than 60 dBA.  
19 Because predicted noise levels do not exceed any adopted land use compatibility thresholds  
20 (see Table 3.7-1), no significant noise-related land use compatibility conflicts are anticipated on  
21 Treasure Island. No mitigation is proposed.

22 Noise-related land use compatibility on Yerba Buena Island (Factor 3). Alternative 1 would include  
23 noise-sensitive residential and commercial uses on portions of Yerba Buena Island that are  
24 currently subject to high levels of noise from existing traffic on the SFOBB. Existing CNEL noise  
25 levels of up to 81 dBA were found during computer modeling (see Table 4.7-1). Locations  
26 within approximately 800 feet (244 m) of the freeway would be subject to CNEL levels above 65  
27 dBA except where intervening topography provides noise shielding. Locations within  
28 approximately 500 feet (152 m) of the freeway may be exposed to CNEL levels above 70 dBA.  
29 These noise levels could pose land use compatibility problems for residential land uses and  
30 some commercial land uses (such as restaurants, hotels, and conference centers) if they are not  
31 addressed through building design and construction to minimize indoor noise levels. It is  
32 difficult to mitigate outdoor noise levels for low-density residential development, especially  
33 when noise sources are elevated with respect to residential areas. For residential and  
34 commercial developments using tall buildings, the building structures can be used to mitigate  
35 outdoor noise levels in relatively modest, largely enclosed outdoor spaces. Since precise site  
36 design and building design plans are not known, it is speculative to draw conclusions regarding  
37 the significance of outdoor noise impacts for locations relatively close to the SFOBB.

38 For development on the northern portion of Yerba Buena Island, the Draft Reuse Plan design  
39 guidelines identify methods to reduce bridge noise effects (including arranging proposed  
40 buildings to open away from the bridge and designing buildings with a "U" or courtyard  
41 shape). In addition, state requirements for building insulation would reduce interior noise  
42 levels to acceptable levels. If feasible, existing buildings that would be retained in areas of high  
43 ambient noise levels (e.g., historic structures on Yerba Buena Island) could be retrofitted with  
44 noise insulation features such as fixed windows and climate controls. These building insulation

1 requirements and the associated noise reduction benefits apply to all structures regardless of  
2 interior noise levels. Land use compatibility conflicts, therefore, would be not significant, and  
3 no mitigation is proposed.

4 Construction and demolition noise (Factor 4). Construction, demolition, and pile-driving activities  
5 have the potential for causing temporary disturbance to adjacent land uses. Construction and  
6 demolition activities would occur intermittently over an extended period; economic conditions  
7 would influence the amount, duration, and location of construction activities.

8 Noise levels from typical construction and demolition activities are summarized in Table 4.7-2.  
9 Most construction and demolition activity would result in CNEL levels above 70 dBA within  
10 approximately 200 feet (61 m) of construction sites. Pile-driving equipment generates a highly  
11 disturbing impulsive noise; over an 8-hour work day, CNEL increments would exceed 70 dBA  
12 for locations within approximately 600 feet (183 m) of pile-driving sites. Most pile-driving  
13 activity would occur on Treasure Island. Construction noise would become objectionable when  
14 areas close to noise-sensitive land uses are developed. Under Alternative 1, proposed noise-  
15 sensitive land uses include new residences, as well as parks, plazas, and other open space and  
16 recreational areas.

17 Construction noise impacts would be reduced to acceptable levels by restricting construction  
18 activities to normal daytime periods, by providing temporary noise barriers, such as heavy  
19 plywood fencing where necessary, and by sequencing development, to the extent feasible and  
20 practicable, such that noise-sensitive land uses are constructed last. Conditions would be  
21 imposed through San Francisco's building permit process and would result in controlled and  
22 reduced noise emissions. If pile driving during nighttime hours is required, it would be  
23 necessary to obtain a work permit from the San Francisco Director of Public Works, pursuant to  
24 San Francisco Noise Ordinance Section 2908. Construction noise, therefore, would not result in  
25 a significant impact. No mitigation is proposed.

#### 26 4.7.2 Alternative 2

##### 27 *Not Significant Impacts*

28 Noise generated by traffic associated with reuse (Factors 1 and 2). Noise levels on NSTI roadways  
29 and from ferry service to and from Treasure Island would not be significant, as described above  
30 for Alternative 1.

31 Noise levels on Yerba Buena Island are dominated by existing freeway noise from the SFOBB.  
32 Similar to Alternative 1, traffic added to the SFOBB by Alternative 2 would not cause a  
33 noticeable change in freeway noise levels; compared to future baseline conditions without the  
34 project, noise levels would increase by less than one-tenth of an A-weighted decibel (see Table  
35 4.7-1). Consequently, Alternative 2 would not generate significant traffic noise impacts. No  
36 mitigation is proposed.

37 Noise-related land use compatibility on Treasure Island (Factor 3). Similar to Alternative 1, the  
38 proposed themed attraction would be a potential source of locally high noise levels from traffic,  
39 visitors, and rides and attractions, but potential impacts would be avoided by appropriate site  
40 design. In addition, noise-sensitive land uses such as residences or schools would not be

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- 1 developed on Treasure Island. Consequently, no significant noise-related land use conflicts are  
 2 anticipated on Treasure Island. No mitigation is proposed.

Table 4.7-2. Typical Construction Noise Impacts

Distance from Site (feet)	CNEL INCREMENTS (dBA) FROM TYPICAL CONSTRUCTION PHASES			
	Building Demolition	Site Preparation	Excavation	Pile Driving
50	85.1	84.7	85.7	92.0
100	79.0	78.6	79.6	85.9
200	72.8	72.5	73.5	79.7
400	66.5	66.2	67.2	73.4
600	62.7	62.3	63.4	69.6
800	59.9	59.6	60.6	66.8
1,000	57.6	57.3	58.4	64.5
1,500	53.3	53.1	54.1	60.2
2,000	50.1	49.9	50.9	56.9
2,500	47.4	47.3	48.3	54.2
3,000	45.1	45.1	46.1	51.8
4,000	41.3	41.3	42.3	47.7
5,280	37.2	37.3	38.3	43.3
7,500	31.5	31.6	32.7	36.8
9,000	28.3	28.4	29.5	32.9
10,560	25.2	25.3	26.5	29.1

*Notes:* dB = decibel. Decibel scales are a logarithmic index based on ratios between a measured value and reference value.  
 dBA = A-weighted decibels.  
 CNEL = Community noise equivalent level. Noise calculations incorporate both distance attenuation and atmospheric absorption effect. Noise estimates assume variable equipment use over a 10-hour work day with no nighttime construction activity. Building demolition assumed to be through use of heavy equipment rather than explosives. Building demolition assumed to require two bulldozers, one front end loader, two heavy trucks, and a water truck. Site preparation assumed to require one bulldozer, one backhoe, one front end loader, two heavy trucks, and one water truck. Foundation excavation assumed to require one power shovel, one front end loader, two heavy trucks, and one water truck. Pile driving assumed to require one heavy truck, one crane, one forklift, and one pile driver.

*Sources:* EPA 1971; Gharabegian, et al. 1985; Acoustical Society of America 1978.

- 3 Noise-related land use compatibility on Yerba Buena Island (Factor 3). Potential noise-related land  
 4 use compatibility impacts and their remedies on Yerba Buena Island under Alternative 2 would  
 5 be similar to those described for Alternative 1 and would be not significant. If feasible, existing  
 6 buildings that would be retained in areas of high ambient noise levels (e.g., historic structures  
 7 on Yerba Buena Island) could be retrofitted with noise insulation features, such as fixed  
 8 windows and climate controls. No mitigation is proposed.

- 9 Construction and demolition noise (Factor 4). Noise impacts from construction, demolition, and  
 10 pile driving would be similar for Alternative 2 to those discussed for Alternative 1. While the

1 amount of construction activity would be less than for Alternative 1, the nature and scale of  
2 individual construction projects would probably be similar.

3 As indicated in Table 4.7-2, most construction and demolition activity would result in CNEL  
4 levels above 70 dBA within approximately 200 feet (61 m) of construction sites. Pile driving  
5 would result in CNEL levels above 70 dBA within approximately 600 feet (183 m) of the  
6 construction site. Most pile-driving activity would occur on Treasure Island. Construction  
7 noise would become objectionable if areas close to noise-sensitive land uses are developed. For  
8 Alternative 2, noise-sensitive land uses include a golf course and other open space and  
9 recreational areas. Construction noise impacts would be temporary, limited to the construction  
10 period, and minimized by restricting construction activities to daytime periods, by providing  
11 temporary noise barriers, by muffling and shielding construction equipment, where necessary,  
12 and by sequencing development. No mitigation is proposed.

### 13 4.7.3 Alternative 3

#### 14 *Not Significant Impacts*

15 Noise generated by traffic associated with reuse (Factors 1 and 2). Traffic generated by buildout of  
16 Alternative 3 would not cause significant noise impacts on Treasure Island or Yerba Buena  
17 Island.

18 Noise levels on Yerba Buena Island are dominated by existing freeway noise on the SFOBB.  
19 Traffic added to the SFOBB by Alternative 3 would not cause a noticeable change in freeway  
20 noise levels; compared to future baseline conditions without the project, noise levels would  
21 actually decrease by approximately one-tenth of an A-weighted decibel (see Table 4.7-1).  
22 Consequently, Alternative 3 would not generate traffic noise impacts and would provide a  
23 beneficial impact. No mitigation is proposed.

24 Noise-related land use compatibility on Treasure Island (Factor 3). The proposed themed attraction  
25 would be a potential source of locally high noise levels, but potential impacts would be avoided  
26 by appropriate site design. Reasonable attention to site planning and building design would  
27 minimize the potential for noise problems in mixed-use zones; consequently, no significant  
28 noise-related land use conflicts are anticipated on Treasure Island. No mitigation is proposed.

29 Noise-related land use compatibility on Yerba Buena Island (Factor 3). Potential noise-related land  
30 use compatibility impacts and their remedies on Yerba Buena Island under Alternative 3 would  
31 be similar to those described for Alternative 1 and would not be significant. However, because  
32 Alternative 3 calls for extensive reuse of existing buildings, the Draft Reuse Plan design  
33 guidelines to reduce bridge noise effects in new construction and building design would not  
34 apply. If feasible, existing buildings that would be retained in areas of high ambient noise  
35 levels (e.g., historic structures on Yerba Buena Island) could be retrofitted with noise insulation  
36 features, such as fixed windows and climate controls. No mitigation is proposed.

37 Construction and demolition noise (Factor 4). Although new construction under this alternative  
38 would be substantially less than for the other reuse alternatives, the nature and scale of some  
39 individual construction projects would be similar to those of the other reuse alternatives.  
40 Construction noise would become objectionable if areas close to noise-sensitive land uses were

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1 developed, such as residential and recreation uses. Construction noise impacts generally can be  
2 reduced by restricting construction activities to daytime periods, by providing temporary noise  
3 barriers, by muffling and shielding equipment, where necessary, and by sequencing  
4 development. Noise impacts from construction and demolition activities, therefore, would not  
5 be significant. No mitigation is proposed.

#### **6 4.7.4 No Action Alternative**

7 Under the No Action Alternative, NSTI would remain in federal government ownership under  
8 a caretaker maintenance program, and existing interim leases would be allowed to expire.  
9 Minimal use of the property and facilities would occur under this alternative, and no noise-  
10 sensitive land uses would be introduced on NSTI. No new activity would occur on NSTI,  
11 resulting in the elimination of traffic noise generated by vehicles traveling to and from the  
12 islands. As a result, the No Action Alternative would have a beneficial impact of reducing  
13 traffic noise.