Existing Conditions
Noise

July 7, 2020

This report, prepared by Rincon Consultants, Inc., describes existing noise conditions, major noise sources, and regulatory framework related to noise within the Downtown Watsonville Specific Plan Area. Noise is defined as unwanted sound and may adversely affect sensitive receivers throughout the Plan Area. Noise sources in Plan Area include high traffic roadways, aircraft approaching and departing the Watsonville Municipal Airport, and railroad activities in the southwestern portion of the Plan Area. Understanding the nosiest locations in the Plan Area is important to inform the planning process to ensure that sensitive land uses are not located near high noise areas. A description of noise in the Plan Area is provided below.

Key Terms

The following key terms used in this report are defined as follows:

A-Weighted Decibel (dBA). The sound pressure level in decibels as measured on a sound level meter using the A-weighting filter network. The A-weighting filter de-emphasizes the very low- and very high-frequency components of the sound in a manner similar to the frequency response of the human ear and correlates well with subjective human reactions to noise.

Ambient Noise Level. The composite of noise from all sources near and far. The normal or existing level of environmental noise at a given location.

Community Noise Equivalent Level (CNEL). The average A-weighted noise level during a 24-hour day, obtained after addition of five decibels in the evening from 7:00 p.m. to 10:00 p.m. and after addition of 10 decibels to sound levels measured in the night between 10:00 p.m. and 7:00 a.m.

Day/Night Noise Level, Ldn or DNL. The average A-weighted noise level during a 24-hour day, obtained after addition of 10 decibels to levels measured in the night between 10:00 p.m. and 7:00 a.m.

Decibel (dB). a measurement of sound pressure level, using the logarithmic decibel scale

dBA. Refer to “A-Weighted Decibel”.

Equivalent Noise Level (Leq). An average noise level; the single steady A-weighted level that is equivalent to the same amount of energy as that contained in the actual fluctuating levels over a period of time.

Federal Department of Housing and Urban Development (HUD). HUD was established in 1965 by the Housing and Urban Development Act to address the nation's housing needs, ensure fair housing opportunities, and improve and develop communities in the nation.

Federal Highway Administration (FHWA). A division of the United States Department of Transportation that specializes in highway transportation.

Federal Transit Administration (FTA). Federal agency within the United Department of Transportation that provides financial and technical assistance to local public transportation systems.

Frequency. The number of complete pressure fluctuations per second above and below atmospheric pressure. Normal human hearing is between 20 Hertz (Hz) and 20,000 Hz.

Hertz (Hz). A unit of frequency that measures the number of cycles per second. This can be used to measure electric currents, electromagnetic waves, and sound.

Intrusive. Noise that intrudes over and above the existing ambient noise at a given location. The relative intrusiveness of a sound depends upon its amplitude, duration, frequency, and time of occurrence and tonal or informational content as well as the prevailing ambient noise level.

Lmax and Lmin. The maximum and minimum A-weighted noise level during the measurement period.

Noise Sensitive Uses. Areas where the presence of unwanted sound may adversely affect those present. Typically, residences, schools, hospitals, convalescent homes, hotels/motels, daycare facilities, recreational parks, and other similar facilities are considered noise-sensitive land uses.

Peak Particle Velocity (PPV). The peak signal value of an oscillating vibration velocity waveform. This is usually expressed in terms of inches per second (in/sec).

Sound Pressure Level. The sound force per unit area, usually expressed in micro Pascals (or 20 micro Newtons per square meter), where one Pascal is the pressure resulting from a force of one Newton exerted over an area of one square meter. Sound pressure level is expressed in decibels as 20 times the logarithm to the base 10 of the ratio between the pressures exerted by the sound to a reference sound pressure (e.g., 20 micro Pascals). Sound pressure level is the quantity that is directly measured by a sound level meter.

Vibration. An oscillatory motion that can be described in terms of the displacement, velocity, or acceleration. Vibration is typically measured in terms of either velocity or acceleration.

Vibration decibels (VdB). Vibration velocity level in decibel scale.

Background Information

This section describes the fundamental of noise and vibration and the regulatory framework related to noise levels in the Plan Area.

Noise Background

Noise is defined as unwanted sound, often objectionable due to its loudness or volume. Noise level (or volume) is generally measured in decibels (dB) using the A-weighted sound level (dBA). The A-weighting scale is an adjustment to the actual sound pressure levels to be consistent with that of human hearing response, which is most sensitive to frequencies around 4,000 Hertz (Hz) (about the highest note on a piano) and less sensitive to low frequencies (below 100 Hz).

Sound pressure level is measured on a logarithmic scale with the 0 dB level being the lowest detectable sound pressure level that people can perceive (Berendt & Corliss 1976).[1] Based on the logarithmic scale, a doubling of sound energy is equivalent to an increase of 3 dBA. Because of the nature of the human ear, a sound must be about 10 dBA greater than the reference sound to be judged as twice as loud and a sound that is 10 dBA less than the ambient sound level has no effect on ambient noise. In general, a 3 dBA change in noise levels is noticeable, while 1 to 2 dBA changes generally are not perceived. Quiet suburban areas typically have noise levels in the range of 40 to 50 dBA, while arterial streets are in the 50 to 60 dBA range. Normal conversational levels are in the 60 to 65 dBA range, and ambient noise levels greater than 65 dBA can interrupt conversations.

Noise attenuation is a measure of energy loss of sound propagation and can be thought of as noise reduction. Noise levels typically attenuate at a rate of 6 dBA per doubling of distance from point sources, such as stationary machinery. Noise from linear noise sources, such a railroad tracks or heavily traveled roads typically attenuates at about 3 dB per doubling of distance (Berendt & Corliss 1976). Noise levels may also be reduced by intervening structures; generally, a single row of buildings between the receptor and the noise source reduces the noise level by about 5 dBA, while a solid wall or berm reduces noise levels by 5 to 10 dBA.

[1] Berendt, R.D., & Corliss, E.L.R. 1976. *Quieting: A Practical Guide to Noise Control* (National Bureau of Standards Handbook 119). U.S. Government Printing Office: Washington D.C.

Standard new residential construction typically provides a reduction of exterior-to-interior noise levels of 20 dBA or more with windows closed.

In addition to the actual instantaneous measurement of sound levels, the duration of sound is important since sounds that occur over a long period of time are more likely to be an annoyance or cause direct physical damage or environmental stress. One of the most frequently used noise metrics that considers both duration and sound power level is the equivalent noise level (L_{eq}). The L_{eq} is defined as the average noise level, or the single steady A-weighted level that is equivalent to the same amount of energy as that contained in the actual fluctuating levels over a period of time. Typically, L_{eq} is summed over a one-hour period. L_{max} is the highest root mean squared sound pressure level within the measuring period, and L_{min} is the lowest root mean squared sound pressure level within the measuring period.

The time period in which noise occurs is also important since noise that occurs at night tends to be more disturbing than that which occurs during the day. Community noise is usually measured using Day-Night Average Level (Ldn), which is the 24-hour average noise level with a 10-dBA penalty for noise occurring during nighttime (10 p.m. to 7 a.m.) hours, or Community Noise Equivalent Level (CNEL), which is the 24-hour average noise level with a 5 dBA penalty for noise occurring from 7 p.m. to 10 p.m. and a 10 dBA penalty for noise occurring from 10 p.m. to 7 a.m. Noise levels described by Ldn and CNEL usually do not differ by more than 1 dB.

Noise-sensitive receptors are land uses that are considered more sensitive to noise than others because of the nature of their use. Homes, hospitals, schools, and libraries are most sensitive to noise intrusion and therefore have more stringent noise exposure targets than manufacturing or industrial uses that are not subject to effects such as sleep disturbance.

Vibration Background

Groundborne vibration of concern consists of the oscillatory waves that move from a source through the ground to adjacent structures. The number of cycles per second of oscillation makes up the vibration frequency, described in terms of hertz (Hz). The frequency of a vibrating object describes how rapidly it oscillates. The normal frequency range of most groundborne vibration that can be felt by the human body is from a low of less than 1 Hz up to a high of about 200 Hz.

While people have varying sensitivities to vibrations at different frequencies, in general they are most sensitive to low-frequency vibration. Vibration in buildings, such as from nearby construction activities, may cause windows, items on shelves, and pictures on walls to rattle. Vibration of building components can also take the form of an audible low-frequency rumbling noise, referred to as groundborne noise. Groundborne vibration may result in adverse effects, such as building damage, when the originating vibration spectrum is dominated by frequencies

in the upper end of the range (60 to 200 Hz). Vibration may also damage infrastructure when foundations or utilities, such as sewer and water pipes, physically connect the structure and the vibration source. Although groundborne vibration is sometimes noticeable in outdoor environments, it is almost never annoying to people who are outdoors. The primary concern from vibration is that it can be intrusive and annoying to building occupants and vibration-sensitive land uses.

Regulatory Setting

Federal

Federal Department of Housing and Urban Development Environmental Criteria and Standards

The Federal Department of Housing and Urban Development (HUD) requires new residential construction that qualifies for HUD financing to incorporate noise reduction features to maintain acceptable interior noise levels if the project is proposed in high noise areas (exceeding 65 dBA Ldn). HUD requires that all structures provide sufficient attenuation to achieve an interior level of 45 dBA Ldn or less if the exterior level is 65 dBA Ldn or more. HUD project approval in a "normally unacceptable noise zone" (between 65 and 75 dBA) requires a minimum 5 dB additional noise attenuation for buildings if the Ldn is greater than 65 dBA but does not exceed 70 dBA, or minimum of 10 dB of additional noise attenuation if the Ldn is greater than 70 dBA but does not exceed 75 dBA.

Federal Transportation Administration Vibration Impact Criteria

The Vibration Impact Criteria thresholds adopted by FTA are designed to identify acceptable noise levels for noise-sensitive buildings, residences, and institutional land uses near railroads. The thresholds that apply to residences and buildings where people normally sleep (e.g., nearby residences) are 72 VdB for frequent events (more than 70 events of the same source per day), 75 VdB for occasional events (30 to 70 vibration events of the same source per day), and 80 VdB for infrequent events (less than 30 vibration events of the same source per day).

Title 23 of the Code of Federal Regulations, Part 772

The Federal Highway Administration (FHWA) requires new Federal or Federal-aid highway construction projects to abate noise per Title 23 of the Code of Federal Regulations. This also applies to alterations to existing highways that significantly change either the horizontal or vertical alignment and/or increases the number of through-traffic lanes. FHWA considers noise abatement for sensitive receivers such as picnic areas, recreation areas, playgrounds, active sport areas, parks, residences, motels, hotels, schools, churches, libraries, and hospitals when

"worst-hour" noise levels approach or exceed 67 dBA Leq. Caltrans has further clarified the definition of approaching the noise abatement criteria to be 1 dBA below the noise abatement criteria (e.g., 66 dBA Leq is considered approaching the noise abatement criteria for Category B activity areas).

State

California Code of Regulations (Title 24)

Title 24 of the California Code of Regulations codifies Sound Transmission Control requirements establishing uniform minimum noise insulation performance standards for new hotels, motels, dormitories, apartment houses, and dwellings other than single-family dwellings. Specifically, Section 1207.4 in Title 24 states that interior noise levels attributable to exterior noise sources shall not exceed 45 dBA CNEL/Ldn in any habitable room of a new building.

California Code of Regulations (Title 21)

The State Division of Aeronautics has adopted standards for airport-related noise. The standards establish an acceptable noise level of 65 dB for uses near airports. This standard applies to persons residing in urban residential areas where houses are of typical California construction and may have windows partially open.

California Department of Transportation Construction Vibration

Caltrans has adopted guidance for construction vibrations. Caltrans uses a vibration limit of 12.7 mm/sec (0.5 inches/sec) Peak Particle Velocity (ppv) for buildings that are structurally sound and designed to modern engineering standards. A conservative vibration limit of 5 mm/sec (0.2 inches/sec) ppv has been used for buildings that are found to be structurally sound but where structural damage is a major concern. For historic buildings or buildings that are documented to be structurally weakened, a conservative limit of 2 mm/sec (0.08 inches/sec) ppv is often used to provide the highest level of protection. All of these limits have been used successfully and compliance with these limits has not been known to result in appreciable structural damage. All vibration limits referred to in this chapter apply on the ground level and account for the response of structural elements (i.e., walls and floors) to ground-borne excitation.

California Government Code Section 65302(f)

California Government Code Section 65302(f) requires all General Plans to include a Noise Element that addresses noise-related impacts in the community. The State Office of Planning and Research (OPR) has prepared guidelines for the content of the Noise Element, which

includes the development of current and future noise level contour maps. These maps must include contours for the following sources:

- Highways and freeways
- Primary arterials and major local streets
- Passenger and freight on-line railroad operations and ground rapid transit systems
- Commercial, general aviation, heliport, and military airport operations, aircraft flyovers, jet engine test stands, and all other ground facilities and maintenance functions related to airport operation
- Local industrial plants, including, but not limited to, railroad classification yards
- Other stationary ground noise sources identified by local agencies as contributing to the community noise environment

Local

City of Watsonville 2005 General Plan

The Watsonville 2005 General Plan provides standards for exterior and interior ambient noise levels (City of Watsonville 1994).[2] The General Plan's the Public Safety Element provides comprehensive noise goals and objectives, as well as policies and standards for acceptable noise levels. The maximum exterior sound level acceptable in residential and noise-sensitive land uses is 60 dBA and the maximum allowable interior noise level is 45 dBA as stated in the 2005 General Plan. The noise section establishes land use compatibility guidelines for community noise environments, as shown in Table 1. The guidelines rank noise levels for various land use types as normally acceptable, conditionally acceptable, normally unacceptable, and clearly unacceptable based on CNEL levels.

Table 1 Land Use Compatibility for Community Noise Environments

	Community Noise Exposure (CNEL)			
Land Use Category	Normally Acceptable	Conditionally Acceptable	Normally Unacceptable	Clearly Unacceptable
Residential – Single Family, Duplex, Mobile Homes	50-60	55-70	70-75	75-85
Residential – Multi-family	50-65	60-70	70-75	70-85
Transient Lodging – Motel, Hotel	50-65	60-70	70-80	80-85
Schools, Libraries, Churches, Hospitals, Nursing Homes	50-70	60-70	70-80	80-85

[2] Watsonville, City of. 1994. *Watsonville 2005 General Plan*. Watsonville, California.

Auditoriums, Concert Halls, Amphitheaters	N/A	50-70	N/A	65-85
Sports Arenas, Outdoor Spectator Sports	N/A	50-75	N/A	70-85
Playgrounds, Neighborhood Parks	50-70	N/A	67.5-75	72.5-85
Golf Courses, Riding Stables, Water Recreation, Cemeteries	50-70	N/A	70-80	80-85
Office Buildings, Business Commercial, and Professional	50-70	67.5-77.5	75-85	N/A
Industrial, Manufacturing, Utilities, Agriculture	50-75	70-80	75-85	N/A

Notes: *Normally Acceptable*: Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal conventional construction, without any special noise insulation requirements

Conditionally Acceptable: New construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is made and needed noise insulation features have been included in the design. Conventional construction, but with closed windows and fresh air supply systems or air conditioning, will normally suffice.

Normally Unacceptable: New construction or development should be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirements must be made and needed noise-insulation features must be included in the design.

Clearly Unacceptable: New construction or development should generally not be undertaken.

Source: Watsonville 2005 General Plan.

City of Watsonville Draft 2030 General Plan

The City of Watsonville has prepared its Draft 2030 General Plan, which is an update to the existing Watsonville 2005 General Plan. The 2030 General Plan has yet to be formally adopted and implemented. Nonetheless, the 2030 General Plan maintains the same acceptability noise standards as presented in Table 1, above.

City of Watsonville Municipal Code

To implement the City's noise policies concerning residential land uses, the City adopted Title 5 Chapter 8 "Noise" of the Watsonville Municipal Code (WMC). WMC Chapter 5-8 prohibits specific types of noises, such as continuous or unusually loud noise which disturbs residential property or public ways within the City. WMC Section 5-8.02 prohibits any noise that is louder than necessary and disturbs the quiet of residential properties and public ways between the hours of 10:00 PM and 7:00 AM in such a manner as to be plainly audible at a distance of 50 feet from the sensitive receptor. The City has no adopted regulations in the WMC concerning other land uses (e.g., commercial, industrial) or activities (e.g., construction-related noise).

Existing Conditions

This section describes existing noise conditions and major noise sources related to noise levels in the Plan Area. Ambient noise is an important factor in the planning process because it affects

well-being and safety. It is essential for the City to identify the primary noise sources and areas with high noise levels to plan for new noise-sensitive uses in quieter areas or require that appropriate measures are taken to reduce exposure to ambient noise.

Traffic

Roadway traffic is the primary noise source in the Plan Area. Noise levels are typically highest along Main Street and West/East Riverside Drive because these roadways have the highest traffic volume of any roadways in the Plan Area. Other roadways with relatively high traffic volumes in the Plan Area include East Lake Street, West Beach Street, and Walker Street.

The California Department of Transportation (Caltrans) prepared a Transportation Concept Report in 2017 for State Route 152, which includes a segment of Main Street and East Beach Street within the Plan Area (Caltrans 2017).[3] Likewise, Caltrans prepared a Transportation Concept Report for State Route 129 in 2015 that included a segment of Riverside Drive in the Plan Area (Caltrans 2015).[4] According to the State Route 152 report, the maximum annual average daily traffic (AADT) on Main Street within the Plan Area occurs between Beach Street and Lake Avenue. The AADT on this segment of Main Street is 23,400 vehicle trips. The maximum AADT on East Beach Street within the Plan Area is 8,300 vehicle trips. The maximum AADT on Riverside Drive is along the segment of East Riverside Drive within the Plan Area. The AADT at this location is 25,300 vehicle trips. The AADT for all three of these roadway segments is based on data collected during 2013 (Caltrans 2015; 2017). There is no known existing recent AADT data for Walker Street. However, because it is designated as a truck route in the City of Watsonville, AADT is assumed to be approximately the same as Riverside Drive, which is a busy street that intersects Walker Street.

The U.S. Department of Housing and Urban Development's Day/Night Noise Level Calculator (HUD DNL Calculator) was used to estimate 24-hour average weighted noise levels (Ldn) along Main Street, East Beach Street, and East Riverside Drive with the aforementioned AADT data, as well as posted travel speed limits, the percentage of medium and heavy truck trips, and distance from the roadway centerline. The percentage of vehicle trips was assumed to be 95 percent passenger cars, 3 percent medium trucks (2 axles), and 2 percent heavy trucks (3+ axles). This is a reasonable assumption given that Main Street, East Beach Street, and East Riverside Drive are urban roadways than do not have high volumes of through traffic of tractor trailers and other large vehicles. The percentage of trips on Walker Street was assumed to be 85 percent passenger cars, 10 percent medium trucks, and 5 percent heavy trucks. This is a

[3] California Department of Transportation (Caltrans). 2017. *Transportation Concept Report: State Route 152, District 5*. June 2017.

[4] California Department of Transportation (Caltrans). 2015. *Transportation Concept Report: State Route 129, District 5*. October 2015.

reasonable assumption because Walker Street is a designated truck route through Watsonville. The HUD DNL Calculator also accounts for the fraction of AADT that occurs during night hours. It was assumed that 15 percent of the AADT occurs on Main Street, East Beach Street, East Riverside Drive, and Walker Street at night because most downtown businesses are closed overnight, reducing the number of trips into the area during nighttime hours. Fifteen percent is also the HUD default value when the nighttime percentage is unknown.

Table 2 presents the ambient noise levels at various distances from the centerline of Main Street, East Beach Street, East Riverside Drive, and Walker Street based on the results of the HUD DNL Calculator. Noise levels that are conditionally acceptable for residential uses (70 CNEL) are achieved at approximately 64 feet from the centerline of Main Street, approximately 40 feet from centerline of East Beach Street, and approximately 80 feet from the centerline of East Riverside Drive. Noise levels that are conditionally acceptable for residential uses are achieved at approximately 142 feet from the centerline of Walker Street

Table 2 Roadway Ambient Noise Level Conditions

	Distance from Roadway Centerline			
DNL (dB)	Main Street	East Beach Street	East Riverside Drive	Walker Street
60	315 feet	197 feet	385 feet	692 feet
65	140 feet	88 feet	170 feet	345 feet
70	64 feet	40 feet	80 feet	142 feet
75	30 feet	19 feet	39 feet	66 feet
80*	14 feet	N/A	18 feet	31 feet

Note: HUD DNL Calculations are provided as an attachment to this report.

* 80 DNL is within existing travel lanes of Main Street and East Riverside Street. Traffic noise does not reach 80 DNL on East Beach Street.

Railroad

Existing railroad tracks coincide with a segment of the southwestern boundary of the Plan Area, adjacent to Walker Street. According to the Draft 2030 General Plan, rail operations in Watsonville are limited, and therefore have little impact on daily level of noise in the City. Although sound levels generated by train travel have been measured at 86 dBA at 50 feet, and whistle blasts may be as high at 98 dBA, these sound levels are of very short duration and occur infrequently. The existing daily frequency of freight operations is not expected to generate sound levels in excess of desirable standards (i.e., 60 dBA), according to the Draft 2030 General Plan.

Aircraft

The Watsonville Municipal Airport is the only public use airport in Santa Cruz County and is a self-supporting City enterprise. The airport is in the northwest area of Watsonville,

approximately 1.7 miles from the Plan Area boundary. The City adopted the Watsonville Municipal Airport Master Plan in 2003 (City of Watsonville 2003).[5] The Master Plan provides results of detailed noise modeling associated with airport operations, including aircraft flight. According to the Master Plan, the Specific Plan Area is entirely outside of the 55 dB CNEL contour of the airport. Therefore, while some departing or arriving aircraft may fly over the Plan Area, noise levels would be below 55 dB CNEL. This noise level would generally be below ambient noise levels associated with roadway traffic in the Plan Area. Therefore, aircraft noise does not substantially contribute to ambient noise levels in the Plan Area.

Summary of Existing Conditions

- Roadway traffic is the main source of noise in the Plan Area. Noise levels are typically highest along Main Street, Riverside Drive, and Walker Street.
- Noise from railroad is present in the southern portion of the Plan Area, but it is infrequent and does not exceed desirable noise standards.
- Aircraft may be heard occasionally in the Plan Area, but the entirety of the Plan Area is outside of the 55 dB CNEL contour of the Watsonville Municipal Airport.

[5] Watsonville, City of. 2003. *Watsonville Municipal Airport Master Plan*. June 2003.

Site ID	East Beach Street - Downtown Watsonville
Record Date	2/5/2020
User's Name	Rincon Consultants

Road # 1 Name:	**East Beach Street**

Road #1

Vehicle Type	**Cars** ☑	**Medium Trucks** ☑	**Heavy Trucks** ☑
Effective Distance	197	197	197
Distance to Stop Sign	25	25	25
Average Speed	25	25	25
Average Daily Trips (ADT)	7885	249	166
Night Fraction of ADT	15	15	15
Road Gradient (%)			0
Vehicle DNL	42.8035	47.7975	59.1475
Calculate Road #1 DNL	59.5401	Reset	

Add Road Source | Add Rail Source

Airport Noise Level	50
Loud Impulse Sounds?	○**Yes** ◉**No**

Combined DNL for all Road and Rail sources	**59.5401**
Combined DNL including Airport	**59.9861**
Site DNL with Loud Impulse Sound	

Calculate

Mitigation Options

If your site DNL is in Excess of 65 decibels, your options are:

- **No Action Alternative**: Cancel the project at this location
- **Other Reasonable Alternatives**: Choose an alternate site
- **Mitigation**
  - **Contact your Field or Regional Environmental Officer (/programs/environmental-review/hud-environmental-staff-contacts/)**
  - Increase mitigation in the building walls (only effective if no outdoor, noise sensitive areas)
  - Reconfigure the site plan to increase the distance between the noise source and noise-sensitive uses
  - Incorporate natural or man-made barriers. See ***The Noise Guidebook (/resource/313/hud-noise-guidebook/)***
  - Construct noise barrier. See the **Barrier Performance Module (/programs/environmental-review/bpm-calculator/)**

Tools and Guidance

Day/Night Noise Level Assessment Tool User Guide (/resource/3822/day-night-noise-level-assessment-tool-user-guide/)

Day/Night Noise Level Assessment Tool Flowcharts (/resource/3823/day-night-noise-level-assessment-tool-flowcharts/)

Site ID	East Beach Street - Downtown Watsonville
Record Date	2/5/2020
User's Name	Rincon Consultants

Road # 1 Name:	**East Beach Street**

Road #1

Vehicle Type	**Cars** ☑	**Medium Trucks** ☑	**Heavy Trucks** ☑
Effective Distance	88	88	88
Distance to Stop Sign	25	25	25
Average Speed	25	25	25
Average Daily Trips (ADT)	7885	249	166
Night Fraction of ADT	15	15	15
Road Gradient (%)			0
Vehicle DNL	48.0533	53.0473	64.3972
Calculate Road #1 DNL	64.7898	Reset	

Add Road Source | Add Rail Source

Airport Noise Level	50
Loud Impulse Sounds?	○**Yes** ◉**No**

Combined DNL for all Road and Rail sources	**64.7898**
Combined DNL including Airport	**64.9503**
Site DNL with Loud Impulse Sound	

Calculate

Mitigation Options

If your site DNL is in Excess of 65 decibels, your options are:

- **No Action Alternative**: Cancel the project at this location
- **Other Reasonable Alternatives**: Choose an alternate site
- **Mitigation**
  - **Contact your Field or Regional Environmental Officer (/programs/environmental-review/hud-environmental-staff-contacts/)**
  - Increase mitigation in the building walls (only effective if no outdoor, noise sensitive areas)
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Site ID	East Beach Street - Downtown Watsonville
Record Date	2/5/2020
User's Name	Rincon Consultants

Road # 1 Name:	**East Beach Street**

Road #1

Vehicle Type	**Cars** ☑	**Medium Trucks** ☑	**Heavy Trucks** ☑
Effective Distance	40	40	40
Distance to Stop Sign	25	25	25
Average Speed	25	25	25
Average Daily Trips (ADT)	7885	249	166
Night Fraction of ADT	15	15	15
Road Gradient (%)			0
Vehicle DNL	53.1896	58.1836	69.5336
Calculate Road #1 DNL	69.9262	Reset	

Add Road Source | Add Rail Source

Airport Noise Level	50
Loud Impulse Sounds?	○**Yes** ◉**No**

Combined DNL for all Road and Rail sources	**69.9262**
Combined DNL including Airport	**69.9262**
Site DNL with Loud Impulse Sound	

Click on this button to determine the Day-Night Noise Level (DNL) for the site being assessed in units of decibel (dB).

Calculate

Mitigation Options

If your site DNL is in Excess of 65 decibels, your options are:

- **No Action Alternative**: Cancel the project at this location
- **Other Reasonable Alternatives**: Choose an alternate site
- **Mitigation**
  - **Contact your Field or Regional Environmental Officer (/programs/environmental-review/hud-environmental-staff-contacts/)**
  - Increase mitigation in the building walls (only effective if no outdoor, noise sensitive areas)
  - Reconfigure the site plan to increase the distance between the noise source and noise-sensitive uses
  - Incorporate natural or man-made barriers. See ***The Noise Guidebook (/resource/313/hud-noise-guidebook/)***
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Site ID	East Beach Street - Downtown Watsonville
Record Date	2/5/2020
User's Name	Rincon Consultants

Road # 1 Name:	**East Beach Street**

Road #1

Vehicle Type	**Cars** ☑	**Medium Trucks** ☑	**Heavy Trucks** ☑
Effective Distance	19	19	19
Distance to Stop Sign	25	25	25
Average Speed	25	25	25
Average Daily Trips (ADT)	7885	249	166
Night Fraction of ADT	15	15	15
Road Gradient (%)			0
Vehicle DNL	58.0392	63.0332	74.3832
Calculate Road #1 DNL	74.7758	Reset	

Add Road Source | Add Rail Source

Airport Noise Level	50
Loud Impulse Sounds?	○**Yes** ◉**No**

Combined DNL for all Road and Rail sources	**74.7758**
Combined DNL including Airport	**74.7758**
Site DNL with Loud Impulse Sound	

Calculate

Mitigation Options

If your site DNL is in Excess of 65 decibels, your options are:

- **No Action Alternative**: Cancel the project at this location
- **Other Reasonable Alternatives**: Choose an alternate site
- **Mitigation**
  - **Contact your Field or Regional Environmental Officer (/programs/environmental-review/hud-environmental-staff-contacts/)**
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Site ID	Main Street - Downtown Watsonville
Record Date	2/5/2020
User's Name	Rincon Consultants

Road # 1 Name:	**Main Street**

Road #1

Vehicle Type	**Cars** ☑	**Medium Trucks** ☑	**Heavy Trucks** ☑
Effective Distance	315	315	315
Distance to Stop Sign			
Average Speed	25	25	25
Average Daily Trips (ADT)	22230	702	468
Night Fraction of ADT	15	15	15
Road Gradient (%)			0
Vehicle DNL	52.8642	47.8582	58.0385

Click on this button to add an additional road to be evaluated into the noise assessment.

Calculate Road #1 DNL | 59.5459 | Reset

Add Road Source | Add Rail Source

Airport Noise Level	50
Loud Impulse Sounds?	○**Yes** ◉**No**

Combined DNL for all Road and Rail sources	**59.5459**
Combined DNL including Airport	**59.9913**
Site DNL with Loud Impulse Sound	

Calculate

Mitigation Options

If your site DNL is in Excess of 65 decibels, your options are:

- **No Action Alternative**: Cancel the project at this location
- **Other Reasonable Alternatives**: Choose an alternate site
- **Mitigation**
  - **Contact your Field or Regional Environmental Officer (/programs/environmental-review/hud-environmental-staff-contacts/)**
  - Increase mitigation in the building walls (only effective if no outdoor, noise sensitive areas)
  - Reconfigure the site plan to increase the distance between the noise source and noise-sensitive uses
  - Incorporate natural or man-made barriers. See ***The Noise Guidebook (/resource/313/hud-noise-guidebook/)***
  - Construct noise barrier. See the **Barrier Performance Module (/programs/environmental-review/bpm-calculator/)**

Tools and Guidance

Day/Night Noise Level Assessment Tool User Guide (/resource/3822/day-night-noise-level-assessment-tool-user-guide/)

Day/Night Noise Level Assessment Tool Flowcharts (/resource/3823/day-night-noise-level-assessment-tool-flowcharts/)

Site ID	Main Street - Downtown Watsonville
Record Date	2/5/2020
User's Name	Rincon Consultants

Road # 1 Name:	**Main Street**

Road #1

Vehicle Type	**Cars** ☑	**Medium Trucks** ☑	**Heavy Trucks** ☑
Effective Distance	140	140	140
Distance to Stop Sign			
Average Speed	25	25	25
Average Daily Trips (ADT)	22230	702	468
Night Fraction of ADT	15	15	15
Road Gradient (%)			0
Vehicle DNL	58.147	53.1409	63.3212
Calculate Road #1 DNL	64.8286	Reset	

Add Road Source | Add Rail Source

Airport Noise Level	50
Loud Impulse Sounds?	○**Yes** ◉**No**

Combined DNL for all Road and Rail sources	**64.8286**
Combined DNL including Airport	**64.9872**
Site DNL with Loud Impulse Sound	

Calculate

Mitigation Options

If your site DNL is in Excess of 65 decibels, your options are:

- **No Action Alternative**: Cancel the project at this location
- **Other Reasonable Alternatives**: Choose an alternate site
- **Mitigation**
  - **Contact your Field or Regional Environmental Officer (/programs/environmental-review/hud-environmental-staff-contacts/)**
  - Increase mitigation in the building walls (only effective if no outdoor, noise sensitive areas)
  - Reconfigure the site plan to increase the distance between the noise source and noise-sensitive uses
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Site ID	Main Street - Downtown Watsonville
Record Date	2/5/2020
User's Name	Rincon Consultants

Road # 1 Name:	**Main Street**

Road #1

Vehicle Type	**Cars** ☑	**Medium Trucks** ☑	**Heavy Trucks** ☑
Effective Distance	64	64	64
Distance to Stop Sign			
Average Speed	25	25	25
Average Daily Trips (ADT)	22230	702	468
Night Fraction of ADT	15	15	15
Road Gradient (%)			0
Vehicle DNL	63.2462	58.2402	68.4204
Calculate Road #1 DNL	69.9278	Reset	

Add Road Source | Add Rail Source

Airport Noise Level	50
Loud Impulse Sounds?	○**Yes** ◉**No**

Combined DNL for all Road and Rail sources	**69.9278**
Combined DNL including Airport	**69.9278**
Site DNL with Loud Impulse Sound	

Calculate

Mitigation Options

If your site DNL is in Excess of 65 decibels, your options are:

- **No Action Alternative**: Cancel the project at this location
- **Other Reasonable Alternatives**: Choose an alternate site
- **Mitigation**
  - **Contact your Field or Regional Environmental Officer (/programs/environmental-review/hud-environmental-staff-contacts/)**
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Tools and Guidance

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Site ID	Main Street - Downtown Watsonville
Record Date	2/5/2020
User's Name	Rincon Consultants

Road # 1 Name:	**Main Street**

Road #1

Vehicle Type	**Cars** ☑	**Medium Trucks** ☑	**Heavy Trucks** ☑
Effective Distance	30	30	30
Distance to Stop Sign			
Average Speed	25	25	25
Average Daily Trips (ADT)	22230	702	468
Night Fraction of ADT	15	15	15
Road Gradient (%)			0
Vehicle DNL	68.1821	63.176	73.3563
Calculate Road #1 DNL	74.8637	Reset	

Add Road Source | Add Rail Source

Airport Noise Level	50
Loud Impulse Sounds?	○**Yes** ◉**No**

Combined DNL for all Road and Rail sources	**74.8637**
Combined DNL including Airport	**74.8637**
Site DNL with Loud Impulse Sound	

Calculate

Mitigation Options

If your site DNL is in Excess of 65 decibels, your options are:

- **No Action Alternative**: Cancel the project at this location
- **Other Reasonable Alternatives**: Choose an alternate site
- **Mitigation**
  - **Contact your Field or Regional Environmental Officer (/programs/environmental-review/hud-environmental-staff-contacts/)**
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Tools and Guidance

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Site ID	Main Street - Downtown Watsonville
Record Date	2/5/2020
User's Name	Rincon Consultants

Road # 1 Name:	**Main Street**

Road #1

Vehicle Type	**Cars** ☑	**Medium Trucks** ☑	**Heavy Trucks** ☑
Effective Distance	14	14	14
Distance to Stop Sign			
Average Speed	25	25	25
Average Daily Trips (ADT)	22230	702	468
Night Fraction of ADT	15	15	15
Road Gradient (%)			0
Vehicle DNL	73.147	68.1409	78.3212
Calculate Road #1 DNL	79.8286	Reset	

Add Road Source | Add Rail Source

Airport Noise Level	50
Loud Impulse Sounds?	○**Yes** ◉**No**

Combined DNL for all Road and Rail sources	**79.8286**
Combined DNL including Airport	**79.8286**
Site DNL with Loud Impulse Sound	

Calculate

Mitigation Options

If your site DNL is in Excess of 65 decibels, your options are:

- **No Action Alternative**: Cancel the project at this location
- **Other Reasonable Alternatives**: Choose an alternate site
- **Mitigation**
  - **Contact your Field or Regional Environmental Officer (/programs/environmental-review/hud-environmental-staff-contacts/)**
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  - Reconfigure the site plan to increase the distance between the noise source and noise-sensitive uses
  - Incorporate natural or man-made barriers. See ***The Noise Guidebook (/resource/313/hud-noise-guidebook/)***
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Site ID	East Riverside Drive - Downtown Watsonville
Record Date	2/4/2020
User's Name	Rincon Consultants

Road # 1 Name:	**East Riverside Drive**

Road #1

Vehicle Type	**Cars** ☑	**Medium Trucks** ☑	**Heavy Trucks** ☑
Effective Distance	385	385	385
Distance to Stop Sign	25	25	25
Average Speed	25	25	25
Average Daily Trips (ADT)	24035	759	506
Night Fraction of ADT	15	15	15
Road Gradient (%)			0
Vehicle DNL	43.279	48.273	59.623
Calculate Road #1 DNL	60.0156	Reset	

Add Road Source | Add Rail Source

Airport Noise Level	50
Loud Impulse Sounds?	○**Yes** ◉**No**

Combined DNL for all Road and Rail sources	**60.0156**
Combined DNL including Airport	**60.4148**
Site DNL with Loud Impulse Sound	

Calculate

Mitigation Options

If your site DNL is in Excess of 65 decibels, your options are:

- **No Action Alternative**: Cancel the project at this location
- **Other Reasonable Alternatives**: Choose an alternate site
- **Mitigation**
  - **Contact your Field or Regional Environmental Officer (/programs/environmental-review/hud-environmental-staff-contacts/)**
  - Increase mitigation in the building walls (only effective if no outdoor, noise sensitive areas)
  - Reconfigure the site plan to increase the distance between the noise source and noise-sensitive uses
  - Incorporate natural or man-made barriers. See ***The Noise Guidebook (/resource/313/hud-noise-guidebook/)***
  - Construct noise barrier. See the **Barrier Performance Module (/programs/environmental-review/bpm-calculator/)**

Tools and Guidance

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Site ID	East Riverside Drive - Downtown Watsonville
Record Date	2/4/2020
User's Name	Rincon Consultants

Road # 1 Name:	**East Riverside Drive**

Road #1

Vehicle Type	**Cars** ☑	**Medium Trucks** ☑	**Heavy Trucks** ☑
Effective Distance	170	170	170
Distance to Stop Sign	25	25	25
Average Speed	25	25	25
Average Daily Trips (ADT)	24035	759	506
Night Fraction of ADT	15	15	15
Road Gradient (%)			0
Vehicle DNL	48.6042	53.5982	64.9482
Calculate Road #1 DNL	65.3408	Reset	

Add Road Source | Add Rail Source

Airport Noise Level	50
Loud Impulse Sounds?	○**Yes** ◉**No**

Combined DNL for all Road and Rail sources	**65.3408**
Combined DNL including Airport	**65.4738**
Site DNL with Loud Impulse Sound	

Calculate

Mitigation Options

If your site DNL is in Excess of 65 decibels, your options are:

- **No Action Alternative**: Cancel the project at this location
- **Other Reasonable Alternatives**: Choose an alternate site
- **Mitigation**
  - **Contact your Field or Regional Environmental Officer (/programs/environmental-review/hud-environmental-staff-contacts/)**
  - Increase mitigation in the building walls (only effective if no outdoor, noise sensitive areas)
  - Reconfigure the site plan to increase the distance between the noise source and noise-sensitive uses
  - Incorporate natural or man-made barriers. See ***The Noise Guidebook (/resource/313/hud-noise-guidebook/)***
  - Construct noise barrier. See the **Barrier Performance Module (/programs/environmental-review/bpm-calculator/)**

Tools and Guidance

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Site ID	East Riverside Drive - Downtown Watsonville
Record Date	2/4/2020
User's Name	Rincon Consultants

Road # 1 Name:	**East Riverside Drive**

Road #1

Vehicle Type	**Cars** ☑	**Medium Trucks** ☑	**Heavy Trucks** ☑
Effective Distance	80	80	80
Distance to Stop Sign	25	25	25
Average Speed	25	25	25
Average Daily Trips (ADT)	24035	759	506
Night Fraction of ADT	15	15	15
Road Gradient (%)			0
Vehicle DNL	53.5146	58.5086	69.8586
Calculate Road #1 DNL	70.2512	Reset	

Add Road Source | Add Rail Source

Airport Noise Level	50
Loud Impulse Sounds?	○**Yes** ◉**No**

Combined DNL for all Road and Rail sources	**70.2512**
Combined DNL including Airport	**70.2512**
Site DNL with Loud Impulse Sound	

Calculate

Mitigation Options

If your site DNL is in Excess of 65 decibels, your options are:

- **No Action Alternative**: Cancel the project at this location
- **Other Reasonable Alternatives**: Choose an alternate site
- **Mitigation**
  - **Contact your Field or Regional Environmental Officer (/programs/environmental-review/hud-environmental-staff-contacts/)**
  - Increase mitigation in the building walls (only effective if no outdoor, noise sensitive areas)
  - Reconfigure the site plan to increase the distance between the noise source and noise-sensitive uses
  - Incorporate natural or man-made barriers. See ***The Noise Guidebook (/resource/313/hud-noise-guidebook/)***
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Tools and Guidance

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Site ID	East Riverside Drive - Downtown Watsonville
Record Date	2/4/2020
User's Name	Rincon Consultants

Road # 1 Name:	**East Riverside Drive**

Road #1

Vehicle Type	**Cars** ☑	**Medium Trucks** ☑	**Heavy Trucks** ☑
Effective Distance	39	39	39
Distance to Stop Sign	25	25	25
Average Speed	25	25	25
Average Daily Trips (ADT)	24035	759	506
Night Fraction of ADT	15	15	15
Road Gradient (%)			0
Vehicle DNL	58.195	63.189	74.5389
Calculate Road #1 DNL	74.9315	Reset	

Add Road Source | Add Rail Source

Airport Noise Level	50
Loud Impulse Sounds?	○**Yes** ◉**No**

Combined DNL for all Road and Rail sources	**74.9315**
Combined DNL including Airport	**74.9315**
Site DNL with Loud Impulse Sound	

Calculate

Mitigation Options

If your site DNL is in Excess of 65 decibels, your options are:

- **No Action Alternative**: Cancel the project at this location
- **Other Reasonable Alternatives**: Choose an alternate site
- **Mitigation**
  - **Contact your Field or Regional Environmental Officer (/programs/environmental-review/hud-environmental-staff-contacts/)**
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  - Reconfigure the site plan to increase the distance between the noise source and noise-sensitive uses
  - Incorporate natural or man-made barriers. See ***The Noise Guidebook (/resource/313/hud-noise-guidebook/)***
  - Construct noise barrier. See the **Barrier Performance Module (/programs/environmental-review/bpm-calculator/)**

Tools and Guidance

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Site ID	East Riverside Drive - Downtown Watsonville
Record Date	2/4/2020
User's Name	Rincon Consultants

Road # 1 Name:	**East Riverside Drive**

Road #1

Vehicle Type	**Cars** ☑	**Medium Trucks** ☑	**Heavy Trucks** ☑
Effective Distance	18	18	18
Distance to Stop Sign	25	25	25
Average Speed	25	25	25
Average Daily Trips (ADT)	24035	759	506
Night Fraction of ADT	15	15	15
Road Gradient (%)			0
Vehicle DNL	63.2319	68.2258	79.5758
Calculate Road #1 DNL	79.9684	Reset	

Add Road Source | Add Rail Source

Airport Noise Level	50
Loud Impulse Sounds?	○**Yes** ◉**No**

Combined DNL for all Road and Rail sources	**79.9684**
Combined DNL including Airport	**79.9684**
Site DNL with Loud Impulse Sound	

Calculate

Mitigation Options

If your site DNL is in Excess of 65 decibels, your options are:

- **No Action Alternative**: Cancel the project at this location
- **Other Reasonable Alternatives**: Choose an alternate site
- **Mitigation**
  - **Contact your Field or Regional Environmental Officer (/programs/environmental-review/hud-environmental-staff-contacts/)**
  - Increase mitigation in the building walls (only effective if no outdoor, noise sensitive areas)
  - Reconfigure the site plan to increase the distance between the noise source and noise-sensitive uses
  - Incorporate natural or man-made barriers. See ***The Noise Guidebook (/resource/313/hud-noise-guidebook/)***
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Tools and Guidance

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DNL Calculator

The Day/Night Noise Level Calculator is an electronic assessment tool that calculates the Day/Night Noise Level (DNL) from roadway and railway traffic. For more information on using the DNL calculator, view the **Day/Night Noise Level Calculator Electronic Assessment Tool Overview (/programs/environmental-review/daynight-noise-level-electronic-assessment-tool/)**.

Guidelines

- To display the Road and/or Rail DNL calculator(s), click on the "Add Road Source" and/or "Add Rail Source" button(s) below.
- All Road and Rail input values must be positive non-decimal numbers.
- All Road and/or Rail DNL value(s) must be calculated separately before calculating the Site DNL.
- All checkboxes that apply must be checked for vehicles and trains in the tables' headers.
- **Note #1:** Tooltips, containing field specific information, have been added in this tool and may be accessed by hovering over all the respective data fields (site identification, roadway and railway assessment, DNL calculation results, roadway and railway input variables) with the mouse.
- **Note #2:** DNL Calculator assumes roadway data is always entered.

DNL Calculator

Site ID	Walker Street - Downtown Watsonville
Record Date	07/07/2020
User's Name	Rincon Consultants

Road # 1 Name:	**Walker Street**

Road #1

Vehicle Type	Cars ☑	Medium Trucks ☑	Heavy Trucks ☑
Effective Distance	692	692	692
Distance to Stop Sign	25	25	25
Average Speed	25	25	25
Average Daily Trips (ADT)	21505	2530	1265
Night Fraction of ADT	15	15	15
Road Gradient (%)			0
Vehicle DNL	38	49	60

Calculate Road #1 DNL | 60 | Reset

Add Road Source | Add Rail Source

Airport Noise Level	50
Loud Impulse Sounds?	○Yes ◉No
Combined DNL for all Road and Rail sources	**60**
Combined DNL including Airport	**60**
Site DNL with Loud Impulse Sound	

Calculate | Reset

Mitigation Options

If your site DNL is in Excess of 65 decibels, your options are:

- **No Action Alternative**: Cancel the project at this location
- **Other Reasonable Alternatives**: Choose an alternate site
- **Mitigation**
    - **Contact your Field or Regional Environmental Officer (/programs/environmental-review/hud-environmental-staff-contacts/)**
    - Increase mitigation in the building walls (only effective if no outdoor, noise sensitive areas)
    - Reconfigure the site plan to increase the distance between the noise source and noise-sensitive uses
    - Incorporate natural or man-made barriers. See ***The Noise Guidebook (/resource/313/hud-noise-guidebook/)***
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DNL Calculator

Site ID	Walker Street - Downtown Watsonville
Record Date	07/07/2020
User's Name	Rincon Consultants

Road # 1 Name:	**Walker Street**

Road #1

Vehicle Type	Cars ☑	Medium Trucks ☑	Heavy Trucks ☑
Effective Distance	345	345	345
Distance to Stop Sign	25	25	25
Average Speed	25	25	25
Average Daily Trips (ADT)	21505	2530	1265
Night Fraction of ADT	15	15	15
Road Gradient (%)			0
Vehicle DNL	43	54	64
Calculate Road #1 DNL	65	Reset	

Add Road Source | Add Rail Source

Airport Noise Level	50
Loud Impulse Sounds?	○Yes ◉No
Combined DNL for all Road and Rail sources	**65**
Combined DNL including Airport	**65**
Site DNL with Loud Impulse Sound	

Calculate | Reset

Mitigation Options

If your site DNL is in Excess of 65 decibels, your options are:

- **No Action Alternative**: Cancel the project at this location
- **Other Reasonable Alternatives**: Choose an alternate site
- **Mitigation**
    - **Contact your Field or Regional Environmental Officer (/programs/environmental-review/hud-environmental-staff-contacts/)**
    - Increase mitigation in the building walls (only effective if no outdoor, noise sensitive areas)
    - Reconfigure the site plan to increase the distance between the noise source and noise-sensitive uses
    - Incorporate natural or man-made barriers. See ***The Noise Guidebook (/resource/313/hud-noise-guidebook/)***
    - Construct noise barrier. See the **Barrier Performance Module (/programs/environmental-review/bpm-calculator/)**

Tools and Guidance

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- All checkboxes that apply must be checked for vehicles and trains in the tables' headers.
- **Note #1:** Tooltips, containing field specific information, have been added in this tool and may be accessed by hovering over all the respective data fields (site identification, roadway and railway assessment, DNL calculation results, roadway and railway input variables) with the mouse.
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DNL Calculator

Site ID	Walker Street - Downtown Watsonville
Record Date	07/07/2020
User's Name	Rincon Consultants

Road # 1 Name:	**Walker Street**

Road #1

Vehicle Type	Cars ☑	Medium Trucks ☑	Heavy Trucks ☑
Effective Distance	142	142	142
Distance to Stop Sign	25	25	25
Average Speed	25	25	25
Average Daily Trips (ADT)	21505	2530	1265
Night Fraction of ADT	15	15	15
Road Gradient (%)			0
Vehicle DNL	49	59	70

Calculate Road #1 DNL | 70 | Reset

Add Road Source | Add Rail Source

Airport Noise Level	50
Loud Impulse Sounds?	○Yes ◉No
Combined DNL for all Road and Rail sources	**70**
Combined DNL including Airport	**70**
Site DNL with Loud Impulse Sound	

Calculate | Reset

Mitigation Options

If your site DNL is in Excess of 65 decibels, your options are:

- **No Action Alternative**: Cancel the project at this location
- **Other Reasonable Alternatives**: Choose an alternate site
- **Mitigation**
    - **Contact your Field or Regional Environmental Officer (/programs/environmental-review/hud-environmental-staff-contacts/)**
    - Increase mitigation in the building walls (only effective if no outdoor, noise sensitive areas)
    - Reconfigure the site plan to increase the distance between the noise source and noise-sensitive uses
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DNL Calculator

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Guidelines

- To display the Road and/or Rail DNL calculator(s), click on the "Add Road Source" and/or "Add Rail Source" button(s) below.
- All Road and Rail input values must be positive non-decimal numbers.
- All Road and/or Rail DNL value(s) must be calculated separately before calculating the Site DNL.
- All checkboxes that apply must be checked for vehicles and trains in the tables' headers.
- **Note #1:** Tooltips, containing field specific information, have been added in this tool and may be accessed by hovering over all the respective data fields (site identification, roadway and railway assessment, DNL calculation results, roadway and railway input variables) with the mouse.
- **Note #2:** DNL Calculator assumes roadway data is always entered.

DNL Calculator

Site ID	Walker Street - Downtown Watsonville
Record Date	07/07/2020
User's Name	Rincon Consultants

Road # 1 Name:	**Walker Street**

Road #1

Vehicle Type	Cars ☑	Medium Trucks ☑	Heavy Trucks ☑
Effective Distance	66	66	66
Distance to Stop Sign	25	25	25
Average Speed	25	25	25
Average Daily Trips (ADT)	21505	2530	1265
Night Fraction of ADT	15	15	15
Road Gradient (%)			0
Vehicle DNL	54	64	75

Calculate Road #1 DNL | 75 | Reset

Add Road Source | Add Rail Source

Airport Noise Level	50
Loud Impulse Sounds?	○Yes ◉No
Combined DNL for all Road and Rail sources	**75**
Combined DNL including Airport	**75**
Site DNL with Loud Impulse Sound	

Calculate | Reset

Mitigation Options

If your site DNL is in Excess of 65 decibels, your options are:

- **No Action Alternative**: Cancel the project at this location
- **Other Reasonable Alternatives**: Choose an alternate site
- **Mitigation**
    - **Contact your Field or Regional Environmental Officer (/programs/environmental-review/hud-environmental-staff-contacts/)**
    - Increase mitigation in the building walls (only effective if no outdoor, noise sensitive areas)
    - Reconfigure the site plan to increase the distance between the noise source and noise-sensitive uses
    - Incorporate natural or man-made barriers. See ***The Noise Guidebook (/resource/313/hud-noise-guidebook/)***
    - Construct noise barrier. See the **Barrier Performance Module (/programs/environmental-review/bpm-calculator/)**

Tools and Guidance

Day/Night Noise Level Assessment Tool User Guide (/resource/3822/day-night-noise-level-assessment-tool-user-guide/)

Day/Night Noise Level Assessment Tool Flowcharts (/resource/3823/day-night-noise-level-assessment-tool-flowcharts/)

DNL Calculator

The Day/Night Noise Level Calculator is an electronic assessment tool that calculates the Day/Night Noise Level (DNL) from roadway and railway traffic. For more information on using the DNL calculator, view the **Day/Night Noise Level Calculator Electronic Assessment Tool Overview (/programs/environmental-review/daynight-noise-level-electronic-assessment-tool/)**.

Guidelines

- To display the Road and/or Rail DNL calculator(s), click on the "Add Road Source" and/or "Add Rail Source" button(s) below.
- All Road and Rail input values must be positive non-decimal numbers.
- All Road and/or Rail DNL value(s) must be calculated separately before calculating the Site DNL.
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- **Note #1:** Tooltips, containing field specific information, have been added in this tool and may be accessed by hovering over all the respective data fields (site identification, roadway and railway assessment, DNL calculation results, roadway and railway input variables) with the mouse.
- **Note #2:** DNL Calculator assumes roadway data is always entered.

DNL Calculator

Site ID	Walker Street - Downtown Watsonville
Record Date	07/07/2020
User's Name	Rincon Consultants

Road # 1 Name:	**Walker Street**

Road #1

Vehicle Type	Cars ☑	Medium Trucks ☑	Heavy Trucks ☑
Effective Distance	31	31	31
Distance to Stop Sign	25	25	25
Average Speed	25	25	25
Average Daily Trips (ADT)	21505	2530	1265
Night Fraction of ADT	15	15	15
Road Gradient (%)			0
Vehicle DNL	59	69	80

Calculate Road #1 DNL | 80 | Reset

Add Road Source | Add Rail Source

Airport Noise Level	50
Loud Impulse Sounds?	○Yes ◉No
Combined DNL for all Road and Rail sources	**80**
Combined DNL including Airport	**80**
Site DNL with Loud Impulse Sound	

Calculate | Reset

Mitigation Options

If your site DNL is in Excess of 65 decibels, your options are:

- **No Action Alternative**: Cancel the project at this location
- **Other Reasonable Alternatives**: Choose an alternate site
- **Mitigation**
    - **Contact your Field or Regional Environmental Officer (/programs/environmental-review/hud-environmental-staff-contacts/)**
    - Increase mitigation in the building walls (only effective if no outdoor, noise sensitive areas)
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Tools and Guidance

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Day/Night Noise Level Assessment Tool Flowcharts (/resource/3823/day-night-noise-level-assessment-tool-flowcharts/)