June 20, 2023

Mr. Carl Winter
LSA
1500 Iowa Avenue, Suite 200
Riverside, CA 92507

**SUBJECT: VILLA SERENA NOISE ASSESSMENT**

Dear Mr. Carl Winter:

Urban Crossroads, Inc. is pleased to provide the following Noise Assessment for the Villa Serena Project ("Project"), which is located on the north side of 15th Street in in the City of Upland, as shown on Exhibit A. This Noise Assessment evaluates potential Project noise impacts in the context of applicable City of Upland noise standards and significance criteria based on guidance provided by Section XIII (a) of the Environmental Checklist Form Appendix G of the California Environmental Quality Act (CEQA). (1) In addition, this noise assessment has been revised in response May 8, 2023, City of Upland incomplete notice.

## EXECUTIVE SUMMARY

This Noise Assessment shows that the land uses adjacent to the study area roadway segments would experience *less than significant* noise level increases on receiving land uses due to the Project-related traffic for existing conditions. The Villa Serena Project is not expected to include any specific type of operational noise (stationary source) levels beyond the typical noise sources associated with the planned residential land use. This includes residents moving around the site, parking activities, air conditioning units and background outdoor activities. Residential land use is generally considered a noise-sensitive receiving land use. Using the reference noise levels to represent the proposed Project operations that include residential air conditioning units and other background outdoor activity, the operational noise levels associated with Villa Serena Project will satisfy the City of Upland 55 dBA $L_{eq}$ daytime (7:00 a.m. to 10:00 p.m.) and 45 dBA $L_{eq}$ nighttime (10:00 p.m. to 7:00 a.m.) exterior noise level standards at all nearby receiver locations. In addition, the Project-related operational noise level increases over the ambient noise conditions will satisfy the operational noise level increase criteria at the nearest sensitive receiver locations and the potential impact will be *less than significant*.

## PROJECT DESCRIPTION

The preliminary site plan for the proposed Project is shown on Exhibit B. The proposed Project includes the development of 66 single family residential dwelling units, the 15th Street extension and the basin trail. The Villa Serena is not expected to include any specific type of operational noise (stationary source) levels beyond the typical noise sources associated with the planned residential land use. This includes residents moving around the site, parking activities, air conditioning units and background outdoor activities. Residential land use is generally considered a noise-sensitive receiving land use.

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**EXHIBIT A: LOCATION MAP**

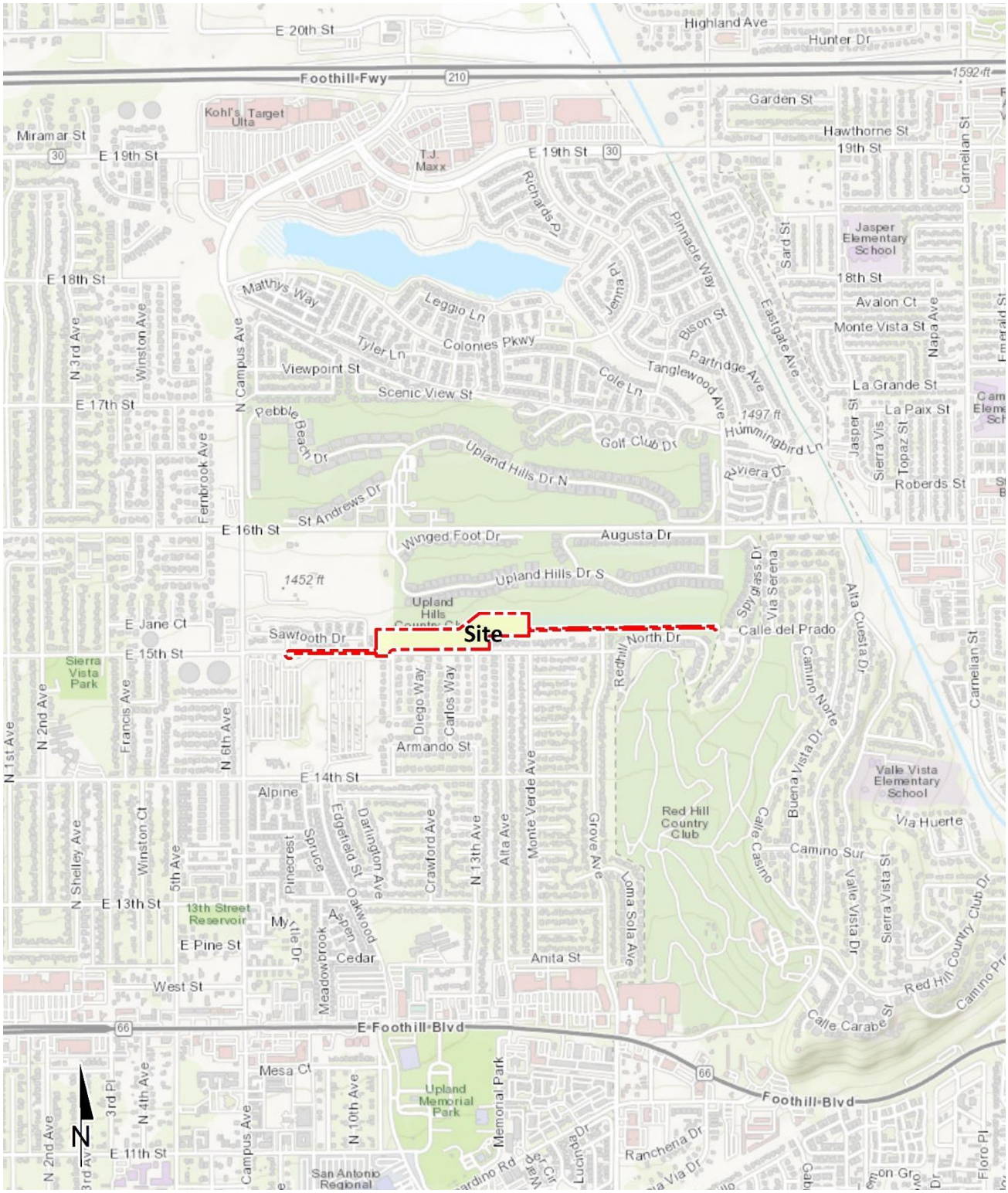

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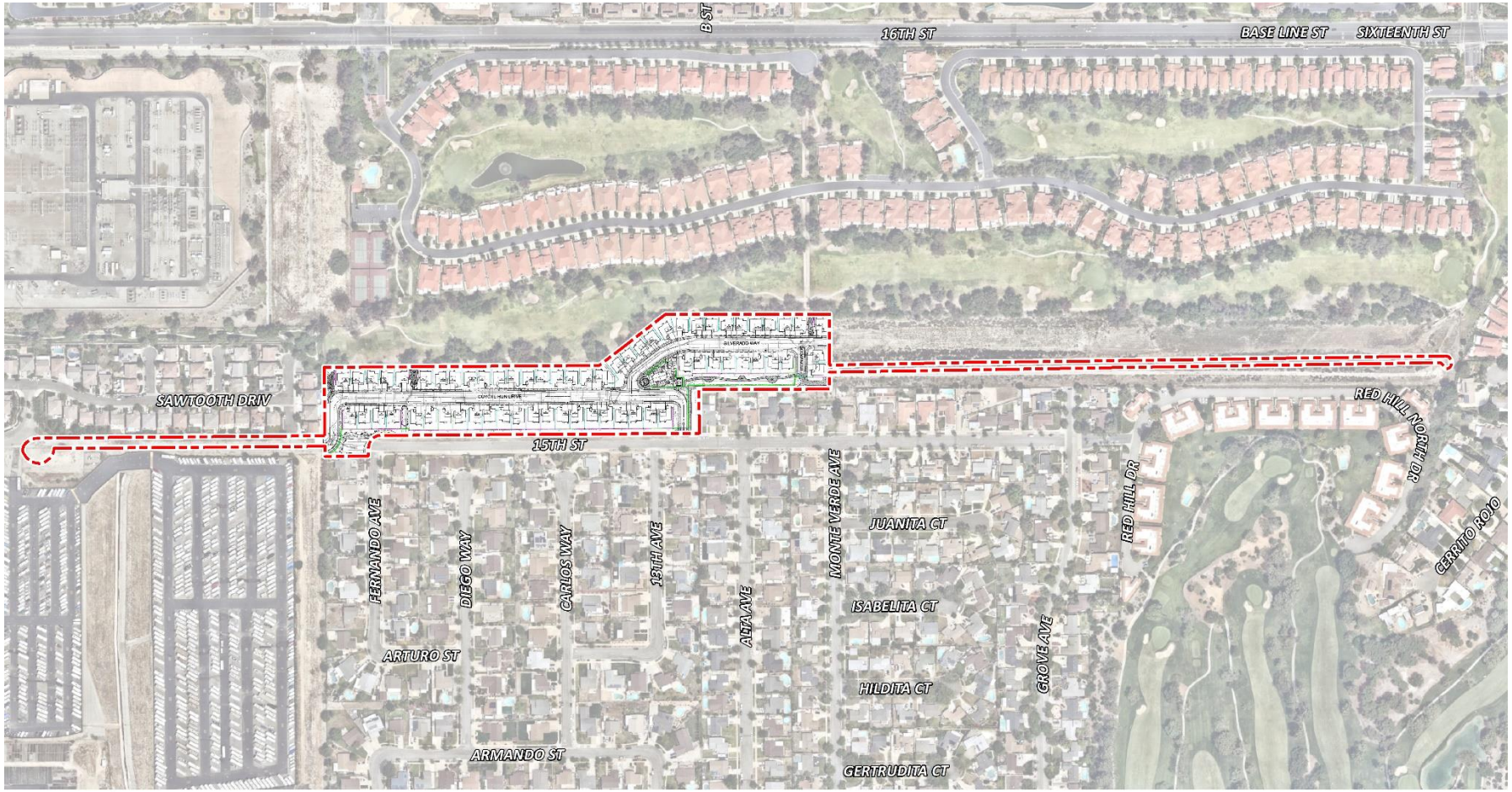
**EXHIBIT B: SITE PLAN**



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## PROJECT BACKGROUND

On July 20, 2018, Urban Crossroads, Inc. prepared the *Upland Colonies Noise Impact Analysis (NIA).* The NIA evaluated the on-site traffic noise level impacts to future residents of the Project and assessed the potential off-site construction noise and vibration impacts to the adjacent existing residential community. The purpose of this work effort is to assess the potential the Project related traffic noise level increases and the operational noise levels increases associated with the planned residential land use in response to the Superior Court ruling included in Appendix A. According to the ruling from Judge David Cohn, the NIA did not evaluate *the impacts of the Project compared to the Ambient Noise Level*. The analysis provided in this Noise Assessment was prepared to evaluate the incremental noise level increases or impacts of the Project in comparison to the existing ambient noise levels.

## NOISE DESCRIPTORS

According to the *Caltrans Technical Noise Supplement to the Traffic Noise Analysis Protocol*, the proper noise descriptor to use in any given situation depends on the nature of the noise source. For example, a high amplitude short duration event such as gunshot requires a different descriptor than a constant relatively low amplitude noise source such as traffic. The proper descriptor depends on the spatial distribution of noise sources, duration of the noise event, amount of fluctuation, and time patterns. Dozens of descriptors and scales have been devised over the years to quantify community noise, aircraft flyovers, traffic noise, industrial noise, speech interference, etc. (2) Environmental noise descriptors are generally based on averages, rather than instantaneous, noise levels. The most used figure is the equivalent level ($L_{eq}$). Equivalent sound levels are not measured directly but are calculated from sound pressure levels typically measured in A-weighted decibels (dBA). The equivalent sound level ($L_{eq}$) represents a steady state sound level containing the same total energy as a time varying signal over a given sample period and is commonly used to describe the "average" noise levels within the environment. The City of Upland relies on the equivalent level ($L_{eq}$) to assess operational activities associated with non-transportation transportation related stationary noise sources.

Peak hour or average noise levels, while useful, do not completely describe a given noise environment. Noise levels lower than peak hour may be disturbing if they occur during times when quiet is most desirable, namely evening and nighttime (sleeping) hours. To account for this, the Community Noise Equivalent Level (CNEL), representing a composite 24-hour noise level is utilized. The CNEL is the weighted average of the intensity of a sound, with corrections for time of day, and averaged over 24 hours. The time-of-day corrections require the addition of 5 decibels to dBA $L_{eq}$ sound levels in the evening from 7:00 p.m. to 10:00 p.m., and the addition of 10 decibels to dBA $L_{eq}$ sound levels at night between 10:00 p.m. and 7:00 a.m. These additions are made to account for the noise sensitive time periods during the evening and night hours when sound appears louder. CNEL does not represent the actual sound level heard at any time, but rather represents the total sound exposure. The City of Upland relies on the 24-hour CNEL level to assess land use compatibility with transportation related noise sources.

## OFF-SITE TRAFFIC NOISE LEVEL INCREASES

Noise level increases resulting from the Project are evaluated based on the Appendix G CEQA Environmental Checklist Form XIII (a) Noise Guidelines at the nearest sensitive receiver locations. Under CEQA, consideration must be given to the magnitude of the increase, the existing ambient noise levels, and the location of noise-sensitive receivers to determine if a noise increase represents a significant adverse environmental impact. This approach *recognizes that there is no single noise increase that renders the noise impact significant.* (3) The City of Upland General Plan Safety Element Table SAF-4 *Exterior Incremental Noise Impact Standards for Noise Sensitive Use* outlines the allowable noise exposure increases that are derived from the Federal Transit Administration (FTA) *Transit Noise and Vibration Impact Assessment Manual.* To describe the amount to which a given noise level increase is considered acceptable, the FTA criteria is used to evaluate the incremental noise level increase and establishes a method for comparing future project noise with existing ambient conditions under CEQA Significance Threshold A. In effect, the amount to which a given noise level increase is considered acceptable is reduced based on existing ambient noise conditions. Table 1 presents the allowable noise exposure increase levels.

**TABLE 1: ALLOWABLE NOISE EXPOSURE LEVELS**

| Analysis | Condition(s) | Significance Criteria | |
|---|---|---|---|
| | | Daytime | Nighttime |
| Off-Site Traffic[1] | If ambient is < 50 dBA CNEL | ≥ 8 dBA CNEL Project increase | |
| | If ambient is 50 - 55 dBA CNEL | ≥ 5 dBA CNEL Project increase | |
| | If ambient is 55 - 60 dBA CNEL | ≥ 3 dBA CNEL Project increase | |
| | If ambient is 60 - 65 dBA CNEL | ≥ 2 dBA CNEL Project increase | |
| | If ambient is 65 - 75 dBA CNEL | ≥ 1 dBA CNEL Project increase | |
| | If ambient is > 75 dBA CNEL | 0 dBA CNEL Project increase | |

[1] Federal Transit Administration, Transit Noise and Vibration Impact Assessment Manual, consistent with the City of Upland General Plan.

Consistent with the City of Upland General Plan Safety Element, the 24-hour CNEL level is used to assess land use compatibility with transportation related noise sources. CNEL does not represent the actual sound level heard at any time, but rather represents the total sound exposure. This is consistent with the Noise Compatible Land Use Planning guidance provided by Appendix D: Noise Element Guidelines from the State of California General Plan Guidelines. (4)

### FHWA TRAFFIC NOISE PREDICTION MODEL

The expected roadway noise level increases from vehicular traffic were calculated by Urban Crossroads, Inc. using a computer program that replicates the Federal Highway Administration (FHWA) Traffic Noise Prediction Model- FHWA-RD-77-108. (5) The FHWA Model arrives at a predicted noise level through a series of adjustments to the Reference Energy Mean Emission Level (REMEL). In California the national REMELs are substituted with the California Vehicle Noise (Calveno) Emission Levels. (6) Adjustments are then made to the REMEL to account for: the roadway classification (e.g., collector, secondary, major or

arterial), the roadway active width (i.e., the distance between the center of the outermost travel lanes on each side of the roadway), the total average daily traffic (ADT), the travel speed, the percentages of automobiles, medium trucks, and heavy trucks in the traffic volume, the roadway grade, the angle of view (e.g., whether the roadway view is blocked), the site conditions ("hard" or "soft" relates to the absorption of the ground, pavement, or landscaping), and the percentage of total ADT which flows each hour throughout a 24-hour period.

Research conducted by Caltrans has shown that the use of soft site conditions is appropriate for the application of the FHWA traffic noise prediction model used in this analysis. (7) Table 2 presents the roadway parameters used to assess the Project's off-site transportation noise impacts. The ADT volumes used in this study are presented on Table 3 are based on the *Villa Serena Traffic Impact Analysis* prepared by Urban Crossroads, Inc. (8)

**TABLE 2: OFF-SITE ROADWAY PARAMETERS**

| ID | Roadway | Segment | Receiving Land Use[1] | Classification[2] | Centerline Distance to Receiving Land Use | Vehicle Speed (mph)[3] |
|---|---|---|---|---|---|---|
| 1 | Campus Av. | n/o 16th St. | Sensitive | Secondary | 44' | 40 |
| 2 | Campus Av. | s/o 16th St. | Sensitive | Secondary | 44' | 40 |
| 3 | Campus Av. | n/o 14th St. | Sensitive | Secondary | 44' | 40 |
| 4 | Campus Av. | s/o 14th St. | Sensitive | Secondary | 44' | 40 |
| 5 | 16th St. | w/o Campus Av. | Sensitive | Secondary | 44' | 45 |
| 6 | 16th St. | e/o Campus Av. | Sensitive | Secondary | 44' | 45 |
| 7 | 15th St. | w/o Campus Av. | Sensitive | Collector | 33' | 35 |
| 8 | 15th St. | e/o Campus Av. | Sensitive | Collector | 33' | 25 |
| 9 | 15th St. | w/o Grove Av. | Sensitive | Collector | 33' | 25 |
| 10 | 14th St. | w/o Campus Av. | Sensitive | Collector | 33' | 35 |

[1] Based on a review of existing aerial imagery. Noise sensitive uses limited to existing residential land uses.
[2] City of Upland General Plan Circulation Element
[3] Upland Colonies Traffic Analysis, Urban Crossroads, Inc.

The ADT volumes vary for each roadway segment based on the existing traffic volumes and the combination of project traffic distributions. In addition, the off-site traffic noise analysis maintains a peak hour to average daily traffic (peak-to-daily) relationship of 7.9%. This analysis relies on a comparative analysis of the off-site traffic noise impacts, without and with project ADT traffic volumes from the Project traffic study. Table 4 provides the time of day (daytime, evening, and nighttime) vehicle splits and Table 5 presents the traffic flow distributions (vehicle mix) used for this analysis. The vehicle mix provides the hourly distribution percentages of automobiles, medium trucks, and heavy trucks for input into the FHWA noise prediction model.

**TABLE 3: AVERAGE DAILY TRAFFIC VOLUMES**

| ID | Roadway | Segment | Average Daily Traffic Volumes[1] | | | |
|---|---|---|---|---|---|---|
| | | | Existing | | OYC | |
| | | | Without Project | With Project | Without Project | With Project |
| 1 | Campus Av. | n/o 16th St. | 20,900 | 21,084 | 22,885 | 23,069 |
| 2 | Campus Av. | s/o 16th St. | 20,354 | 20,630 | 22,946 | 23,222 |
| 3 | Campus Av. | n/o 14th St. | 19,427 | 19,733 | 22,284 | 22,590 |
| 4 | Campus Av. | s/o 14th St. | 16,608 | 16,730 | 19,613 | 19,735 |
| 5 | 16th St. | w/o Campus Av. | 22,614 | 22,644 | 24,318 | 24,348 |
| 6 | 16th St. | e/o Campus Av. | 23,465 | 23,527 | 25,221 | 25,283 |
| 7 | 15th St. | w/o Campus Av. | 2,870 | 2,900 | 3,365 | 3,395 |
| 8 | 15th St. | e/o Campus Av. | 100 | 609 | 105 | 614 |
| 9 | 15th St. | w/o Grove Av. | 127 | 219 | 135 | 227 |
| 10 | 14th St. | w/o Campus Av. | 3,581 | 3,673 | 4,120 | 4,212 |

[1] Upland Colonies Traffic Analysis, Urban Crossroads, Inc.

**TABLE 4: TIME OF DAY VEHICLE SPLITS**

| Vehicle Type | Time of Day Splits | | | Total of Time of Day Splits |
|---|---|---|---|---|
| | Daytime | Evening | Nighttime | |
| Autos | 77.50% | 12.90% | 9.60% | 100.00% |
| Medium Trucks | 84.80% | 4.90% | 10.30% | 100.00% |
| Heavy Trucks | 86.50% | 2.70% | 10.80% | 100.00% |

"Daytime" = 7:00 a.m. to 7:00 p.m.; "Evening" = 7:00 p.m. to 10:00 p.m.; "Nighttime" = 10:00 p.m. to 7:00 a.m.

**TABLE 5: TRAFFIC FLOW BY VEHICLE TYPE (VEHICLE MIX)**

| Roadway Classification | Total % Traffic Flow | | | Total |
|---|---|---|---|---|
| | Autos | Medium Trucks | Heavy Trucks | |
| All Roadways | 97.42% | 1.84% | 0.74% | 100.00% |

Typical California Vehicle Mix.

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## OFF-SITE TRAFFIC NOISE ANALYSIS

To assess the off-site transportation CNEL noise level impacts associated with development of the proposed Project, noise contours were developed for each traffic scenario described in the *Villa Serena Traffic Study*. (8) Noise contour boundaries represent the equal levels of noise exposure and are measured in CNEL from the center of the roadway. Noise contours were used to assess the Project's incremental 24-hour dBA CNEL traffic-related noise impacts at receiving land uses adjacent to roadways conveying Project traffic. The noise contours represent the distance to noise levels of a constant value and are measured from the center of the roadway for the 70, 65, and 60 dBA CNEL noise levels.

The noise contours do not consider the effect of any existing noise barriers or topography that may attenuate ambient noise levels. In addition, because the noise contours reflect modeling of vehicular noise on area roadways, they appropriately do not reflect noise contributions from the surrounding stationary noise sources within the Project study area. Tables 6 through 9 present a summary of the exterior dBA CNEL traffic noise level, for existing, and opening year cumulative conditions without and with Project conditions. Appendix A includes a summary of the dBA CNEL traffic noise level contour for each of the traffic scenarios.

**TABLE 6: EXISTING CONTOURS**

| ID | Road | Segment | Receiving Land Use[1] | CNEL at Nearest Receiving Land Use (dBA)[2] | Distance to Contour from Centerline (Feet) | | |
|---|---|---|---|---|---|---|---|
| | | | | | 70 dBA CNEL | 65 dBA CNEL | 60 dBA CNEL |
| 1 | Campus Av. | n/o 16th St. | Sensitive | 69.8 | RW | 92 | 198 |
| 2 | Campus Av. | s/o 16th St. | Sensitive | 69.7 | RW | 90 | 194 |
| 3 | Campus Av. | n/o 14th St. | Sensitive | 69.5 | RW | 87 | 188 |
| 4 | Campus Av. | s/o 14th St. | Sensitive | 68.8 | RW | 79 | 170 |
| 5 | 16th St. | w/o Campus Av. | Sensitive | 71.4 | RW | 118 | 253 |
| 6 | 16th St. | e/o Campus Av. | Sensitive | 71.6 | RW | 121 | 260 |
| 7 | 15th St. | w/o Campus Av. | Sensitive | 61.1 | RW | RW | RW |
| 8 | 15th St. | e/o Campus Av. | Sensitive | 43.1 | RW | RW | RW |
| 9 | 15th St. | w/o Grove Av. | Sensitive | 44.1 | RW | RW | RW |
| 10 | 14th St. | w/o Campus Av. | Sensitive | 62.1 | RW | RW | RW |

[1] Based on a review of existing aerial imagery. Noise sensitive uses limited to existing residential land uses.
[2] The CNEL is calculated at the boundary of the right-of-way of each roadway and the property line of the nearest receiving land use.
"RW" = Location of the respective noise contour falls within the right-of-way of the road.

**TABLE 7: EXISTING WITH PROJECT CONTOURS**

| ID | Road | Segment | Receiving Land Use[1] | CNEL at Nearest Receiving Land Use (dBA)[2] | Distance to Contour from Centerline (Feet) | | |
|---|---|---|---|---|---|---|---|
| | | | | | 70 dBA CNEL | 65 dBA CNEL | 60 dBA CNEL |
| 1 | Campus Av. | n/o 16th St. | Sensitive | 69.8 | RW | 92 | 199 |
| 2 | Campus Av. | s/o 16th St. | Sensitive | 69.7 | RW | 91 | 196 |
| 3 | Campus Av. | n/o 14th St. | Sensitive | 69.5 | RW | 88 | 190 |
| 4 | Campus Av. | s/o 14th St. | Sensitive | 68.8 | RW | 79 | 171 |
| 5 | 16th St. | w/o Campus Av. | Sensitive | 71.4 | RW | 118 | 254 |
| 6 | 16th St. | e/o Campus Av. | Sensitive | 71.6 | RW | 121 | 260 |
| 7 | 15th St. | w/o Campus Av. | Sensitive | 61.2 | RW | RW | RW |
| 8 | 15th St. | e/o Campus Av. | Sensitive | 50.9 | RW | RW | RW |
| 9 | 15th St. | w/o Grove Av. | Sensitive | 46.5 | RW | RW | RW |
| 10 | 14th St. | w/o Campus Av. | Sensitive | 62.2 | RW | RW | RW |

[1] Based on a review of existing aerial imagery. Noise sensitive uses limited to existing residential land uses.
[2] The CNEL is calculated at the boundary of the right-of-way of each roadway and the property line of the nearest receiving land use.
"RW" = Location of the respective noise contour falls within the right-of-way of the road.

**TABLE 8: OPENING YEAR CUMULATIVE CONTOURS**

| ID | Road | Segment | Receiving Land Use[1] | CNEL at Nearest Receiving Land Use (dBA)[2] | Distance to Contour from Centerline (Feet) | | |
|---|---|---|---|---|---|---|---|
| | | | | | 70 dBA CNEL | 65 dBA CNEL | 60 dBA CNEL |
| 1 | Campus Av. | n/o 16th St. | Sensitive | 70.2 | RW | 98 | 210 |
| 2 | Campus Av. | s/o 16th St. | Sensitive | 70.2 | RW | 98 | 210 |
| 3 | Campus Av. | n/o 14th St. | Sensitive | 70.1 | RW | 96 | 206 |
| 4 | Campus Av. | s/o 14th St. | Sensitive | 69.5 | RW | 88 | 190 |
| 5 | 16th St. | w/o Campus Av. | Sensitive | 71.7 | RW | 123 | 266 |
| 6 | 16th St. | e/o Campus Av. | Sensitive | 71.9 | 59 | 126 | 272 |
| 7 | 15th St. | w/o Campus Av. | Sensitive | 61.8 | RW | RW | RW |
| 8 | 15th St. | e/o Campus Av. | Sensitive | 43.3 | RW | RW | RW |
| 9 | 15th St. | w/o Grove Av. | Sensitive | 44.4 | RW | RW | RW |
| 10 | 14th St. | w/o Campus Av. | Sensitive | 62.7 | RW | RW | RW |

[1] Based on a review of existing aerial imagery. Noise sensitive uses limited to existing residential land uses.
[2] The CNEL is calculated at the boundary of the right-of-way of each roadway and the property line of the nearest receiving land use.
"RW" = Location of the respective noise contour falls within the right-of-way of the road.

**TABLE 9: OPENING YEAR CUMULATIVE WITH PROJECT CONTOURS**

| ID | Road | Segment | Receiving Land Use[1] | CNEL at Nearest Receiving Land Use (dBA)[2] | Distance to Contour from Centerline (Feet) | | |
|---|---|---|---|---|---|---|---|
| | | | | | 70 dBA CNEL | 65 dBA CNEL | 60 dBA CNEL |
| 1 | Campus Av. | n/o 16th St. | Sensitive | 70.2 | RW | 98 | 211 |
| 2 | Campus Av. | s/o 16th St. | Sensitive | 70.2 | RW | 98 | 212 |
| 3 | Campus Av. | n/o 14th St. | Sensitive | 70.1 | RW | 97 | 208 |
| 4 | Campus Av. | s/o 14th St. | Sensitive | 69.5 | RW | 88 | 190 |
| 5 | 16th St. | w/o Campus Av. | Sensitive | 71.7 | RW | 124 | 266 |
| 6 | 16th St. | e/o Campus Av. | Sensitive | 71.9 | 59 | 127 | 273 |
| 7 | 15th St. | w/o Campus Av. | Sensitive | 61.8 | RW | RW | RW |
| 8 | 15th St. | e/o Campus Av. | Sensitive | 51.0 | RW | RW | RW |
| 9 | 15th St. | w/o Grove Av. | Sensitive | 46.6 | RW | RW | RW |
| 10 | 14th St. | w/o Campus Av. | Sensitive | 62.8 | RW | RW | RW |

[1] Based on a review of existing aerial imagery. Noise sensitive uses limited to existing residential land uses.
[2] The CNEL is calculated at the boundary of the right-of-way of each roadway and the property line of the nearest receiving land use.
"RW" = Location of the respective noise contour falls within the right-of-way of the road.

## PROJECT TRAFFIC NOISE LEVEL INCREASES

An analysis of existing traffic noise levels plus traffic noise generated by the proposed Project has been included in this report for informational purposes and to fully analyze the existing traffic scenarios identified in the *Villa Serena Traffic Study*. (8) However, the analysis of existing off-site traffic noise levels plus traffic noise generated by the proposed Project scenario will not actually occur since the Project would not be fully constructed and operational until future conditions when the Project is built and fully occupied. Table 6 shows the Existing without Project conditions CNEL noise levels. The Existing without Project exterior noise levels range from 43.1 to 71.6 dBA CNEL, without accounting for any noise attenuation features such as noise barriers or topography. Table 7 shows the Existing with Project conditions range from 46.5 to 71.6 dBA CNEL. Table 10 shows that the Project off-site traffic noise level increases range from 0.0 to 7.8 dBA CNEL on the study area roadway segments. Based on the significance criteria for off-site traffic noise presented in Table 1, land uses adjacent to the study area roadway segments would experience *less than significant* noise level increases on receiving land uses due to the Project-related traffic for existing conditions.

**TABLE 10: EXISTING PROJECT TRAFFIC NOISE LEVEL INCREASES**

| ID | Road | Segment | Receiving Land Use[1] | CNEL at Receiving Land Use (dBA)[2] | | | Incremental Noise Level Increase Threshold | |
|---|---|---|---|---|---|---|---|---|
| | | | | No Project | With Project | Project Addition | Limit[3] | Exceeded[4] |
| 1 | Campus Av. | n/o 16th St. | Sensitive | 69.8 | 69.8 | 0.0 | 1 | No |
| 2 | Campus Av. | s/o 16th St. | Sensitive | 69.7 | 69.7 | 0.0 | 1 | No |
| 3 | Campus Av. | n/o 14th St. | Sensitive | 69.5 | 69.5 | 0.0 | 1 | No |
| 4 | Campus Av. | s/o 14th St. | Sensitive | 68.8 | 68.8 | 0.0 | 1 | No |
| 5 | 16th St. | w/o Campus Av. | Sensitive | 71.4 | 71.4 | 0.0 | 1 | No |
| 6 | 16th St. | e/o Campus Av. | Sensitive | 71.6 | 71.6 | 0.0 | 1 | No |
| 7 | 15th St. | w/o Campus Av. | Sensitive | 61.1 | 61.2 | 0.1 | 2 | No |
| 8 | 15th St. | e/o Campus Av. | Sensitive | 43.1 | 50.9 | 7.8 | 8 | No |
| 9 | 15th St. | w/o Grove Av. | Sensitive | 44.1 | 46.5 | 2.4 | 8 | No |
| 10 | 14th St. | w/o Campus Av. | Sensitive | 62.1 | 62.2 | 0.1 | 2 | No |

[1] Based on a review of existing aerial imagery. Noise sensitive uses limited to existing residential land uses.
[2] The CNEL is calculated at the boundary of the right-of-way of each roadway and the property line of the receiving land use.
[3] City of Upland General Plan Table SAF-4.
[4] Does the Project create an incremental noise level increase exceeding the significance criteria?

Table 8 presents the Opening Year Cumulative without Project conditions CNEL noise levels. The Opening Year Cumulative without Project exterior noise levels are expected to range from 43.3 to 71.9 dBA CNEL, without accounting for any noise attenuation features such as noise barriers or topography. Table 9 shows the Opening Year Cumulative with Project conditions will range from 46.6 to 71.9 dBA CNEL. Table 11 shows that the Project off-site traffic noise level increases will range from 0.0 to 7.7 dBA CNEL. Based on the significance criteria for off-site traffic noise presented in Table 1, land uses adjacent to the study area roadway segments would experience *less than significant* noise level increases on receiving land uses due to the Project-related traffic for Opening Year Cumulative conditions

## EXISTING NOISE LEVEL MEASUREMENTS

To assess the existing noise level environment, 24-hour noise level measurements were taken at five locations in the Project study area. The receiver locations were selected to describe and document the existing noise environment within the Project study area. Exhibit C provides the boundaries of the Project study area and the noise level measurement locations. To fully describe the existing noise conditions, noise level measurements were collected by Urban Crossroads, Inc. on Tuesday, August 31, 2021. Appendix B includes study area photos.

Mr. Carl Winter
LSA
June 20, 2023

**EXHIBIT C: NOISE MEASUREMENT LOCATIONS**

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## MEASUREMENT PROCEDURE AND CRITERIA

To describe the existing noise environment, the hourly noise levels were measured during typical weekday conditions over a 24-hour period. By collecting individual hourly noise level measurements, it is possible to describe the daytime and nighttime hourly noise levels and calculate the 24-hour CNEL. The long-term noise readings were recorded using Piccolo Type 2 integrating sound level meter and dataloggers. The Piccolo sound level meters were calibrated using a Larson-Davis calibrator, Model CAL 150. All noise meters were programmed in "slow" mode to record noise levels in "A" weighted form. The sound level meters and microphones were equipped with a windscreen during all measurements. All noise level measurement equipment satisfies the American National Standards Institute (ANSI) standard specifications for sound level meters ANSI S1.4-2014/IEC 61672-1:2013. (9)

## NOISE MEASUREMENT LOCATIONS

The long-term noise level measurements were positioned as close to the nearest sensitive receiver locations as possible to assess the existing ambient hourly noise levels surrounding the Project site. These measurement locations were collected at locations that are intended to best describe the existing ambient noise levels within the noise sensitive receiver locations near the Project. In addition, due to the long-term nature of these measurements, the noise level meters are placed in locations where the meter can be securely positioned to avoid any interference. Measurement locations L1 and L2 were selected to describe the noise sensitive residential homes within the Upland Hills Country Club. Measurement locations, L3, L4 and L5 were selected to describe the existing residential community south of the Project Site on 15$^{th}$ Street.

Both Caltrans and the FTA recognize that it is not reasonable to collect noise level measurements that can fully represent every part of a private yard, patio, deck, or balcony normally used for human activity when estimating impacts for new development projects. This is demonstrated in the Caltrans general site location guidelines which indicate that, *sites must be free of noise contamination by sources other than sources of interest. Avoid sites located near sources such as barking dogs, lawnmowers, pool pumps, and air conditioners unless it is the express intent of the analyst to measure these sources*. (2) Further, FTA guidance states, t*hat it is not necessary nor recommended that existing noise exposure be determined by measuring at every noise-sensitive location in the project area. Rather, the recommended approach is to characterize the noise environment for clusters of sites based on measurements or estimates at representative locations in the community*. (10)

Based on recommendations of Caltrans and the FTA, it is not necessary to collect measurements at each individual building or residence, because each receiver measurement represents a group of buildings that share acoustical equivalence. (10) In other words, the area represented by the receiver shares similar shielding, terrain, and geometric relationship to the reference noise source. Receivers represent a location of noise sensitive areas and are used to estimate the future noise level impacts. Collecting reference ambient noise level measurements at the nearby sensitive receiver locations allows for a comparison of the before and after Project noise levels and is necessary to assess potential noise impacts due to the Project's contribution to the ambient noise levels.

## NOISE MEASUREMENT RESULTS

The noise measurements presented below focus on the average or equivalent sound levels ($L_{eq}$). The equivalent sound level ($L_{eq}$) represents a steady state sound level containing the same total energy as a time varying signal over a given sample period. Table 12 identifies the hourly daytime (7:00 a.m. to 10:00 p.m.) and nighttime (10:00 p.m. to 7:00 a.m.) noise levels at each noise level measurement location. The daytime and nighttime energy average noise levels represent the average of all hourly noise levels observed during these time periods expressed as a single number. Appendix C provides summary worksheets of the noise levels for each hour as well as the minimum, maximum, $L_1$, $L_2$, $L_5$, $L_8$, $L_{25}$, $L_{50}$, $L_{90}$, $L_{95}$, and $L_{99}$ percentile noise levels observed during the daytime and nighttime periods.

Table 12 shows that the existing ambient noise level at measurements locations L1 to L5 are consistent with the quiet nature of the surrounding residential community. While there is some variation in the individual noise levels at each location, the noise levels reresent on Table 12 represent the average of all hourly noise levels observed during these time periods expressed as a single number.

**TABLE 12: AMBIENT NOISE LEVEL MEASUREMENTS**

| Location[1] | Description | Energy Average Noise Level (dBA $L_{eq}$)[2] | |
|---|---|---|---|
| | | Daytime | Nighttime |
| L1 | Located north of the Project site near single-family residence at 1168 Upland Hills Drive South. | 47.2 | 42.5 |
| L2 | Located east of the Project site near single-family residence at 8269 Calle Del Prado. | 43.6 | 39.3 |
| L3 | Located south of the Project site near single-family residence at 1335 East 15th Street. | 47.2 | 40.6 |
| L4 | Located south of the Project site near single-family residence at 1497 Fernando Avenue. | 45.7 | 41.0 |
| L5 | Located west of the Project site near single-family residence at 1520 North Himalayas Circle. | 42.6 | 38.5 |

[1] See Exhibit C for the noise level measurement locations.
[2] Energy (logarithmic) average levels. The long-term 24-hour measurement worksheets are included in Appendix C. "Daytime" = 7:00 a.m. to 10:00 p.m.; "Nighttime" = 10:00 p.m. to 7:00 a.m.

## RECEIVER LOCATIONS

To assess the potential for long-term operational noise impacts, the following receiver locations, as shown on Exhibit D, were identified as representative locations for focused analysis. This includes additional receiver locations adjacent to the 15th Street extension and the basin trail. While the existing noise level measurement locations are used to describe the existing background ambient noise conditions in the Project study area, the receiver locations are used to calculate the Project operational noise levels at potentially impact nearby noise sensitive residences. Sensitive receivers are generally

defined as locations where people reside or where the presence of unwanted sound could otherwise adversely affect the use of the land. Noise-sensitive land uses are generally considered to include schools, hospitals, single-family dwellings, mobile home parks, churches, libraries, and recreation areas. Noise-sensitive receivers near the Project site include the existing residential homes located to the west of the Project site on Himalayas Circle, south on 15$^{th}$ Street and north on Upland Hills Drive. Other sensitive land uses in the Project study area that are located at greater distances than those identified in this noise study will experience lower noise levels than those presented in this report due to the additional attenuation from distance and the shielding of intervening structures.

## NOISE PREDICTION MODEL

To fully describe the exterior operational noise levels from the Project, Urban Crossroads, Inc. developed a noise prediction model using the CadnaA (Computer Aided Noise Abatement) computer program. CadnaA can analyze multiple types of noise sources using the spatially accurate Project site plan, georeferenced Nearmap aerial imagery, topography, buildings, and barriers in its calculations to predict outdoor noise levels.

Using the ISO 9613-2 protocol, CadnaA will calculate the distance from each noise source to the noise receiver locations, using the ground absorption, distance, and barrier/building attenuation inputs to provide a summary of noise level at each receiver and the partial noise level contributions by noise source. Consistent with the ISO 9613-2 protocol, the CadnaA noise prediction model relies on the reference sound power level ($L_w$) to describe individual noise sources. The operational noise level calculations provided in this noise study account for the distance attenuation provided due to geometric spreading, when sound from a localized stationary source (i.e., a point source) propagates uniformly outward in a spherical pattern. A default ground attenuation factor of 0.5 was used in the noise analysis to account for mixed ground representing a combination of hard and soft surfaces. Appendix D includes the detailed noise model inputs.

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LSA
June 20, 2023

**EXHIBIT D: RECEIVER LOCATIONS**

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June 20, 2023

## OPERATIONAL NOISE ANALYSIS

This section analyzes the potential stationary-source operational noise impacts at the nearest receiver locations resulting from the operation of the proposed Villa Serena Project. This operational noise analysis is intended to describe noise level impacts associated with the typical activities expected at the Project site. The on-site Project-related noise sources shown on Exhibit E are expected to include residential air conditioning units and other background outdoor activity. This noise source activity is representative of the planned residential land use that is not expected to produce any type of peak or single event noise source activities.

To estimate the Project operational noise impacts, reference sound power levels ($L_w$) were collected from similar types of activities to represent the noise levels expected with the development of the proposed Project. While sound pressure levels (e.g. $L_{eq}$) quantify in decibels the intensity of given sound sources at a reference distance, sound power levels ($L_w$) are connected to the sound source and are independent of distance. Sound pressure levels vary substantially with distance from the source and diminish because of intervening obstacles and barriers, air absorption, wind, and other factors. Sound power is the acoustical energy emitted by the sound source and is an absolute value that is not affected by the environment. The reference Project operational sound power noise levels are summarized below:

- A/C Condenser Units: 73 dBA $L_w$ according to the reference product data sheet for the Bryant 124ANS Series 5-Ton Air Conditioner Unit.
- Background Outdoor Activity: 75 dBA $L_w$ based on reference outdoor noise level measurements collected by Urban Crossroads, Inc.

### PROJECT OPERATIONAL NOISE STANDARDS

To analyze noise impacts originating from a designated fixed location or private property such as the Villa Serena Project, stationary-source (operational) noise such as the expected residential air conditioning units and other background outdoor activity are typically evaluated against standards established under a jurisdiction's Municipal Code. The City of Upland noise control guidelines for determining and mitigating non-transportation or stationary noise source impacts from operations in neighboring residential areas are found in Chapter 9.40 of the Municipal Code, provided in Appendix D. The performance standards found in Chapter 9.40 limit the base exterior noise level to 55 dBA $L_{eq}$ during the daytime hours from 7:00 am to 10:00 p.m., and 45 dBA $L_{eq}$ during the nighttime hours from 10:00 p.m. 7:00 a.m. at sensitive residential receiver locations. (11)

Mr. Carl Winter
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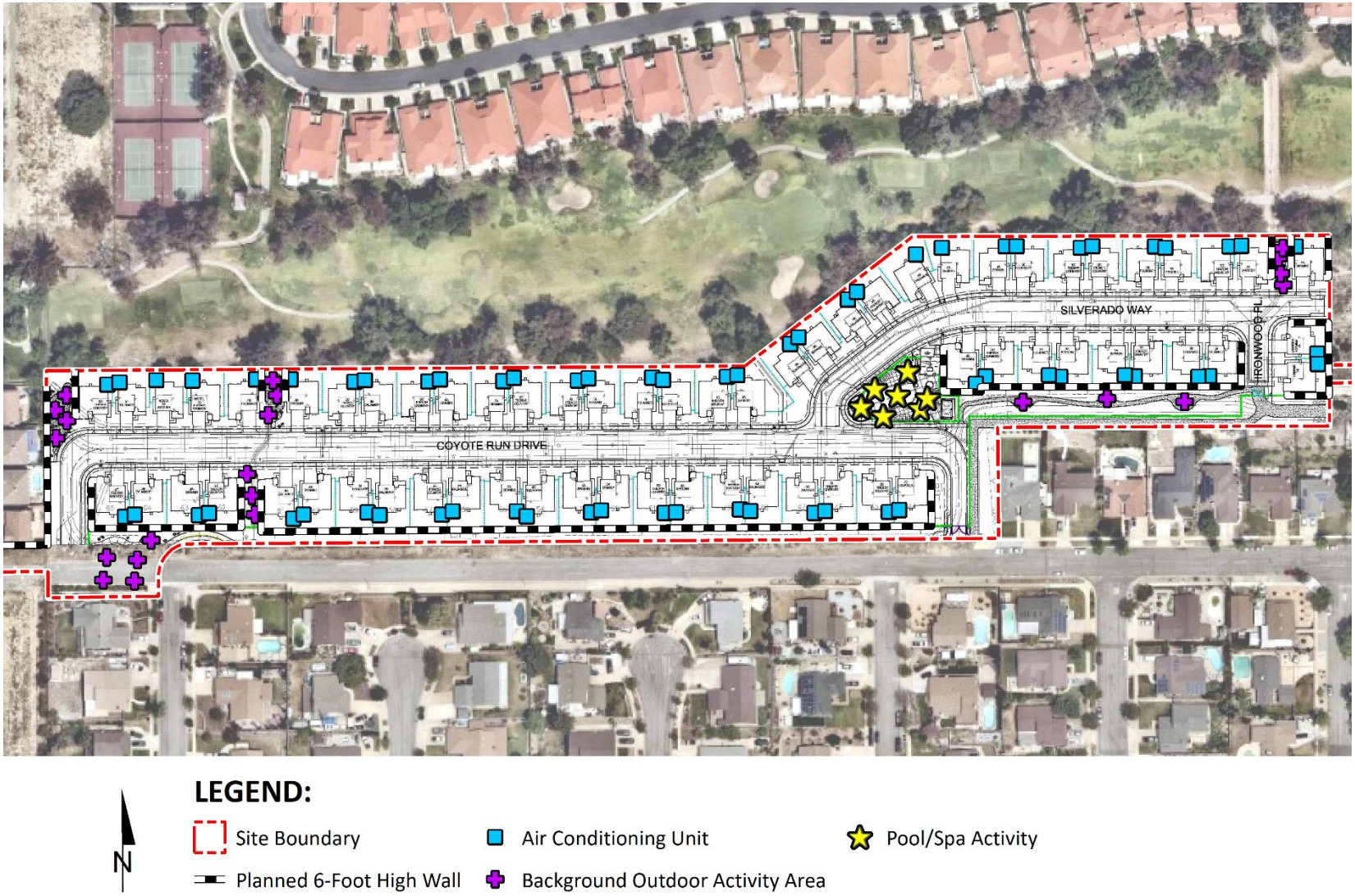
June 20, 2023

**EXHIBIT E: PROJECT OPERATIONAL NOISE SOURCE LOCATIONS**



## PROJECT OPERATIONAL NOISE LEVELS

Using the reference noise levels to represent the proposed Project operations that include residential air conditioning units and other background outdoor activity, Urban Crossroads, Inc. calculated the operational source noise levels that are expected to be generated at the Project site and the Project-related noise level increases that would be experienced at each of the sensitive receiver locations. Table 13 shows that the daytime Project operational noise at the off-site receiver locations with the planned 6-foot-high wall is expected to range from 30.9 to 51.3 dBA $L_{eq}$. It is important to recognize that the operational noise analysis includes all sixty-six air conditioning units and outdoor activities all operating at the same time without accounting for any of the planned residential building structures. In real world operating conditions, the air conditioning units will cycle on and off throughout the day and night. Therefore, the noise levels presented below conservatively overstate the Project operational noise levels.

**TABLE 13: PROJECT OPERATIONAL NOISE LEVELS**

| Receiver Location[1] | Project Operational Noise Levels (dBA Leq)[2] | | Noise Level Standards (dBA Leq)[3] | | Noise Level Standards Exceeded?[4] | |
|---|---|---|---|---|---|---|
| | Daytime | Nighttime | Daytime | Nighttime | Daytime | Nighttime |
| R1 | 43.8 | 34.1 | 55 | 45 | No | No |
| R2 | 50.0 | 35.3 | 55 | 45 | No | No |
| R3 | 30.9 | 19.6 | 55 | 45 | No | No |
| R4 | 35.9 | 20.6 | 55 | 45 | No | No |
| R5 | 44.6 | 33.6 | 55 | 45 | No | No |
| R6 | 51.3 | 36.2 | 55 | 45 | No | No |
| R7 | 46.7 | 33.6 | 55 | 45 | No | No |
| R8 | 43.3 | 30.0 | 55 | 45 | No | No |
| R9 | 32.9 | 21.6 | 55 | 45 | No | No |
| R10 | 45.2 | 31.4 | 55 | 45 | No | No |

[1] See Exhibit D for the receiver locations.
[2] Proposed Project unmitigated operational noise level calculations are included in Appendix E.
[3] City of Upland Municipal Code Chapter 9.40. (Appendix D).
[4] Do the estimated Project operational noise source activities exceed the noise level standards?
"Daytime" = 7:00 a.m. to 10:00 p.m.; "Nighttime" = 10:00 p.m. to 7:00 a.m.

To demonstrate compliance with local noise regulations, the Project-only operational noise levels are evaluated against exterior noise level thresholds based on the City of Upland exterior noise level standards at the nearest noise-sensitive receiver locations. Table 13 shows the operational noise levels associated with Villa Serena Project will not exceed the City of Upland 55 dBA $L_{eq}$ daytime (7:00 a.m. to 10:00 p.m.) and 45 dBA $L_{eq}$ nighttime (10:00 p.m. to 7:00 a.m.) exterior noise level standards at all nearby receiver locations. Therefore, the operational noise impacts are considered *less than significant* at the nearest noise-sensitive receiver locations.

Mr. Carl Winter
LSA
June 20, 2023

## PROJECT OPERATIONAL NOISE LEVEL INCREASES

Under CEQA, consideration must be given to the magnitude of the increase, the existing ambient noise levels, and the location of receivers to determine if a noise increase represents a significant adverse environmental impact (3). This approach recognizes that there is no completely satisfactory way to measure the subjective effects of noise or of the corresponding human reactions of annoyance and dissatisfaction, primarily because of the wide variation in individual thresholds of annoyance and differing individual experiences with noise. Thus, an effective way of determining a person's subjective reaction to a new noise is the comparison of it to the existing environment to which one has adapted—the so-called *ambient* environment. In general, the more a new noise exceeds the previously existing ambient noise level, the less acceptable the new noise will typically be judged. To describe the Project operational noise level increases, the Project operational noise levels are combined with the existing ambient noise levels measurements for the nearby receiver locations potentially impacted by Project operational noise sources. Since the units used to measure noise, decibels (dB), are logarithmic units, the Project-operational and existing ambient noise levels cannot be combined using standard arithmetic equations. (2) Instead, they must be logarithmically added using the following base equation:

$$SPL_{Total} = 10\log_{10}[10^{SPL1/10} + 10^{SPL2/10} + \ldots 10^{SPLn/10}]$$

Where "SPL1," "SPL2," etc. are equal to the sound pressure levels being combined, or in this case, the Project-operational and existing ambient noise levels. The difference between the combined Project and ambient noise levels describes the Project noise level increases to the existing ambient noise environment. As indicated on Table 14, the Project will generate a daytime operational noise level increase ranging from 0.2 to 5.5 dBA $L_{eq}$ at the nearest receiver locations. Table 15 shows that the Project will generate a nighttime operational noise level increase ranging from 0.0 to 1.3 dBA $L_{eq}$ at the nearest receiver locations. To describe the amount to which a given noise level increase is considered substantial (Threshold A), the City of Upland General Plan outlines criteria (Table SAF-4) to evaluate the incremental noise level increase and establishes a method for comparing future project noise with existing ambient conditions under CEQA Significance Noise Threshold A. Based on the significance criteria presented in Table 1, the Project-related operational noise level increases will satisfy the operational noise level increase criteria at the nearest sensitive receiver locations and the impact will be *less than significant.*

### TABLE 14: DAYTIME PROJECT OPERATIONAL NOISE LEVEL INCREASES

| Receiver Location[1] | Total Project Operational Noise Level[2] | Measurement Location[3] | Reference Ambient Noise Levels[4] | Combined Project and Ambient[5] | Project Increase[6] | Increase Criteria[7] | Increase Criteria Exceeded? |
|---|---|---|---|---|---|---|---|
| R1 | 43.8 | L1 | 47.2 | 48.8 | 1.6 | 8 | No |
| R2 | 50.0 | L1 | 47.2 | 51.8 | 4.6 | 8 | No |
| R3 | 30.9 | L2 | 43.6 | 43.8 | 0.2 | 8 | No |
| R4 | 35.9 | L2 | 43.6 | 44.3 | 0.7 | 8 | No |
| R5 | 44.6 | L3 | 47.2 | 49.1 | 1.9 | 8 | No |
| R6 | 51.3 | L3 | 47.2 | 52.7 | 5.5 | 8 | No |
| R7 | 46.7 | L3 | 47.2 | 50.0 | 2.8 | 8 | No |
| R8 | 43.3 | L4 | 45.7 | 47.7 | 2.0 | 8 | No |
| R9 | 32.9 | L5 | 42.6 | 43.0 | 0.4 | 8 | No |
| R10 | 45.2 | L5 | 42.6 | 47.1 | 4.5 | 8 | No |

[1] See Exhibit D for the receiver locations.
[2] Total Project daytime operational noise levels as shown on Table 16.
[3] Reference noise level measurement locations as shown on Exhibit C.
[4] Observed daytime ambient noise levels as shown on Table 15.
[5] Represents the combined ambient conditions plus the Project activities.
[6] The noise level increase expected with the addition of the proposed Project activities.
[7] City of Upland General Plan Table SAF-4.

### TABLE 15: NIGHTTIME PROJECT OPERATIONAL NOISE LEVEL INCREASES

| Receiver Location[1] | Total Project Operational Noise Level[2] | Measurement Location[3] | Reference Ambient Noise Levels[4] | Combined Project and Ambient[5] | Project Increase[6] | Increase Criteria[7] | Increase Criteria Exceeded? |
|---|---|---|---|---|---|---|---|
| R1 | 34.1 | L1 | 42.5 | 43.1 | 0.6 | 8 | No |
| R2 | 35.3 | L1 | 42.5 | 43.3 | 0.8 | 8 | No |
| R3 | 19.6 | L2 | 39.3 | 39.3 | 0.0 | 8 | No |
| R4 | 20.6 | L2 | 39.3 | 39.4 | 0.1 | 8 | No |
| R5 | 33.6 | L3 | 40.6 | 41.4 | 0.8 | 8 | No |
| R6 | 36.2 | L3 | 40.6 | 41.9 | 1.3 | 8 | No |
| R7 | 33.6 | L3 | 40.6 | 41.4 | 0.8 | 8 | No |
| R8 | 30.0 | L4 | 41.0 | 41.3 | 0.3 | 8 | No |
| R9 | 21.6 | L5 | 38.5 | 38.6 | 0.1 | 8 | No |
| R10 | 31.4 | L5 | 38.5 | 39.3 | 0.8 | 8 | No |

[1] See Exhibit D for the receiver locations.
[2] Total Project nighttime operational noise levels as shown on Table 16.
[3] Reference noise level measurement locations as shown on Exhibit C.
[4] Observed nighttime ambient noise levels as shown on Table 15.
[5] Represents the combined ambient conditions plus the Project activities.
[6] The noise level increase expected with the addition of the proposed Project activities.
[7] City of Upland General Plan Table SAF-4.

## COMMUNITY RESPONSE TO NOISE

Community responses to noise vary depending upon everyone's susceptibility to noise and personal attitudes about noise. Approximately ten percent of the population has a very low tolerance for noise and will object to any noise not of their making. Consequently, even in the quietest environment, some complaints will occur. Twenty-five percent of the population will not complain even in very severe noise environments. Thus, a variety of reactions can be expected from people exposed to any given noise environment. (12) Surveys have shown that about ten percent of the people exposed to traffic noise of 60 dBA will report being highly annoyed with the noise, and each increase of one dBA is associated with approximately two percent more people being highly annoyed. When traffic noise exceeds 60 dBA or aircraft noise exceeds 55 dBA, people may begin to complain. (12) Despite this variability in behavior on an individual level, the population can be expected to exhibit the following responses to changes in noise levels as shown on Exhibit F. A change of 3 dBA is considered *barely perceptible*, and changes of 5 dBA are considered *readily perceptible*. (13) An increase of 10 dBA is considered twice as loud.

The operational noise level increase analysis shows that the nearest noise sensitive residential receivers will potentially experience a background ambient noise level increases are considered *barely* or *readily perceptible.* This finding is conservatively based on all sixty-six air conditioning units and outdoor activities all operating at the same time without accounting for any building structures or planned perimeter walls.

## CONSTRUCTION NOISE ANALYSIS

To control noise impacts associated with the construction of the proposed Project, the City of Upland has established limits to the hours of operation. Section 9.40.100(M) of the City's Municipal Code states: *It is unlawful for any person to engage in or permit the erection (including excavation), demolition, alteration or repair of any building other than between the hours of 7:00 a.m. and 6:00 p.m. on weekdays…* (14) However, neither the City of Upland General Plan Noise Element nor Municipal Code establish numeric maximum acceptable construction source noise levels at potentially affected receivers. Therefore, a numerical construction threshold based on Federal Transit Administration (FTA) *Transit Noise and Vibration Impact Assessment Manual* is used for analysis of daytime construction impacts, as discussed below. According to the FTA, local noise ordinances are typically not very useful in evaluating construction noise. They usually relate to nuisance and hours of allowed activity, and sometimes specify limits in terms of maximum levels, but are generally not practical for assessing the impact of a construction project. Due to the lack of standardized construction noise thresholds, the FTA provides guidelines that can be considered reasonable criteria for construction noise assessment. The FTA considers a daytime exterior construction noise level of 80 dBA $L_{eq}$ as a reasonable threshold for noise sensitive residential land use (10 p. 179).

### CONSTRUCTION REFERENCE NOISE LEVELS

To describe construction noise activities, this construction noise analysis was prepared using reference construction equipment noise levels from the Federal Highway Administration (FHWA) published the Roadway Construction Noise Model (RCNM), which includes a national database of construction equipment reference noise emission levels. (16) The RCNM equipment database, provides a comprehensive list of the noise generating characteristics for specific types of construction equipment. In addition, the database provides an acoustical usage factor to estimate the fraction of time each piece of construction equipment is operating at full power (i.e., its loudest condition) during a construction operation. Using the reference construction equipment noise levels and the CadnaA noise prediction model, calculations of the Project construction noise level impacts at the nearby sensitive receiver locations were completed. Consistent with FTA guidance for general construction noise assessment, the loudest construction equipment represented by the combined noise levels for graders, excavators and compactors represent a sound power level of 115 $L_w$, assuming they operate at the same time. Appendix G includes the detailed CadnaA construction noise model inputs.

### CONSTRUCTION NOISE ANALYSIS

To evaluate whether the Project will generate potentially significant short-term noise levels at nearest receiver locations shown on Exhibit F, a construction-related daytime noise level threshold of 80 dBA $L_{eq}$ is used as a reasonable threshold to assess the daytime construction noise level impacts. Table 16 shows that the construction noise levels are expected to range from 51.2 to 66.9 dBA $L_{eq}$ at the nearby receiver locations and will not exceed the reasonable daytime 80 dBA $L_{eq}$ significance threshold. Therefore, the noise impacts due to Project construction noise are considered *less than significant* at all receiver locations.

## CONSTRUCTION VIBRATION ANALYSIS

Construction activity can result in varying degrees of ground-borne vibration, depending on the equipment and methods used, distance to the affected structures and soil type. (10) Construction vibration is generally associated with pile driving and rock blasting. Other construction equipment such as air compressors, light trucks, hydraulic loaders, etc., generates little or no ground vibration. (10) Occasionally large bulldozers and loaded trucks can cause perceptible vibration levels at close proximity.

To analyze vibration impacts originating from the operation and construction of the Villa Serena, vibration-generating activities are appropriately evaluated against standards established under a City's Municipal Code, if such standards exist. However, the City of Upland does not identify specific vibration level limits and instead relies on the Federal Transit Administration (FTA) methodology (10) consistent with the City of Upland General Plan Final Program EIR. (17) The FTA *Transit Noise and Vibration Impact Assessment* methodology provides guidelines for the maximum-acceptable vibration criteria for different types of land uses. These guidelines allow 90 VdB for industrial (workshop) use, 84 VdB for office use and 78 VdB for daytime residential uses and 72 VdB for nighttime uses in buildings where people normally sleep. (10)

Mr. Carl Winter
LSA
June 20, 2023

**EXHIBIT F: PROJECT CONSTRUCTION NOISE SOURCE LOCATIONS**

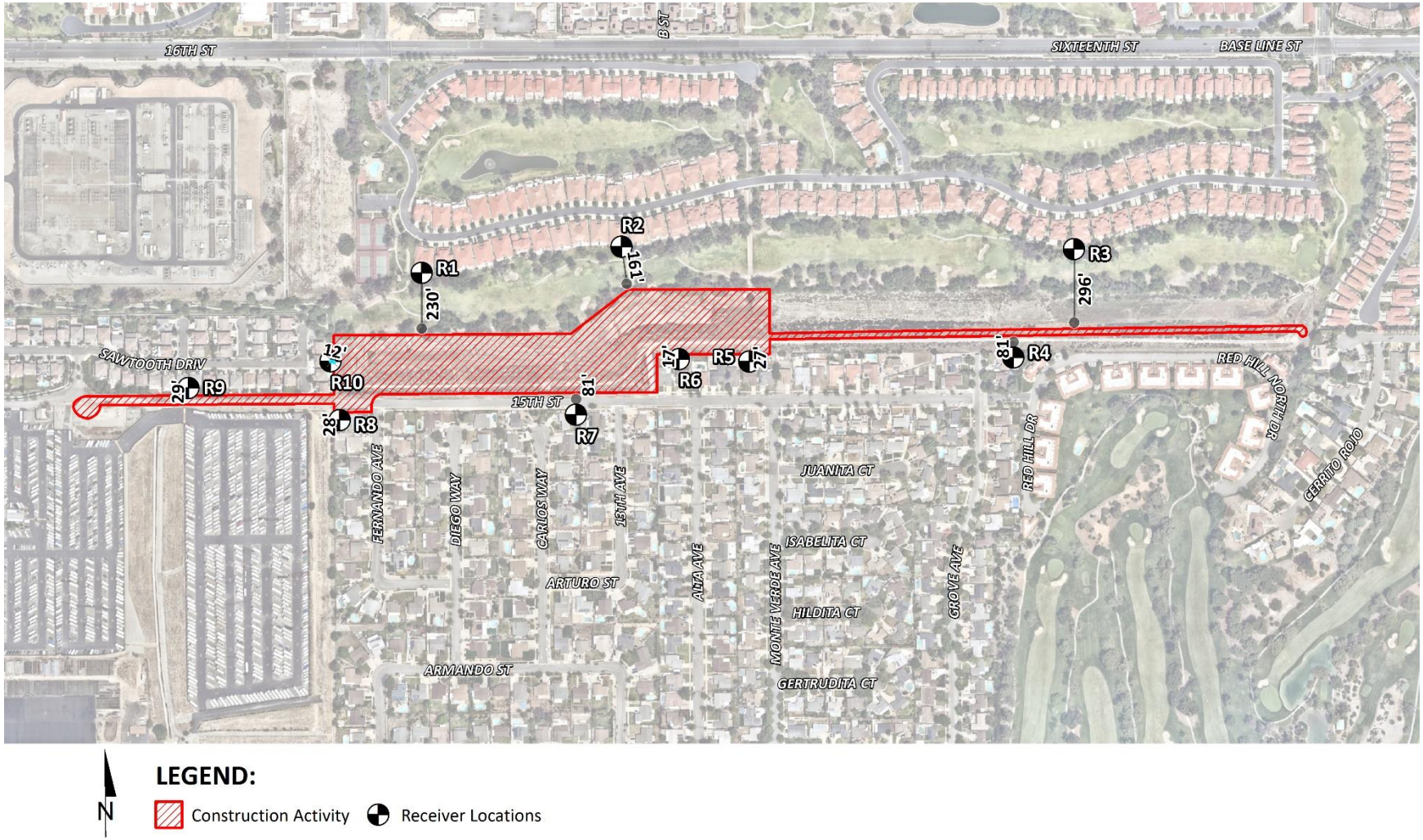


**TABLE 16: CONSTRUCTION NOISE LEVEL COMPLIANCE**

| Receiver Location[1] | Construction Noise Levels (dBA $L_{eq}$) | | |
|---|---|---|---|
| | Highest Construction Noise Levels[2] | Threshold[3] | Threshold Exceeded?[4] |
| R1 | 58.3 | 80 | No |
| R2 | 59.3 | 80 | No |
| R3 | 51.2 | 80 | No |
| R4 | 56.5 | 80 | No |
| R5 | 64.7 | 80 | No |
| R6 | 66.9 | 80 | No |
| R7 | 62.5 | 80 | No |
| R8 | 63.7 | 80 | No |
| R9 | 61.9 | 80 | No |
| R10 | 66.6 | 80 | No |

[1] Construction noise source and receiver locations are shown on Exhibit F.
[2] Highest construction noise level calculations based on distance from the construction noise source activity to the nearest receiver locations.
[3] FTA Transit Noise and Vibration Impact Assessment Manual.
[4] Do the estimated Project construction noise levels exceed the construction noise level threshold?

## TYPICAL CONSTRUCTION VIBRATION IMPACTS

Ground-borne vibration levels resulting from typical construction activities occurring within the Project site were estimated by data published by the Federal Transit Administration (FTA) (10). However, while vehicular traffic is rarely perceptible, construction has the potential to result in varying degrees of temporary ground vibration, depending on the specific construction activities and equipment used. Ground vibration levels associated with various types of construction equipment are summarized on Table 17. Based on the representative vibration levels presented for typical construction equipment types, it is possible to estimate the potential Project construction vibration levels using the following vibration assessment methods defined by the FTA. To describe the human response (annoyance) associated with vibration impacts the FTA provides the following equation: $L_{VdB}(D) = L_{VdB}(25\ ft) - 30\log(D/25)$

**TABLE 17: VIBRATION SOURCE LEVELS FOR TYPICAL CONSTRUCTION EQUIPMENT**

| Equipment | Vibration Decibels (VdB) at 25 feet |
|---|---|
| Small bulldozer | 58 |
| Jackhammer | 79 |
| Loaded Trucks | 86 |
| Large bulldozer | 87 |

Source: Federal Transit Administration, Transit Noise and Vibration Impact Assessment Manual

Table 18 presents the expected typical construction equipment vibration levels at the nearest receiver locations. At distances ranging from 12 feet to 296 feet from typical Project construction activities (at the Project site boundary), construction vibration levels are estimated to range from 54.8 to 96.6 VdB and will exceed the FTA Transit Noise and Vibration Impact Assessment Manual maximum acceptable vibration criteria of 78 VdB for daytime residential uses at receivers located within 50 feet of the Project site boundary. The vibration analysis shows that the Project-related construction vibration impacts will be *potentially significant* during the typical construction activities at the Project site and mitigation is required.

**TABLE 18: TYPICAL CONSTRUCTION EQUIPMENT VIBRATION LEVELS**

| Receiver Location[1] | Distance to Construction Activity (Feet) | Receiver Vibration Levels (VdB)[2] | | | | | Threshold VdB[3] | Threshold Exceeded?[4] |
|---|---|---|---|---|---|---|---|---|
| | | Small Bulldozer | Jack-hammer | Loaded Trucks | Large Bulldozer | Highest Vibration Levels | | |
| R1 | 230' | 29.1 | 50.1 | 57.1 | 58.1 | 58.1 | 78 | No |
| R2 | 161' | 33.7 | 54.7 | 61.7 | 62.7 | 62.7 | 78 | No |
| R3 | 296' | 25.8 | 46.8 | 53.8 | 54.8 | 54.8 | 78 | No |
| R4 | 81' | 42.7 | 63.7 | 70.7 | 71.7 | 71.7 | 78 | No |
| R5 | 27' | 57.0 | 78.0 | 85.0 | 86.0 | 86.0 | 78 | Yes |
| R6 | 17' | 63.0 | 84.0 | 91.0 | 92.0 | 92.0 | 78 | Yes |
| R7 | 81' | 42.7 | 63.7 | 70.7 | 71.7 | 71.7 | 78 | No |
| R8 | 28' | 56.5 | 77.5 | 84.5 | 85.5 | 85.5 | 78 | Yes |
| R9 | 29' | 56.1 | 77.1 | 84.1 | 85.1 | 85.1 | 78 | Yes |
| R10 | 12' | 67.6 | 88.6 | 95.6 | 96.6 | 96.6 | 78 | Yes |

[1] Receiver locations are shown on Exhibit B.
[2] Based on the Vibration Source Levels of Construction Equipment included on Table 4.
[3] FTA Transit Noise and Vibration Impact Assessment maximum acceptable vibration criteria.
[4] Does the vibration level exceed the maximum acceptable vibration threshold?

Therefore, a 50-foot buffer setback mitigation measure is required which would restrict the use of large, loaded trucks, and heavy mobile equipment greater than 80,000 pounds, within 50-feet of occupied sensitive receiver locations represented by receiver locations R5, R6, R8, R9 and R10. Instead, small rubber-tired or alternative equipment, as well as soil compaction equipment shall be used during Project construction to reduce vibration effects on nearby structures and their occupants. Table 19 shows that with the 50-foot setback buffer, Project construction vibration levels will not exceed the 78 VdB construction vibration threshold for daytime residential uses. Therefore, the Project-related construction vibration impacts are considered *less than significant* with a 50-foot buffer setback mitigation measure during typical construction activities at the Project site. Moreover, the vibration levels reported at the sensitive receiver locations are unlikely to be sustained during the entire construction period but will occur rather only during the times that heavy construction equipment is operating adjacent to the Project site perimeter.

Mr. Carl Winter
LSA
June 20, 2023

## CONCLUSIONS

This Noise Assessment demonstrates that the construction noise and vibration levels associated with Villa Serena Project will satisfy the noise standards outlined in the City of Upland Plan. Therefore, the Project-related construction noise and vibration impacts are considered *less than significant* with mitigation at the nearby noise-sensitive receiver locations. If you have any questions, please contact me directly at (949) 584-3148.

If you have any questions, please contact me directly at (949) 584-3148.

Respectfully submitted,

URBAN CROSSROADS, INC.


Bill Lawson, P.E., INCE
Principal

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# APPENDIX A

# SUPERIOR COURT RULING

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Superior Court of California
County of San Bernardino
247 West Third Street, Dept. S26
San Bernardino, California 92415

FILED
SUPERIOR COURT OF CALIFORNIA
COUNTY OF SAN BERNARDINO
SAN BERNARDINO DISTRICT

SEP 13 2021

BY _____
JESSICA MORALES, DEPUTY

**SUPERIOR COURT OF THE STATE OF CALIFORNIA**

**COUNTY OF SAN BERNARDINO, SAN BERNARDINO DISTRICT**

FRIENDS OF UPLAND WETLANDS,

Petitioner,

vs.

CITY OF UPLAND; AND DOES 11 through 100,

Respondent.

FH II, LLC; and DOES 101 through 1,000

Defendants and Real Parties in Interest

Case No.: CIVDS-2010521

RULING ON SUBMITTED MATTER:

PETITION FOR WRIT OF MANDATE GRANTED IN PART

Hearing Date: July 14, 2021
Dept: S-26, Judge David Cohn

*San Diego* (2019) 43 Cal.App.5th 404, 418, quoting *Benach v. County of Los Angeles* (2007) 149 Cal.App.4th 836, 852.) "Issues do not have a life of their own: if they are not raised or supported by argument or citation to authority, we consider the issues waived." (*Jones v. Superior Court* (1994) 26 Cal.App.4th 92, 96, cited in *Holden v. City of San Diego, supra,* at p. 418; *see also*, Cal. Rules of Court, rule 3.1113(a) [provides for waiver of all grounds not supported in the points and authorities accompanying a motion or opposition to a motion].)

FUW's failure to specify the reasons why the IS/MND is inadequate on this issue is fatal to this argument.

**F. The IS/MND Failed to Analyze the Noise Impacts of the Project Compared to the Ambient Noise Level, but Considered Only the Maximum Noise Threshold.**

FUW contends the IS/MND improperly relied on Upland's "exterior noise standard" and a federal vibration standard as thresholds of significance in analyzing the potentially significant noise impacts of the project. FUW's argument is unsupported.

The CEQA Guidelines define the "threshold of significance" as "an identifiable quantitative, qualitative, or performance level of a particular environmental effect, non-compliance with which means the effect will normally be determined to be significant by the agency and compliance with which means the effect normally will be determined to be less than significant." (Guidelines, § 15064.7, subd. (a).) "'The lead agency has substantial discretion in determining the appropriate threshold of significance to evaluate the severity of a particular impact.' [Citation.]" (*Jensen, supra,* 23 Cal.App.5th at p. 885.)

Regarding noise impacts, the environmental checklist form in the Guidelines includes a series of questions to frame the analysis. (*See*, Guidelines Appendix G: Environmental Checklist Form, XIII, Noise.) The key question is whether the project will generate "a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standard established in the local general plan or noise ordinance, or applicable standard of other agencies." (Guidelines Appendix G: Environmental Checklist Form, XIII, Noise.)

The IS/MND identifies Upland Municipal Code Chapter 9.40, Unnecessary Noise, and Upland's General Plan Policies SAF-1.1 and SAF-1.3 as the basis for the thresholds of significance used in analyzing noise impacts of the project. (*See*, AR 156-159, 1384-1458.) Vibration level standards are not identified in the Upland General Plan or Municipal Code. As a result, the IS/MND adopted the U.S. Department of Transportation Federal Transit Administration ("FTA") guidelines for maximum-acceptable vibration criteria for different land uses. (AR 1411.)

The public agency's decision in choosing the threshold is presumed correct, and a petitioner bears the burden of proving that the threshold selected is legally inadequate. FUW does not suggest any alternatives to the thresholds of significance used by Upland and FH, nor do they point to any evidence in the record demonstrating that the selected thresholds are inadequate. Therefore, FUW has not met its burden of demonstrating the selected thresholds are legally inadequate.

Nonetheless, Guidelines section 15064, subdivision (b)(2), provides:

> When using a threshold, the lead agency should briefly explain how compliance with the threshold means that the project's impacts are less than significant. Compliance with the threshold does not relieve a lead agency of the obligation to

consider substantial evidence indicating that the project's environmental effect may still be significant.

FUW argues that Upland failed to exercise "careful judgment" in analyzing the noise impacts. FUW contends the IS/MND failed to analyze the qualitative increase in existing ambient noise levels, and did not consider that "an activity which may not be significant in an urban area may be significant in a rural area." (Guidelines, § 15064, subd. (b).) According to FUW, the noise analysis should have started with the existing noise situation as the "baseline," not with Upland's noise standard as the "ceiling."

Lead agencies often use the CEQA checklist in conjunction with an analysis using quantitative limits on maximum allowed noise levels and on increases in the level of noise to determine whether noise impacts are significant. (*King & Gardiner Farms, LLC v. County of Kern* (2020) 45 Cal.App.5th 814, 883; *see also*, *Jensen, supra,* 23 Cal.App.5th 877 [negative declaration case].) Nevertheless, "[t]he noise questions in the checklist do not define what maximum level of noise, or increase in the level of noise, constitutes a significant impact." (2 Kostka & Zischke, *supra,* § 13.64A, citing to *King & Gardiner Farms, supra*, 45 Cal.App.5th at p. 884.)

Upland and FH contend that since they used the relevant provisions of the General Plan and Upland Municipal Code as the thresholds of significance, the noise impacts analysis is proper. But lead agencies do not have discretion to consider only maximum noise levels and ignore any increases in noise levels relative to existing conditions in the project area. (*King & Gardiner Farms, supra,* 45 Cal.App.5th at p. 887, quoting *Keep our Mountains Quiet v. County of Santa Clara* (2015) 236 Cal.App.4th 714, 732-733 [negative declaration case holding that increase in noise level must be considered, not just absolute noise level].) Here, there is substantial evidence

supporting a fair argument that Upland considered only the maximum threshold and did not qualitatively analyze the noise impacts.

In Upland's General Plan, Policy SAF-1.1 provides the "Exterior Noise Standards" and states: "For a single-family residential land use such as the Project, the *normally acceptable* exterior noise level standard is 60 A-weighted decibels (dBA) CNEL [Community Noise Equivalent Level]."[27] (AR 1409, 159.) Policy SAF-1.3 sets forth the "Interior Noise Standards" and "identifies an interior noise level standard of 45 dBA CNEL for new residential developments." (AR 1409.)

In the technical analysis (Appendix "H" to the IS/MND), the section discussing the construction noise standards states that section 9.40.040 of the UMC "identifies the maximum allowable noise levels at residential use based on the 55 dBA *base ambient noise level* standard plus 20 dBA, which equates to a 75 dBA $L_{max}$ noise level standard."[28] (AR 1410.) This assertion that the maximum allowable noise level is 75 dBA $L_{max}$ is misleading. The maximum exterior residential noise level above the base ambient noise level is set forth in UMC section 9.40.070, and it provides maximum duration periods for noise levels exceeding the base ambient noise level. The code section states that a noise level of 20 dBA above base ambient level is not permitted at

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[27] Policy SAF-1.1 "identifies the transportation-related exterior noise compatibility standards for different land uses in Table SAF-1 ...." [AR 1409.] The IS/MND states that "[t]he Community Noise Equivalent Level (CNEL) uses weighted averages of the intensity of a sound, with corrections for time of day, to represent a composite 24-hour noise level. [Upland] uses CNEL to represent their exterior and interior noise standards." [AR 159.]

[28] UMC sections 9.40.040 provides, "All ambient noise measurements shall commence at the base ambient levels in decibels within the respective times and zones as follows," and then establishes the base ambient noise level for residential land uses of 55 dBA during the hours of 7:00 a.m. to 10:00 p.m. [AR 1442.] The code section goes on to state, "Actual decibel measurements exceeding the above levels at the times and within the zones corresponding thereto shall be employed as the base ambient noise level referred to in this chapter. Otherwise, no ambient noise shall be deemed to be less than the above specified levels." [AR 1442.]

all, and the base ambient noise level is allowed for only thirty minutes per hour.[29] (AR 1443.)

The technical analysis of the noise impacts repeatedly seeks only to "satisfy the City of Upland 60 dBA CNEL exterior noise level standard for residential land use" or "satisfy the 45 dBA CNEL interior noise level standard." (AR 1391, 1392, 1419.) There is no discussion of the *actual* base ambient noise level in the areas surrounding the site and the increase in that noise level—only a discussion of the predicted absolute noise levels associated with the project. Therefore, in finding that the unmitigated exterior noise levels generated by on-site transportation "will range from 57.0 to 66.4 dBA CNEL," the technical analysis only contemplates mitigation that will result in an exterior noise level not in excess of 60 dBA CNEL. (AR 1419.)

Similarly, the technical analysis seems to view the 75 dBA $L_{max}$ noise level as the unqualified maximum threshold to be exceeded in determining whether unmitigated project-related construction noise levels are potentially significant. (AR 1392.) The technical analysis states that "the Project-related construction noise impacts [were] evaluated based on the maximum allowable noise level for residential uses of 75 dBA $L_{max}$." (AR 1410.) As a result, when the technical analysis determined that the unmitigated construction noise levels were expected to range from 61.3 to 83.3 dBA $L_{max}$, the formulation of a mitigation measure was based only on the 83.3 dBA $L_{max}$ noise level since that level exceeded the 75 dBA $L_{max}$ level. (AR 1430-1431.) Since the mitigated temporary construction noise level was determined to range between 64.7

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[29] The noise level of 15 dBA above base ambient level is allowed only for one minute per hour, 10 dBA above base ambient noise level is allowed only for five minutes per hour, and 5 dBA above base ambient noise level is allowed for only 15 minutes per hour. [AR 1443.]

and 74.1 dBA $L_{max}$, the IS/MND concluded that the mitigation would reduce the noise impact to a less than significant level. (AR 1431.) Again, there was no discussion of the *actual* base ambient noise level in the surrounding area and the projected increase in that noise level caused by the project.[30]

Contrary to Upland's and FH's argument, "conformity with the absolute or maximum noise level specified in a general plan does not prevent a fair argument from being made that the proposed project will generate environmentally significant noise impacts. [Citation.] ... '[T]he lead agency should consider both the increase in noise level and absolute noise level associated with a project.' [Citation.]" (*King & Gardiner Farms, LLC, supra,* 45 Cal.App.5th at p. 887, quoting *Keep our Mountains Quiet v. County of Santa Clara* (2015) 236 Cal.App.4th 714, 732-733 [negative declaration case holding that increase in noise level must be considered, not just absolute noise level]; *see also, Citizens for Responsible & Open Development v. City of Grand Terrace* (2008) 160 Cal.App.4th 1323, 1338.)

Therefore, there is substantial evidence in the record supporting a fair argument that Upland and FH failed to qualitatively analyze the noise impacts of the project.

**G. FUW's Traffic Impact Argument is Moot.**

The IS/MND concluded that the project will result in less than significant traffic impacts. FUW, however, argues there is substantial evidence supporting a fair argument that the project may result in traffic *safety* issues. FUW cites comments made

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[30] Contrary to Upland's and FH's assertion, residents submitted written comments during the public comment period regarding their concerns regarding the noise impacts from the project and project-related construction. (AR 3910-3911, 3915, 3923, 3925.) In responses, Upland and FH claimed "no significant traffic noise impact was determined to exceed established City standards" (AR 3916), and "[w]ith the implementation of mitigation and imposition of standard City conditions, project-related ... noise impacts were reduced to less than significant levels (below established thresholds)." (AR 3924, 3928.)

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# APPENDIX B

# OFF-SITE TRAFFIC NOISE ANALYSIS WORKSHEETS

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## FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

*Scenario:* E
*Road Name:* Campus Av.
*Road Segment:* n/o 16th St.
*Project Name:* Upland Colonies
*Job Number:* 14319

### SITE SPECIFIC INPUT DATA

***Highway Data***

| | |
|---|---|
| *Average Daily Traffic (Adt):* | 20,900 vehicles |
| *Peak Hour Percentage:* | 7.90% |
| *Peak Hour Volume:* | 1,651 vehicles |
| *Vehicle Speed:* | 40 mph |
| *Near/Far Lane Distance:* | 36 feet |

***Site Data***

| | |
|---|---|
| ***Barrier Height:*** | **0.0 feet** |
| *Barrier Type (0-Wall, 1-Berm):* | 0.0 |
| *Centerline Dist. to Barrier:* | 44.0 feet |
| *Centerline Dist. to Observer:* | 44.0 feet |
| *Barrier Distance to Observer:* | 0.0 feet |
| *Observer Height (Above Pad):* | 5.0 feet |
| *Pad Elevation:* | 0.0 feet |
| *Road Elevation:* | 0.0 feet |
| *Road Grade:* | 0.0% |
| *Left View:* | -90.0 degrees |
| *Right View:* | 90.0 degrees |

### NOISE MODEL INPUTS

***Site Conditions (Hard = 10, Soft = 15)***

| | |
|---|---|
| *Autos:* | 15 |
| *Medium Trucks (2 Axles):* | 15 |
| *Heavy Trucks (3+ Axles):* | 15 |

***Vehicle Mix***

| *VehicleType* | *Day* | *Evening* | *Night* | *Daily* |
|---|---|---|---|---|
| *Autos:* | 77.5% | 12.9% | 9.6% | 97.42% |
| *Medium Trucks:* | 84.8% | 4.9% | 10.3% | 1.84% |
| *Heavy Trucks:* | 86.5% | 2.7% | 10.8% | 0.74% |

***Noise Source Elevations (in feet)***

| | | | |
|---|---|---|---|
| *Autos:* | 0.000 | | |
| *Medium Trucks:* | 2.297 | | |
| *Heavy Trucks:* | 8.006 | *Grade Adjustment:* | 0.0 |

***Lane Equivalent Distance (in feet)***

| | |
|---|---|
| *Autos:* | 40.460 |
| *Medium Trucks:* | 40.241 |
| *Heavy Trucks:* | 40.262 |

***FHWA Noise Model Calculations***

| *VehicleType* | *REMEL* | *Traffic Flow* | *Distance* | *Finite Road* | *Fresnel* | *Barrier Atten* | *Berm Atten* |
|---|---|---|---|---|---|---|---|
| *Autos:* | 66.51 | 0.74 | 1.28 | -1.20 | *-4.61* | 0.000 | 0.000 |
| *Medium Trucks:* | 77.72 | -16.50 | 1.31 | -1.20 | *-4.87* | 0.000 | 0.000 |
| *Heavy Trucks:* | 82.99 | -20.46 | 1.31 | -1.20 | *-5.50* | 0.000 | 0.000 |

***Unmitigated Noise Levels (without Topo and barrier attenuation)***

| *VehicleType* | *Leq Peak Hour* | *Leq Day* | *Leq Evening* | *Leq Night* | *Ldn* | *CNEL* |
|---|---|---|---|---|---|---|
| *Autos:* | 67.3 | 66.5 | 64.7 | 58.6 | 67.3 | 67.9 |
| *Medium Trucks:* | 61.3 | 60.8 | 54.5 | 52.9 | 61.4 | 61.6 |
| *Heavy Trucks:* | 62.6 | 62.2 | 53.2 | 54.5 | 62.8 | 62.9 |
| *Vehicle Noise:* | 69.3 | 68.6 | 65.4 | 60.8 | 69.3 | 69.8 |

***Centerline Distance to Noise Contour (in feet)***

| | *70 dBA* | *65 dBA* | *60 dBA* | *55 dBA* |
|---|---|---|---|---|
| *Ldn:* | 40 | 86 | 185 | 398 |
| *CNEL:* | 43 | 92 | 198 | 426 |



## FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

*Scenario:* E
*Road Name:* Campus Av.
*Road Segment:* s/o 16th St.
*Project Name:* Upland Colonies
*Job Number:* 14319

### SITE SPECIFIC INPUT DATA

***Highway Data***

| | |
|---|---|
| *Average Daily Traffic (Adt):* | 20,354 vehicles |
| *Peak Hour Percentage:* | 7.90% |
| *Peak Hour Volume:* | 1,608 vehicles |
| *Vehicle Speed:* | 40 mph |
| *Near/Far Lane Distance:* | 36 feet |

***Site Data***

| | |
|---|---|
| ***Barrier Height:*** | **0.0 feet** |
| *Barrier Type (0-Wall, 1-Berm):* | 0.0 |
| *Centerline Dist. to Barrier:* | 44.0 feet |
| *Centerline Dist. to Observer:* | 44.0 feet |
| *Barrier Distance to Observer:* | 0.0 feet |
| *Observer Height (Above Pad):* | 5.0 feet |
| *Pad Elevation:* | 0.0 feet |
| *Road Elevation:* | 0.0 feet |
| *Road Grade:* | 0.0% |
| *Left View:* | -90.0 degrees |
| *Right View:* | 90.0 degrees |

### NOISE MODEL INPUTS

***Site Conditions (Hard = 10, Soft = 15)***

| | |
|---|---|
| *Autos:* | 15 |
| *Medium Trucks (2 Axles):* | 15 |
| *Heavy Trucks (3+ Axles):* | 15 |

***Vehicle Mix***

| *VehicleType* | *Day* | *Evening* | *Night* | *Daily* |
|---|---|---|---|---|
| *Autos:* | 77.5% | 12.9% | 9.6% | 97.42% |
| *Medium Trucks:* | 84.8% | 4.9% | 10.3% | 1.84% |
| *Heavy Trucks:* | 86.5% | 2.7% | 10.8% | 0.74% |

***Noise Source Elevations (in feet)***

| | | | |
|---|---|---|---|
| *Autos:* | 0.000 | | |
| *Medium Trucks:* | 2.297 | | |
| *Heavy Trucks:* | 8.006 | *Grade Adjustment:* | 0.0 |

***Lane Equivalent Distance (in feet)***

| | |
|---|---|
| *Autos:* | 40.460 |
| *Medium Trucks:* | 40.241 |
| *Heavy Trucks:* | 40.262 |

***FHWA Noise Model Calculations***

| *VehicleType* | *REMEL* | *Traffic Flow* | *Distance* | *Finite Road* | *Fresnel* | *Barrier Atten* | *Berm Atten* |
|---|---|---|---|---|---|---|---|
| *Autos:* | 66.51 | 0.62 | 1.28 | -1.20 | *-4.61* | 0.000 | 0.000 |
| *Medium Trucks:* | 77.72 | -16.62 | 1.31 | -1.20 | *-4.87* | 0.000 | 0.000 |
| *Heavy Trucks:* | 82.99 | -20.57 | 1.31 | -1.20 | *-5.50* | 0.000 | 0.000 |

***Unmitigated Noise Levels (without Topo and barrier attenuation)***

| *VehicleType* | *Leq Peak Hour* | *Leq Day* | *Leq Evening* | *Leq Night* | *Ldn* | *CNEL* |
|---|---|---|---|---|---|---|
| *Autos:* | 67.2 | 66.3 | 64.6 | 58.5 | 67.1 | 67.7 |
| *Medium Trucks:* | 61.2 | 60.7 | 54.4 | 52.8 | 61.3 | 61.5 |
| *Heavy Trucks:* | 62.5 | 62.1 | 53.1 | 54.3 | 62.7 | 62.8 |
| *Vehicle Noise:* | 69.2 | 68.5 | 65.2 | 60.7 | 69.2 | 69.7 |

***Centerline Distance to Noise Contour (in feet)***

| | *70 dBA* | *65 dBA* | *60 dBA* | *55 dBA* |
|---|---|---|---|---|
| *Ldn:* | 39 | 84 | 182 | 391 |
| *CNEL:* | 42 | 90 | 194 | 419 |



## FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

*Scenario:* E
*Road Name:* Campus Av.
*Road Segment:* n/o 14th St.
*Project Name:* Upland Colonies
*Job Number:* 14319

### SITE SPECIFIC INPUT DATA

***Highway Data***

| | |
|---|---|
| *Average Daily Traffic (Adt):* | 19,427 vehicles |
| *Peak Hour Percentage:* | 7.90% |
| *Peak Hour Volume:* | 1,535 vehicles |
| *Vehicle Speed:* | 40 mph |
| *Near/Far Lane Distance:* | 36 feet |

***Site Data***

| | |
|---|---|
| ***Barrier Height:*** | **0.0 feet** |
| *Barrier Type (0-Wall, 1-Berm):* | 0.0 |
| *Centerline Dist. to Barrier:* | 44.0 feet |
| *Centerline Dist. to Observer:* | 44.0 feet |
| *Barrier Distance to Observer:* | 0.0 feet |
| *Observer Height (Above Pad):* | 5.0 feet |
| *Pad Elevation:* | 0.0 feet |
| *Road Elevation:* | 0.0 feet |
| *Road Grade:* | 0.0% |
| *Left View:* | -90.0 degrees |
| *Right View:* | 90.0 degrees |

### NOISE MODEL INPUTS

***Site Conditions (Hard = 10, Soft = 15)***

| | |
|---|---|
| *Autos:* | 15 |
| *Medium Trucks (2 Axles):* | 15 |
| *Heavy Trucks (3+ Axles):* | 15 |

***Vehicle Mix***

| *VehicleType* | *Day* | *Evening* | *Night* | *Daily* |
|---|---|---|---|---|
| *Autos:* | 77.5% | 12.9% | 9.6% | 97.42% |
| *Medium Trucks:* | 84.8% | 4.9% | 10.3% | 1.84% |
| *Heavy Trucks:* | 86.5% | 2.7% | 10.8% | 0.74% |

***Noise Source Elevations (in feet)***

| | | | |
|---|---|---|---|
| *Autos:* | 0.000 | | |
| *Medium Trucks:* | 2.297 | | |
| *Heavy Trucks:* | 8.006 | *Grade Adjustment:* | 0.0 |

***Lane Equivalent Distance (in feet)***

| | |
|---|---|
| *Autos:* | 40.460 |
| *Medium Trucks:* | 40.241 |
| *Heavy Trucks:* | 40.262 |

***FHWA Noise Model Calculations***

| *VehicleType* | *REMEL* | *Traffic Flow* | *Distance* | *Finite Road* | *Fresnel* | *Barrier Atten* | *Berm Atten* |
|---|---|---|---|---|---|---|---|
| *Autos:* | 66.51 | 0.42 | 1.28 | -1.20 | *-4.61* | 0.000 | 0.000 |
| *Medium Trucks:* | 77.72 | -16.82 | 1.31 | -1.20 | *-4.87* | 0.000 | 0.000 |
| *Heavy Trucks:* | 82.99 | -20.77 | 1.31 | -1.20 | *-5.50* | 0.000 | 0.000 |

***Unmitigated Noise Levels (without Topo and barrier attenuation)***

| *VehicleType* | *Leq Peak Hour* | *Leq Day* | *Leq Evening* | *Leq Night* | *Ldn* | *CNEL* |
|---|---|---|---|---|---|---|
| *Autos:* | 67.0 | 66.1 | 64.4 | 58.3 | 66.9 | 67.5 |
| *Medium Trucks:* | 61.0 | 60.5 | 54.2 | 52.6 | 61.1 | 61.3 |
| *Heavy Trucks:* | 62.3 | 61.9 | 52.9 | 54.1 | 62.5 | 62.6 |
| *Vehicle Noise:* | 69.0 | 68.3 | 65.0 | 60.5 | 69.0 | 69.5 |

***Centerline Distance to Noise Contour (in feet)***

| | *70 dBA* | *65 dBA* | *60 dBA* | *55 dBA* |
|---|---|---|---|---|
| *Ldn:* | 38 | 82 | 176 | 379 |
| *CNEL:* | 41 | 87 | 188 | 406 |



## FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

*Scenario:* E
*Road Name:* Campus Av.
*Road Segment:* s/o 14th St.
*Project Name:* Upland Colonies
*Job Number:* 14319

### SITE SPECIFIC INPUT DATA

***Highway Data***

| | |
|---|---|
| *Average Daily Traffic (Adt):* | 16,608 vehicles |
| *Peak Hour Percentage:* | 7.90% |
| *Peak Hour Volume:* | 1,312 vehicles |
| *Vehicle Speed:* | 40 mph |
| *Near/Far Lane Distance:* | 36 feet |

***Site Data***

| | |
|---|---|
| ***Barrier Height:*** | **0.0 feet** |
| *Barrier Type (0-Wall, 1-Berm):* | 0.0 |
| *Centerline Dist. to Barrier:* | 44.0 feet |
| *Centerline Dist. to Observer:* | 44.0 feet |
| *Barrier Distance to Observer:* | 0.0 feet |
| *Observer Height (Above Pad):* | 5.0 feet |
| *Pad Elevation:* | 0.0 feet |
| *Road Elevation:* | 0.0 feet |
| *Road Grade:* | 0.0% |
| *Left View:* | -90.0 degrees |
| *Right View:* | 90.0 degrees |

### NOISE MODEL INPUTS

***Site Conditions (Hard = 10, Soft = 15)***

| | |
|---|---|
| *Autos:* | 15 |
| *Medium Trucks (2 Axles):* | 15 |
| *Heavy Trucks (3+ Axles):* | 15 |

***Vehicle Mix***

| *VehicleType* | *Day* | *Evening* | *Night* | *Daily* |
|---|---|---|---|---|
| *Autos:* | 77.5% | 12.9% | 9.6% | 97.42% |
| *Medium Trucks:* | 84.8% | 4.9% | 10.3% | 1.84% |
| *Heavy Trucks:* | 86.5% | 2.7% | 10.8% | 0.74% |

***Noise Source Elevations (in feet)***

| | | | |
|---|---|---|---|
| *Autos:* | 0.000 | | |
| *Medium Trucks:* | 2.297 | | |
| *Heavy Trucks:* | 8.006 | *Grade Adjustment:* | 0.0 |

***Lane Equivalent Distance (in feet)***

| | |
|---|---|
| *Autos:* | 40.460 |
| *Medium Trucks:* | 40.241 |
| *Heavy Trucks:* | 40.262 |

***FHWA Noise Model Calculations***

| *VehicleType* | *REMEL* | *Traffic Flow* | *Distance* | *Finite Road* | *Fresnel* | *Barrier Atten* | *Berm Atten* |
|---|---|---|---|---|---|---|---|
| *Autos:* | 66.51 | -0.26 | 1.28 | -1.20 | *-4.61* | 0.000 | 0.000 |
| *Medium Trucks:* | 77.72 | -17.50 | 1.31 | -1.20 | *-4.87* | 0.000 | 0.000 |
| *Heavy Trucks:* | 82.99 | -21.45 | 1.31 | -1.20 | *-5.50* | 0.000 | 0.000 |

***Unmitigated Noise Levels (without Topo and barrier attenuation)***

| *VehicleType* | *Leq Peak Hour* | *Leq Day* | *Leq Evening* | *Leq Night* | *Ldn* | *CNEL* |
|---|---|---|---|---|---|---|
| *Autos:* | 66.3 | 65.5 | 63.7 | 57.6 | 66.3 | 66.9 |
| *Medium Trucks:* | 60.3 | 59.8 | 53.5 | 51.9 | 60.4 | 60.6 |
| *Heavy Trucks:* | 61.6 | 61.2 | 52.2 | 53.5 | 61.8 | 61.9 |
| *Vehicle Noise:* | 68.3 | 67.6 | 64.4 | 59.8 | 68.3 | 68.8 |

***Centerline Distance to Noise Contour (in feet)***

| | *70 dBA* | *65 dBA* | *60 dBA* | *55 dBA* |
|---|---|---|---|---|
| *Ldn:* | 34 | 74 | 158 | 341 |
| *CNEL:* | 37 | 79 | 170 | 366 |

## FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

*Scenario:* E
*Road Name:* 16th St.
*Road Segment:* w/o Campus Av.

*Project Name:* Upland Colonies
*Job Number:* 14319

### SITE SPECIFIC INPUT DATA

***Highway Data***

| | |
|---|---|
| *Average Daily Traffic (Adt):* | 22,614 vehicles |
| *Peak Hour Percentage:* | 7.90% |
| *Peak Hour Volume:* | 1,787 vehicles |
| *Vehicle Speed:* | 45 mph |
| *Near/Far Lane Distance:* | 36 feet |

***Site Data***

| | |
|---|---|
| ***Barrier Height:*** | **0.0 feet** |
| *Barrier Type (0-Wall, 1-Berm):* | 0.0 |
| *Centerline Dist. to Barrier:* | 44.0 feet |
| *Centerline Dist. to Observer:* | 44.0 feet |
| *Barrier Distance to Observer:* | 0.0 feet |
| *Observer Height (Above Pad):* | 5.0 feet |
| *Pad Elevation:* | 0.0 feet |
| *Road Elevation:* | 0.0 feet |
| *Road Grade:* | 0.0% |
| *Left View:* | -90.0 degrees |
| *Right View:* | 90.0 degrees |

### NOISE MODEL INPUTS

***Site Conditions (Hard = 10, Soft = 15)***

| | |
|---|---|
| *Autos:* | 15 |
| *Medium Trucks (2 Axles):* | 15 |
| *Heavy Trucks (3+ Axles):* | 15 |

***Vehicle Mix***

| *VehicleType* | *Day* | *Evening* | *Night* | *Daily* |
|---|---|---|---|---|
| *Autos:* | 77.5% | 12.9% | 9.6% | 97.42% |
| *Medium Trucks:* | 84.8% | 4.9% | 10.3% | 1.84% |
| *Heavy Trucks:* | 86.5% | 2.7% | 10.8% | 0.74% |

***Noise Source Elevations (in feet)***

| | | | |
|---|---|---|---|
| *Autos:* | 0.000 | | |
| *Medium Trucks:* | 2.297 | | |
| *Heavy Trucks:* | 8.006 | *Grade Adjustment:* | 0.0 |

***Lane Equivalent Distance (in feet)***

| | |
|---|---|
| *Autos:* | 40.460 |
| *Medium Trucks:* | 40.241 |
| *Heavy Trucks:* | 40.262 |

***FHWA Noise Model Calculations***

| *VehicleType* | *REMEL* | *Traffic Flow* | *Distance* | *Finite Road* | *Fresnel* | *Barrier Atten* | *Berm Atten* |
|---|---|---|---|---|---|---|---|
| *Autos:* | 68.46 | 0.57 | 1.28 | -1.20 | *-4.61* | 0.000 | 0.000 |
| *Medium Trucks:* | 79.45 | -16.67 | 1.31 | -1.20 | *-4.87* | 0.000 | 0.000 |
| *Heavy Trucks:* | 84.25 | -20.63 | 1.31 | -1.20 | *-5.50* | 0.000 | 0.000 |

***Unmitigated Noise Levels (without Topo and barrier attenuation)***

| *VehicleType* | *Leq Peak Hour* | *Leq Day* | *Leq Evening* | *Leq Night* | *Ldn* | *CNEL* |
|---|---|---|---|---|---|---|
| *Autos:* | 69.1 | 68.2 | 66.5 | 60.4 | 69.0 | 69.6 |
| *Medium Trucks:* | 62.9 | 62.4 | 56.0 | 54.5 | 63.0 | 63.2 |
| *Heavy Trucks:* | 63.7 | 63.3 | 54.3 | 55.6 | 63.9 | 64.0 |
| *Vehicle Noise:* | 71.0 | 70.2 | 67.1 | 62.4 | 70.9 | 71.4 |

***Centerline Distance to Noise Contour (in feet)***

| | *70 dBA* | *65 dBA* | *60 dBA* | *55 dBA* |
|---|---|---|---|---|
| *Ldn:* | 51 | 110 | 236 | 509 |
| *CNEL:* | 55 | 118 | 253 | 546 |



## FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

*Scenario:* E
*Road Name:* 16th St.
*Road Segment:* e/o Campus Av.

*Project Name:* Upland Colonies
*Job Number:* 14319

### SITE SPECIFIC INPUT DATA

***Highway Data***

| | |
|---|---|
| *Average Daily Traffic (Adt):* | 23,465 vehicles |
| *Peak Hour Percentage:* | 7.90% |
| *Peak Hour Volume:* | 1,854 vehicles |
| *Vehicle Speed:* | 45 mph |
| *Near/Far Lane Distance:* | 36 feet |

***Site Data***

| | |
|---|---|
| ***Barrier Height:*** | **0.0 feet** |
| *Barrier Type (0-Wall, 1-Berm):* | 0.0 |
| *Centerline Dist. to Barrier:* | 44.0 feet |
| *Centerline Dist. to Observer:* | 44.0 feet |
| *Barrier Distance to Observer:* | 0.0 feet |
| *Observer Height (Above Pad):* | 5.0 feet |
| *Pad Elevation:* | 0.0 feet |
| *Road Elevation:* | 0.0 feet |
| *Road Grade:* | 0.0% |
| *Left View:* | -90.0 degrees |
| *Right View:* | 90.0 degrees |

### NOISE MODEL INPUTS

***Site Conditions (Hard = 10, Soft = 15)***

| | |
|---|---|
| *Autos:* | 15 |
| *Medium Trucks (2 Axles):* | 15 |
| *Heavy Trucks (3+ Axles):* | 15 |

***Vehicle Mix***

| *VehicleType* | *Day* | *Evening* | *Night* | *Daily* |
|---|---|---|---|---|
| *Autos:* | 77.5% | 12.9% | 9.6% | 97.42% |
| *Medium Trucks:* | 84.8% | 4.9% | 10.3% | 1.84% |
| *Heavy Trucks:* | 86.5% | 2.7% | 10.8% | 0.74% |

***Noise Source Elevations (in feet)***

| | | | |
|---|---|---|---|
| *Autos:* | 0.000 | | |
| *Medium Trucks:* | 2.297 | | |
| *Heavy Trucks:* | 8.006 | *Grade Adjustment:* | 0.0 |

***Lane Equivalent Distance (in feet)***

| | |
|---|---|
| *Autos:* | 40.460 |
| *Medium Trucks:* | 40.241 |
| *Heavy Trucks:* | 40.262 |

***FHWA Noise Model Calculations***

| *VehicleType* | *REMEL* | *Traffic Flow* | *Distance* | *Finite Road* | *Fresnel* | *Barrier Atten* | *Berm Atten* |
|---|---|---|---|---|---|---|---|
| *Autos:* | 68.46 | 0.73 | 1.28 | -1.20 | *-4.61* | 0.000 | 0.000 |
| *Medium Trucks:* | 79.45 | -16.51 | 1.31 | -1.20 | *-4.87* | 0.000 | 0.000 |
| *Heavy Trucks:* | 84.25 | -20.46 | 1.31 | -1.20 | *-5.50* | 0.000 | 0.000 |

***Unmitigated Noise Levels (without Topo and barrier attenuation)***

| *VehicleType* | *Leq Peak Hour* | *Leq Day* | *Leq Evening* | *Leq Night* | *Ldn* | *CNEL* |
|---|---|---|---|---|---|---|
| *Autos:* | 69.3 | 68.4 | 66.6 | 60.6 | 69.2 | 69.8 |
| *Medium Trucks:* | 63.1 | 62.6 | 56.2 | 54.7 | 63.1 | 63.4 |
| *Heavy Trucks:* | 63.9 | 63.5 | 54.5 | 55.7 | 64.1 | 64.2 |
| *Vehicle Noise:* | 71.1 | 70.4 | 67.2 | 62.6 | 71.1 | 71.6 |

***Centerline Distance to Noise Contour (in feet)***

| | *70 dBA* | *65 dBA* | *60 dBA* | *55 dBA* |
|---|---|---|---|---|
| *Ldn:* | 52 | 112 | 242 | 522 |
| *CNEL:* | 56 | 121 | 260 | 559 |



## FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

*Scenario:* E
*Road Name:* 15th St.
*Road Segment:* w/o Campus Av.

*Project Name:* Upland Colonies
*Job Number:* 14319

### SITE SPECIFIC INPUT DATA

***Highway Data***

| | |
|---|---|
| *Average Daily Traffic (Adt):* | 2,870 vehicles |
| *Peak Hour Percentage:* | 7.90% |
| *Peak Hour Volume:* | 227 vehicles |
| *Vehicle Speed:* | 35 mph |
| *Near/Far Lane Distance:* | 12 feet |

***Site Data***

| | |
|---|---|
| ***Barrier Height:*** | **0.0 feet** |
| *Barrier Type (0-Wall, 1-Berm):* | 0.0 |
| *Centerline Dist. to Barrier:* | 33.0 feet |
| *Centerline Dist. to Observer:* | 33.0 feet |
| *Barrier Distance to Observer:* | 0.0 feet |
| *Observer Height (Above Pad):* | 5.0 feet |
| *Pad Elevation:* | 0.0 feet |
| *Road Elevation:* | 0.0 feet |
| *Road Grade:* | 0.0% |
| *Left View:* | -90.0 degrees |
| *Right View:* | 90.0 degrees |

### NOISE MODEL INPUTS

***Site Conditions (Hard = 10, Soft = 15)***

| | |
|---|---|
| *Autos:* | 15 |
| *Medium Trucks (2 Axles):* | 15 |
| *Heavy Trucks (3+ Axles):* | 15 |

***Vehicle Mix***

| *VehicleType* | *Day* | *Evening* | *Night* | *Daily* |
|---|---|---|---|---|
| *Autos:* | 77.5% | 12.9% | 9.6% | 97.42% |
| *Medium Trucks:* | 84.8% | 4.9% | 10.3% | 1.84% |
| *Heavy Trucks:* | 86.5% | 2.7% | 10.8% | 0.74% |

***Noise Source Elevations (in feet)***

| | | | |
|---|---|---|---|
| *Autos:* | 0.000 | | |
| *Medium Trucks:* | 2.297 | | |
| *Heavy Trucks:* | 8.006 | *Grade Adjustment:* | 0.0 |

***Lane Equivalent Distance (in feet)***

| | |
|---|---|
| *Autos:* | 32.833 |
| *Medium Trucks:* | 32.562 |
| *Heavy Trucks:* | 32.589 |

***FHWA Noise Model Calculations***

| *VehicleType* | *REMEL* | *Traffic Flow* | *Distance* | *Finite Road* | *Fresnel* | *Barrier Atten* | *Berm Atten* |
|---|---|---|---|---|---|---|---|
| *Autos:* | 64.30 | -7.31 | 2.64 | -1.20 | *-4.52* | 0.000 | 0.000 |
| *Medium Trucks:* | 75.75 | -24.54 | 2.69 | -1.20 | *-4.86* | 0.000 | 0.000 |
| *Heavy Trucks:* | 81.57 | -28.50 | 2.69 | -1.20 | *-5.69* | 0.000 | 0.000 |

***Unmitigated Noise Levels (without Topo and barrier attenuation)***

| *VehicleType* | *Leq Peak Hour* | *Leq Day* | *Leq Evening* | *Leq Night* | *Ldn* | *CNEL* |
|---|---|---|---|---|---|---|
| *Autos:* | 58.4 | 57.6 | 55.8 | 49.7 | 58.4 | 59.0 |
| *Medium Trucks:* | 52.7 | 52.2 | 45.9 | 44.3 | 52.8 | 53.0 |
| *Heavy Trucks:* | 54.6 | 54.2 | 45.1 | 46.4 | 54.7 | 54.9 |
| *Vehicle Noise:* | 60.7 | 60.0 | 56.5 | 52.2 | 60.7 | 61.1 |

***Centerline Distance to Noise Contour (in feet)***

| | *70 dBA* | *65 dBA* | *60 dBA* | *55 dBA* |
|---|---|---|---|---|
| *Ldn:* | 8 | 17 | 37 | 79 |
| *CNEL:* | 8 | 18 | 39 | 84 |



## FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

*Scenario:* E
*Road Name:* 15th St.
*Road Segment:* e/o Campus Av.

*Project Name:* Upland Colonies
*Job Number:* 14319

### SITE SPECIFIC INPUT DATA

***Highway Data***

| | |
|---|---|
| *Average Daily Traffic (Adt):* | 100 vehicles |
| *Peak Hour Percentage:* | 7.90% |
| *Peak Hour Volume:* | 8 vehicles |
| *Vehicle Speed:* | 25 mph |
| *Near/Far Lane Distance:* | 12 feet |

***Site Data***

| | |
|---|---|
| ***Barrier Height:*** | **0.0 feet** |
| *Barrier Type (0-Wall, 1-Berm):* | 0.0 |
| *Centerline Dist. to Barrier:* | 33.0 feet |
| *Centerline Dist. to Observer:* | 33.0 feet |
| *Barrier Distance to Observer:* | 0.0 feet |
| *Observer Height (Above Pad):* | 5.0 feet |
| *Pad Elevation:* | 0.0 feet |
| *Road Elevation:* | 0.0 feet |
| *Road Grade:* | 0.0% |
| *Left View:* | -90.0 degrees |
| *Right View:* | 90.0 degrees |

### NOISE MODEL INPUTS

***Site Conditions (Hard = 10, Soft = 15)***

| | |
|---|---|
| *Autos:* | 15 |
| *Medium Trucks (2 Axles):* | 15 |
| *Heavy Trucks (3+ Axles):* | 15 |

***Vehicle Mix***

| *VehicleType* | *Day* | *Evening* | *Night* | *Daily* |
|---|---|---|---|---|
| *Autos:* | 77.5% | 12.9% | 9.6% | 97.42% |
| *Medium Trucks:* | 84.8% | 4.9% | 10.3% | 1.84% |
| *Heavy Trucks:* | 86.5% | 2.7% | 10.8% | 0.74% |

***Noise Source Elevations (in feet)***

| | | | |
|---|---|---|---|
| *Autos:* | 0.000 | | |
| *Medium Trucks:* | 2.297 | | |
| *Heavy Trucks:* | 8.006 | *Grade Adjustment:* | 0.0 |

***Lane Equivalent Distance (in feet)***

| | |
|---|---|
| *Autos:* | 32.833 |
| *Medium Trucks:* | 32.562 |
| *Heavy Trucks:* | 32.589 |

***FHWA Noise Model Calculations***

| *VehicleType* | *REMEL* | *Traffic Flow* | *Distance* | *Finite Road* | *Fresnel* | *Barrier Atten* | *Berm Atten* |
|---|---|---|---|---|---|---|---|
| *Autos:* | 58.73 | -20.42 | 2.64 | -1.20 | *-4.52* | 0.000 | 0.000 |
| *Medium Trucks:* | 70.80 | -37.66 | 2.69 | -1.20 | *-4.86* | 0.000 | 0.000 |
| *Heavy Trucks:* | 77.97 | -41.62 | 2.69 | -1.20 | *-5.69* | 0.000 | 0.000 |

***Unmitigated Noise Levels (without Topo and barrier attenuation)***

| *VehicleType* | *Leq Peak Hour* | *Leq Day* | *Leq Evening* | *Leq Night* | *Ldn* | *CNEL* |
|---|---|---|---|---|---|---|
| *Autos:* | 39.7 | 38.9 | 37.1 | 31.1 | 39.7 | 40.3 |
| *Medium Trucks:* | 34.6 | 34.1 | 27.8 | 26.2 | 34.7 | 34.9 |
| *Heavy Trucks:* | 37.8 | 37.4 | 28.4 | 29.7 | 38.0 | 38.1 |
| *Vehicle Noise:* | 42.7 | 42.0 | 38.1 | 34.2 | 42.7 | 43.1 |

***Centerline Distance to Noise Contour (in feet)***

| | *70 dBA* | *65 dBA* | *60 dBA* | *55 dBA* |
|---|---|---|---|---|
| *Ldn:* | 0 | 1 | 2 | 5 |
| *CNEL:* | 1 | 1 | 2 | 5 |

## FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

*Scenario:* E
*Road Name:* 15th St.
*Road Segment:* w/o Grove Av.

*Project Name:* Upland Colonies
*Job Number:* 14319

### SITE SPECIFIC INPUT DATA

***Highway Data***

| | |
|---|---|
| *Average Daily Traffic (Adt):* | 127 vehicles |
| *Peak Hour Percentage:* | 7.90% |
| *Peak Hour Volume:* | 10 vehicles |
| *Vehicle Speed:* | 25 mph |
| *Near/Far Lane Distance:* | 12 feet |

***Site Data***

| | |
|---|---|
| ***Barrier Height:*** | **0.0 feet** |
| *Barrier Type (0-Wall, 1-Berm):* | 0.0 |
| *Centerline Dist. to Barrier:* | 33.0 feet |
| *Centerline Dist. to Observer:* | 33.0 feet |
| *Barrier Distance to Observer:* | 0.0 feet |
| *Observer Height (Above Pad):* | 5.0 feet |
| *Pad Elevation:* | 0.0 feet |
| *Road Elevation:* | 0.0 feet |
| *Road Grade:* | 0.0% |
| *Left View:* | -90.0 degrees |
| *Right View:* | 90.0 degrees |

### NOISE MODEL INPUTS

***Site Conditions (Hard = 10, Soft = 15)***

| | |
|---|---|
| *Autos:* | 15 |
| *Medium Trucks (2 Axles):* | 15 |
| *Heavy Trucks (3+ Axles):* | 15 |

***Vehicle Mix***

| *VehicleType* | *Day* | *Evening* | *Night* | *Daily* |
|---|---|---|---|---|
| *Autos:* | 77.5% | 12.9% | 9.6% | 97.42% |
| *Medium Trucks:* | 84.8% | 4.9% | 10.3% | 1.84% |
| *Heavy Trucks:* | 86.5% | 2.7% | 10.8% | 0.74% |

***Noise Source Elevations (in feet)***

| | | | |
|---|---|---|---|
| *Autos:* | 0.000 | | |
| *Medium Trucks:* | 2.297 | | |
| *Heavy Trucks:* | 8.006 | *Grade Adjustment:* | 0.0 |

***Lane Equivalent Distance (in feet)***

| | |
|---|---|
| *Autos:* | 32.833 |
| *Medium Trucks:* | 32.562 |
| *Heavy Trucks:* | 32.589 |

***FHWA Noise Model Calculations***

| *VehicleType* | *REMEL* | *Traffic Flow* | *Distance* | *Finite Road* | *Fresnel* | *Barrier Atten* | *Berm Atten* |
|---|---|---|---|---|---|---|---|
| *Autos:* | 58.73 | -19.38 | 2.64 | -1.20 | *-4.52* | 0.000 | 0.000 |
| *Medium Trucks:* | 70.80 | -36.62 | 2.69 | -1.20 | *-4.86* | 0.000 | 0.000 |
| *Heavy Trucks:* | 77.97 | -40.58 | 2.69 | -1.20 | *-5.69* | 0.000 | 0.000 |

***Unmitigated Noise Levels (without Topo and barrier attenuation)***

| *VehicleType* | *Leq Peak Hour* | *Leq Day* | *Leq Evening* | *Leq Night* | *Ldn* | *CNEL* |
|---|---|---|---|---|---|---|
| *Autos:* | 40.8 | 39.9 | 38.1 | 32.1 | 40.7 | 41.3 |
| *Medium Trucks:* | 35.7 | 35.2 | 28.8 | 27.3 | 35.7 | 36.0 |
| *Heavy Trucks:* | 38.9 | 38.5 | 29.4 | 30.7 | 39.0 | 39.2 |
| *Vehicle Noise:* | 43.7 | 43.0 | 39.1 | 35.2 | 43.7 | 44.1 |

***Centerline Distance to Noise Contour (in feet)***

| | *70 dBA* | *65 dBA* | *60 dBA* | *55 dBA* |
|---|---|---|---|---|
| *Ldn:* | 1 | 1 | 3 | 6 |
| *CNEL:* | 1 | 1 | 3 | 6 |



## FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

*Scenario:* E
*Road Name:* 14th St.
*Road Segment:* w/o Campus Av.

*Project Name:* Upland Colonies
*Job Number:* 14319

### SITE SPECIFIC INPUT DATA

***Highway Data***

| | |
|---|---|
| *Average Daily Traffic (Adt):* | 3,581 vehicles |
| *Peak Hour Percentage:* | 7.90% |
| *Peak Hour Volume:* | 283 vehicles |
| *Vehicle Speed:* | 35 mph |
| *Near/Far Lane Distance:* | 12 feet |

***Site Data***

| | |
|---|---|
| ***Barrier Height:*** | **0.0 feet** |
| *Barrier Type (0-Wall, 1-Berm):* | 0.0 |
| *Centerline Dist. to Barrier:* | 33.0 feet |
| *Centerline Dist. to Observer:* | 33.0 feet |
| *Barrier Distance to Observer:* | 0.0 feet |
| *Observer Height (Above Pad):* | 5.0 feet |
| *Pad Elevation:* | 0.0 feet |
| *Road Elevation:* | 0.0 feet |
| *Road Grade:* | 0.0% |
| *Left View:* | -90.0 degrees |
| *Right View:* | 90.0 degrees |

### NOISE MODEL INPUTS

***Site Conditions (Hard = 10, Soft = 15)***

| | |
|---|---|
| *Autos:* | 15 |
| *Medium Trucks (2 Axles):* | 15 |
| *Heavy Trucks (3+ Axles):* | 15 |

***Vehicle Mix***

| *VehicleType* | *Day* | *Evening* | *Night* | *Daily* |
|---|---|---|---|---|
| *Autos:* | 77.5% | 12.9% | 9.6% | 97.42% |
| *Medium Trucks:* | 84.8% | 4.9% | 10.3% | 1.84% |
| *Heavy Trucks:* | 86.5% | 2.7% | 10.8% | 0.74% |

***Noise Source Elevations (in feet)***

| | | | |
|---|---|---|---|
| *Autos:* | 0.000 | | |
| *Medium Trucks:* | 2.297 | | |
| *Heavy Trucks:* | 8.006 | *Grade Adjustment:* | 0.0 |

***Lane Equivalent Distance (in feet)***

| | |
|---|---|
| *Autos:* | 32.833 |
| *Medium Trucks:* | 32.562 |
| *Heavy Trucks:* | 32.589 |

***FHWA Noise Model Calculations***

| *VehicleType* | *REMEL* | *Traffic Flow* | *Distance* | *Finite Road* | *Fresnel* | *Barrier Atten* | *Berm Atten* |
|---|---|---|---|---|---|---|---|
| *Autos:* | 64.30 | -6.34 | 2.64 | -1.20 | *-4.52* | 0.000 | 0.000 |
| *Medium Trucks:* | 75.75 | -23.58 | 2.69 | -1.20 | *-4.86* | 0.000 | 0.000 |
| *Heavy Trucks:* | 81.57 | -27.54 | 2.69 | -1.20 | *-5.69* | 0.000 | 0.000 |

***Unmitigated Noise Levels (without Topo and barrier attenuation)***

| *VehicleType* | *Leq Peak Hour* | *Leq Day* | *Leq Evening* | *Leq Night* | *Ldn* | *CNEL* |
|---|---|---|---|---|---|---|
| *Autos:* | 59.4 | 58.5 | 56.8 | 50.7 | 59.3 | 59.9 |
| *Medium Trucks:* | 53.7 | 53.2 | 46.8 | 45.3 | 53.7 | 54.0 |
| *Heavy Trucks:* | 55.5 | 55.1 | 46.1 | 47.3 | 55.7 | 55.8 |
| *Vehicle Noise:* | 61.6 | 60.9 | 57.5 | 53.1 | 61.6 | 62.1 |

***Centerline Distance to Noise Contour (in feet)***

| | *70 dBA* | *65 dBA* | *60 dBA* | *55 dBA* |
|---|---|---|---|---|
| *Ldn:* | 9 | 20 | 43 | 92 |
| *CNEL:* | 10 | 21 | 45 | 98 |



## FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

*Scenario:* E+P
*Road Name:* Campus Av.
*Road Segment:* n/o 16th St.

*Project Name:* Upland Colonies
*Job Number:* 14319

### SITE SPECIFIC INPUT DATA

***Highway Data***

| | |
|---|---|
| *Average Daily Traffic (Adt):* | 21,084 vehicles |
| *Peak Hour Percentage:* | 7.90% |
| *Peak Hour Volume:* | 1,666 vehicles |
| *Vehicle Speed:* | 40 mph |
| *Near/Far Lane Distance:* | 36 feet |

***Site Data***

| | |
|---|---|
| ***Barrier Height:*** | **0.0 feet** |
| *Barrier Type (0-Wall, 1-Berm):* | 0.0 |
| *Centerline Dist. to Barrier:* | 44.0 feet |
| *Centerline Dist. to Observer:* | 44.0 feet |
| *Barrier Distance to Observer:* | 0.0 feet |
| *Observer Height (Above Pad):* | 5.0 feet |
| *Pad Elevation:* | 0.0 feet |
| *Road Elevation:* | 0.0 feet |
| *Road Grade:* | 0.0% |
| *Left View:* | -90.0 degrees |
| *Right View:* | 90.0 degrees |

### NOISE MODEL INPUTS

***Site Conditions (Hard = 10, Soft = 15)***

| | |
|---|---|
| *Autos:* | 15 |
| *Medium Trucks (2 Axles):* | 15 |
| *Heavy Trucks (3+ Axles):* | 15 |

***Vehicle Mix***

| *VehicleType* | *Day* | *Evening* | *Night* | *Daily* |
|---|---|---|---|---|
| *Autos:* | 77.5% | 12.9% | 9.6% | 97.42% |
| *Medium Trucks:* | 84.8% | 4.9% | 10.3% | 1.84% |
| *Heavy Trucks:* | 86.5% | 2.7% | 10.8% | 0.74% |

***Noise Source Elevations (in feet)***

| | | | |
|---|---|---|---|
| *Autos:* | 0.000 | | |
| *Medium Trucks:* | 2.297 | | |
| *Heavy Trucks:* | 8.006 | *Grade Adjustment:* | 0.0 |

***Lane Equivalent Distance (in feet)***

| | |
|---|---|
| *Autos:* | 40.460 |
| *Medium Trucks:* | 40.241 |
| *Heavy Trucks:* | 40.262 |

***FHWA Noise Model Calculations***

| *VehicleType* | *REMEL* | *Traffic Flow* | *Distance* | *Finite Road* | *Fresnel* | *Barrier Atten* | *Berm Atten* |
|---|---|---|---|---|---|---|---|
| *Autos:* | 66.51 | 0.78 | 1.28 | -1.20 | *-4.61* | 0.000 | 0.000 |
| *Medium Trucks:* | 77.72 | -16.46 | 1.31 | -1.20 | *-4.87* | 0.000 | 0.000 |
| *Heavy Trucks:* | 82.99 | -20.42 | 1.31 | -1.20 | *-5.50* | 0.000 | 0.000 |

***Unmitigated Noise Levels (without Topo and barrier attenuation)***

| *VehicleType* | *Leq Peak Hour* | *Leq Day* | *Leq Evening* | *Leq Night* | *Ldn* | *CNEL* |
|---|---|---|---|---|---|---|
| *Autos:* | 67.4 | 66.5 | 64.7 | 58.7 | 67.3 | 67.9 |
| *Medium Trucks:* | 61.4 | 60.9 | 54.5 | 53.0 | 61.4 | 61.7 |
| *Heavy Trucks:* | 62.7 | 62.3 | 53.3 | 54.5 | 62.9 | 63.0 |
| *Vehicle Noise:* | 69.4 | 68.7 | 65.4 | 60.8 | 69.4 | 69.8 |

***Centerline Distance to Noise Contour (in feet)***

| | *70 dBA* | *65 dBA* | *60 dBA* | *55 dBA* |
|---|---|---|---|---|
| *Ldn:* | 40 | 86 | 186 | 400 |
| *CNEL:* | 43 | 92 | 199 | 429 |



## FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

*Scenario:* E+P
*Road Name:* Campus Av.
*Road Segment:* s/o 16th St.

*Project Name:* Upland Colonies
*Job Number:* 14319

### SITE SPECIFIC INPUT DATA

***Highway Data***

| | |
|---|---|
| *Average Daily Traffic (Adt):* | 20,630 vehicles |
| *Peak Hour Percentage:* | 7.90% |
| *Peak Hour Volume:* | 1,630 vehicles |
| *Vehicle Speed:* | 40 mph |
| *Near/Far Lane Distance:* | 36 feet |

***Site Data***

| | |
|---|---|
| ***Barrier Height:*** | **0.0 feet** |
| *Barrier Type (0-Wall, 1-Berm):* | 0.0 |
| *Centerline Dist. to Barrier:* | 44.0 feet |
| *Centerline Dist. to Observer:* | 44.0 feet |
| *Barrier Distance to Observer:* | 0.0 feet |
| *Observer Height (Above Pad):* | 5.0 feet |
| *Pad Elevation:* | 0.0 feet |
| *Road Elevation:* | 0.0 feet |
| *Road Grade:* | 0.0% |
| *Left View:* | -90.0 degrees |
| *Right View:* | 90.0 degrees |

### NOISE MODEL INPUTS

***Site Conditions (Hard = 10, Soft = 15)***

| | |
|---|---|
| *Autos:* | 15 |
| *Medium Trucks (2 Axles):* | 15 |
| *Heavy Trucks (3+ Axles):* | 15 |

***Vehicle Mix***

| *VehicleType* | *Day* | *Evening* | *Night* | *Daily* |
|---|---|---|---|---|
| *Autos:* | 77.5% | 12.9% | 9.6% | 97.42% |
| *Medium Trucks:* | 84.8% | 4.9% | 10.3% | 1.84% |
| *Heavy Trucks:* | 86.5% | 2.7% | 10.8% | 0.74% |

***Noise Source Elevations (in feet)***

| | | | |
|---|---|---|---|
| *Autos:* | 0.000 | | |
| *Medium Trucks:* | 2.297 | | |
| *Heavy Trucks:* | 8.006 | *Grade Adjustment:* | 0.0 |

***Lane Equivalent Distance (in feet)***

| | |
|---|---|
| *Autos:* | 40.460 |
| *Medium Trucks:* | 40.241 |
| *Heavy Trucks:* | 40.262 |

***FHWA Noise Model Calculations***

| *VehicleType* | *REMEL* | *Traffic Flow* | *Distance* | *Finite Road* | *Fresnel* | *Barrier Atten* | *Berm Atten* |
|---|---|---|---|---|---|---|---|
| *Autos:* | 66.51 | 0.68 | 1.28 | -1.20 | *-4.61* | 0.000 | 0.000 |
| *Medium Trucks:* | 77.72 | -16.56 | 1.31 | -1.20 | *-4.87* | 0.000 | 0.000 |
| *Heavy Trucks:* | 82.99 | -20.51 | 1.31 | -1.20 | *-5.50* | 0.000 | 0.000 |

***Unmitigated Noise Levels (without Topo and barrier attenuation)***

| *VehicleType* | *Leq Peak Hour* | *Leq Day* | *Leq Evening* | *Leq Night* | *Ldn* | *CNEL* |
|---|---|---|---|---|---|---|
| *Autos:* | 67.3 | 66.4 | 64.6 | 58.6 | 67.2 | 67.8 |
| *Medium Trucks:* | 61.3 | 60.8 | 54.4 | 52.9 | 61.3 | 61.6 |
| *Heavy Trucks:* | 62.6 | 62.2 | 53.2 | 54.4 | 62.8 | 62.9 |
| *Vehicle Noise:* | 69.3 | 68.6 | 65.3 | 60.8 | 69.3 | 69.7 |

***Centerline Distance to Noise Contour (in feet)***

| | *70 dBA* | *65 dBA* | *60 dBA* | *55 dBA* |
|---|---|---|---|---|
| *Ldn:* | 39 | 85 | 183 | 395 |
| *CNEL:* | 42 | 91 | 196 | 422 |

## FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

*Scenario:* E+P
*Road Name:* Campus Av.
*Road Segment:* n/o 14th St.

*Project Name:* Upland Colonies
*Job Number:* 14319

### SITE SPECIFIC INPUT DATA

***Highway Data***

| | |
|---|---|
| *Average Daily Traffic (Adt):* | 19,733 vehicles |
| *Peak Hour Percentage:* | 7.90% |
| *Peak Hour Volume:* | 1,559 vehicles |
| *Vehicle Speed:* | 40 mph |
| *Near/Far Lane Distance:* | 36 feet |

***Site Data***

| | |
|---|---|
| ***Barrier Height:*** | **0.0 feet** |
| *Barrier Type (0-Wall, 1-Berm):* | 0.0 |
| *Centerline Dist. to Barrier:* | 44.0 feet |
| *Centerline Dist. to Observer:* | 44.0 feet |
| *Barrier Distance to Observer:* | 0.0 feet |
| *Observer Height (Above Pad):* | 5.0 feet |
| *Pad Elevation:* | 0.0 feet |
| *Road Elevation:* | 0.0 feet |
| *Road Grade:* | 0.0% |
| *Left View:* | -90.0 degrees |
| *Right View:* | 90.0 degrees |

### NOISE MODEL INPUTS

***Site Conditions (Hard = 10, Soft = 15)***

| | |
|---|---|
| *Autos:* | 15 |
| *Medium Trucks (2 Axles):* | 15 |
| *Heavy Trucks (3+ Axles):* | 15 |

***Vehicle Mix***

| *VehicleType* | *Day* | *Evening* | *Night* | *Daily* |
|---|---|---|---|---|
| *Autos:* | 77.5% | 12.9% | 9.6% | 97.42% |
| *Medium Trucks:* | 84.8% | 4.9% | 10.3% | 1.84% |
| *Heavy Trucks:* | 86.5% | 2.7% | 10.8% | 0.74% |

***Noise Source Elevations (in feet)***

| | | | |
|---|---|---|---|
| *Autos:* | 0.000 | | |
| *Medium Trucks:* | 2.297 | | |
| *Heavy Trucks:* | 8.006 | *Grade Adjustment:* | 0.0 |

***Lane Equivalent Distance (in feet)***

| | |
|---|---|
| *Autos:* | 40.460 |
| *Medium Trucks:* | 40.241 |
| *Heavy Trucks:* | 40.262 |

***FHWA Noise Model Calculations***

| *VehicleType* | *REMEL* | *Traffic Flow* | *Distance* | *Finite Road* | *Fresnel* | *Barrier Atten* | *Berm Atten* |
|---|---|---|---|---|---|---|---|
| *Autos:* | 66.51 | 0.49 | 1.28 | -1.20 | *-4.61* | 0.000 | 0.000 |
| *Medium Trucks:* | 77.72 | -16.75 | 1.31 | -1.20 | *-4.87* | 0.000 | 0.000 |
| *Heavy Trucks:* | 82.99 | -20.71 | 1.31 | -1.20 | *-5.50* | 0.000 | 0.000 |

***Unmitigated Noise Levels (without Topo and barrier attenuation)***

| *VehicleType* | *Leq Peak Hour* | *Leq Day* | *Leq Evening* | *Leq Night* | *Ldn* | *CNEL* |
|---|---|---|---|---|---|---|
| *Autos:* | 67.1 | 66.2 | 64.4 | 58.4 | 67.0 | 67.6 |
| *Medium Trucks:* | 61.1 | 60.6 | 54.2 | 52.7 | 61.1 | 61.4 |
| *Heavy Trucks:* | 62.4 | 62.0 | 53.0 | 54.2 | 62.6 | 62.7 |
| *Vehicle Noise:* | 69.1 | 68.4 | 65.1 | 60.6 | 69.1 | 69.5 |

***Centerline Distance to Noise Contour (in feet)***

| | *70 dBA* | *65 dBA* | *60 dBA* | *55 dBA* |
|---|---|---|---|---|
| *Ldn:* | 38 | 83 | 178 | 383 |
| *CNEL:* | 41 | 88 | 190 | 410 |



## FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

*Scenario:* E+P
*Road Name:* Campus Av.
*Road Segment:* s/o 14th St.

*Project Name:* Upland Colonies
*Job Number:* 14319

### SITE SPECIFIC INPUT DATA

***Highway Data***

| | |
|---|---|
| *Average Daily Traffic (Adt):* | 16,730 vehicles |
| *Peak Hour Percentage:* | 7.90% |
| *Peak Hour Volume:* | 1,322 vehicles |
| *Vehicle Speed:* | 40 mph |
| *Near/Far Lane Distance:* | 36 feet |

***Site Data***

| | |
|---|---|
| ***Barrier Height:*** | **0.0 feet** |
| *Barrier Type (0-Wall, 1-Berm):* | 0.0 |
| *Centerline Dist. to Barrier:* | 44.0 feet |
| *Centerline Dist. to Observer:* | 44.0 feet |
| *Barrier Distance to Observer:* | 0.0 feet |
| *Observer Height (Above Pad):* | 5.0 feet |
| *Pad Elevation:* | 0.0 feet |
| *Road Elevation:* | 0.0 feet |
| *Road Grade:* | 0.0% |
| *Left View:* | -90.0 degrees |
| *Right View:* | 90.0 degrees |

### NOISE MODEL INPUTS

***Site Conditions (Hard = 10, Soft = 15)***

| | |
|---|---|
| *Autos:* | 15 |
| *Medium Trucks (2 Axles):* | 15 |
| *Heavy Trucks (3+ Axles):* | 15 |

***Vehicle Mix***

| *VehicleType* | *Day* | *Evening* | *Night* | *Daily* |
|---|---|---|---|---|
| *Autos:* | 77.5% | 12.9% | 9.6% | 97.42% |
| *Medium Trucks:* | 84.8% | 4.9% | 10.3% | 1.84% |
| *Heavy Trucks:* | 86.5% | 2.7% | 10.8% | 0.74% |

***Noise Source Elevations (in feet)***

| | | | |
|---|---|---|---|
| *Autos:* | 0.000 | | |
| *Medium Trucks:* | 2.297 | | |
| *Heavy Trucks:* | 8.006 | *Grade Adjustment:* | 0.0 |

***Lane Equivalent Distance (in feet)***

| | |
|---|---|
| *Autos:* | 40.460 |
| *Medium Trucks:* | 40.241 |
| *Heavy Trucks:* | 40.262 |

***FHWA Noise Model Calculations***

| *VehicleType* | *REMEL* | *Traffic Flow* | *Distance* | *Finite Road* | *Fresnel* | *Barrier Atten* | *Berm Atten* |
|---|---|---|---|---|---|---|---|
| *Autos:* | 66.51 | -0.23 | 1.28 | -1.20 | *-4.61* | 0.000 | 0.000 |
| *Medium Trucks:* | 77.72 | -17.47 | 1.31 | -1.20 | *-4.87* | 0.000 | 0.000 |
| *Heavy Trucks:* | 82.99 | -21.42 | 1.31 | -1.20 | *-5.50* | 0.000 | 0.000 |

***Unmitigated Noise Levels (without Topo and barrier attenuation)***

| *VehicleType* | *Leq Peak Hour* | *Leq Day* | *Leq Evening* | *Leq Night* | *Ldn* | *CNEL* |
|---|---|---|---|---|---|---|
| *Autos:* | 66.4 | 65.5 | 63.7 | 57.7 | 66.3 | 66.9 |
| *Medium Trucks:* | 60.4 | 59.9 | 53.5 | 52.0 | 60.4 | 60.7 |
| *Heavy Trucks:* | 61.7 | 61.3 | 52.2 | 53.5 | 61.9 | 62.0 |
| *Vehicle Noise:* | 68.4 | 67.7 | 64.4 | 59.8 | 68.4 | 68.8 |

***Centerline Distance to Noise Contour (in feet)***

| | *70 dBA* | *65 dBA* | *60 dBA* | *55 dBA* |
|---|---|---|---|---|
| *Ldn:* | 34 | 74 | 159 | 343 |
| *CNEL:* | 37 | 79 | 171 | 367 |



## FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

*Scenario:* E+P
*Road Name:* 16th St.
*Road Segment:* w/o Campus Av.

*Project Name:* Upland Colonies
*Job Number:* 14319

### SITE SPECIFIC INPUT DATA

***Highway Data***

| | |
|---|---|
| *Average Daily Traffic (Adt):* | 22,644 vehicles |
| *Peak Hour Percentage:* | 7.90% |
| *Peak Hour Volume:* | 1,789 vehicles |
| *Vehicle Speed:* | 45 mph |
| *Near/Far Lane Distance:* | 36 feet |

***Site Data***

| | |
|---|---|
| ***Barrier Height:*** | **0.0 feet** |
| *Barrier Type (0-Wall, 1-Berm):* | 0.0 |
| *Centerline Dist. to Barrier:* | 44.0 feet |
| *Centerline Dist. to Observer:* | 44.0 feet |
| *Barrier Distance to Observer:* | 0.0 feet |
| *Observer Height (Above Pad):* | 5.0 feet |
| *Pad Elevation:* | 0.0 feet |
| *Road Elevation:* | 0.0 feet |
| *Road Grade:* | 0.0% |
| *Left View:* | -90.0 degrees |
| *Right View:* | 90.0 degrees |

### NOISE MODEL INPUTS

***Site Conditions (Hard = 10, Soft = 15)***

| | |
|---|---|
| *Autos:* | 15 |
| *Medium Trucks (2 Axles):* | 15 |
| *Heavy Trucks (3+ Axles):* | 15 |

***Vehicle Mix***

| *VehicleType* | *Day* | *Evening* | *Night* | *Daily* |
|---|---|---|---|---|
| *Autos:* | 77.5% | 12.9% | 9.6% | 97.42% |
| *Medium Trucks:* | 84.8% | 4.9% | 10.3% | 1.84% |
| *Heavy Trucks:* | 86.5% | 2.7% | 10.8% | 0.74% |

***Noise Source Elevations (in feet)***

| | | | |
|---|---|---|---|
| *Autos:* | 0.000 | | |
| *Medium Trucks:* | 2.297 | | |
| *Heavy Trucks:* | 8.006 | *Grade Adjustment:* | 0.0 |

***Lane Equivalent Distance (in feet)***

| | |
|---|---|
| *Autos:* | 40.460 |
| *Medium Trucks:* | 40.241 |
| *Heavy Trucks:* | 40.262 |

***FHWA Noise Model Calculations***

| *VehicleType* | *REMEL* | *Traffic Flow* | *Distance* | *Finite Road* | *Fresnel* | *Barrier Atten* | *Berm Atten* |
|---|---|---|---|---|---|---|---|
| *Autos:* | 68.46 | 0.57 | 1.28 | -1.20 | *-4.61* | 0.000 | 0.000 |
| *Medium Trucks:* | 79.45 | -16.66 | 1.31 | -1.20 | *-4.87* | 0.000 | 0.000 |
| *Heavy Trucks:* | 84.25 | -20.62 | 1.31 | -1.20 | *-5.50* | 0.000 | 0.000 |

***Unmitigated Noise Levels (without Topo and barrier attenuation)***

| *VehicleType* | *Leq Peak Hour* | *Leq Day* | *Leq Evening* | *Leq Night* | *Ldn* | *CNEL* |
|---|---|---|---|---|---|---|
| *Autos:* | 69.1 | 68.2 | 66.5 | 60.4 | 69.0 | 69.6 |
| *Medium Trucks:* | 62.9 | 62.4 | 56.1 | 54.5 | 63.0 | 63.2 |
| *Heavy Trucks:* | 63.7 | 63.3 | 54.3 | 55.6 | 63.9 | 64.0 |
| *Vehicle Noise:* | 71.0 | 70.2 | 67.1 | 62.4 | 71.0 | 71.4 |

***Centerline Distance to Noise Contour (in feet)***

| | *70 dBA* | *65 dBA* | *60 dBA* | *55 dBA* |
|---|---|---|---|---|
| *Ldn:* | 51 | 110 | 236 | 509 |
| *CNEL:* | 55 | 118 | 254 | 546 |



## FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

*Scenario:* E+P
*Road Name:* 16th St.
*Road Segment:* e/o Campus Av.

*Project Name:* Upland Colonies
*Job Number:* 14319

### SITE SPECIFIC INPUT DATA

***Highway Data***

| | |
|---|---|
| *Average Daily Traffic (Adt):* | 23,527 vehicles |
| *Peak Hour Percentage:* | 7.90% |
| *Peak Hour Volume:* | 1,859 vehicles |
| *Vehicle Speed:* | 45 mph |
| *Near/Far Lane Distance:* | 36 feet |

***Site Data***

| | |
|---|---|
| ***Barrier Height:*** | **0.0 feet** |
| *Barrier Type (0-Wall, 1-Berm):* | 0.0 |
| *Centerline Dist. to Barrier:* | 44.0 feet |
| *Centerline Dist. to Observer:* | 44.0 feet |
| *Barrier Distance to Observer:* | 0.0 feet |
| *Observer Height (Above Pad):* | 5.0 feet |
| *Pad Elevation:* | 0.0 feet |
| *Road Elevation:* | 0.0 feet |
| *Road Grade:* | 0.0% |
| *Left View:* | -90.0 degrees |
| *Right View:* | 90.0 degrees |

### NOISE MODEL INPUTS

***Site Conditions (Hard = 10, Soft = 15)***

| | |
|---|---|
| *Autos:* | 15 |
| *Medium Trucks (2 Axles):* | 15 |
| *Heavy Trucks (3+ Axles):* | 15 |

***Vehicle Mix***

| *VehicleType* | *Day* | *Evening* | *Night* | *Daily* |
|---|---|---|---|---|
| *Autos:* | 77.5% | 12.9% | 9.6% | 97.42% |
| *Medium Trucks:* | 84.8% | 4.9% | 10.3% | 1.84% |
| *Heavy Trucks:* | 86.5% | 2.7% | 10.8% | 0.74% |

***Noise Source Elevations (in feet)***

| | | | |
|---|---|---|---|
| *Autos:* | 0.000 | | |
| *Medium Trucks:* | 2.297 | | |
| *Heavy Trucks:* | 8.006 | *Grade Adjustment:* | 0.0 |

***Lane Equivalent Distance (in feet)***

| | |
|---|---|
| *Autos:* | 40.460 |
| *Medium Trucks:* | 40.241 |
| *Heavy Trucks:* | 40.262 |

***FHWA Noise Model Calculations***

| *VehicleType* | *REMEL* | *Traffic Flow* | *Distance* | *Finite Road* | *Fresnel* | *Barrier Atten* | *Berm Atten* |
|---|---|---|---|---|---|---|---|
| *Autos:* | 68.46 | 0.74 | 1.28 | -1.20 | *-4.61* | 0.000 | 0.000 |
| *Medium Trucks:* | 79.45 | -16.50 | 1.31 | -1.20 | *-4.87* | 0.000 | 0.000 |
| *Heavy Trucks:* | 84.25 | -20.45 | 1.31 | -1.20 | *-5.50* | 0.000 | 0.000 |

***Unmitigated Noise Levels (without Topo and barrier attenuation)***

| *VehicleType* | *Leq Peak Hour* | *Leq Day* | *Leq Evening* | *Leq Night* | *Ldn* | *CNEL* |
|---|---|---|---|---|---|---|
| *Autos:* | 69.3 | 68.4 | 66.6 | 60.6 | 69.2 | 69.8 |
| *Medium Trucks:* | 63.1 | 62.6 | 56.2 | 54.7 | 63.1 | 63.4 |
| *Heavy Trucks:* | 63.9 | 63.5 | 54.5 | 55.7 | 64.1 | 64.2 |
| *Vehicle Noise:* | 71.1 | 70.4 | 67.2 | 62.6 | 71.1 | 71.6 |

***Centerline Distance to Noise Contour (in feet)***

| | *70 dBA* | *65 dBA* | *60 dBA* | *55 dBA* |
|---|---|---|---|---|
| *Ldn:* | 52 | 113 | 243 | 522 |
| *CNEL:* | 56 | 121 | 260 | 560 |

## FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

*Scenario:* E+P
*Road Name:* 15th St.
*Road Segment:* w/o Campus Av.
*Project Name:* Upland Colonies
*Job Number:* 14319

### SITE SPECIFIC INPUT DATA

***Highway Data***

| | |
|---|---|
| *Average Daily Traffic (Adt):* | 2,900 vehicles |
| *Peak Hour Percentage:* | 7.90% |
| *Peak Hour Volume:* | 229 vehicles |
| *Vehicle Speed:* | 35 mph |
| *Near/Far Lane Distance:* | 12 feet |

***Site Data***

| | |
|---|---|
| ***Barrier Height:*** | **0.0 feet** |
| *Barrier Type (0-Wall, 1-Berm):* | 0.0 |
| *Centerline Dist. to Barrier:* | 33.0 feet |
| *Centerline Dist. to Observer:* | 33.0 feet |
| *Barrier Distance to Observer:* | 0.0 feet |
| *Observer Height (Above Pad):* | 5.0 feet |
| *Pad Elevation:* | 0.0 feet |
| *Road Elevation:* | 0.0 feet |
| *Road Grade:* | 0.0% |
| *Left View:* | -90.0 degrees |
| *Right View:* | 90.0 degrees |

### NOISE MODEL INPUTS

***Site Conditions (Hard = 10, Soft = 15)***

| | |
|---|---|
| *Autos:* | 15 |
| *Medium Trucks (2 Axles):* | 15 |
| *Heavy Trucks (3+ Axles):* | 15 |

***Vehicle Mix***

| *VehicleType* | *Day* | *Evening* | *Night* | *Daily* |
|---|---|---|---|---|
| *Autos:* | 77.5% | 12.9% | 9.6% | 97.42% |
| *Medium Trucks:* | 84.8% | 4.9% | 10.3% | 1.84% |
| *Heavy Trucks:* | 86.5% | 2.7% | 10.8% | 0.74% |

***Noise Source Elevations (in feet)***

| | | | |
|---|---|---|---|
| *Autos:* | 0.000 | | |
| *Medium Trucks:* | 2.297 | | |
| *Heavy Trucks:* | 8.006 | *Grade Adjustment:* | 0.0 |

***Lane Equivalent Distance (in feet)***

| | |
|---|---|
| *Autos:* | 32.833 |
| *Medium Trucks:* | 32.562 |
| *Heavy Trucks:* | 32.589 |

***FHWA Noise Model Calculations***

| *VehicleType* | *REMEL* | *Traffic Flow* | *Distance* | *Finite Road* | *Fresnel* | *Barrier Atten* | *Berm Atten* |
|---|---|---|---|---|---|---|---|
| *Autos:* | 64.30 | -7.26 | 2.64 | -1.20 | *-4.52* | 0.000 | 0.000 |
| *Medium Trucks:* | 75.75 | -24.50 | 2.69 | -1.20 | *-4.86* | 0.000 | 0.000 |
| *Heavy Trucks:* | 81.57 | -28.45 | 2.69 | -1.20 | *-5.69* | 0.000 | 0.000 |

***Unmitigated Noise Levels (without Topo and barrier attenuation)***

| *VehicleType* | *Leq Peak Hour* | *Leq Day* | *Leq Evening* | *Leq Night* | *Ldn* | *CNEL* |
|---|---|---|---|---|---|---|
| *Autos:* | 58.5 | 57.6 | 55.8 | 49.8 | 58.4 | 59.0 |
| *Medium Trucks:* | 52.7 | 52.3 | 45.9 | 44.4 | 52.8 | 53.0 |
| *Heavy Trucks:* | 54.6 | 54.2 | 45.2 | 46.4 | 54.8 | 54.9 |
| *Vehicle Noise:* | 60.7 | 60.0 | 56.6 | 52.2 | 60.7 | 61.2 |

***Centerline Distance to Noise Contour (in feet)***

| | *70 dBA* | *65 dBA* | *60 dBA* | *55 dBA* |
|---|---|---|---|---|
| *Ldn:* | 8 | 17 | 37 | 80 |
| *CNEL:* | 8 | 18 | 39 | 85 |



## FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

*Scenario:* E+P
*Road Name:* 15th St.
*Road Segment:* e/o Campus Av.
*Project Name:* Upland Colonies
*Job Number:* 14319

### SITE SPECIFIC INPUT DATA

***Highway Data***

| | |
|---|---|
| *Average Daily Traffic (Adt):* | 609 vehicles |
| *Peak Hour Percentage:* | 7.90% |
| *Peak Hour Volume:* | 48 vehicles |
| *Vehicle Speed:* | 25 mph |
| *Near/Far Lane Distance:* | 12 feet |

***Site Data***

| | |
|---|---|
| ***Barrier Height:*** | **0.0 feet** |
| *Barrier Type (0-Wall, 1-Berm):* | 0.0 |
| *Centerline Dist. to Barrier:* | 33.0 feet |
| *Centerline Dist. to Observer:* | 33.0 feet |
| *Barrier Distance to Observer:* | 0.0 feet |
| *Observer Height (Above Pad):* | 5.0 feet |
| *Pad Elevation:* | 0.0 feet |
| *Road Elevation:* | 0.0 feet |
| *Road Grade:* | 0.0% |
| *Left View:* | -90.0 degrees |
| *Right View:* | 90.0 degrees |

### NOISE MODEL INPUTS

***Site Conditions (Hard = 10, Soft = 15)***

| | |
|---|---|
| *Autos:* | 15 |
| *Medium Trucks (2 Axles):* | 15 |
| *Heavy Trucks (3+ Axles):* | 15 |

***Vehicle Mix***

| *VehicleType* | *Day* | *Evening* | *Night* | *Daily* |
|---|---|---|---|---|
| *Autos:* | 77.5% | 12.9% | 9.6% | 97.42% |
| *Medium Trucks:* | 84.8% | 4.9% | 10.3% | 1.84% |
| *Heavy Trucks:* | 86.5% | 2.7% | 10.8% | 0.74% |

***Noise Source Elevations (in feet)***

| | | | |
|---|---|---|---|
| *Autos:* | 0.000 | | |
| *Medium Trucks:* | 2.297 | | |
| *Heavy Trucks:* | 8.006 | *Grade Adjustment:* | 0.0 |

***Lane Equivalent Distance (in feet)***

| | |
|---|---|
| *Autos:* | 32.833 |
| *Medium Trucks:* | 32.562 |
| *Heavy Trucks:* | 32.589 |

***FHWA Noise Model Calculations***

| *VehicleType* | *REMEL* | *Traffic Flow* | *Distance* | *Finite Road* | *Fresnel* | *Barrier Atten* | *Berm Atten* |
|---|---|---|---|---|---|---|---|
| *Autos:* | 58.73 | -12.58 | 2.64 | -1.20 | *-4.52* | 0.000 | 0.000 |
| *Medium Trucks:* | 70.80 | -29.81 | 2.69 | -1.20 | *-4.86* | 0.000 | 0.000 |
| *Heavy Trucks:* | 77.97 | -33.77 | 2.69 | -1.20 | *-5.69* | 0.000 | 0.000 |

***Unmitigated Noise Levels (without Topo and barrier attenuation)***

| *VehicleType* | *Leq Peak Hour* | *Leq Day* | *Leq Evening* | *Leq Night* | *Ldn* | *CNEL* |
|---|---|---|---|---|---|---|
| *Autos:* | 47.6 | 46.7 | 45.0 | 38.9 | 47.5 | 48.1 |
| *Medium Trucks:* | 42.5 | 42.0 | 35.6 | 34.1 | 42.5 | 42.8 |
| *Heavy Trucks:* | 45.7 | 45.3 | 36.3 | 37.5 | 45.9 | 46.0 |
| *Vehicle Noise:* | 50.5 | 49.8 | 45.9 | 42.0 | 50.5 | 50.9 |

***Centerline Distance to Noise Contour (in feet)***

| | *70 dBA* | *65 dBA* | *60 dBA* | *55 dBA* |
|---|---|---|---|---|
| *Ldn:* | 2 | 4 | 8 | 17 |
| *CNEL:* | 2 | 4 | 8 | 18 |



## FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

*Scenario:* E+P
*Road Name:* 15th St.
*Road Segment:* w/o Grove Av.
*Project Name:* Upland Colonies
*Job Number:* 14319

### SITE SPECIFIC INPUT DATA

***Highway Data***

| | |
|---|---|
| *Average Daily Traffic (Adt):* | 219 vehicles |
| *Peak Hour Percentage:* | 7.90% |
| *Peak Hour Volume:* | 17 vehicles |
| *Vehicle Speed:* | 25 mph |
| *Near/Far Lane Distance:* | 12 feet |

***Site Data***

| | |
|---|---|
| ***Barrier Height:*** | **0.0 feet** |
| *Barrier Type (0-Wall, 1-Berm):* | 0.0 |
| *Centerline Dist. to Barrier:* | 33.0 feet |
| *Centerline Dist. to Observer:* | 33.0 feet |
| *Barrier Distance to Observer:* | 0.0 feet |
| *Observer Height (Above Pad):* | 5.0 feet |
| *Pad Elevation:* | 0.0 feet |
| *Road Elevation:* | 0.0 feet |
| *Road Grade:* | 0.0% |
| *Left View:* | -90.0 degrees |
| *Right View:* | 90.0 degrees |

### NOISE MODEL INPUTS

***Site Conditions (Hard = 10, Soft = 15)***

| | |
|---|---|
| *Autos:* | 15 |
| *Medium Trucks (2 Axles):* | 15 |
| *Heavy Trucks (3+ Axles):* | 15 |

***Vehicle Mix***

| *VehicleType* | *Day* | *Evening* | *Night* | *Daily* |
|---|---|---|---|---|
| *Autos:* | 77.5% | 12.9% | 9.6% | 97.42% |
| *Medium Trucks:* | 84.8% | 4.9% | 10.3% | 1.84% |
| *Heavy Trucks:* | 86.5% | 2.7% | 10.8% | 0.74% |

***Noise Source Elevations (in feet)***

| | | | |
|---|---|---|---|
| *Autos:* | 0.000 | | |
| *Medium Trucks:* | 2.297 | | |
| *Heavy Trucks:* | 8.006 | *Grade Adjustment:* | 0.0 |

***Lane Equivalent Distance (in feet)***

| | |
|---|---|
| *Autos:* | 32.833 |
| *Medium Trucks:* | 32.562 |
| *Heavy Trucks:* | 32.589 |

***FHWA Noise Model Calculations***

| *VehicleType* | *REMEL* | *Traffic Flow* | *Distance* | *Finite Road* | *Fresnel* | *Barrier Atten* | *Berm Atten* |
|---|---|---|---|---|---|---|---|
| *Autos:* | 58.73 | -17.02 | 2.64 | -1.20 | *-4.52* | 0.000 | 0.000 |
| *Medium Trucks:* | 70.80 | -34.26 | 2.69 | -1.20 | *-4.86* | 0.000 | 0.000 |
| *Heavy Trucks:* | 77.97 | -38.21 | 2.69 | -1.20 | *-5.69* | 0.000 | 0.000 |

***Unmitigated Noise Levels (without Topo and barrier attenuation)***

| *VehicleType* | *Leq Peak Hour* | *Leq Day* | *Leq Evening* | *Leq Night* | *Ldn* | *CNEL* |
|---|---|---|---|---|---|---|
| *Autos:* | 43.2 | 42.3 | 40.5 | 34.5 | 43.1 | 43.7 |
| *Medium Trucks:* | 38.0 | 37.5 | 31.2 | 29.6 | 38.1 | 38.3 |
| *Heavy Trucks:* | 41.2 | 40.8 | 31.8 | 33.1 | 41.4 | 41.5 |
| *Vehicle Noise:* | 46.1 | 45.4 | 41.5 | 37.6 | 46.1 | 46.5 |

***Centerline Distance to Noise Contour (in feet)***

| | *70 dBA* | *65 dBA* | *60 dBA* | *55 dBA* |
|---|---|---|---|---|
| *Ldn:* | 1 | 2 | 4 | 8 |
| *CNEL:* | 1 | 2 | 4 | 9 |



## FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

*Scenario:* E+P
*Road Name:* 14th St.
*Road Segment:* w/o Campus Av.
*Project Name:* Upland Colonies
*Job Number:* 14319

### SITE SPECIFIC INPUT DATA

***Highway Data***

| | |
|---|---|
| *Average Daily Traffic (Adt):* | 3,673 vehicles |
| *Peak Hour Percentage:* | 7.90% |
| *Peak Hour Volume:* | 290 vehicles |
| *Vehicle Speed:* | 35 mph |
| *Near/Far Lane Distance:* | 12 feet |

***Site Data***

| | |
|---|---|
| ***Barrier Height:*** | **0.0 feet** |
| *Barrier Type (0-Wall, 1-Berm):* | 0.0 |
| *Centerline Dist. to Barrier:* | 33.0 feet |
| *Centerline Dist. to Observer:* | 33.0 feet |
| *Barrier Distance to Observer:* | 0.0 feet |
| *Observer Height (Above Pad):* | 5.0 feet |
| *Pad Elevation:* | 0.0 feet |
| *Road Elevation:* | 0.0 feet |
| *Road Grade:* | 0.0% |
| *Left View:* | -90.0 degrees |
| *Right View:* | 90.0 degrees |

### NOISE MODEL INPUTS

***Site Conditions (Hard = 10, Soft = 15)***

| | |
|---|---|
| *Autos:* | 15 |
| *Medium Trucks (2 Axles):* | 15 |
| *Heavy Trucks (3+ Axles):* | 15 |

***Vehicle Mix***

| *VehicleType* | *Day* | *Evening* | *Night* | *Daily* |
|---|---|---|---|---|
| *Autos:* | 77.5% | 12.9% | 9.6% | 97.42% |
| *Medium Trucks:* | 84.8% | 4.9% | 10.3% | 1.84% |
| *Heavy Trucks:* | 86.5% | 2.7% | 10.8% | 0.74% |

***Noise Source Elevations (in feet)***

| | | | |
|---|---|---|---|
| *Autos:* | 0.000 | | |
| *Medium Trucks:* | 2.297 | | |
| *Heavy Trucks:* | 8.006 | *Grade Adjustment:* | 0.0 |

***Lane Equivalent Distance (in feet)***

| | |
|---|---|
| *Autos:* | 32.833 |
| *Medium Trucks:* | 32.562 |
| *Heavy Trucks:* | 32.589 |

***FHWA Noise Model Calculations***

| *VehicleType* | *REMEL* | *Traffic Flow* | *Distance* | *Finite Road* | *Fresnel* | *Barrier Atten* | *Berm Atten* |
|---|---|---|---|---|---|---|---|
| *Autos:* | 64.30 | -6.23 | 2.64 | -1.20 | *-4.52* | 0.000 | 0.000 |
| *Medium Trucks:* | 75.75 | -23.47 | 2.69 | -1.20 | *-4.86* | 0.000 | 0.000 |
| *Heavy Trucks:* | 81.57 | -27.43 | 2.69 | -1.20 | *-5.69* | 0.000 | 0.000 |

***Unmitigated Noise Levels (without Topo and barrier attenuation)***

| *VehicleType* | *Leq Peak Hour* | *Leq Day* | *Leq Evening* | *Leq Night* | *Ldn* | *CNEL* |
|---|---|---|---|---|---|---|
| *Autos:* | 59.5 | 58.6 | 56.9 | 50.8 | 59.4 | 60.0 |
| *Medium Trucks:* | 53.8 | 53.3 | 46.9 | 45.4 | 53.8 | 54.1 |
| *Heavy Trucks:* | 55.6 | 55.2 | 46.2 | 47.4 | 55.8 | 55.9 |
| *Vehicle Noise:* | 61.7 | 61.1 | 57.6 | 53.2 | 61.8 | 62.2 |

***Centerline Distance to Noise Contour (in feet)***

| | *70 dBA* | *65 dBA* | *60 dBA* | *55 dBA* |
|---|---|---|---|---|
| *Ldn:* | 9 | 20 | 43 | 93 |
| *CNEL:* | 10 | 21 | 46 | 99 |

## FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OYC
Road Name: Campus Av.
Road Segment: n/o 16th St.
Project Name: Upland Colonies
Job Number: 14319

### SITE SPECIFIC INPUT DATA

**Highway Data**

| | |
|---|---|
| Average Daily Traffic (Adt): | 22,885 vehicles |
| Peak Hour Percentage: | 7.90% |
| Peak Hour Volume: | 1,808 vehicles |
| Vehicle Speed: | 40 mph |
| Near/Far Lane Distance: | 36 feet |

**Site Data**

| | |
|---|---|
| **Barrier Height:** | **0.0 feet** |
| Barrier Type (0-Wall, 1-Berm): | 0.0 |
| Centerline Dist. to Barrier: | 44.0 feet |
| Centerline Dist. to Observer: | 44.0 feet |
| Barrier Distance to Observer: | 0.0 feet |
| Observer Height (Above Pad): | 5.0 feet |
| Pad Elevation: | 0.0 feet |
| Road Elevation: | 0.0 feet |
| Road Grade: | 0.0% |
| Left View: | -90.0 degrees |
| Right View: | 90.0 degrees |

### NOISE MODEL INPUTS

**Site Conditions (Hard = 10, Soft = 15)**

| | |
|---|---|
| Autos: | 15 |
| Medium Trucks (2 Axles): | 15 |
| Heavy Trucks (3+ Axles): | 15 |

**Vehicle Mix**

| VehicleType | Day | Evening | Night | Daily |
|---|---|---|---|---|
| Autos: | 77.5% | 12.9% | 9.6% | 97.42% |
| Medium Trucks: | 84.8% | 4.9% | 10.3% | 1.84% |
| Heavy Trucks: | 86.5% | 2.7% | 10.8% | 0.74% |

**Noise Source Elevations (in feet)**

| | | | |
|---|---|---|---|
| Autos: | 0.000 | | |
| Medium Trucks: | 2.297 | | |
| Heavy Trucks: | 8.006 | Grade Adjustment: | 0.0 |

**Lane Equivalent Distance (in feet)**

| | |
|---|---|
| Autos: | 40.460 |
| Medium Trucks: | 40.241 |
| Heavy Trucks: | 40.262 |

**FHWA Noise Model Calculations**

| VehicleType | REMEL | Traffic Flow | Distance | Finite Road | Fresnel | Barrier Atten | Berm Atten |
|---|---|---|---|---|---|---|---|
| Autos: | 66.51 | 1.13 | 1.28 | -1.20 | -4.61 | 0.000 | 0.000 |
| Medium Trucks: | 77.72 | -16.11 | 1.31 | -1.20 | -4.87 | 0.000 | 0.000 |
| Heavy Trucks: | 82.99 | -20.06 | 1.31 | -1.20 | -5.50 | 0.000 | 0.000 |

**Unmitigated Noise Levels (without Topo and barrier attenuation)**

| VehicleType | Leq Peak Hour | Leq Day | Leq Evening | Leq Night | Ldn | CNEL |
|---|---|---|---|---|---|---|
| Autos: | 67.7 | 66.8 | 65.1 | 59.0 | 67.6 | 68.3 |
| Medium Trucks: | 61.7 | 61.2 | 54.9 | 53.3 | 61.8 | 62.0 |
| Heavy Trucks: | 63.0 | 62.6 | 53.6 | 54.9 | 63.2 | 63.3 |
| Vehicle Noise: | 69.7 | 69.0 | 65.7 | 61.2 | 69.7 | 70.2 |

**Centerline Distance to Noise Contour (in feet)**

| | 70 dBA | 65 dBA | 60 dBA | 55 dBA |
|---|---|---|---|---|
| Ldn: | 42 | 91 | 196 | 423 |
| CNEL: | 45 | 98 | 210 | 453 |



## FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OYC
Road Name: Campus Av.
Road Segment: s/o 16th St.
Project Name: Upland Colonies
Job Number: 14319

### SITE SPECIFIC INPUT DATA

**Highway Data**

| | |
|---|---|
| Average Daily Traffic (Adt): | 22,946 vehicles |
| Peak Hour Percentage: | 7.90% |
| Peak Hour Volume: | 1,813 vehicles |
| Vehicle Speed: | 40 mph |
| Near/Far Lane Distance: | 36 feet |

**Site Data**

| | |
|---|---|
| **Barrier Height:** | **0.0 feet** |
| Barrier Type (0-Wall, 1-Berm): | 0.0 |
| Centerline Dist. to Barrier: | 44.0 feet |
| Centerline Dist. to Observer: | 44.0 feet |
| Barrier Distance to Observer: | 0.0 feet |
| Observer Height (Above Pad): | 5.0 feet |
| Pad Elevation: | 0.0 feet |
| Road Elevation: | 0.0 feet |
| Road Grade: | 0.0% |
| Left View: | -90.0 degrees |
| Right View: | 90.0 degrees |

### NOISE MODEL INPUTS

**Site Conditions (Hard = 10, Soft = 15)**

| | |
|---|---|
| Autos: | 15 |
| Medium Trucks (2 Axles): | 15 |
| Heavy Trucks (3+ Axles): | 15 |

**Vehicle Mix**

| VehicleType | Day | Evening | Night | Daily |
|---|---|---|---|---|
| Autos: | 77.5% | 12.9% | 9.6% | 97.42% |
| Medium Trucks: | 84.8% | 4.9% | 10.3% | 1.84% |
| Heavy Trucks: | 86.5% | 2.7% | 10.8% | 0.74% |

**Noise Source Elevations (in feet)**

| | | | |
|---|---|---|---|
| Autos: | 0.000 | | |
| Medium Trucks: | 2.297 | | |
| Heavy Trucks: | 8.006 | Grade Adjustment: | 0.0 |

**Lane Equivalent Distance (in feet)**

| | |
|---|---|
| Autos: | 40.460 |
| Medium Trucks: | 40.241 |
| Heavy Trucks: | 40.262 |

**FHWA Noise Model Calculations**

| VehicleType | REMEL | Traffic Flow | Distance | Finite Road | Fresnel | Barrier Atten | Berm Atten |
|---|---|---|---|---|---|---|---|
| Autos: | 66.51 | 1.14 | 1.28 | -1.20 | -4.61 | 0.000 | 0.000 |
| Medium Trucks: | 77.72 | -16.09 | 1.31 | -1.20 | -4.87 | 0.000 | 0.000 |
| Heavy Trucks: | 82.99 | -20.05 | 1.31 | -1.20 | -5.50 | 0.000 | 0.000 |

**Unmitigated Noise Levels (without Topo and barrier attenuation)**

| VehicleType | Leq Peak Hour | Leq Day | Leq Evening | Leq Night | Ldn | CNEL |
|---|---|---|---|---|---|---|
| Autos: | 67.7 | 66.9 | 65.1 | 59.0 | 67.7 | 68.3 |
| Medium Trucks: | 61.7 | 61.2 | 54.9 | 53.3 | 61.8 | 62.0 |
| Heavy Trucks: | 63.1 | 62.7 | 53.6 | 54.9 | 63.2 | 63.3 |
| Vehicle Noise: | 69.7 | 69.0 | 65.8 | 61.2 | 69.8 | 70.2 |

**Centerline Distance to Noise Contour (in feet)**

| | 70 dBA | 65 dBA | 60 dBA | 55 dBA |
|---|---|---|---|---|
| Ldn: | 42 | 91 | 197 | 424 |
| CNEL: | 45 | 98 | 210 | 453 |



## FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OYC
Road Name: Campus Av.
Road Segment: n/o 14th St.
Project Name: Upland Colonies
Job Number: 14319

### SITE SPECIFIC INPUT DATA

**Highway Data**

| | |
|---|---|
| Average Daily Traffic (Adt): | 22,284 vehicles |
| Peak Hour Percentage: | 7.90% |
| Peak Hour Volume: | 1,760 vehicles |
| Vehicle Speed: | 40 mph |
| Near/Far Lane Distance: | 36 feet |

**Site Data**

| | |
|---|---|
| **Barrier Height:** | **0.0 feet** |
| Barrier Type (0-Wall, 1-Berm): | 0.0 |
| Centerline Dist. to Barrier: | 44.0 feet |
| Centerline Dist. to Observer: | 44.0 feet |
| Barrier Distance to Observer: | 0.0 feet |
| Observer Height (Above Pad): | 5.0 feet |
| Pad Elevation: | 0.0 feet |
| Road Elevation: | 0.0 feet |
| Road Grade: | 0.0% |
| Left View: | -90.0 degrees |
| Right View: | 90.0 degrees |

### NOISE MODEL INPUTS

**Site Conditions (Hard = 10, Soft = 15)**

| | |
|---|---|
| Autos: | 15 |
| Medium Trucks (2 Axles): | 15 |
| Heavy Trucks (3+ Axles): | 15 |

**Vehicle Mix**

| VehicleType | Day | Evening | Night | Daily |
|---|---|---|---|---|
| Autos: | 77.5% | 12.9% | 9.6% | 97.42% |
| Medium Trucks: | 84.8% | 4.9% | 10.3% | 1.84% |
| Heavy Trucks: | 86.5% | 2.7% | 10.8% | 0.74% |

**Noise Source Elevations (in feet)**

| | | | |
|---|---|---|---|
| Autos: | 0.000 | | |
| Medium Trucks: | 2.297 | | |
| Heavy Trucks: | 8.006 | Grade Adjustment: | 0.0 |

**Lane Equivalent Distance (in feet)**

| | |
|---|---|
| Autos: | 40.460 |
| Medium Trucks: | 40.241 |
| Heavy Trucks: | 40.262 |

**FHWA Noise Model Calculations**

| VehicleType | REMEL | Traffic Flow | Distance | Finite Road | Fresnel | Barrier Atten | Berm Atten |
|---|---|---|---|---|---|---|---|
| Autos: | 66.51 | 1.02 | 1.28 | -1.20 | -4.61 | 0.000 | 0.000 |
| Medium Trucks: | 77.72 | -16.22 | 1.31 | -1.20 | -4.87 | 0.000 | 0.000 |
| Heavy Trucks: | 82.99 | -20.18 | 1.31 | -1.20 | -5.50 | 0.000 | 0.000 |

**Unmitigated Noise Levels (without Topo and barrier attenuation)**

| VehicleType | Leq Peak Hour | Leq Day | Leq Evening | Leq Night | Ldn | CNEL |
|---|---|---|---|---|---|---|
| Autos: | 67.6 | 66.7 | 65.0 | 58.9 | 67.5 | 68.1 |
| Medium Trucks: | 61.6 | 61.1 | 54.8 | 53.2 | 61.7 | 61.9 |
| Heavy Trucks: | 62.9 | 62.5 | 53.5 | 54.7 | 63.1 | 63.2 |
| Vehicle Noise: | 69.6 | 68.9 | 65.6 | 61.1 | 69.6 | 70.1 |

**Centerline Distance to Noise Contour (in feet)**

| | 70 dBA | 65 dBA | 60 dBA | 55 dBA |
|---|---|---|---|---|
| Ldn: | 42 | 89 | 193 | 415 |
| CNEL: | 44 | 96 | 206 | 445 |



## FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OYC
Road Name: Campus Av.
Road Segment: s/o 14th St.
Project Name: Upland Colonies
Job Number: 14319

### SITE SPECIFIC INPUT DATA

**Highway Data**

| | |
|---|---|
| Average Daily Traffic (Adt): | 19,613 vehicles |
| Peak Hour Percentage: | 7.90% |
| Peak Hour Volume: | 1,549 vehicles |
| Vehicle Speed: | 40 mph |
| Near/Far Lane Distance: | 36 feet |

**Site Data**

| | |
|---|---|
| **Barrier Height:** | **0.0 feet** |
| Barrier Type (0-Wall, 1-Berm): | 0.0 |
| Centerline Dist. to Barrier: | 44.0 feet |
| Centerline Dist. to Observer: | 44.0 feet |
| Barrier Distance to Observer: | 0.0 feet |
| Observer Height (Above Pad): | 5.0 feet |
| Pad Elevation: | 0.0 feet |
| Road Elevation: | 0.0 feet |
| Road Grade: | 0.0% |
| Left View: | -90.0 degrees |
| Right View: | 90.0 degrees |

### NOISE MODEL INPUTS

**Site Conditions (Hard = 10, Soft = 15)**

| | |
|---|---|
| Autos: | 15 |
| Medium Trucks (2 Axles): | 15 |
| Heavy Trucks (3+ Axles): | 15 |

**Vehicle Mix**

| VehicleType | Day | Evening | Night | Daily |
|---|---|---|---|---|
| Autos: | 77.5% | 12.9% | 9.6% | 97.42% |
| Medium Trucks: | 84.8% | 4.9% | 10.3% | 1.84% |
| Heavy Trucks: | 86.5% | 2.7% | 10.8% | 0.74% |

**Noise Source Elevations (in feet)**

| | | | |
|---|---|---|---|
| Autos: | 0.000 | | |
| Medium Trucks: | 2.297 | | |
| Heavy Trucks: | 8.006 | Grade Adjustment: | 0.0 |

**Lane Equivalent Distance (in feet)**

| | |
|---|---|
| Autos: | 40.460 |
| Medium Trucks: | 40.241 |
| Heavy Trucks: | 40.262 |

**FHWA Noise Model Calculations**

| VehicleType | REMEL | Traffic Flow | Distance | Finite Road | Fresnel | Barrier Atten | Berm Atten |
|---|---|---|---|---|---|---|---|
| Autos: | 66.51 | 0.46 | 1.28 | -1.20 | -4.61 | 0.000 | 0.000 |
| Medium Trucks: | 77.72 | -16.78 | 1.31 | -1.20 | -4.87 | 0.000 | 0.000 |
| Heavy Trucks: | 82.99 | -20.73 | 1.31 | -1.20 | -5.50 | 0.000 | 0.000 |

**Unmitigated Noise Levels (without Topo and barrier attenuation)**

| VehicleType | Leq Peak Hour | Leq Day | Leq Evening | Leq Night | Ldn | CNEL |
|---|---|---|---|---|---|---|
| Autos: | 67.0 | 66.2 | 64.4 | 58.4 | 67.0 | 67.6 |
| Medium Trucks: | 61.1 | 60.6 | 54.2 | 52.7 | 61.1 | 61.4 |
| Heavy Trucks: | 62.4 | 62.0 | 52.9 | 54.2 | 62.5 | 62.7 |
| Vehicle Noise: | 69.1 | 68.4 | 65.1 | 60.5 | 69.1 | 69.5 |

**Centerline Distance to Noise Contour (in feet)**

| | 70 dBA | 65 dBA | 60 dBA | 55 dBA |
|---|---|---|---|---|
| Ldn: | 38 | 82 | 177 | 381 |
| CNEL: | 41 | 88 | 190 | 408 |

## FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

*Scenario:* OYC
*Road Name:* 16th St.
*Road Segment:* w/o Campus Av.

*Project Name:* Upland Colonies
*Job Number:* 14319

### SITE SPECIFIC INPUT DATA

***Highway Data***

| | |
|---|---|
| *Average Daily Traffic (Adt):* | 24,318 vehicles |
| *Peak Hour Percentage:* | 7.90% |
| *Peak Hour Volume:* | 1,921 vehicles |
| *Vehicle Speed:* | 45 mph |
| *Near/Far Lane Distance:* | 36 feet |

***Site Data***

| | |
|---|---|
| ***Barrier Height:*** | **0.0 feet** |
| *Barrier Type (0-Wall, 1-Berm):* | 0.0 |
| *Centerline Dist. to Barrier:* | 44.0 feet |
| *Centerline Dist. to Observer:* | 44.0 feet |
| *Barrier Distance to Observer:* | 0.0 feet |
| *Observer Height (Above Pad):* | 5.0 feet |
| *Pad Elevation:* | 0.0 feet |
| *Road Elevation:* | 0.0 feet |
| *Road Grade:* | 0.0% |
| *Left View:* | -90.0 degrees |
| *Right View:* | 90.0 degrees |

### NOISE MODEL INPUTS

***Site Conditions (Hard = 10, Soft = 15)***

| | |
|---|---|
| *Autos:* | 15 |
| *Medium Trucks (2 Axles):* | 15 |
| *Heavy Trucks (3+ Axles):* | 15 |

***Vehicle Mix***

| *VehicleType* | *Day* | *Evening* | *Night* | *Daily* |
|---|---|---|---|---|
| *Autos:* | 77.5% | 12.9% | 9.6% | 97.42% |
| *Medium Trucks:* | 84.8% | 4.9% | 10.3% | 1.84% |
| *Heavy Trucks:* | 86.5% | 2.7% | 10.8% | 0.74% |

***Noise Source Elevations (in feet)***

| | | | |
|---|---|---|---|
| *Autos:* | 0.000 | | |
| *Medium Trucks:* | 2.297 | | |
| *Heavy Trucks:* | 8.006 | *Grade Adjustment:* | 0.0 |

***Lane Equivalent Distance (in feet)***

| | |
|---|---|
| *Autos:* | 40.460 |
| *Medium Trucks:* | 40.241 |
| *Heavy Trucks:* | 40.262 |

***FHWA Noise Model Calculations***

| *VehicleType* | *REMEL* | *Traffic Flow* | *Distance* | *Finite Road* | *Fresnel* | *Barrier Atten* | *Berm Atten* |
|---|---|---|---|---|---|---|---|
| *Autos:* | 68.46 | 0.88 | 1.28 | -1.20 | *-4.61* | 0.000 | 0.000 |
| *Medium Trucks:* | 79.45 | -16.35 | 1.31 | -1.20 | *-4.87* | 0.000 | 0.000 |
| *Heavy Trucks:* | 84.25 | -20.31 | 1.31 | -1.20 | *-5.50* | 0.000 | 0.000 |

***Unmitigated Noise Levels (without Topo and barrier attenuation)***

| *VehicleType* | *Leq Peak Hour* | *Leq Day* | *Leq Evening* | *Leq Night* | *Ldn* | *CNEL* |
|---|---|---|---|---|---|---|
| *Autos:* | 69.4 | 68.5 | 66.8 | 60.7 | 69.3 | 70.0 |
| *Medium Trucks:* | 63.2 | 62.7 | 56.4 | 54.8 | 63.3 | 63.5 |
| *Heavy Trucks:* | 64.1 | 63.7 | 54.6 | 55.9 | 64.2 | 64.3 |
| *Vehicle Noise:* | 71.3 | 70.5 | 67.4 | 62.7 | 71.3 | 71.7 |

***Centerline Distance to Noise Contour (in feet)***

| | *70 dBA* | *65 dBA* | *60 dBA* | *55 dBA* |
|---|---|---|---|---|
| *Ldn:* | 53 | 115 | 248 | 534 |
| *CNEL:* | 57 | 123 | 266 | 573 |



## FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

*Scenario:* OYC
*Road Name:* 16th St.
*Road Segment:* e/o Campus Av.

*Project Name:* Upland Colonies
*Job Number:* 14319

### SITE SPECIFIC INPUT DATA

***Highway Data***

| | |
|---|---|
| *Average Daily Traffic (Adt):* | 25,221 vehicles |
| *Peak Hour Percentage:* | 7.90% |
| *Peak Hour Volume:* | 1,992 vehicles |
| *Vehicle Speed:* | 45 mph |
| *Near/Far Lane Distance:* | 36 feet |

***Site Data***

| | |
|---|---|
| ***Barrier Height:*** | **0.0 feet** |
| *Barrier Type (0-Wall, 1-Berm):* | 0.0 |
| *Centerline Dist. to Barrier:* | 44.0 feet |
| *Centerline Dist. to Observer:* | 44.0 feet |
| *Barrier Distance to Observer:* | 0.0 feet |
| *Observer Height (Above Pad):* | 5.0 feet |
| *Pad Elevation:* | 0.0 feet |
| *Road Elevation:* | 0.0 feet |
| *Road Grade:* | 0.0% |
| *Left View:* | -90.0 degrees |
| *Right View:* | 90.0 degrees |

### NOISE MODEL INPUTS

***Site Conditions (Hard = 10, Soft = 15)***

| | |
|---|---|
| *Autos:* | 15 |
| *Medium Trucks (2 Axles):* | 15 |
| *Heavy Trucks (3+ Axles):* | 15 |

***Vehicle Mix***

| *VehicleType* | *Day* | *Evening* | *Night* | *Daily* |
|---|---|---|---|---|
| *Autos:* | 77.5% | 12.9% | 9.6% | 97.42% |
| *Medium Trucks:* | 84.8% | 4.9% | 10.3% | 1.84% |
| *Heavy Trucks:* | 86.5% | 2.7% | 10.8% | 0.74% |

***Noise Source Elevations (in feet)***

| | | | |
|---|---|---|---|
| *Autos:* | 0.000 | | |
| *Medium Trucks:* | 2.297 | | |
| *Heavy Trucks:* | 8.006 | *Grade Adjustment:* | 0.0 |

***Lane Equivalent Distance (in feet)***

| | |
|---|---|
| *Autos:* | 40.460 |
| *Medium Trucks:* | 40.241 |
| *Heavy Trucks:* | 40.262 |

***FHWA Noise Model Calculations***

| *VehicleType* | *REMEL* | *Traffic Flow* | *Distance* | *Finite Road* | *Fresnel* | *Barrier Atten* | *Berm Atten* |
|---|---|---|---|---|---|---|---|
| *Autos:* | 68.46 | 1.04 | 1.28 | -1.20 | *-4.61* | 0.000 | 0.000 |
| *Medium Trucks:* | 79.45 | -16.20 | 1.31 | -1.20 | *-4.87* | 0.000 | 0.000 |
| *Heavy Trucks:* | 84.25 | -20.15 | 1.31 | -1.20 | *-5.50* | 0.000 | 0.000 |

***Unmitigated Noise Levels (without Topo and barrier attenuation)***

| *VehicleType* | *Leq Peak Hour* | *Leq Day* | *Leq Evening* | *Leq Night* | *Ldn* | *CNEL* |
|---|---|---|---|---|---|---|
| *Autos:* | 69.6 | 68.7 | 66.9 | 60.9 | 69.5 | 70.1 |
| *Medium Trucks:* | 63.4 | 62.9 | 56.5 | 55.0 | 63.4 | 63.7 |
| *Heavy Trucks:* | 64.2 | 63.8 | 54.8 | 56.0 | 64.4 | 64.5 |
| *Vehicle Noise:* | 71.4 | 70.7 | 67.6 | 62.9 | 71.4 | 71.9 |

***Centerline Distance to Noise Contour (in feet)***

| | *70 dBA* | *65 dBA* | *60 dBA* | *55 dBA* |
|---|---|---|---|---|
| *Ldn:* | 55 | 118 | 254 | 547 |
| *CNEL:* | 59 | 126 | 272 | 587 |



## FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

*Scenario:* OYC
*Road Name:* 15th St.
*Road Segment:* w/o Campus Av.

*Project Name:* Upland Colonies
*Job Number:* 14319

### SITE SPECIFIC INPUT DATA

***Highway Data***

| | |
|---|---|
| *Average Daily Traffic (Adt):* | 3,365 vehicles |
| *Peak Hour Percentage:* | 7.90% |
| *Peak Hour Volume:* | 266 vehicles |
| *Vehicle Speed:* | 35 mph |
| *Near/Far Lane Distance:* | 12 feet |

***Site Data***

| | |
|---|---|
| ***Barrier Height:*** | **0.0 feet** |
| *Barrier Type (0-Wall, 1-Berm):* | 0.0 |
| *Centerline Dist. to Barrier:* | 33.0 feet |
| *Centerline Dist. to Observer:* | 33.0 feet |
| *Barrier Distance to Observer:* | 0.0 feet |
| *Observer Height (Above Pad):* | 5.0 feet |
| *Pad Elevation:* | 0.0 feet |
| *Road Elevation:* | 0.0 feet |
| *Road Grade:* | 0.0% |
| *Left View:* | -90.0 degrees |
| *Right View:* | 90.0 degrees |

### NOISE MODEL INPUTS

***Site Conditions (Hard = 10, Soft = 15)***

| | |
|---|---|
| *Autos:* | 15 |
| *Medium Trucks (2 Axles):* | 15 |
| *Heavy Trucks (3+ Axles):* | 15 |

***Vehicle Mix***

| *VehicleType* | *Day* | *Evening* | *Night* | *Daily* |
|---|---|---|---|---|
| *Autos:* | 77.5% | 12.9% | 9.6% | 97.42% |
| *Medium Trucks:* | 84.8% | 4.9% | 10.3% | 1.84% |
| *Heavy Trucks:* | 86.5% | 2.7% | 10.8% | 0.74% |

***Noise Source Elevations (in feet)***

| | | | |
|---|---|---|---|
| *Autos:* | 0.000 | | |
| *Medium Trucks:* | 2.297 | | |
| *Heavy Trucks:* | 8.006 | *Grade Adjustment:* | 0.0 |

***Lane Equivalent Distance (in feet)***

| | |
|---|---|
| *Autos:* | 32.833 |
| *Medium Trucks:* | 32.562 |
| *Heavy Trucks:* | 32.589 |

***FHWA Noise Model Calculations***

| *VehicleType* | *REMEL* | *Traffic Flow* | *Distance* | *Finite Road* | *Fresnel* | *Barrier Atten* | *Berm Atten* |
|---|---|---|---|---|---|---|---|
| *Autos:* | 64.30 | -6.61 | 2.64 | -1.20 | *-4.52* | 0.000 | 0.000 |
| *Medium Trucks:* | 75.75 | -23.85 | 2.69 | -1.20 | *-4.86* | 0.000 | 0.000 |
| *Heavy Trucks:* | 81.57 | -27.81 | 2.69 | -1.20 | *-5.69* | 0.000 | 0.000 |

***Unmitigated Noise Levels (without Topo and barrier attenuation)***

| *VehicleType* | *Leq Peak Hour* | *Leq Day* | *Leq Evening* | *Leq Night* | *Ldn* | *CNEL* |
|---|---|---|---|---|---|---|
| *Autos:* | 59.1 | 58.3 | 56.5 | 50.4 | 59.1 | 59.7 |
| *Medium Trucks:* | 53.4 | 52.9 | 46.5 | 45.0 | 53.5 | 53.7 |
| *Heavy Trucks:* | 55.2 | 54.8 | 45.8 | 47.1 | 55.4 | 55.5 |
| *Vehicle Noise:* | 61.4 | 60.7 | 57.2 | 52.9 | 61.4 | 61.8 |

***Centerline Distance to Noise Contour (in feet)***

| | *70 dBA* | *65 dBA* | *60 dBA* | *55 dBA* |
|---|---|---|---|---|
| *Ldn:* | 9 | 19 | 41 | 88 |
| *CNEL:* | 9 | 20 | 44 | 94 |



## FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

*Scenario:* OYC
*Road Name:* 15th St.
*Road Segment:* e/o Campus Av.

*Project Name:* Upland Colonies
*Job Number:* 14319

### SITE SPECIFIC INPUT DATA

***Highway Data***

| | |
|---|---|
| *Average Daily Traffic (Adt):* | 105 vehicles |
| *Peak Hour Percentage:* | 7.90% |
| *Peak Hour Volume:* | 8 vehicles |
| *Vehicle Speed:* | 25 mph |
| *Near/Far Lane Distance:* | 12 feet |

***Site Data***

| | |
|---|---|
| ***Barrier Height:*** | **0.0 feet** |
| *Barrier Type (0-Wall, 1-Berm):* | 0.0 |
| *Centerline Dist. to Barrier:* | 33.0 feet |
| *Centerline Dist. to Observer:* | 33.0 feet |
| *Barrier Distance to Observer:* | 0.0 feet |
| *Observer Height (Above Pad):* | 5.0 feet |
| *Pad Elevation:* | 0.0 feet |
| *Road Elevation:* | 0.0 feet |
| *Road Grade:* | 0.0% |
| *Left View:* | -90.0 degrees |
| *Right View:* | 90.0 degrees |

### NOISE MODEL INPUTS

***Site Conditions (Hard = 10, Soft = 15)***

| | |
|---|---|
| *Autos:* | 15 |
| *Medium Trucks (2 Axles):* | 15 |
| *Heavy Trucks (3+ Axles):* | 15 |

***Vehicle Mix***

| *VehicleType* | *Day* | *Evening* | *Night* | *Daily* |
|---|---|---|---|---|
| *Autos:* | 77.5% | 12.9% | 9.6% | 97.42% |
| *Medium Trucks:* | 84.8% | 4.9% | 10.3% | 1.84% |
| *Heavy Trucks:* | 86.5% | 2.7% | 10.8% | 0.74% |

***Noise Source Elevations (in feet)***

| | | | |
|---|---|---|---|
| *Autos:* | 0.000 | | |
| *Medium Trucks:* | 2.297 | | |
| *Heavy Trucks:* | 8.006 | *Grade Adjustment:* | 0.0 |

***Lane Equivalent Distance (in feet)***

| | |
|---|---|
| *Autos:* | 32.833 |
| *Medium Trucks:* | 32.562 |
| *Heavy Trucks:* | 32.589 |

***FHWA Noise Model Calculations***

| *VehicleType* | *REMEL* | *Traffic Flow* | *Distance* | *Finite Road* | *Fresnel* | *Barrier Atten* | *Berm Atten* |
|---|---|---|---|---|---|---|---|
| *Autos:* | 58.73 | -20.21 | 2.64 | -1.20 | *-4.52* | 0.000 | 0.000 |
| *Medium Trucks:* | 70.80 | -37.45 | 2.69 | -1.20 | *-4.86* | 0.000 | 0.000 |
| *Heavy Trucks:* | 77.97 | -41.40 | 2.69 | -1.20 | *-5.69* | 0.000 | 0.000 |

***Unmitigated Noise Levels (without Topo and barrier attenuation)***

| *VehicleType* | *Leq Peak Hour* | *Leq Day* | *Leq Evening* | *Leq Night* | *Ldn* | *CNEL* |
|---|---|---|---|---|---|---|
| *Autos:* | 40.0 | 39.1 | 37.3 | 31.3 | 39.9 | 40.5 |
| *Medium Trucks:* | 34.8 | 34.4 | 28.0 | 26.4 | 34.9 | 35.1 |
| *Heavy Trucks:* | 38.1 | 37.7 | 28.6 | 29.9 | 38.2 | 38.4 |
| *Vehicle Noise:* | 42.9 | 42.2 | 38.3 | 34.4 | 42.9 | 43.3 |

***Centerline Distance to Noise Contour (in feet)***

| | *70 dBA* | *65 dBA* | *60 dBA* | *55 dBA* |
|---|---|---|---|---|
| *Ldn:* | 1 | 1 | 2 | 5 |
| *CNEL:* | 1 | 1 | 3 | 5 |

## FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OYC
Road Name: 15th St.
Road Segment: w/o Grove Av.
Project Name: Upland Colonies
Job Number: 14319

### SITE SPECIFIC INPUT DATA

**Highway Data**

| | |
|---|---|
| Average Daily Traffic (Adt): | 135 vehicles |
| Peak Hour Percentage: | 7.90% |
| Peak Hour Volume: | 11 vehicles |
| Vehicle Speed: | 25 mph |
| Near/Far Lane Distance: | 12 feet |

**Site Data**

| | |
|---|---|
| **Barrier Height:** | **0.0 feet** |
| Barrier Type (0-Wall, 1-Berm): | 0.0 |
| Centerline Dist. to Barrier: | 33.0 feet |
| Centerline Dist. to Observer: | 33.0 feet |
| Barrier Distance to Observer: | 0.0 feet |
| Observer Height (Above Pad): | 5.0 feet |
| Pad Elevation: | 0.0 feet |
| Road Elevation: | 0.0 feet |
| Road Grade: | 0.0% |
| Left View: | -90.0 degrees |
| Right View: | 90.0 degrees |

### NOISE MODEL INPUTS

**Site Conditions (Hard = 10, Soft = 15)**

| | |
|---|---|
| Autos: | 15 |
| Medium Trucks (2 Axles): | 15 |
| Heavy Trucks (3+ Axles): | 15 |

**Vehicle Mix**

| VehicleType | Day | Evening | Night | Daily |
|---|---|---|---|---|
| Autos: | 77.5% | 12.9% | 9.6% | 97.42% |
| Medium Trucks: | 84.8% | 4.9% | 10.3% | 1.84% |
| Heavy Trucks: | 86.5% | 2.7% | 10.8% | 0.74% |

**Noise Source Elevations (in feet)**

| | | | |
|---|---|---|---|
| Autos: | 0.000 | | |
| Medium Trucks: | 2.297 | | |
| Heavy Trucks: | 8.006 | Grade Adjustment: | 0.0 |

**Lane Equivalent Distance (in feet)**

| | |
|---|---|
| Autos: | 32.833 |
| Medium Trucks: | 32.562 |
| Heavy Trucks: | 32.589 |

**FHWA Noise Model Calculations**

| VehicleType | REMEL | Traffic Flow | Distance | Finite Road | Fresnel | Barrier Atten | Berm Atten |
|---|---|---|---|---|---|---|---|
| Autos: | 58.73 | -19.13 | 2.64 | -1.20 | -4.52 | 0.000 | 0.000 |
| Medium Trucks: | 70.80 | -36.37 | 2.69 | -1.20 | -4.86 | 0.000 | 0.000 |
| Heavy Trucks: | 77.97 | -40.32 | 2.69 | -1.20 | -5.69 | 0.000 | 0.000 |

**Unmitigated Noise Levels (without Topo and barrier attenuation)**

| VehicleType | Leq Peak Hour | Leq Day | Leq Evening | Leq Night | Ldn | CNEL |
|---|---|---|---|---|---|---|
| Autos: | 41.0 | 40.2 | 38.4 | 32.3 | 41.0 | 41.6 |
| Medium Trucks: | 35.9 | 35.4 | 29.1 | 27.5 | 36.0 | 36.2 |
| Heavy Trucks: | 39.1 | 38.7 | 29.7 | 31.0 | 39.3 | 39.4 |
| Vehicle Noise: | 43.9 | 43.3 | 39.4 | 35.5 | 44.0 | 44.4 |

**Centerline Distance to Noise Contour (in feet)**

| | 70 dBA | 65 dBA | 60 dBA | 55 dBA |
|---|---|---|---|---|
| Ldn: | 1 | 1 | 3 | 6 |
| CNEL: | 1 | 1 | 3 | 6 |

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## FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OYC
Road Name: 14th St.
Road Segment: w/o Campus Av.
Project Name: Upland Colonies
Job Number: 14319

### SITE SPECIFIC INPUT DATA

**Highway Data**

| | |
|---|---|
| Average Daily Traffic (Adt): | 4,120 vehicles |
| Peak Hour Percentage: | 7.90% |
| Peak Hour Volume: | 325 vehicles |
| Vehicle Speed: | 35 mph |
| Near/Far Lane Distance: | 12 feet |

**Site Data**

| | |
|---|---|
| **Barrier Height:** | **0.0 feet** |
| Barrier Type (0-Wall, 1-Berm): | 0.0 |
| Centerline Dist. to Barrier: | 33.0 feet |
| Centerline Dist. to Observer: | 33.0 feet |
| Barrier Distance to Observer: | 0.0 feet |
| Observer Height (Above Pad): | 5.0 feet |
| Pad Elevation: | 0.0 feet |
| Road Elevation: | 0.0 feet |
| Road Grade: | 0.0% |
| Left View: | -90.0 degrees |
| Right View: | 90.0 degrees |

### NOISE MODEL INPUTS

**Site Conditions (Hard = 10, Soft = 15)**

| | |
|---|---|
| Autos: | 15 |
| Medium Trucks (2 Axles): | 15 |
| Heavy Trucks (3+ Axles): | 15 |

**Vehicle Mix**

| VehicleType | Day | Evening | Night | Daily |
|---|---|---|---|---|
| Autos: | 77.5% | 12.9% | 9.6% | 97.42% |
| Medium Trucks: | 84.8% | 4.9% | 10.3% | 1.84% |
| Heavy Trucks: | 86.5% | 2.7% | 10.8% | 0.74% |

**Noise Source Elevations (in feet)**

| | | | |
|---|---|---|---|
| Autos: | 0.000 | | |
| Medium Trucks: | 2.297 | | |
| Heavy Trucks: | 8.006 | Grade Adjustment: | 0.0 |

**Lane Equivalent Distance (in feet)**

| | |
|---|---|
| Autos: | 32.833 |
| Medium Trucks: | 32.562 |
| Heavy Trucks: | 32.589 |

**FHWA Noise Model Calculations**

| VehicleType | REMEL | Traffic Flow | Distance | Finite Road | Fresnel | Barrier Atten | Berm Atten |
|---|---|---|---|---|---|---|---|
| Autos: | 64.30 | -5.73 | 2.64 | -1.20 | -4.52 | 0.000 | 0.000 |
| Medium Trucks: | 75.75 | -22.97 | 2.69 | -1.20 | -4.86 | 0.000 | 0.000 |
| Heavy Trucks: | 81.57 | -26.93 | 2.69 | -1.20 | -5.69 | 0.000 | 0.000 |

**Unmitigated Noise Levels (without Topo and barrier attenuation)**

| VehicleType | Leq Peak Hour | Leq Day | Leq Evening | Leq Night | Ldn | CNEL |
|---|---|---|---|---|---|---|
| Autos: | 60.0 | 59.1 | 57.4 | 51.3 | 59.9 | 60.5 |
| Medium Trucks: | 54.3 | 53.8 | 47.4 | 45.9 | 54.3 | 54.6 |
| Heavy Trucks: | 56.1 | 55.7 | 46.7 | 47.9 | 56.3 | 56.4 |
| Vehicle Noise: | 62.2 | 61.6 | 58.1 | 53.7 | 62.3 | 62.7 |

**Centerline Distance to Noise Contour (in feet)**

| | 70 dBA | 65 dBA | 60 dBA | 55 dBA |
|---|---|---|---|---|
| Ldn: | 10 | 22 | 47 | 101 |
| CNEL: | 11 | 23 | 50 | 107 |

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## FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OYC+P
Road Name: Campus Av.
Road Segment: n/o 16th St.
Project Name: Upland Colonies
Job Number: 14319

### SITE SPECIFIC INPUT DATA

**Highway Data**

| | |
|---|---|
| Average Daily Traffic (Adt): | 23,069 vehicles |
| Peak Hour Percentage: | 7.90% |
| Peak Hour Volume: | 1,822 vehicles |
| Vehicle Speed: | 40 mph |
| Near/Far Lane Distance: | 36 feet |

**Site Data**

| | |
|---|---|
| **Barrier Height:** | **0.0 feet** |
| Barrier Type (0-Wall, 1-Berm): | 0.0 |
| Centerline Dist. to Barrier: | 44.0 feet |
| Centerline Dist. to Observer: | 44.0 feet |
| Barrier Distance to Observer: | 0.0 feet |
| Observer Height (Above Pad): | 5.0 feet |
| Pad Elevation: | 0.0 feet |
| Road Elevation: | 0.0 feet |
| Road Grade: | 0.0% |
| Left View: | -90.0 degrees |
| Right View: | 90.0 degrees |

### NOISE MODEL INPUTS

**Site Conditions (Hard = 10, Soft = 15)**

| | |
|---|---|
| Autos: | 15 |
| Medium Trucks (2 Axles): | 15 |
| Heavy Trucks (3+ Axles): | 15 |

**Vehicle Mix**

| VehicleType | Day | Evening | Night | Daily |
|---|---|---|---|---|
| Autos: | 77.5% | 12.9% | 9.6% | 97.42% |
| Medium Trucks: | 84.8% | 4.9% | 10.3% | 1.84% |
| Heavy Trucks: | 86.5% | 2.7% | 10.8% | 0.74% |

**Noise Source Elevations (in feet)**

| | | | |
|---|---|---|---|
| Autos: | 0.000 | | |
| Medium Trucks: | 2.297 | | |
| Heavy Trucks: | 8.006 | Grade Adjustment: | 0.0 |

**Lane Equivalent Distance (in feet)**

| | |
|---|---|
| Autos: | 40.460 |
| Medium Trucks: | 40.241 |
| Heavy Trucks: | 40.262 |

**FHWA Noise Model Calculations**

| VehicleType | REMEL | Traffic Flow | Distance | Finite Road | Fresnel | Barrier Atten | Berm Atten |
|---|---|---|---|---|---|---|---|
| Autos: | 66.51 | 1.17 | 1.28 | -1.20 | -4.61 | 0.000 | 0.000 |
| Medium Trucks: | 77.72 | -16.07 | 1.31 | -1.20 | -4.87 | 0.000 | 0.000 |
| Heavy Trucks: | 82.99 | -20.03 | 1.31 | -1.20 | -5.50 | 0.000 | 0.000 |

**Unmitigated Noise Levels (without Topo and barrier attenuation)**

| VehicleType | Leq Peak Hour | Leq Day | Leq Evening | Leq Night | Ldn | CNEL |
|---|---|---|---|---|---|---|
| Autos: | 67.8 | 66.9 | 65.1 | 59.1 | 67.7 | 68.3 |
| Medium Trucks: | 61.8 | 61.3 | 54.9 | 53.4 | 61.8 | 62.1 |
| Heavy Trucks: | 63.1 | 62.7 | 53.6 | 54.9 | 63.2 | 63.4 |
| Vehicle Noise: | 69.8 | 69.1 | 65.8 | 61.2 | 69.8 | 70.2 |

**Centerline Distance to Noise Contour (in feet)**

| | 70 dBA | 65 dBA | 60 dBA | 55 dBA |
|---|---|---|---|---|
| Ldn: | 43 | 92 | 197 | 425 |
| CNEL: | 46 | 98 | 211 | 455 |

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## FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OYC+P
Road Name: Campus Av.
Road Segment: s/o 16th St.
Project Name: Upland Colonies
Job Number: 14319

### SITE SPECIFIC INPUT DATA

**Highway Data**

| | |
|---|---|
| Average Daily Traffic (Adt): | 23,222 vehicles |
| Peak Hour Percentage: | 7.90% |
| Peak Hour Volume: | 1,835 vehicles |
| Vehicle Speed: | 40 mph |
| Near/Far Lane Distance: | 36 feet |

**Site Data**

| | |
|---|---|
| **Barrier Height:** | **0.0 feet** |
| Barrier Type (0-Wall, 1-Berm): | 0.0 |
| Centerline Dist. to Barrier: | 44.0 feet |
| Centerline Dist. to Observer: | 44.0 feet |
| Barrier Distance to Observer: | 0.0 feet |
| Observer Height (Above Pad): | 5.0 feet |
| Pad Elevation: | 0.0 feet |
| Road Elevation: | 0.0 feet |
| Road Grade: | 0.0% |
| Left View: | -90.0 degrees |
| Right View: | 90.0 degrees |

### NOISE MODEL INPUTS

**Site Conditions (Hard = 10, Soft = 15)**

| | |
|---|---|
| Autos: | 15 |
| Medium Trucks (2 Axles): | 15 |
| Heavy Trucks (3+ Axles): | 15 |

**Vehicle Mix**

| VehicleType | Day | Evening | Night | Daily |
|---|---|---|---|---|
| Autos: | 77.5% | 12.9% | 9.6% | 97.42% |
| Medium Trucks: | 84.8% | 4.9% | 10.3% | 1.84% |
| Heavy Trucks: | 86.5% | 2.7% | 10.8% | 0.74% |

**Noise Source Elevations (in feet)**

| | | | |
|---|---|---|---|
| Autos: | 0.000 | | |
| Medium Trucks: | 2.297 | | |
| Heavy Trucks: | 8.006 | Grade Adjustment: | 0.0 |

**Lane Equivalent Distance (in feet)**

| | |
|---|---|
| Autos: | 40.460 |
| Medium Trucks: | 40.241 |
| Heavy Trucks: | 40.262 |

**FHWA Noise Model Calculations**

| VehicleType | REMEL | Traffic Flow | Distance | Finite Road | Fresnel | Barrier Atten | Berm Atten |
|---|---|---|---|---|---|---|---|
| Autos: | 66.51 | 1.20 | 1.28 | -1.20 | -4.61 | 0.000 | 0.000 |
| Medium Trucks: | 77.72 | -16.04 | 1.31 | -1.20 | -4.87 | 0.000 | 0.000 |
| Heavy Trucks: | 82.99 | -20.00 | 1.31 | -1.20 | -5.50 | 0.000 | 0.000 |

**Unmitigated Noise Levels (without Topo and barrier attenuation)**

| VehicleType | Leq Peak Hour | Leq Day | Leq Evening | Leq Night | Ldn | CNEL |
|---|---|---|---|---|---|---|
| Autos: | 67.8 | 66.9 | 65.1 | 59.1 | 67.7 | 68.3 |
| Medium Trucks: | 61.8 | 61.3 | 54.9 | 53.4 | 61.9 | 62.1 |
| Heavy Trucks: | 63.1 | 62.7 | 53.7 | 54.9 | 63.3 | 63.4 |
| Vehicle Noise: | 69.8 | 69.1 | 65.8 | 61.3 | 69.8 | 70.2 |

**Centerline Distance to Noise Contour (in feet)**

| | 70 dBA | 65 dBA | 60 dBA | 55 dBA |
|---|---|---|---|---|
| Ldn: | 43 | 92 | 198 | 427 |
| CNEL: | 46 | 98 | 212 | 457 |

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## FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OYC+P
Road Name: Campus Av.
Road Segment: n/o 14th St.

Project Name: Upland Colonies
Job Number: 14319

### SITE SPECIFIC INPUT DATA

**Highway Data**

| | |
|---|---|
| Average Daily Traffic (Adt): | 22,590 vehicles |
| Peak Hour Percentage: | 7.90% |
| Peak Hour Volume: | 1,785 vehicles |
| Vehicle Speed: | 40 mph |
| Near/Far Lane Distance: | 36 feet |

**Site Data**

| | |
|---|---|
| **Barrier Height:** | **0.0 feet** |
| Barrier Type (0-Wall, 1-Berm): | 0.0 |
| Centerline Dist. to Barrier: | 44.0 feet |
| Centerline Dist. to Observer: | 44.0 feet |
| Barrier Distance to Observer: | 0.0 feet |
| Observer Height (Above Pad): | 5.0 feet |
| Pad Elevation: | 0.0 feet |
| Road Elevation: | 0.0 feet |
| Road Grade: | 0.0% |
| Left View: | -90.0 degrees |
| Right View: | 90.0 degrees |

### NOISE MODEL INPUTS

**Site Conditions (Hard = 10, Soft = 15)**

| | |
|---|---|
| Autos: | 15 |
| Medium Trucks (2 Axles): | 15 |
| Heavy Trucks (3+ Axles): | 15 |

**Vehicle Mix**

| VehicleType | Day | Evening | Night | Daily |
|---|---|---|---|---|
| Autos: | 77.5% | 12.9% | 9.6% | 97.42% |
| Medium Trucks: | 84.8% | 4.9% | 10.3% | 1.84% |
| Heavy Trucks: | 86.5% | 2.7% | 10.8% | 0.74% |

**Noise Source Elevations (in feet)**

| | | | |
|---|---|---|---|
| Autos: | 0.000 | | |
| Medium Trucks: | 2.297 | | |
| Heavy Trucks: | 8.006 | Grade Adjustment: | 0.0 |

**Lane Equivalent Distance (in feet)**

| | |
|---|---|
| Autos: | 40.460 |
| Medium Trucks: | 40.241 |
| Heavy Trucks: | 40.262 |

**FHWA Noise Model Calculations**

| VehicleType | REMEL | Traffic Flow | Distance | Finite Road | Fresnel | Barrier Atten | Berm Atten |
|---|---|---|---|---|---|---|---|
| Autos: | 66.51 | 1.08 | 1.28 | -1.20 | -4.61 | 0.000 | 0.000 |
| Medium Trucks: | 77.72 | -16.16 | 1.31 | -1.20 | -4.87 | 0.000 | 0.000 |
| Heavy Trucks: | 82.99 | -20.12 | 1.31 | -1.20 | -5.50 | 0.000 | 0.000 |

**Unmitigated Noise Levels (without Topo and barrier attenuation)**

| VehicleType | Leq Peak Hour | Leq Day | Leq Evening | Leq Night | Ldn | CNEL |
|---|---|---|---|---|---|---|
| Autos: | 67.7 | 66.8 | 65.0 | 59.0 | 67.6 | 68.2 |
| Medium Trucks: | 61.7 | 61.2 | 54.8 | 53.3 | 61.7 | 62.0 |
| Heavy Trucks: | 63.0 | 62.6 | 53.5 | 54.8 | 63.2 | 63.3 |
| Vehicle Noise: | 69.7 | 69.0 | 65.7 | 61.1 | 69.7 | 70.1 |

**Centerline Distance to Noise Contour (in feet)**

| | 70 dBA | 65 dBA | 60 dBA | 55 dBA |
|---|---|---|---|---|
| Ldn: | 42 | 90 | 195 | 419 |
| CNEL: | 45 | 97 | 208 | 449 |

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## FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OYC+P
Road Name: Campus Av.
Road Segment: s/o 14th St.

Project Name: Upland Colonies
Job Number: 14319

### SITE SPECIFIC INPUT DATA

**Highway Data**

| | |
|---|---|
| Average Daily Traffic (Adt): | 19,735 vehicles |
| Peak Hour Percentage: | 7.90% |
| Peak Hour Volume: | 1,559 vehicles |
| Vehicle Speed: | 40 mph |
| Near/Far Lane Distance: | 36 feet |

**Site Data**

| | |
|---|---|
| **Barrier Height:** | **0.0 feet** |
| Barrier Type (0-Wall, 1-Berm): | 0.0 |
| Centerline Dist. to Barrier: | 44.0 feet |
| Centerline Dist. to Observer: | 44.0 feet |
| Barrier Distance to Observer: | 0.0 feet |
| Observer Height (Above Pad): | 5.0 feet |
| Pad Elevation: | 0.0 feet |
| Road Elevation: | 0.0 feet |
| Road Grade: | 0.0% |
| Left View: | -90.0 degrees |
| Right View: | 90.0 degrees |

### NOISE MODEL INPUTS

**Site Conditions (Hard = 10, Soft = 15)**

| | |
|---|---|
| Autos: | 15 |
| Medium Trucks (2 Axles): | 15 |
| Heavy Trucks (3+ Axles): | 15 |

**Vehicle Mix**

| VehicleType | Day | Evening | Night | Daily |
|---|---|---|---|---|
| Autos: | 77.5% | 12.9% | 9.6% | 97.42% |
| Medium Trucks: | 84.8% | 4.9% | 10.3% | 1.84% |
| Heavy Trucks: | 86.5% | 2.7% | 10.8% | 0.74% |

**Noise Source Elevations (in feet)**

| | | | |
|---|---|---|---|
| Autos: | 0.000 | | |
| Medium Trucks: | 2.297 | | |
| Heavy Trucks: | 8.006 | Grade Adjustment: | 0.0 |

**Lane Equivalent Distance (in feet)**

| | |
|---|---|
| Autos: | 40.460 |
| Medium Trucks: | 40.241 |
| Heavy Trucks: | 40.262 |

**FHWA Noise Model Calculations**

| VehicleType | REMEL | Traffic Flow | Distance | Finite Road | Fresnel | Barrier Atten | Berm Atten |
|---|---|---|---|---|---|---|---|
| Autos: | 66.51 | 0.49 | 1.28 | -1.20 | -4.61 | 0.000 | 0.000 |
| Medium Trucks: | 77.72 | -16.75 | 1.31 | -1.20 | -4.87 | 0.000 | 0.000 |
| Heavy Trucks: | 82.99 | -20.71 | 1.31 | -1.20 | -5.50 | 0.000 | 0.000 |

**Unmitigated Noise Levels (without Topo and barrier attenuation)**

| VehicleType | Leq Peak Hour | Leq Day | Leq Evening | Leq Night | Ldn | CNEL |
|---|---|---|---|---|---|---|
| Autos: | 67.1 | 66.2 | 64.4 | 58.4 | 67.0 | 67.6 |
| Medium Trucks: | 61.1 | 60.6 | 54.2 | 52.7 | 61.1 | 61.4 |
| Heavy Trucks: | 62.4 | 62.0 | 53.0 | 54.2 | 62.6 | 62.7 |
| Vehicle Noise: | 69.1 | 68.4 | 65.1 | 60.6 | 69.1 | 69.5 |

**Centerline Distance to Noise Contour (in feet)**

| | 70 dBA | 65 dBA | 60 dBA | 55 dBA |
|---|---|---|---|---|
| Ldn: | 38 | 83 | 178 | 383 |
| CNEL: | 41 | 88 | 190 | 410 |

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## FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OYC+P
Road Name: 16th St.
Road Segment: w/o Campus Av.

Project Name: Upland Colonies
Job Number: 14319

### SITE SPECIFIC INPUT DATA

**Highway Data**

| | |
|---|---|
| Average Daily Traffic (Adt): | 24,348 vehicles |
| Peak Hour Percentage: | 7.90% |
| Peak Hour Volume: | 1,924 vehicles |
| Vehicle Speed: | 45 mph |
| Near/Far Lane Distance: | 36 feet |

**Site Data**

| | |
|---|---|
| **Barrier Height:** | **0.0 feet** |
| Barrier Type (0-Wall, 1-Berm): | 0.0 |
| Centerline Dist. to Barrier: | 44.0 feet |
| Centerline Dist. to Observer: | 44.0 feet |
| Barrier Distance to Observer: | 0.0 feet |
| Observer Height (Above Pad): | 5.0 feet |
| Pad Elevation: | 0.0 feet |
| Road Elevation: | 0.0 feet |
| Road Grade: | 0.0% |
| Left View: | -90.0 degrees |
| Right View: | 90.0 degrees |

### NOISE MODEL INPUTS

**Site Conditions (Hard = 10, Soft = 15)**

| | |
|---|---|
| Autos: | 15 |
| Medium Trucks (2 Axles): | 15 |
| Heavy Trucks (3+ Axles): | 15 |

**Vehicle Mix**

| VehicleType | Day | Evening | Night | Daily |
|---|---|---|---|---|
| Autos: | 77.5% | 12.9% | 9.6% | 97.42% |
| Medium Trucks: | 84.8% | 4.9% | 10.3% | 1.84% |
| Heavy Trucks: | 86.5% | 2.7% | 10.8% | 0.74% |

**Noise Source Elevations (in feet)**

| | | | |
|---|---|---|---|
| Autos: | 0.000 | | |
| Medium Trucks: | 2.297 | | |
| Heavy Trucks: | 8.006 | Grade Adjustment: | 0.0 |

**Lane Equivalent Distance (in feet)**

| | |
|---|---|
| Autos: | 40.460 |
| Medium Trucks: | 40.241 |
| Heavy Trucks: | 40.262 |

**FHWA Noise Model Calculations**

| VehicleType | REMEL | Traffic Flow | Distance | Finite Road | Fresnel | Barrier Atten | Berm Atten |
|---|---|---|---|---|---|---|---|
| Autos: | 68.46 | 0.89 | 1.28 | -1.20 | -4.61 | 0.000 | 0.000 |
| Medium Trucks: | 79.45 | -16.35 | 1.31 | -1.20 | -4.87 | 0.000 | 0.000 |
| Heavy Trucks: | 84.25 | -20.30 | 1.31 | -1.20 | -5.50 | 0.000 | 0.000 |

**Unmitigated Noise Levels (without Topo and barrier attenuation)**

| VehicleType | Leq Peak Hour | Leq Day | Leq Evening | Leq Night | Ldn | CNEL |
|---|---|---|---|---|---|---|
| Autos: | 69.4 | 68.6 | 66.8 | 60.7 | 69.4 | 70.0 |
| Medium Trucks: | 63.2 | 62.7 | 56.4 | 54.8 | 63.3 | 63.5 |
| Heavy Trucks: | 64.1 | 63.7 | 54.6 | 55.9 | 64.2 | 64.4 |
| Vehicle Noise: | 71.3 | 70.6 | 67.4 | 62.7 | 71.3 | 71.7 |

**Centerline Distance to Noise Contour (in feet)**

| | 70 dBA | 65 dBA | 60 dBA | 55 dBA |
|---|---|---|---|---|
| Ldn: | 53 | 115 | 248 | 535 |
| CNEL: | 57 | 124 | 266 | 573 |

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## FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OYC+P
Road Name: 16th St.
Road Segment: e/o Campus Av.

Project Name: Upland Colonies
Job Number: 14319

### SITE SPECIFIC INPUT DATA

**Highway Data**

| | |
|---|---|
| Average Daily Traffic (Adt): | 25,283 vehicles |
| Peak Hour Percentage: | 7.90% |
| Peak Hour Volume: | 1,997 vehicles |
| Vehicle Speed: | 45 mph |
| Near/Far Lane Distance: | 36 feet |

**Site Data**

| | |
|---|---|
| **Barrier Height:** | **0.0 feet** |
| Barrier Type (0-Wall, 1-Berm): | 0.0 |
| Centerline Dist. to Barrier: | 44.0 feet |
| Centerline Dist. to Observer: | 44.0 feet |
| Barrier Distance to Observer: | 0.0 feet |
| Observer Height (Above Pad): | 5.0 feet |
| Pad Elevation: | 0.0 feet |
| Road Elevation: | 0.0 feet |
| Road Grade: | 0.0% |
| Left View: | -90.0 degrees |
| Right View: | 90.0 degrees |

### NOISE MODEL INPUTS

**Site Conditions (Hard = 10, Soft = 15)**

| | |
|---|---|
| Autos: | 15 |
| Medium Trucks (2 Axles): | 15 |
| Heavy Trucks (3+ Axles): | 15 |

**Vehicle Mix**

| VehicleType | Day | Evening | Night | Daily |
|---|---|---|---|---|
| Autos: | 77.5% | 12.9% | 9.6% | 97.42% |
| Medium Trucks: | 84.8% | 4.9% | 10.3% | 1.84% |
| Heavy Trucks: | 86.5% | 2.7% | 10.8% | 0.74% |

**Noise Source Elevations (in feet)**

| | | | |
|---|---|---|---|
| Autos: | 0.000 | | |
| Medium Trucks: | 2.297 | | |
| Heavy Trucks: | 8.006 | Grade Adjustment: | 0.0 |

**Lane Equivalent Distance (in feet)**

| | |
|---|---|
| Autos: | 40.460 |
| Medium Trucks: | 40.241 |
| Heavy Trucks: | 40.262 |

**FHWA Noise Model Calculations**

| VehicleType | REMEL | Traffic Flow | Distance | Finite Road | Fresnel | Barrier Atten | Berm Atten |
|---|---|---|---|---|---|---|---|
| Autos: | 68.46 | 1.05 | 1.28 | -1.20 | -4.61 | 0.000 | 0.000 |
| Medium Trucks: | 79.45 | -16.18 | 1.31 | -1.20 | -4.87 | 0.000 | 0.000 |
| Heavy Trucks: | 84.25 | -20.14 | 1.31 | -1.20 | -5.50 | 0.000 | 0.000 |

**Unmitigated Noise Levels (without Topo and barrier attenuation)**

| VehicleType | Leq Peak Hour | Leq Day | Leq Evening | Leq Night | Ldn | CNEL |
|---|---|---|---|---|---|---|
| Autos: | 69.6 | 68.7 | 66.9 | 60.9 | 69.5 | 70.1 |
| Medium Trucks: | 63.4 | 62.9 | 56.5 | 55.0 | 63.4 | 63.7 |
| Heavy Trucks: | 64.2 | 63.8 | 54.8 | 56.0 | 64.4 | 64.5 |
| Vehicle Noise: | 71.4 | 70.7 | 67.6 | 62.9 | 71.4 | 71.9 |

**Centerline Distance to Noise Contour (in feet)**

| | 70 dBA | 65 dBA | 60 dBA | 55 dBA |
|---|---|---|---|---|
| Ldn: | 55 | 118 | 254 | 548 |
| CNEL: | 59 | 127 | 273 | 588 |

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## FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OYC+P
Road Name: 15th St.
Road Segment: w/o Campus Av.

Project Name: Upland Colonies
Job Number: 14319

### SITE SPECIFIC INPUT DATA

**Highway Data**

| | |
|---|---|
| Average Daily Traffic (Adt): | 3,395 vehicles |
| Peak Hour Percentage: | 7.90% |
| Peak Hour Volume: | 268 vehicles |
| Vehicle Speed: | 35 mph |
| Near/Far Lane Distance: | 12 feet |

**Site Data**

| | |
|---|---|
| **Barrier Height:** | **0.0 feet** |
| Barrier Type (0-Wall, 1-Berm): | 0.0 |
| Centerline Dist. to Barrier: | 33.0 feet |
| Centerline Dist. to Observer: | 33.0 feet |
| Barrier Distance to Observer: | 0.0 feet |
| Observer Height (Above Pad): | 5.0 feet |
| Pad Elevation: | 0.0 feet |
| Road Elevation: | 0.0 feet |
| Road Grade: | 0.0% |
| Left View: | -90.0 degrees |
| Right View: | 90.0 degrees |

### NOISE MODEL INPUTS

**Site Conditions (Hard = 10, Soft = 15)**

| | |
|---|---|
| Autos: | 15 |
| Medium Trucks (2 Axles): | 15 |
| Heavy Trucks (3+ Axles): | 15 |

**Vehicle Mix**

| VehicleType | Day | Evening | Night | Daily |
|---|---|---|---|---|
| Autos: | 77.5% | 12.9% | 9.6% | 97.42% |
| Medium Trucks: | 84.8% | 4.9% | 10.3% | 1.84% |
| Heavy Trucks: | 86.5% | 2.7% | 10.8% | 0.74% |

**Noise Source Elevations (in feet)**

| | | | |
|---|---|---|---|
| Autos: | 0.000 | | |
| Medium Trucks: | 2.297 | | |
| Heavy Trucks: | 8.006 | Grade Adjustment: | 0.0 |

**Lane Equivalent Distance (in feet)**

| | |
|---|---|
| Autos: | 32.833 |
| Medium Trucks: | 32.562 |
| Heavy Trucks: | 32.589 |

**FHWA Noise Model Calculations**

| VehicleType | REMEL | Traffic Flow | Distance | Finite Road | Fresnel | Barrier Atten | Berm Atten |
|---|---|---|---|---|---|---|---|
| Autos: | 64.30 | -6.57 | 2.64 | -1.20 | -4.52 | 0.000 | 0.000 |
| Medium Trucks: | 75.75 | -23.81 | 2.69 | -1.20 | -4.86 | 0.000 | 0.000 |
| Heavy Trucks: | 81.57 | -27.77 | 2.69 | -1.20 | -5.69 | 0.000 | 0.000 |

**Unmitigated Noise Levels (without Topo and barrier attenuation)**

| VehicleType | Leq Peak Hour | Leq Day | Leq Evening | Leq Night | Ldn | CNEL |
|---|---|---|---|---|---|---|
| Autos: | 59.2 | 58.3 | 56.5 | 50.5 | 59.1 | 59.7 |
| Medium Trucks: | 53.4 | 52.9 | 46.6 | 45.0 | 53.5 | 53.7 |
| Heavy Trucks: | 55.3 | 54.9 | 45.9 | 47.1 | 55.5 | 55.6 |
| Vehicle Noise: | 61.4 | 60.7 | 57.3 | 52.9 | 61.4 | 61.8 |

**Centerline Distance to Noise Contour (in feet)**

| | 70 dBA | 65 dBA | 60 dBA | 55 dBA |
|---|---|---|---|---|
| Ldn: | 9 | 19 | 41 | 88 |
| CNEL: | 9 | 20 | 44 | 94 |



## FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OYC+P
Road Name: 15th St.
Road Segment: e/o Campus Av.

Project Name: Upland Colonies
Job Number: 14319

### SITE SPECIFIC INPUT DATA

**Highway Data**

| | |
|---|---|
| Average Daily Traffic (Adt): | 614 vehicles |
| Peak Hour Percentage: | 7.90% |
| Peak Hour Volume: | 49 vehicles |
| Vehicle Speed: | 25 mph |
| Near/Far Lane Distance: | 12 feet |

**Site Data**

| | |
|---|---|
| **Barrier Height:** | **0.0 feet** |
| Barrier Type (0-Wall, 1-Berm): | 0.0 |
| Centerline Dist. to Barrier: | 33.0 feet |
| Centerline Dist. to Observer: | 33.0 feet |
| Barrier Distance to Observer: | 0.0 feet |
| Observer Height (Above Pad): | 5.0 feet |
| Pad Elevation: | 0.0 feet |
| Road Elevation: | 0.0 feet |
| Road Grade: | 0.0% |
| Left View: | -90.0 degrees |
| Right View: | 90.0 degrees |

### NOISE MODEL INPUTS

**Site Conditions (Hard = 10, Soft = 15)**

| | |
|---|---|
| Autos: | 15 |
| Medium Trucks (2 Axles): | 15 |
| Heavy Trucks (3+ Axles): | 15 |

**Vehicle Mix**

| VehicleType | Day | Evening | Night | Daily |
|---|---|---|---|---|
| Autos: | 77.5% | 12.9% | 9.6% | 97.42% |
| Medium Trucks: | 84.8% | 4.9% | 10.3% | 1.84% |
| Heavy Trucks: | 86.5% | 2.7% | 10.8% | 0.74% |

**Noise Source Elevations (in feet)**

| | | | |
|---|---|---|---|
| Autos: | 0.000 | | |
| Medium Trucks: | 2.297 | | |
| Heavy Trucks: | 8.006 | Grade Adjustment: | 0.0 |

**Lane Equivalent Distance (in feet)**

| | |
|---|---|
| Autos: | 32.833 |
| Medium Trucks: | 32.562 |
| Heavy Trucks: | 32.589 |

**FHWA Noise Model Calculations**

| VehicleType | REMEL | Traffic Flow | Distance | Finite Road | Fresnel | Barrier Atten | Berm Atten |
|---|---|---|---|---|---|---|---|
| Autos: | 58.73 | -12.54 | 2.64 | -1.20 | -4.52 | 0.000 | 0.000 |
| Medium Trucks: | 70.80 | -29.78 | 2.69 | -1.20 | -4.86 | 0.000 | 0.000 |
| Heavy Trucks: | 77.97 | -33.73 | 2.69 | -1.20 | -5.69 | 0.000 | 0.000 |

**Unmitigated Noise Levels (without Topo and barrier attenuation)**

| VehicleType | Leq Peak Hour | Leq Day | Leq Evening | Leq Night | Ldn | CNEL |
|---|---|---|---|---|---|---|
| Autos: | 47.6 | 46.8 | 45.0 | 38.9 | 47.6 | 48.2 |
| Medium Trucks: | 42.5 | 42.0 | 35.7 | 34.1 | 42.6 | 42.8 |
| Heavy Trucks: | 45.7 | 45.3 | 36.3 | 37.5 | 45.9 | 46.0 |
| Vehicle Noise: | 50.5 | 49.9 | 46.0 | 42.1 | 50.6 | 51.0 |

**Centerline Distance to Noise Contour (in feet)**

| | 70 dBA | 65 dBA | 60 dBA | 55 dBA |
|---|---|---|---|---|
| Ldn: | 2 | 4 | 8 | 17 |
| CNEL: | 2 | 4 | 8 | 18 |



## FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OYC+P
Road Name: 15th St.
Road Segment: w/o Grove Av.

Project Name: Upland Colonies
Job Number: 14319

### SITE SPECIFIC INPUT DATA

**Highway Data**

| | |
|---|---|
| Average Daily Traffic (Adt): | 227 vehicles |
| Peak Hour Percentage: | 7.90% |
| Peak Hour Volume: | 18 vehicles |
| Vehicle Speed: | 25 mph |
| Near/Far Lane Distance: | 12 feet |

**Site Data**

| | |
|---|---|
| **Barrier Height:** | **0.0 feet** |
| Barrier Type (0-Wall, 1-Berm): | 0.0 |
| Centerline Dist. to Barrier: | 33.0 feet |
| Centerline Dist. to Observer: | 33.0 feet |
| Barrier Distance to Observer: | 0.0 feet |
| Observer Height (Above Pad): | 5.0 feet |
| Pad Elevation: | 0.0 feet |
| Road Elevation: | 0.0 feet |
| Road Grade: | 0.0% |
| Left View: | -90.0 degrees |
| Right View: | 90.0 degrees |

### NOISE MODEL INPUTS

**Site Conditions (Hard = 10, Soft = 15)**

| | |
|---|---|
| Autos: | 15 |
| Medium Trucks (2 Axles): | 15 |
| Heavy Trucks (3+ Axles): | 15 |

**Vehicle Mix**

| VehicleType | Day | Evening | Night | Daily |
|---|---|---|---|---|
| Autos: | 77.5% | 12.9% | 9.6% | 97.42% |
| Medium Trucks: | 84.8% | 4.9% | 10.3% | 1.84% |
| Heavy Trucks: | 86.5% | 2.7% | 10.8% | 0.74% |

**Noise Source Elevations (in feet)**

| | | | |
|---|---|---|---|
| Autos: | 0.000 | | |
| Medium Trucks: | 2.297 | | |
| Heavy Trucks: | 8.006 | Grade Adjustment: | 0.0 |

**Lane Equivalent Distance (in feet)**

| | |
|---|---|
| Autos: | 32.833 |
| Medium Trucks: | 32.562 |
| Heavy Trucks: | 32.589 |

**FHWA Noise Model Calculations**

| VehicleType | REMEL | Traffic Flow | Distance | Finite Road | Fresnel | Barrier Atten | Berm Atten |
|---|---|---|---|---|---|---|---|
| Autos: | 58.73 | -16.87 | 2.64 | -1.20 | -4.52 | 0.000 | 0.000 |
| Medium Trucks: | 70.80 | -34.10 | 2.69 | -1.20 | -4.86 | 0.000 | 0.000 |
| Heavy Trucks: | 77.97 | -38.06 | 2.69 | -1.20 | -5.69 | 0.000 | 0.000 |

**Unmitigated Noise Levels (without Topo and barrier attenuation)**

| VehicleType | Leq Peak Hour | Leq Day | Leq Evening | Leq Night | Ldn | CNEL |
|---|---|---|---|---|---|---|
| Autos: | 43.3 | 42.4 | 40.7 | 34.6 | 43.2 | 43.8 |
| Medium Trucks: | 38.2 | 37.7 | 31.3 | 29.8 | 38.3 | 38.5 |
| Heavy Trucks: | 41.4 | 41.0 | 32.0 | 33.2 | 41.6 | 41.7 |
| Vehicle Noise: | 46.2 | 45.6 | 41.6 | 37.7 | 46.2 | 46.6 |

**Centerline Distance to Noise Contour (in feet)**

| | 70 dBA | 65 dBA | 60 dBA | 55 dBA |
|---|---|---|---|---|
| Ldn: | 1 | 2 | 4 | 9 |
| CNEL: | 1 | 2 | 4 | 9 |



## FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OYC+P
Road Name: 14th St.
Road Segment: w/o Campus Av.

Project Name: Upland Colonies
Job Number: 14319

### SITE SPECIFIC INPUT DATA

**Highway Data**

| | |
|---|---|
| Average Daily Traffic (Adt): | 4,212 vehicles |
| Peak Hour Percentage: | 7.90% |
| Peak Hour Volume: | 333 vehicles |
| Vehicle Speed: | 35 mph |
| Near/Far Lane Distance: | 12 feet |

**Site Data**

| | |
|---|---|
| **Barrier Height:** | **0.0 feet** |
| Barrier Type (0-Wall, 1-Berm): | 0.0 |
| Centerline Dist. to Barrier: | 33.0 feet |
| Centerline Dist. to Observer: | 33.0 feet |
| Barrier Distance to Observer: | 0.0 feet |
| Observer Height (Above Pad): | 5.0 feet |
| Pad Elevation: | 0.0 feet |
| Road Elevation: | 0.0 feet |
| Road Grade: | 0.0% |
| Left View: | -90.0 degrees |
| Right View: | 90.0 degrees |

### NOISE MODEL INPUTS

**Site Conditions (Hard = 10, Soft = 15)**

| | |
|---|---|
| Autos: | 15 |
| Medium Trucks (2 Axles): | 15 |
| Heavy Trucks (3+ Axles): | 15 |

**Vehicle Mix**

| VehicleType | Day | Evening | Night | Daily |
|---|---|---|---|---|
| Autos: | 77.5% | 12.9% | 9.6% | 97.42% |
| Medium Trucks: | 84.8% | 4.9% | 10.3% | 1.84% |
| Heavy Trucks: | 86.5% | 2.7% | 10.8% | 0.74% |

**Noise Source Elevations (in feet)**

| | | | |
|---|---|---|---|
| Autos: | 0.000 | | |
| Medium Trucks: | 2.297 | | |
| Heavy Trucks: | 8.006 | Grade Adjustment: | 0.0 |

**Lane Equivalent Distance (in feet)**

| | |
|---|---|
| Autos: | 32.833 |
| Medium Trucks: | 32.562 |
| Heavy Trucks: | 32.589 |

**FHWA Noise Model Calculations**

| VehicleType | REMEL | Traffic Flow | Distance | Finite Road | Fresnel | Barrier Atten | Berm Atten |
|---|---|---|---|---|---|---|---|
| Autos: | 64.30 | -5.64 | 2.64 | -1.20 | -4.52 | 0.000 | 0.000 |
| Medium Trucks: | 75.75 | -22.88 | 2.69 | -1.20 | -4.86 | 0.000 | 0.000 |
| Heavy Trucks: | 81.57 | -26.83 | 2.69 | -1.20 | -5.69 | 0.000 | 0.000 |

**Unmitigated Noise Levels (without Topo and barrier attenuation)**

| VehicleType | Leq Peak Hour | Leq Day | Leq Evening | Leq Night | Ldn | CNEL |
|---|---|---|---|---|---|---|
| Autos: | 60.1 | 59.2 | 57.5 | 51.4 | 60.0 | 60.6 |
| Medium Trucks: | 54.4 | 53.9 | 47.5 | 46.0 | 54.4 | 54.7 |
| Heavy Trucks: | 56.2 | 55.8 | 46.8 | 48.0 | 56.4 | 56.5 |
| Vehicle Noise: | 62.3 | 61.7 | 58.2 | 53.8 | 62.4 | 62.8 |

**Centerline Distance to Noise Contour (in feet)**

| | 70 dBA | 65 dBA | 60 dBA | 55 dBA |
|---|---|---|---|---|
| Ldn: | 10 | 22 | 47 | 102 |
| CNEL: | 11 | 23 | 51 | 109 |

# APPENDIX C

# STUDY AREA PHOTOS

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# JN: 14319 Study Area Photos

**L1-E**
**34, 7' 8.710000"117, 38' 9.850000"**

**L1-N**
**34, 7' 8.580000"117, 38' 9.910000"**

**L1-S**
**34, 7' 7.810000"117, 38' 10.460000"**

**L1-W**
**34, 7' 8.700000"117, 38' 9.850000"**

**L2-E**
**34, 7' 7.090000"117, 37' 28.570000"**

**L2-N**
**34, 7' 7.150000"117, 37' 28.540000"**

# JN: 14319 Study Area Photos

**L2-S**
**34, 7' 7.130000"117, 37' 28.540000"**

**L2-W**
**34, 7' 7.080000"117, 37' 28.570000"**

**L3-E**
**34, 7' 5.020000"117, 37' 58.560000"**

**L3-N**
**34, 7' 4.940000"117, 37' 58.590000"**

**L3-S**
**34, 7' 4.940000"117, 37' 58.590000"**

**L3-W**
**34, 7' 5.010000"117, 37' 58.590000"**

# JN: 14319 Study Area Photos

**L4-E**
**34, 7' 4.280000"117, 38' 11.200000"**

**L4-N**
**34, 7' 4.320000"117, 38' 11.200000"**

**L4-S**
**34, 7' 4.280000"117, 38' 11.200000"**

**L4-W**
**34, 7' 4.260000"117, 38' 11.170000"**

**L5-E**
**34, 7' 5.010000"117, 38' 12.460000"**

**L5-N**
**34, 7' 5.050000"117, 38' 12.570000"**

# JN: 14319 Study Area Photos

**L5-S**
**34, 7' 5.020000"117, 38' 12.520000"**

**L5-W**
**34, 7' 4.990000"117, 38' 12.490000"**

# APPENDIX D

# NOISE LEVEL MEASUREMENT WORKSHEETS

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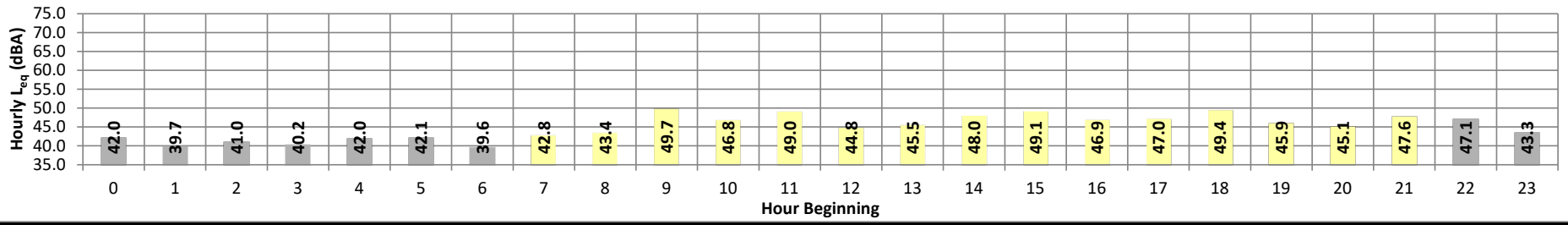
# 24-Hour Noise Level Measurement Summary

*Date:* Tuesday, August 31, 2021 *Location:* L1 - Located north of the Project site near single-family *Meter:* Piccolo II *JN:* 14319

*Project:* Colonies Upland *Source:* residence at 1168 Upland Hills Drive South. *Analyst:* A. Khan

***Hourly $L_{eq}$ dBA Readings (unadjusted)***




| Timeframe | Hour | $L_{eq}$ | $L_{max}$ | $L_{min}$ | L1% | L2% | L5% | L8% | L25% | L50% | L90% | L95% | L99% | $L_{eq}$ | Adj. | Adj. $L_{eq}$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Night | 0 | 42.0 | 58.3 | 44.9 | 57.6 | 56.3 | 53.2 | 52.0 | 49.4 | 47.0 | 45.3 | 45.1 | 45.0 | 42.0 | 10.0 | 52.0 |
| | 1 | 39.7 | 44.5 | 37.1 | 44.1 | 43.7 | 42.7 | 42.1 | 40.3 | 39.0 | 37.6 | 37.4 | 37.2 | 39.7 | 10.0 | 49.7 |
| | 2 | 41.0 | 47.0 | 37.4 | 46.7 | 46.3 | 45.2 | 44.5 | 41.6 | 39.5 | 38.0 | 37.7 | 37.5 | 41.0 | 10.0 | 51.0 |
| | 3 | 40.2 | 49.7 | 36.0 | 49.0 | 47.8 | 44.8 | 43.8 | 39.6 | 38.2 | 36.5 | 36.3 | 36.1 | 40.2 | 10.0 | 50.2 |
| | 4 | 42.0 | 51.8 | 37.4 | 51.3 | 50.5 | 47.5 | 45.6 | 41.0 | 39.3 | 37.9 | 37.7 | 37.4 | 42.0 | 10.0 | 52.0 |
| | 5 | 42.1 | 50.1 | 38.2 | 49.4 | 48.6 | 46.4 | 45.2 | 42.3 | 40.5 | 38.7 | 38.5 | 38.3 | 42.1 | 10.0 | 52.1 |
| | 6 | 39.6 | 46.4 | 36.0 | 46.0 | 45.5 | 44.4 | 43.4 | 39.7 | 37.9 | 36.6 | 36.4 | 36.1 | 39.6 | 10.0 | 49.6 |
| Day | 7 | 42.8 | 51.3 | 37.6 | 50.5 | 49.8 | 47.8 | 46.4 | 42.9 | 40.8 | 38.6 | 38.2 | 37.8 | 42.8 | 0.0 | 42.8 |
| | 8 | 43.4 | 50.2 | 40.1 | 49.6 | 49.0 | 47.3 | 46.2 | 43.7 | 42.3 | 40.8 | 40.6 | 40.2 | 43.4 | 0.0 | 43.4 |
| | 9 | 49.7 | 55.1 | 42.2 | 54.7 | 54.4 | 53.9 | 53.4 | 50.7 | 48.9 | 43.8 | 43.2 | 42.4 | 49.7 | 0.0 | 49.7 |
| | 10 | 46.8 | 55.3 | 41.6 | 54.8 | 54.1 | 52.2 | 50.9 | 46.7 | 44.2 | 42.4 | 42.1 | 41.7 | 46.8 | 0.0 | 46.8 |
| | 11 | 49.0 | 60.7 | 41.2 | 60.1 | 59.2 | 55.7 | 53.2 | 47.0 | 43.9 | 41.9 | 41.7 | 41.4 | 49.0 | 0.0 | 49.0 |
| | 12 | 44.8 | 50.0 | 41.9 | 49.7 | 49.2 | 48.3 | 47.6 | 45.2 | 43.8 | 42.4 | 42.2 | 42.0 | 44.8 | 0.0 | 44.8 |
| | 13 | 45.5 | 53.5 | 41.3 | 52.4 | 51.5 | 49.8 | 48.9 | 45.7 | 44.0 | 42.1 | 41.8 | 41.5 | 45.5 | 0.0 | 45.5 |
| | 14 | 48.0 | 57.1 | 43.8 | 56.6 | 55.9 | 53.7 | 51.9 | 47.2 | 45.4 | 44.3 | 44.1 | 43.9 | 48.0 | 0.0 | 48.0 |
| | 15 | 49.1 | 57.7 | 45.1 | 57.4 | 56.7 | 54.3 | 52.5 | 48.4 | 47.2 | 45.7 | 45.5 | 45.2 | 49.1 | 0.0 | 49.1 |
| | 16 | 46.9 | 53.5 | 43.7 | 53.1 | 52.5 | 50.8 | 49.6 | 47.0 | 45.8 | 44.4 | 44.1 | 43.8 | 46.9 | 0.0 | 46.9 |
| | 17 | 47.0 | 53.8 | 44.2 | 53.3 | 52.6 | 50.9 | 49.7 | 47.1 | 45.9 | 44.8 | 44.6 | 44.4 | 47.0 | 0.0 | 47.0 |
| | 18 | 49.4 | 54.1 | 46.4 | 53.7 | 53.3 | 52.5 | 51.9 | 50.1 | 48.8 | 47.0 | 46.8 | 46.5 | 49.4 | 0.0 | 49.4 |
| | 19 | 45.9 | 51.7 | 42.6 | 51.1 | 50.7 | 49.4 | 48.6 | 46.3 | 45.0 | 43.4 | 43.1 | 42.7 | 45.9 | 5.0 | 50.9 |
| | 20 | 45.1 | 51.3 | 42.6 | 50.5 | 49.6 | 48.0 | 47.0 | 45.4 | 44.4 | 43.3 | 43.1 | 42.8 | 45.1 | 5.0 | 50.1 |
| | 21 | 47.6 | 52.8 | 45.0 | 52.5 | 52.0 | 51.1 | 50.4 | 47.8 | 46.7 | 45.6 | 45.4 | 45.2 | 47.6 | 5.0 | 52.6 |
| Night | 22 | 47.1 | 53.0 | 43.5 | 52.4 | 51.9 | 50.7 | 49.9 | 47.8 | 45.9 | 44.1 | 43.8 | 43.6 | 47.1 | 10.0 | 57.1 |
| | 23 | 43.3 | 49.0 | 39.8 | 48.4 | 48.0 | 47.2 | 46.6 | 44.3 | 41.8 | 40.5 | 40.2 | 39.9 | 43.3 | 10.0 | 53.3 |

| Timeframe | Hour | $L_{eq}$ | $L_{max}$ | $L_{min}$ | L1% | L2% | L5% | L8% | L25% | L50% | L90% | L95% | L99% |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Day | Min | 42.8 | 50.0 | 37.6 | 49.6 | 49.0 | 47.3 | 46.2 | 42.9 | 40.8 | 38.6 | 38.2 | 37.8 |
| | Max | 49.7 | 60.7 | 46.4 | 60.1 | 59.2 | 55.7 | 53.4 | 50.7 | 48.9 | 47.0 | 46.8 | 46.5 |
| Energy Average | | 47.2 | Average: | | 53.3 | 52.7 | 51.0 | 49.9 | 46.7 | 45.1 | 43.4 | 43.1 | 42.8 |
| Night | Min | 39.6 | 44.5 | 36.0 | 44.1 | 43.7 | 42.7 | 42.1 | 39.6 | 37.9 | 36.5 | 36.3 | 36.1 |
| | Max | 47.1 | 58.3 | 44.9 | 57.6 | 56.3 | 53.2 | 52.0 | 49.4 | 47.0 | 45.3 | 45.1 | 45.0 |
| Energy Average | | 42.5 | Average: | | 49.4 | 48.7 | 46.9 | 45.9 | 42.9 | 41.0 | 39.5 | 39.2 | 39.0 |

| $L_{eq}$ (dBA) | | |
|---|---|---|
| 24-Hour | Daytime (7am-10pm) | Nighttime (10pm-7am) |
| **46.0** | **47.2** | **42.5** |



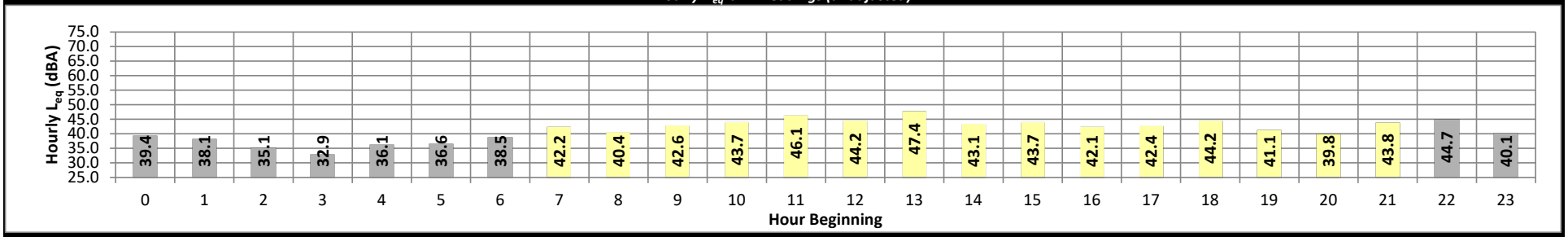
URBAN CROSSROADS

## 24-Hour Noise Level Measurement Summary

*Date:* Tuesday, August 31, 2021 *Location:* L2 - Located east of the Project site near single-family *Meter:* Piccolo II *JN:* 14319

*Project:* Colonies Upland *Source:* residence at 8269 Calle Del Prado. *Analyst:* A. Khan

***Hourly $L_{eq}$ dBA Readings (unadjusted)***




| Timeframe | Hour | $L_{eq}$ | $L_{max}$ | $L_{min}$ | L1% | L2% | L5% | L8% | L25% | L50% | L90% | L95% | L99% | $L_{eq}$ | Adj. | Adj. $L_{eq}$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Night | 0 | 39.4 | 44.4 | 36.0 | 43.9 | 43.5 | 42.6 | 42.1 | 40.1 | 38.6 | 36.7 | 36.4 | 36.1 | 39.4 | 10.0 | 49.4 |
| | 1 | 38.1 | 42.7 | 35.8 | 42.3 | 41.9 | 41.1 | 40.3 | 38.7 | 37.4 | 36.1 | 36.0 | 35.9 | 38.1 | 10.0 | 48.1 |
| | 2 | 35.1 | 38.6 | 33.4 | 38.3 | 37.9 | 37.3 | 36.8 | 35.4 | 34.7 | 33.7 | 33.6 | 33.4 | 35.1 | 10.0 | 45.1 |
| | 3 | 32.9 | 36.6 | 31.4 | 36.3 | 35.8 | 35.3 | 34.8 | 33.2 | 32.3 | 31.6 | 31.5 | 31.5 | 32.9 | 10.0 | 42.9 |
| | 4 | 36.1 | 40.5 | 34.3 | 40.2 | 40.0 | 39.2 | 38.3 | 36.4 | 35.3 | 34.5 | 34.4 | 34.3 | 36.1 | 10.0 | 46.1 |
| | 5 | 36.6 | 42.0 | 33.0 | 41.4 | 40.8 | 39.9 | 39.3 | 37.2 | 35.7 | 33.8 | 33.4 | 33.1 | 36.6 | 10.0 | 46.6 |
| | 6 | 38.5 | 49.0 | 33.6 | 47.4 | 46.0 | 43.4 | 42.1 | 38.2 | 36.2 | 34.3 | 34.0 | 33.7 | 38.5 | 10.0 | 48.5 |
| Day | 7 | 42.2 | 47.2 | 38.6 | 46.8 | 46.4 | 45.6 | 45.2 | 43.0 | 41.2 | 39.5 | 39.2 | 38.7 | 42.2 | 0.0 | 42.2 |
| | 8 | 40.4 | 48.1 | 36.1 | 47.4 | 46.8 | 45.1 | 43.9 | 40.6 | 38.6 | 37.1 | 36.7 | 36.3 | 40.4 | 0.0 | 40.4 |
| | 9 | 42.6 | 51.6 | 36.4 | 50.8 | 50.2 | 47.9 | 46.6 | 42.6 | 40.3 | 37.4 | 37.0 | 36.6 | 42.6 | 0.0 | 42.6 |
| | 10 | 43.7 | 53.8 | 36.9 | 52.3 | 50.9 | 48.7 | 47.6 | 43.9 | 41.3 | 38.3 | 37.8 | 37.1 | 43.7 | 0.0 | 43.7 |
| | 11 | 46.1 | 55.7 | 37.9 | 54.2 | 53.2 | 51.5 | 50.6 | 46.2 | 43.7 | 39.9 | 39.2 | 38.3 | 46.1 | 0.0 | 46.1 |
| | 12 | 44.2 | 54.7 | 39.4 | 54.2 | 53.8 | 52.5 | 51.7 | 48.9 | 45.9 | 40.6 | 40.3 | 39.7 | 44.2 | 0.0 | 44.2 |
| | 13 | 47.4 | 55.4 | 43.2 | 55.2 | 54.9 | 54.3 | 53.9 | 51.7 | 49.2 | 45.0 | 44.4 | 43.4 | 47.4 | 0.0 | 47.4 |
| | 14 | 43.1 | 50.9 | 38.3 | 50.6 | 50.0 | 47.9 | 46.8 | 43.3 | 40.7 | 38.9 | 38.7 | 38.4 | 43.1 | 0.0 | 43.1 |
| | 15 | 43.7 | 51.7 | 39.2 | 50.7 | 49.9 | 48.3 | 47.0 | 44.3 | 42.0 | 39.9 | 39.6 | 39.3 | 43.7 | 0.0 | 43.7 |
| | 16 | 42.1 | 48.9 | 38.2 | 48.1 | 47.6 | 46.2 | 45.3 | 42.9 | 40.7 | 38.8 | 38.6 | 38.4 | 42.1 | 0.0 | 42.1 |
| | 17 | 42.4 | 50.0 | 39.1 | 49.3 | 48.7 | 46.8 | 45.1 | 42.5 | 41.2 | 39.7 | 39.5 | 39.3 | 42.4 | 0.0 | 42.4 |
| | 18 | 44.2 | 50.2 | 40.2 | 49.7 | 49.4 | 48.2 | 47.4 | 44.9 | 43.1 | 41.0 | 40.7 | 40.4 | 44.2 | 0.0 | 44.2 |
| | 19 | 41.1 | 48.9 | 36.8 | 47.5 | 46.5 | 45.0 | 44.2 | 41.8 | 39.9 | 37.7 | 37.3 | 37.0 | 41.1 | 5.0 | 46.1 |
| | 20 | 39.8 | 44.5 | 38.2 | 43.9 | 43.3 | 42.0 | 41.4 | 40.1 | 39.4 | 38.6 | 38.5 | 38.2 | 39.8 | 5.0 | 44.8 |
| | 21 | 43.8 | 47.8 | 42.1 | 47.3 | 46.8 | 45.8 | 45.3 | 44.1 | 43.4 | 42.5 | 42.4 | 42.2 | 43.8 | 5.0 | 48.8 |
| Night | 22 | 44.7 | 50.1 | 41.3 | 49.5 | 49.0 | 48.1 | 47.6 | 45.7 | 43.9 | 41.7 | 41.5 | 41.4 | 44.7 | 10.0 | 54.7 |
| | 23 | 40.1 | 47.7 | 36.9 | 46.6 | 45.7 | 44.1 | 43.1 | 40.4 | 38.7 | 37.4 | 37.2 | 37.0 | 40.1 | 10.0 | 50.1 |

| Timeframe | Hour | $L_{eq}$ | $L_{max}$ | $L_{min}$ | L1% | L2% | L5% | L8% | L25% | L50% | L90% | L95% | L99% |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Day | Min | 39.8 | 44.5 | 36.1 | 43.9 | 43.3 | 42.0 | 41.4 | 40.1 | 38.6 | 37.1 | 36.7 | 36.3 |
| | Max | 47.4 | 55.7 | 43.2 | 55.2 | 54.9 | 54.3 | 53.9 | 51.7 | 49.2 | 45.0 | 44.4 | 43.4 |
| Energy Average | | 43.6 | Average: | | 49.9 | 49.2 | 47.7 | 46.8 | 44.0 | 42.0 | 39.7 | 39.3 | 38.9 |
| Night | Min | 32.9 | 36.6 | 31.4 | 36.3 | 35.8 | 35.3 | 34.8 | 33.2 | 32.3 | 31.6 | 31.5 | 31.5 |
| | Max | 44.7 | 50.1 | 41.3 | 49.5 | 49.0 | 48.1 | 47.6 | 45.7 | 43.9 | 41.7 | 41.5 | 41.4 |
| Energy Average | | 39.3 | Average: | | 42.9 | 42.3 | 41.2 | 40.5 | 38.4 | 37.0 | 35.5 | 35.3 | 35.1 |

| $L_{eq}$ (dBA) | | |
|---|---|---|
| 24-Hour | Daytime (7am-10pm) | Nighttime (10pm-7am) |
| **42.4** | **43.6** | **39.3** |



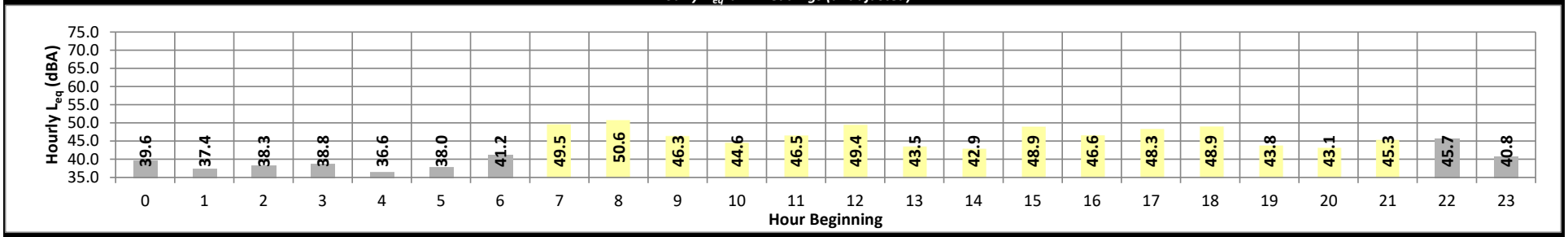
URBAN CROSSROADS

## 24-Hour Noise Level Measurement Summary

*Date:* Tuesday, August 31, 2021 *Location:* L3 - Located south of the Project site near single-family *Meter:* Piccolo II *JN:* 14319

*Project:* Colonies Upland *Source:* residence at 1335 East 15th Street. *Analyst:* A. Khan

***Hourly $L_{eq}$ dBA Readings (unadjusted)***




| Timeframe | Hour | $L_{eq}$ | $L_{max}$ | $L_{min}$ | L1% | L2% | L5% | L8% | L25% | L50% | L90% | L95% | L99% | $L_{eq}$ | Adj. | Adj. $L_{eq}$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Night | 0 | 39.6 | 44.6 | 36.2 | 44.1 | 43.6 | 42.7 | 42.2 | 40.5 | 38.9 | 37.0 | 36.7 | 36.4 | 39.6 | 10.0 | 49.6 |
| | 1 | 37.4 | 40.5 | 35.1 | 40.2 | 39.9 | 39.4 | 39.0 | 38.0 | 37.1 | 35.6 | 35.5 | 35.2 | 37.4 | 10.0 | 47.4 |
| | 2 | 38.3 | 42.8 | 35.9 | 42.4 | 41.9 | 41.0 | 40.6 | 38.8 | 37.6 | 36.4 | 36.2 | 36.0 | 38.3 | 10.0 | 48.3 |
| | 3 | 38.8 | 49.8 | 32.4 | 49.4 | 48.8 | 47.0 | 43.8 | 35.2 | 33.6 | 32.7 | 32.6 | 32.5 | 38.8 | 10.0 | 48.8 |
| | 4 | 36.6 | 44.3 | 33.1 | 43.9 | 43.2 | 40.8 | 39.4 | 36.7 | 34.9 | 33.9 | 33.7 | 33.5 | 36.6 | 10.0 | 46.6 |
| | 5 | 38.0 | 44.5 | 34.9 | 43.9 | 43.3 | 41.9 | 41.0 | 38.1 | 36.7 | 35.5 | 35.3 | 35.0 | 38.0 | 10.0 | 48.0 |
| | 6 | 41.2 | 52.2 | 35.1 | 51.7 | 50.7 | 48.7 | 46.3 | 38.3 | 36.8 | 35.6 | 35.4 | 35.2 | 41.2 | 10.0 | 51.2 |
| Day | 7 | 49.5 | 59.9 | 36.4 | 58.9 | 58.4 | 56.1 | 53.9 | 49.7 | 45.3 | 39.1 | 38.0 | 36.8 | 49.5 | 0.0 | 49.5 |
| | 8 | 50.6 | 62.3 | 37.2 | 61.1 | 60.1 | 57.9 | 55.8 | 50.1 | 42.8 | 38.4 | 37.9 | 37.4 | 50.6 | 0.0 | 50.6 |
| | 9 | 46.3 | 56.8 | 38.4 | 56.3 | 55.4 | 53.6 | 51.5 | 44.4 | 42.0 | 39.3 | 38.9 | 38.5 | 46.3 | 0.0 | 46.3 |
| | 10 | 44.6 | 52.9 | 40.6 | 52.3 | 51.7 | 50.3 | 48.7 | 43.5 | 42.5 | 41.2 | 41.0 | 40.7 | 44.6 | 0.0 | 44.6 |
| | 11 | 46.5 | 57.6 | 38.4 | 56.8 | 56.1 | 54.3 | 52.4 | 43.4 | 41.0 | 39.0 | 38.8 | 38.5 | 46.5 | 0.0 | 46.5 |
| | 12 | 49.4 | 62.7 | 38.6 | 62.1 | 61.1 | 57.0 | 53.1 | 45.5 | 40.7 | 39.2 | 39.0 | 38.7 | 49.4 | 0.0 | 49.4 |
| | 13 | 43.5 | 53.8 | 38.1 | 53.2 | 52.6 | 50.1 | 47.7 | 42.2 | 39.9 | 38.6 | 38.4 | 38.3 | 43.5 | 0.0 | 43.5 |
| | 14 | 42.9 | 67.4 | 40.5 | 66.2 | 65.5 | 64.2 | 63.4 | 59.1 | 54.8 | 41.0 | 40.9 | 40.6 | 42.9 | 0.0 | 42.9 |
| | 15 | 48.9 | 56.7 | 41.5 | 56.2 | 55.5 | 54.0 | 52.5 | 50.0 | 46.7 | 42.7 | 42.0 | 41.6 | 48.9 | 0.0 | 48.9 |
| | 16 | 46.6 | 54.9 | 41.0 | 54.0 | 53.2 | 51.7 | 50.5 | 47.1 | 44.4 | 41.8 | 41.5 | 41.2 | 46.6 | 0.0 | 46.6 |
| | 17 | 48.3 | 58.0 | 43.1 | 57.3 | 56.3 | 53.5 | 51.4 | 47.8 | 46.1 | 44.1 | 43.7 | 43.3 | 48.3 | 0.0 | 48.3 |
| | 18 | 48.9 | 63.3 | 42.8 | 62.5 | 61.5 | 59.0 | 56.3 | 48.4 | 46.3 | 43.9 | 43.5 | 43.0 | 48.9 | 0.0 | 48.9 |
| | 19 | 43.8 | 64.5 | 39.6 | 64.2 | 63.9 | 63.0 | 62.2 | 53.5 | 43.4 | 40.4 | 40.0 | 39.7 | 43.8 | 5.0 | 48.8 |
| | 20 | 43.1 | 50.3 | 40.2 | 49.9 | 49.4 | 47.9 | 46.4 | 42.7 | 41.6 | 40.7 | 40.5 | 40.3 | 43.1 | 5.0 | 48.1 |
| | 21 | 45.3 | 63.9 | 43.0 | 63.5 | 62.9 | 60.6 | 58.4 | 46.3 | 45.0 | 43.6 | 43.4 | 43.1 | 45.3 | 5.0 | 50.3 |
| Night | 22 | 45.7 | 53.7 | 41.8 | 53.3 | 52.6 | 51.0 | 49.3 | 45.6 | 43.8 | 42.3 | 42.1 | 41.9 | 45.7 | 10.0 | 55.7 |
| | 23 | 40.8 | 46.0 | 38.0 | 45.6 | 45.1 | 44.1 | 43.4 | 41.4 | 39.8 | 38.5 | 38.3 | 38.1 | 40.8 | 10.0 | 50.8 |

| Timeframe | Hour | $L_{eq}$ | $L_{max}$ | $L_{min}$ | L1% | L2% | L5% | L8% | L25% | L50% | L90% | L95% | L99% |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Day | Min | 42.9 | 50.3 | 36.4 | 49.9 | 49.4 | 47.9 | 46.4 | 42.2 | 39.9 | 38.4 | 37.9 | 36.8 |
| | Max | 50.6 | 67.4 | 43.1 | 66.2 | 65.5 | 64.2 | 63.4 | 59.1 | 54.8 | 44.1 | 43.7 | 43.3 |
| Energy Average | | 47.2 | Average: | | 58.3 | 57.6 | 55.6 | 53.6 | 47.6 | 44.2 | 40.9 | 40.5 | 40.1 |
| Night | Min | 36.6 | 40.5 | 32.4 | 40.2 | 39.9 | 39.4 | 39.0 | 35.2 | 33.6 | 32.7 | 32.6 | 32.5 |
| | Max | 45.7 | 53.7 | 41.8 | 53.3 | 52.6 | 51.0 | 49.3 | 45.6 | 43.8 | 42.3 | 42.1 | 41.9 |
| Energy Average | | 40.6 | Average: | | 46.0 | 45.5 | 44.1 | 42.8 | 39.2 | 37.7 | 36.4 | 36.2 | 36.0 |

| $L_{eq}$ (dBA) | | |
|---|---|---|
| 24-Hour | Daytime (7am-10pm) | Nighttime (10pm-7am) |
| **45.7** | **47.2** | **40.6** |



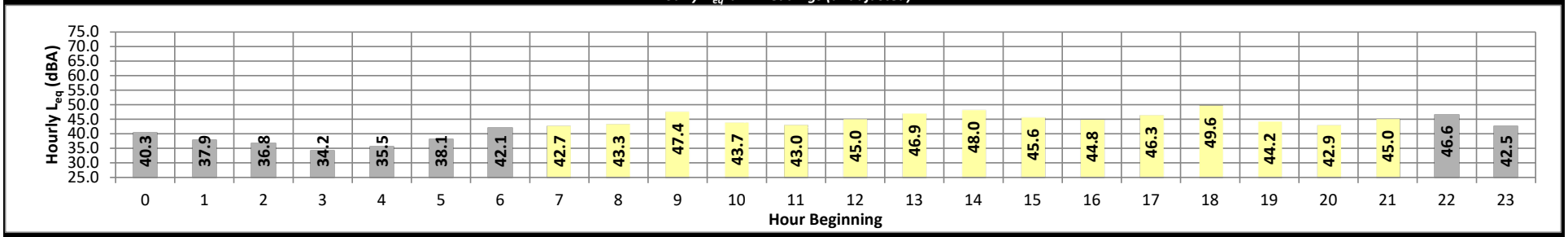
URBAN CROSSROADS

## 24-Hour Noise Level Measurement Summary

*Date:* Tuesday, August 31, 2021 *Location:* L4 - Located south of the Project site near single-family *Meter:* Piccolo II *JN:* 14319

*Project:* Colonies Upland *Source:* residence at 1497 Fernando Avenue. *Analyst:* A. Khan

***Hourly $L_{eq}$ dBA Readings (unadjusted)***




| Timeframe | Hour | $L_{eq}$ | $L_{max}$ | $L_{min}$ | L1% | L2% | L5% | L8% | L25% | L50% | L90% | L95% | L99% | $L_{eq}$ | Adj. | Adj. $L_{eq}$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Night | 0 | 40.3 | 74.8 | 37.2 | 74.5 | 74.0 | 71.4 | 66.4 | 58.5 | 45.8 | 38.4 | 37.8 | 37.3 | 40.3 | 10.0 | 50.3 |
| | 1 | 37.9 | 42.3 | 34.3 | 41.9 | 41.5 | 40.9 | 40.4 | 38.9 | 37.5 | 34.8 | 34.6 | 34.4 | 37.9 | 10.0 | 47.9 |
| | 2 | 36.8 | 41.9 | 34.3 | 41.4 | 40.8 | 40.0 | 39.5 | 37.1 | 36.0 | 34.7 | 34.6 | 34.4 | 36.8 | 10.0 | 46.8 |
| | 3 | 34.2 | 57.4 | 32.8 | 56.9 | 56.3 | 54.0 | 49.8 | 37.1 | 33.7 | 33.0 | 32.9 | 32.8 | 34.2 | 10.0 | 44.2 |
| | 4 | 35.5 | 41.4 | 33.0 | 40.9 | 40.6 | 39.0 | 37.8 | 36.0 | 34.4 | 33.3 | 33.2 | 33.0 | 35.5 | 10.0 | 45.5 |
| | 5 | 38.1 | 43.0 | 34.0 | 42.5 | 42.1 | 41.4 | 40.8 | 39.0 | 37.5 | 35.1 | 34.5 | 34.2 | 38.1 | 10.0 | 48.1 |
| | 6 | 42.1 | 51.5 | 35.6 | 51.2 | 50.5 | 48.2 | 46.8 | 41.5 | 38.2 | 36.2 | 36.0 | 35.7 | 42.1 | 10.0 | 52.1 |
| Day | 7 | 42.7 | 51.6 | 35.7 | 50.9 | 50.2 | 47.7 | 46.0 | 43.1 | 40.5 | 37.1 | 36.5 | 35.9 | 42.7 | 0.0 | 42.7 |
| | 8 | 43.3 | 52.3 | 36.8 | 51.8 | 51.2 | 49.6 | 48.0 | 42.8 | 39.9 | 37.7 | 37.3 | 37.0 | 43.3 | 0.0 | 43.3 |
| | 9 | 47.4 | 56.6 | 37.9 | 56.0 | 55.5 | 54.0 | 53.1 | 46.2 | 42.8 | 38.9 | 38.5 | 38.0 | 47.4 | 0.0 | 47.4 |
| | 10 | 43.7 | 53.4 | 38.4 | 53.1 | 52.5 | 49.3 | 46.7 | 43.0 | 41.2 | 39.2 | 38.9 | 38.6 | 43.7 | 0.0 | 43.7 |
| | 11 | 43.0 | 51.3 | 38.5 | 50.7 | 49.9 | 47.7 | 46.6 | 42.8 | 41.1 | 39.1 | 38.9 | 38.7 | 43.0 | 0.0 | 43.0 |
| | 12 | 45.0 | 55.1 | 39.5 | 54.4 | 53.8 | 51.3 | 49.2 | 43.9 | 41.5 | 40.1 | 39.8 | 39.6 | 45.0 | 0.0 | 45.0 |
| | 13 | 46.9 | 58.0 | 39.9 | 57.4 | 56.3 | 53.5 | 51.2 | 45.3 | 41.9 | 40.4 | 40.2 | 40.0 | 46.9 | 0.0 | 46.9 |
| | 14 | 48.0 | 66.1 | 45.5 | 66.0 | 65.7 | 64.3 | 62.8 | 54.9 | 49.9 | 46.4 | 46.1 | 45.7 | 48.0 | 0.0 | 48.0 |
| | 15 | 45.6 | 53.6 | 42.0 | 53.0 | 52.4 | 50.1 | 48.3 | 45.5 | 44.0 | 42.6 | 42.4 | 42.1 | 45.6 | 0.0 | 45.6 |
| | 16 | 44.8 | 74.4 | 41.2 | 73.8 | 72.9 | 70.7 | 67.8 | 61.7 | 52.8 | 42.2 | 41.8 | 41.4 | 44.8 | 0.0 | 44.8 |
| | 17 | 46.3 | 61.3 | 41.6 | 61.1 | 60.6 | 58.9 | 57.0 | 47.4 | 44.2 | 42.2 | 41.9 | 41.7 | 46.3 | 0.0 | 46.3 |
| | 18 | 49.6 | 76.6 | 43.0 | 76.4 | 75.7 | 71.0 | 67.8 | 56.0 | 47.1 | 43.9 | 43.6 | 43.2 | 49.6 | 0.0 | 49.6 |
| | 19 | 44.2 | 52.5 | 39.5 | 51.8 | 51.0 | 49.1 | 47.7 | 44.1 | 42.5 | 40.3 | 39.9 | 39.6 | 44.2 | 5.0 | 49.2 |
| | 20 | 42.9 | 49.5 | 39.7 | 49.2 | 48.8 | 47.3 | 45.9 | 42.9 | 41.7 | 40.2 | 40.0 | 39.8 | 42.9 | 5.0 | 47.9 |
| | 21 | 45.0 | 79.2 | 42.8 | 78.8 | 78.3 | 75.2 | 69.7 | 58.7 | 49.9 | 43.6 | 43.3 | 42.9 | 45.0 | 5.0 | 50.0 |
| Night | 22 | 46.6 | 54.0 | 41.7 | 53.6 | 53.1 | 51.7 | 50.7 | 47.0 | 44.6 | 42.3 | 42.1 | 41.9 | 46.6 | 10.0 | 56.6 |
| | 23 | 42.5 | 51.0 | 37.4 | 50.7 | 50.2 | 48.2 | 46.2 | 42.5 | 40.1 | 38.1 | 37.8 | 37.5 | 42.5 | 10.0 | 52.5 |

| Timeframe | Hour | $L_{eq}$ | $L_{max}$ | $L_{min}$ | L1% | L2% | L5% | L8% | L25% | L50% | L90% | L95% | L99% |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Day | Min | 42.7 | 49.5 | 35.7 | 49.2 | 48.8 | 47.3 | 45.9 | 42.8 | 39.9 | 37.1 | 36.5 | 35.9 |
| | Max | 49.6 | 79.2 | 45.5 | 78.8 | 78.3 | 75.2 | 69.7 | 61.7 | 52.8 | 46.4 | 46.1 | 45.7 |
| Energy Average | | 45.7 | Average: | | 59.0 | 58.3 | 56.0 | 53.9 | 47.9 | 44.1 | 40.9 | 40.6 | 40.3 |
| Night | Min | 34.2 | 41.4 | 32.8 | 40.9 | 40.6 | 39.0 | 37.8 | 36.0 | 33.7 | 33.0 | 32.9 | 32.8 |
| | Max | 46.6 | 74.8 | 41.7 | 74.5 | 74.0 | 71.4 | 66.4 | 58.5 | 45.8 | 42.3 | 42.1 | 41.9 |
| Energy Average | | 41.0 | Average: | | 50.4 | 49.9 | 48.3 | 46.5 | 42.0 | 38.7 | 36.2 | 35.9 | 35.7 |

| 24-Hour | $L_{eq}$ (dBA) Daytime (7am-10pm) | Nighttime (10pm-7am) |
|---|---|---|
| **44.5** | **45.7** | **41.0** |



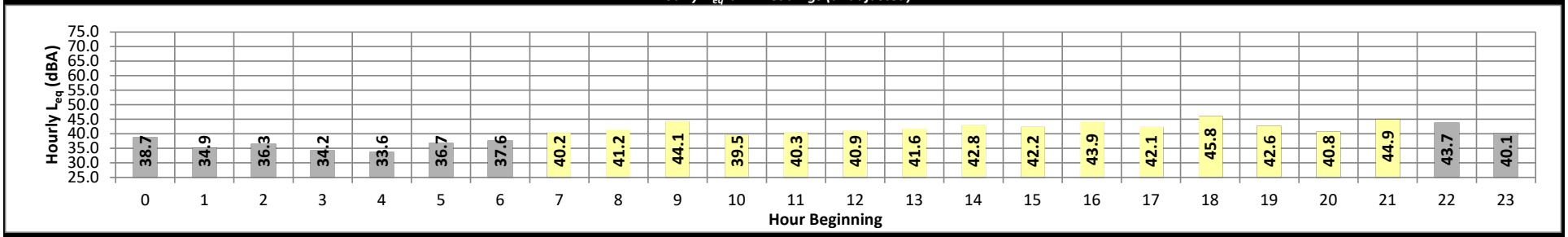
URBAN CROSSROADS

## 24-Hour Noise Level Measurement Summary

*Date:* Tuesday, August 31, 2021 *Location:* L5 - Located west of the Project site near single-family *Meter:* Piccolo II *JN:* 14319

*Project:* Colonies Upland *Source:* residence at 1520 North Himalayas Circle. *Analyst:* A. Khan

***Hourly $L_{eq}$ dBA Readings (unadjusted)***




| Timeframe | Hour | $L_{eq}$ | $L_{max}$ | $L_{min}$ | L1% | L2% | L5% | L8% | L25% | L50% | L90% | L95% | L99% | $L_{eq}$ | Adj. | Adj. $L_{eq}$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Night | 0 | 38.7 | 57.9 | 35.9 | 57.4 | 56.9 | 52.7 | 50.1 | 42.7 | 39.0 | 36.8 | 36.5 | 36.1 | 38.7 | 10.0 | 48.7 |
| | 1 | 34.9 | 40.8 | 32.8 | 40.3 | 40.0 | 39.2 | 38.7 | 37.0 | 35.6 | 33.8 | 33.3 | 32.9 | 34.9 | 10.0 | 44.9 |
| | 2 | 36.3 | 42.9 | 32.3 | 42.4 | 41.7 | 40.2 | 39.2 | 37.0 | 35.2 | 32.9 | 32.7 | 32.4 | 36.3 | 10.0 | 46.3 |
| | 3 | 34.2 | 40.5 | 31.5 | 40.2 | 39.9 | 38.7 | 37.7 | 34.2 | 32.9 | 31.9 | 31.7 | 31.6 | 34.2 | 10.0 | 44.2 |
| | 4 | 33.6 | 37.9 | 31.4 | 37.5 | 37.2 | 36.4 | 35.7 | 34.2 | 32.9 | 31.7 | 31.5 | 31.4 | 33.6 | 10.0 | 43.6 |
| | 5 | 36.7 | 41.3 | 33.0 | 40.8 | 40.4 | 39.6 | 39.1 | 37.5 | 36.0 | 34.2 | 33.6 | 33.2 | 36.7 | 10.0 | 46.7 |
| | 6 | 37.6 | 46.1 | 33.8 | 45.0 | 43.9 | 41.4 | 40.3 | 37.7 | 36.1 | 34.4 | 34.2 | 33.9 | 37.6 | 10.0 | 47.6 |
| Day | 7 | 40.2 | 50.0 | 34.6 | 48.5 | 47.2 | 45.0 | 43.7 | 40.3 | 38.3 | 35.7 | 35.2 | 34.7 | 40.2 | 0.0 | 40.2 |
| | 8 | 41.2 | 51.0 | 35.7 | 49.5 | 48.8 | 47.3 | 46.1 | 40.1 | 38.2 | 36.4 | 36.1 | 35.8 | 41.2 | 0.0 | 41.2 |
| | 9 | 44.1 | 54.0 | 36.6 | 52.7 | 51.5 | 49.7 | 48.3 | 44.4 | 41.2 | 37.7 | 37.3 | 36.8 | 44.1 | 0.0 | 44.1 |
| | 10 | 39.5 | 46.0 | 36.6 | 45.0 | 44.1 | 42.5 | 41.6 | 39.9 | 38.7 | 37.3 | 37.0 | 36.7 | 39.5 | 0.0 | 39.5 |
| | 11 | 40.3 | 46.9 | 36.9 | 45.9 | 45.2 | 43.9 | 43.1 | 40.7 | 39.3 | 37.7 | 37.4 | 37.0 | 40.3 | 0.0 | 40.3 |
| | 12 | 40.9 | 50.9 | 37.0 | 49.5 | 48.2 | 45.4 | 43.7 | 40.6 | 39.0 | 37.6 | 37.4 | 37.1 | 40.9 | 0.0 | 40.9 |
| | 13 | 41.6 | 50.9 | 36.8 | 49.6 | 48.4 | 46.4 | 45.5 | 41.6 | 39.4 | 37.5 | 37.2 | 36.9 | 41.6 | 0.0 | 41.6 |
| | 14 | 42.8 | 49.6 | 39.3 | 49.2 | 48.7 | 47.7 | 46.8 | 43.0 | 41.0 | 39.8 | 39.7 | 39.4 | 42.8 | 0.0 | 42.8 |
| | 15 | 42.2 | 47.0 | 39.6 | 46.4 | 45.8 | 44.8 | 44.3 | 43.0 | 41.6 | 40.3 | 40.1 | 39.8 | 42.2 | 0.0 | 42.2 |
| | 16 | 43.9 | 50.7 | 39.0 | 50.3 | 49.8 | 48.9 | 48.2 | 44.7 | 41.7 | 39.6 | 39.3 | 39.1 | 43.9 | 0.0 | 43.9 |
| | 17 | 42.1 | 48.1 | 39.9 | 47.0 | 46.3 | 44.8 | 44.0 | 42.5 | 41.5 | 40.4 | 40.2 | 40.0 | 42.1 | 0.0 | 42.1 |
| | 18 | 45.8 | 51.5 | 41.4 | 51.0 | 50.6 | 49.9 | 49.2 | 46.7 | 44.6 | 42.3 | 41.9 | 41.5 | 45.8 | 0.0 | 45.8 |
| | 19 | 42.6 | 49.1 | 38.4 | 48.5 | 48.0 | 46.7 | 45.7 | 43.3 | 41.2 | 39.1 | 38.8 | 38.5 | 42.6 | 5.0 | 47.6 |
| | 20 | 40.8 | 45.3 | 38.6 | 44.8 | 44.3 | 43.2 | 42.5 | 41.2 | 40.2 | 39.1 | 38.9 | 38.7 | 40.8 | 5.0 | 45.8 |
| | 21 | 44.9 | 53.0 | 41.2 | 52.5 | 51.8 | 50.3 | 48.2 | 44.8 | 43.3 | 41.8 | 41.6 | 41.4 | 44.9 | 5.0 | 49.9 |
| Night | 22 | 43.7 | 51.1 | 40.2 | 50.0 | 49.0 | 47.4 | 46.6 | 44.3 | 42.4 | 40.9 | 40.6 | 40.3 | 43.7 | 10.0 | 53.7 |
| | 23 | 40.1 | 47.7 | 36.2 | 46.8 | 45.8 | 44.2 | 43.2 | 40.7 | 38.7 | 36.9 | 36.7 | 36.3 | 40.1 | 10.0 | 50.1 |

| Timeframe | Hour | $L_{eq}$ | $L_{max}$ | $L_{min}$ | L1% | L2% | L5% | L8% | L25% | L50% | L90% | L95% | L99% |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Day | Min | 39.5 | 45.3 | 34.6 | 44.8 | 44.1 | 42.5 | 41.6 | 39.9 | 38.2 | 35.7 | 35.2 | 34.7 |
| | Max | 45.8 | 54.0 | 41.4 | 52.7 | 51.8 | 50.3 | 49.2 | 46.7 | 44.6 | 42.3 | 41.9 | 41.5 |
| Energy Average | | 42.6 | Average: | | 48.7 | 47.9 | 46.4 | 45.4 | 42.4 | 40.6 | 38.8 | 38.5 | 38.2 |
| Night | Min | 33.6 | 37.9 | 31.4 | 37.5 | 37.2 | 36.4 | 35.7 | 34.2 | 32.9 | 31.7 | 31.5 | 31.4 |
| | Max | 43.7 | 57.9 | 40.2 | 57.4 | 56.9 | 52.7 | 50.1 | 44.3 | 42.4 | 40.9 | 40.6 | 40.3 |
| Energy Average | | 38.5 | Average: | | 44.5 | 43.9 | 42.2 | 41.2 | 38.4 | 36.5 | 34.8 | 34.5 | 34.2 |

| 24-Hour | $L_{eq}$ (dBA) Daytime (7am-10pm) | Nighttime (10pm-7am) |
|---|---|---|
| 41.5 | 42.6 | 38.5 |



URBAN CROSSROADS

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# APPENDIX E

# CITY OF UPLAND MUNICIPAL CODE NOISE STANDARDS

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# Chapter 9.40 UNNECESSARY NOISE

## Note

* Prior ordinance history: Ord. 947.

## 9.40.010 Purpose.

The purpose of this chapter is to establish criteria and standards for the regulation of noise levels within the city. (Prior code § 5400.100)

## 9.40.020 Definitions.

As used in this chapter, specific words and phrases are defined as follows:

"Ambient noise level" means the all-encompassing noise level associated with a given environment, being a composite of sounds from all sources, excluding any intrusive noise.

"Average noise level" means the logarithmic average of noise samples taken over a specified length of time.

"Commercial purpose" means the use, operation or maintenance of any sound-amplifying equipment for the purpose of advertising any business, goods, or services and/or for the purpose of advertising or attracting the attention of the public to or soliciting patronage from any performance, entertainment, exhibition or event, or for the purpose of demonstrating any such sound equipment.

"Construction material manufacturer" means any use located on the same property as the mining industry, manufacturing products including concrete, asphalt, concrete blocks, concrete pipe, roofing tile or other similar materials.

"Cumulative time period" means an additive period of time composed of individual time segments which may be continuous or interrupted.

"Decibel (dB)" means a measurement unit of sound pressure level which denotes the ratio between two quantities which are proportional to power; the number of decibels corresponding to the ratio of two amounts of power is 10 times the logarithm to the base 10 of this ratio.

"Impact noise" means the sound produced by the impact or collision of one moving object or mass with a second object or mass that is stationary or moving.

"Intrusive noise" means a sound which intrudes over and above the existing ambient noise level at a given location.

"Mining industry" means any industry which extracts sand and gravel resources from the ground.

"Motor driven vehicle" means and includes, but is not limited to, any automobile, truck, van, bus, motorcycle, minibike, go-cart or other self-propelled vehicle, on or off road.

"Noise" means any sound that is loud or disturbing or that interferes with one's ability to hear some other sound.

"Noise level" means the "A" weighted sound pressure level in decibels audible to humans obtained by using a sound level meter. The unit of noise level measurement shall be designated as dB(A).

"Person" means a person, firm, association, co-partnership, joint venture, corporation, or any entity, public or private in nature.

"Simple tone noise" means a noise characterized by a predominant frequency or frequencies so that other frequencies cannot be readily distinguished.

"Sound pressure level of a sound," in decibels, means 20 times the logarithm to the base 10 of the ratio of the pressure of this sound to the reference pressure, which reference pressure shall be explicitly stated. (Prior code § 5400.300)

## 9.40.030 Noise level measurement criteria.

A. Any noise level measurement, made pursuant to the provisions of this chapter, shall be determined by using a sound level meter that meets the minimum requirements of the American National Standard Institute for sound level meters, or by using an instrument with associated recording and analyzing equipment that will provide equivalent data.

B. The factors which shall be considered in determining whether a violation of the provisions of this section exists shall include, but not be limited to, the following:

1. The sound level of the objectionable noise;
2. The sound level of the ambient noise;
3. The proximity of the noise to residential sleeping facilities;
4. The nature and zoning of the area within which the noise emanates;
5. The number of persons affected by the noise source;
6. The time of day or night the noise occurs;
7. The duration of the noise and its tonal, informational, or musical content;
8. Whether the noise is continuous, recurrent, or intermittent;
9. Whether the noise is produced by a commercial or noncommercial activity.

C. The above considerations shall be considered in addition to the noise levels set forth in this section in determining a violation. However, noises do not necessarily need to exceed those noise level limits to be considered unnecessary or unusual so as to cause discomfort or annoyance to persons in the area. (Prior code § 5400.400)

## 9.40.040 Base ambient noise level.

All ambient noise measurements shall commence at the base ambient noise levels in decibels within the respective times and zones as follows:

| Decibels | Time | Zone Use |
|---|---|---|
| 45 dB(A) | 10:00 p.m.—7:00 a.m. | Residential |
| 55 dB(A) | 7:00 a.m.—10:00 p.m. | Residential |
| 65 dB(A) | Anytime | Uses not specified |
| 75 dB(A) | Anytime | Industrial and commercial |

Actual decibel measurements exceeding the above levels at the times and within the zones corresponding thereto shall be employed as the base ambient noise level referred to in this chapter. Otherwise, no ambient noise shall be deemed to be less than the above specified levels. (Prior code § 5400.500)

## 9.40.050 Exterior noise level measurement.

Exterior noise levels shall be measured at any point relative to the closest point of the source of the noise at the property line on the affected property. Measurements will not be made during extraordinary times, such as during the movement of a nearby train or airplane. (Prior code § 5400.600)

## 9.40.060 Excessive noise unlawful.

A. It is unlawful for any person at any location to create any noise, or to allow the creation of any noise, when such noise causes the noise level to exceed any noise level for the cumulative time periods specified below in Section 9.40.070 and Section 9.40.080.

B. Furthermore, notwithstanding any specified noise level, it is also unlawful for any person to wilfully make or continue, or cause to be made or continued, any loud, unnecessary, or unusual noise which disturbs the peace or quiet of any neighborhood or which causes discomfort or annoyance to any reasonable person residing in the area, and it is unlawful for any person in ownership or control of any premises to knowingly permit a violation of this section upon the premises. (Prior code § 5400.700)

## 9.40.070 Maximum residential noise levels.

Exterior noise shall be measured on the exterior of any residential property, and no noise level shall exceed the following for the duration periods specified:

| Noise Level Exceeded | Maximum Duration Period |
|---|---|
| Base ambient noise level (BANL) | 30 minutes in any hour |
| 5 dB(A) above BANL | 15 minutes in any hour |
| 10 dB(A) above BANL | 5 minutes in any hour |
| 15 dB(A) above BANL | 1 minute in any hour |
| 20 d(B)(A) above BANL | Not permitted |

(Prior code § 5400.800)

## 9.40.080 Maximum nonresidential noise levels.

Measured on the exterior of nonresidential properties, no noise level shall exceed the respective base ambient noise levels for nonresidential land uses as determined by development standards established by the regulating agency. (Prior code § 5400.900)

## 9.40.090 Mining industry allowed noise levels for residential property.

A. Exemptions. This section shall supersede all the provisions of Sections 9.40.040 and 9.46.070 relative to allowed noise for mining industry.

B. Allowed Levels. The allowed maximum exterior average sound level in any hour at any property zoned for residential use shall be as follows:

| Mining Industry Use and Days Allowed | Times | Allowed Levels |
|---|---|---|
| **Monday—Friday:** | | |
| Quarry/plant | 6 a.m.—6 p.m. | 55 dB(A) |
| Construction material manufacturer | 5 a.m.—6 p.m. | 55 dB(A) |
| **Saturday:** | | |
| Quarry/plant | 7 a.m.—3 p.m. | 55 dB(A) |
| Construction material manufacturer | 5 a.m.—3 p.m. | 55 dB(A) |
| **All Times:** | | |
| Quarry/plant | | 45 dB(A) |
| Construction material manufacturer | | 45 dB(A) |

C. Exceptions. Exceptions may be granted in the event of a proven emergency situation or required by a public agency and written authorization is obtained from the city manager or designee prior to quarry, plant or construction

material manufacturer operations being conducted. The maximum exterior sound level at any property zoned for residential use shall not exceed 55 dB(A) during such exception.

D. Measurement Parameters.

1. Measurements shall be made to the one-tenth decibel, but shall be reported to the integer value. Values of 0.1 to 0.4 shall be rounded down to the lower integer. Values of 0.5 to 0.9 shall be rounded up to the higher integer.

2. If measurements are made for more than one hour, the subsequent measurements shall be made on one hour increments. For a series of one hour measurements, compliance shall be determined by the highest average hourly reading. Measurements shall be started on the hour and ended on the hour.

3. Measurements of less than one hour, extrapolated to one hour shall not be used to determine compliance or violation.

4. Measurements will be made on the "A" weighted scale and a slow response.

E. Measurement Location. Exterior measurements shall be at locations on residential property that are considered accessible for normal and usual outdoor human activity and which are intended and used for such purposes. The receptor shall be placed at five feet above the ground surface and 10 feet from any reflecting surface. When these conditions cannot be met, the actual location utilized shall be noted in writing.

F. Calibration. Prior to, and after each measurement period, the sound level meter shall be calibrated using an acoustic calibrator of the coupler type.

Each year, the sound level meter and acoustic calibrator shall be calibrated to manufacturers' specifications by a laboratory subject to the National Bureau of Standards.

G. Ambient Noise.

1. Compliance applies only to the alleged offending source. Preferably, an ambient measurement will be measured at the affected property while the source is nonoperational and immediately prior to or immediately after the measurement period while the source is operating. If this procedure is not feasible and the source operation cannot be controlled, then an ambient measurement will be made at some other location in the vicinity that in the judgment of the measurement technician is representative of the situation at the affected property.

2. If the ambient level is below the source level by 10 dB(A) or more, then the measurement with the source in operation will be equivalent to the source alone within the prescribed resolution. If the ambient level is less than 10 dB(A) lower than the source, then the ambient level will be subtracted logarithmically from the combined measurement to determine the actual source level. If the ambient level is higher than the source level, the source will be considered to comply regardless of its level.

H. Record Keeping. When applying this section for an enforcement action, the following information, as a minimum, shall be recorded and maintained:

1. The date, start time, stop time, average "A" weighted sound level, meter scale when appropriate, slow or fast response, equipment manufacturer, model number and serial number, and the ambient sound level shall be documented.

2. The location of the source, the property measurement point, and the ambient measurement point shall be documented and scaled dimensionally. Photos are not necessary but encouraged. The data sheets shall be signed and dated by the measurement technician.

3. In the event auxiliary recording devices are used for data storage, then settings shall be listed, and equipment type, manufacturer, model and serial number listed.

I. Verification. If data is to be used for enforcement purposes, the technician will certify in writing that the data recorded was from the source and that all procedures have been complied with in the measurement and reporting. (Prior code § 5400.950)

## 9.40.100 Noises prohibited—Unnecessary noise standard.

The following acts are declared to be loud, disturbing and unnecessary noises in violation of this chapter, but such enumeration shall not be deemed to be exclusive, namely:

A. Impact, Repetitive and Tone Noise Levels. In the event any offending noise consists primarily of impact noise, repetitive noise, or simple tone noise, each of the maximum permitted noise levels specified in Section 9.40.070 of this chapter shall be reduced by five dB(A).

B. Radios, Televisions and Stereos. It is unlawful for any person to play, use, operate, or permit to be played, used or operated any radio, television set, musical instrument, phonograph, stereophonic equipment, jukebox or other machine or device for producing, reproducing or amplifying sound when audible at a distance of 50 feet or more from the source of the sound and/ or when audible within any other residence or establishment.

C. Hawkers and Peddlers. It is unlawful for any person to sell anything by public outcry within any area of the city. The provisions of this section shall not be construed to prohibit the selling by outcry of merchandise, food, and beverages at licensed sporting events, parades, fairs, circuses, and other similar licensed public entertainment events.

D. Drums and Musical Instruments. It is unlawful for any person to use any drum or other percussion or musical instrument or device of any kind for the purpose of attracting attention by the creation of noise within the city.

E. Machinery, Equipment, Fans and Air Conditioning. It is unlawful for any person to operate, cause to operate or permit the operation of any machinery, equipment, device, pump, fan, compressor, air conditioning apparatus, or similar mechanical device in any manner so as to create any noise which would cause the noise level at the property line of any property to exceed the ambient noise base level by five dB(A).

F. Motor Driven Vehicles. It is unlawful for any person to operate any motor driven vehicle within the city that, due to the nature of the operation of the vehicle, or due to the operating condition of the vehicle, or due to any modification made to the vehicle, generates noise so that a reasonable person is caused discomfort or annoyance.

G. Horns, Signaling Devices. It is unlawful for any person to cause the sounding of any horn or signaling device on any automobile, motorcycle, street car or other motor driven vehicle on any street or public place of the city, except as a danger warning; to create by means of any such signaling device any unreasonably loud or harsh sound; and to create the sounding of any such device for an unnecessary and unreasonable period of time. It is unlawful for any person to use any signaling device except one operated by hand or electricity; to use any horn, whistle or other device operated by engine exhaust; or to use any such signaling device when traffic is for any reason held up.

H. Loudspeakers, Amplifiers for Advertising. It is unlawful for any person to use, operate or permit to be played, used, or operated any radio receiving set, musical instrument, phonograph, loudspeaker, sound amplifier, or other machine or device for the producing or reproducing of sound which is cast upon the public streets for the purpose of commercial advertising or attracting the attention of the public to any building or structure.

I. Yelling, Shouting. It is unlawful for any person to yell, shout, hoot, whistle, or sing on the public streets, particularly between the hours of 11:00 p.m. and 7:00 a.m., or at any time or place so as to annoy or disturb the quiet, comfort, or repose of any persons in the vicinity.

J. Animals and Fowl. It is unlawful for any person to keep or maintain, or to permit such activity, upon any premises owned, or occupied, or controlled by such person any animal or fowl otherwise permitted to be kept which, by any sound, cry, or behavioral noise, causes annoyance or discomfort to a reasonable person in any residential neighborhood.

K. Exhaust. It is unlawful for any person to discharge into the open air the exhaust of any steam engine, stationary internal combustion engine, motorboat, or motor driven vehicle except through a muffler or other device which will effectively prevent loud or explosive noises therefrom.

L. Loading, Unloading, Opening Boxes. It is unlawful for any person to create any loud and excessive noise in connection with loading or unloading any vehicle or the opening and destruction of bales, boxes, crates, and containers.

M. Construction or Repairing of Buildings. It is unlawful for any person to engage in or permit the erection (including excavation), demolition, alteration or repair of any building other than between the hours of 7:00 a.m. and 6:00 p.m. on weekdays, except in case of urgent necessity in the interest of public health and safety, and then only with a permit from the building inspector, which permit may be granted for a period not to exceed three days or less while the emergency continues, and which permit may be renewed for periods of three days or less while the emergency continues. If the building inspector should determine that the public health and safety will not be

impaired by the erection, demolition, alteration or repair of any building or the excavation of streets and highways within the hours of 6:00 p.m. and 7:00 a.m., and if he or she shall further determine that loss or inconvenience would result to any party in interest, he or she may grant permission for such work to be done within the hours of 6:00 p.m. and 7:00 a.m., upon application being made at the time the permit for the work is awarded or during the progress of the work.

N. Metal Rails, Pillars and Columns—Transportation Thereof. It is unlawful for any person to transport rails, pillars or columns of iron, steel or other material over and along streets and other public places upon carts, trays, cars, trucks, or in any other manner so loaded as to cause loud noises or as to disturb the peace and quiet of such streets or other public places.

O. Hammers, Etc. It is unlawful for any person to operate between the hours of 10:00 p.m. and 7:00 a.m. any steam shovel, pneumatic hammer, derrick, steam or electric hoist or other appliance, the use of which is attended by loud or unusual noise.

P. Blowers. It is unlawful for any person to operate any noise-creating blower or power fan or any internal combustion engine, the operation of which causes noise due to the explosion of operating gases or fluids, unless the noise from such blower or fan is muffled and such engine is equipped with a muffler device sufficient to deaden such noise.

Q. Exceptions. This section shall not apply to persons who are participants in events for which they have obtained a valid permit from the city and have been authorized to engage in such conduct. (Prior code § 5400.1000)

## 9.40.110 Violation a misdemeanor.

Any person violating any of the provisions of this chapter shall be deemed guilty of a misdemeanor and, upon conviction thereof, shall be fined an amount not exceeding $1,000.00, or be imprisoned in the city or county jail for a period not exceeding six months, or by both such fine and imprisonment. Each day such violation is committed or permitted to continue shall constitute a separate offense and shall be punishable as such hereunder. (Prior code § 5400.1100)

## 9.40.120 Manner of enforcement.

Violations of this chapter shall be prosecuted in the same manner as other misdemeanor violations of the city's code. (Prior code § 5400.1200)

## 9.40.130 Additional remedy—Injunction.

As an additional remedy, the operation or maintenance of any device, instrument, vehicle or machinery in violation of any provision hereof and which causes discomfort or annoyance to reasonable persons of normal sensitiveness or which endangers the comfort, repose, health or peace of residents in the area shall be deemed, and is declared to be, a public nuisance and may be subject to abatement summarily by a restraining order or injunction issued by a court of competent jurisdiction. (Prior code § 5400.1300)

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# APPENDIX F

# OPERATIONAL NOISE LEVEL CALCULATIONS

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# 14896 - Upland Colonies

**CadnaA Noise Prediction Model:** 14896-03.cna
**Date:** 19.06.23
**Analyst:** B. Lawson

## Calculation Configuration

| Configuration | |
|---|---|
| Parameter | Value |
| General | |
| Max. Error (dB) | 0.00 |
| Max. Search Radius (#(Unit,LEN)) | 2000.01 |
| Min. Dist Src to Rcvr | 0.00 |
| Partition | |
| Raster Factor | 0.50 |
| Max. Length of Section (#(Unit,LEN)) | 999.99 |
| Min. Length of Section (#(Unit,LEN)) | 1.01 |
| Min. Length of Section (%) | 0.00 |
| Proj. Line Sources | On |
| Proj. Area Sources | On |
| Ref. Time | |
| Daytime Penalty (dB) | 0.00 |
| Recr. Time Penalty (dB) | 5.00 |
| Night-time Penalty (dB) | 10.00 |
| DTM | |
| Standard Height (m) | 0.00 |
| Model of Terrain | Triangulation |
| Reflection | |
| max. Order of Reflection | 2 |
| Search Radius Src | 100.00 |
| Search Radius Rcvr | 100.00 |
| Max. Distance Source - Rcvr | 1000.00 1000.00 |
| Min. Distance Rvcr - Reflector | 1.00 1.00 |
| Min. Distance Source - Reflector | 0.10 |
| Industrial (ISO 9613) | |
| Lateral Diffraction | some Obj |
| Obst. within Area Src do not shield | On |
| Screening | Incl. Ground Att. over Barrier |
| | Dz with limit (20/25) |
| Barrier Coefficients C1,2,3 | 3.0 20.0 0.0 |
| Temperature (#(Unit,TEMP)) | 10 |
| rel. Humidity (%) | 70 |
| Ground Absorption G | 0.50 |
| Wind Speed for Dir. (#(Unit,SPEED)) | 3.0 |
| Roads (RLS-90) | |
| Strictly acc. to RLS-90 | |
| Railways (FTA/FRA) | |
| Aircraft (???) | |
| Strictly acc. to AzB | |

## Receiver Noise Levels

| Name | M. | ID | Level Lr | | | Limit. Value | | | Land Use | | | Height | | Coordinates | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Day | Night | CNEL | Day | Night | CNEL | Type | Auto | Noise Type | | | X | Y | Z |
| | | | (dBA) | (dBA) | (dBA) | (dBA) | (dBA) | (dBA) | | | | (ft) | | (ft) | (ft) | (ft) |
| RECEIVERS | | R01 | 43.8 | 34.1 | 43.5 | 55.0 | 45.0 | 0.0 | | | | 5.00 | a | 6142210.48 | 2353699.29 | 5.00 |
| RECEIVERS | | R02 | 50.0 | 35.3 | 48.0 | 55.0 | 45.0 | 0.0 | | | | 5.00 | a | 6142953.70 | 2353783.32 | 5.00 |
| RECEIVERS | | R03 | 30.9 | 19.6 | 30.0 | 55.0 | 45.0 | 0.0 | | | | 5.00 | a | 6144631.55 | 2353746.43 | 5.00 |
| RECEIVERS | | R04 | 35.9 | 20.6 | 33.8 | 55.0 | 45.0 | 0.0 | | | | 5.00 | a | 6144399.08 | 2353347.84 | 5.00 |
| RECEIVERS | | R05 | 44.6 | 33.6 | 43.7 | 55.0 | 45.0 | 0.0 | | | | 5.00 | a | 6143420.50 | 2353349.82 | 5.00 |
| RECEIVERS | | R06 | 51.3 | 36.2 | 49.3 | 55.0 | 45.0 | 0.0 | | | | 5.00 | a | 6143159.29 | 2353363.44 | 5.00 |
| RECEIVERS | | R07 | 46.7 | 33.6 | 45.2 | 55.0 | 45.0 | 0.0 | | | | 5.00 | a | 6142773.82 | 2353163.07 | 5.00 |
| RECEIVERS | | R08 | 43.3 | 30.0 | 41.7 | 55.0 | 45.0 | 0.0 | | | | 5.00 | a | 6141897.50 | 2353158.34 | 5.00 |
| RECEIVERS | | R09 | 32.9 | 21.6 | 32.0 | 55.0 | 45.0 | 0.0 | | | | 5.00 | a | 6141338.47 | 2353287.11 | 5.00 |
| RECEIVERS | | R10 | 45.2 | 31.4 | 43.5 | 55.0 | 45.0 | 0.0 | | | | 5.00 | a | 6141867.68 | 2353376.72 | 5.00 |

## Point Source(s)

| Name | M. | ID | Result. PWL | | | Lw / Li | | | Operating Time | | | K0 | Height | | Coordinates | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Day | Evening | Night | Type | Value | norm. | Day | Special | Night | | | | X | Y | Z |
| | | | (dBA) | (dBA) | (dBA) | | | dB(A) | (min) | (min) | (min) | (dB) | (ft) | | (ft) | (ft) | (ft) |
| POINTSOURCE | | POOL07 | 95.0 | 95.0 | 95.0 | Lw | 95 | | 900.00 | 0.00 | 0.00 | 0.0 | 5.00 | a | 6142981.07 | 2353406.90 | 5.00 |
| POINTSOURCE | | POOL06 | 95.0 | 95.0 | 95.0 | Lw | 95 | | 900.00 | 0.00 | 0.00 | 0.0 | 5.00 | a | 6142990.57 | 2353419.42 | 5.00 |
| POINTSOURCE | | POOL05 | 95.0 | 95.0 | 95.0 | Lw | 95 | | 900.00 | 0.00 | 0.00 | 0.0 | 5.00 | a | 6142966.23 | 2353453.82 | 5.00 |
| POINTSOURCE | | POOL04 | 95.0 | 95.0 | 95.0 | Lw | 95 | | 900.00 | 0.00 | 0.00 | 0.0 | 5.00 | a | 6142906.57 | 2353409.51 | 5.00 |
| POINTSOURCE | | POOL03 | 95.0 | 95.0 | 95.0 | Lw | 95 | | 900.00 | 0.00 | 0.00 | 0.0 | 5.00 | a | 6142924.17 | 2353431.87 | 5.00 |
| POINTSOURCE | | POOL02 | 95.0 | 95.0 | 95.0 | Lw | 95 | | 900.00 | 0.00 | 0.00 | 0.0 | 5.00 | a | 6142934.47 | 2353397.94 | 5.00 |
| POINTSOURCE | | POOL01 | 95.0 | 95.0 | 95.0 | Lw | 95 | | 900.00 | 0.00 | 0.00 | 0.0 | 5.00 | a | 6142953.03 | 2353423.68 | 5.00 |
| POINTSOURCE | | AC01 | 73.0 | 73.0 | 73.0 | Lw | 73 | | | | | 0.0 | 5.00 | a | 6143051.36 | 2353436.75 | 5.00 |
| POINTSOURCE | | AC02 | 73.0 | 73.0 | 73.0 | Lw | 73 | | | | | 0.0 | 5.00 | a | 6143063.97 | 2353445.60 | 5.00 |

| Name | M. | ID | Result. PWL | | | Lw / Li | | | Operating Time | | | K0 | Height | | Coordinates | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Day | Evening | Night | Type | Value | norm. | Day | Special | Night | | | | X | Y | Z |
| | | | (dBA) | (dBA) | (dBA) | | | dB(A) | (min) | (min) | (min) | (dB) | (ft) | | (ft) | (ft) | (ft) |
| POINTSOURCE | | AC03 | 73.0 | 73.0 | 73.0 | Lw | 73 | | | | | 0.0 | 5.00 | a | 6143143.50 | 2353446.06 | 5.00 |
| POINTSOURCE | | AC04 | 73.0 | 73.0 | 73.0 | Lw | 73 | | | | | 0.0 | 5.00 | a | 6143157.96 | 2353443.55 | 5.00 |
| POINTSOURCE | | AC05 | 73.0 | 73.0 | 73.0 | Lw | 73 | | | | | 0.0 | 5.00 | a | 6143239.53 | 2353444.21 | 5.00 |
| POINTSOURCE | | AC06 | 73.0 | 73.0 | 73.0 | Lw | 73 | | | | | 0.0 | 5.00 | a | 6143251.97 | 2353442.64 | 5.00 |
| POINTSOURCE | | AC07 | 73.0 | 73.0 | 73.0 | Lw | 73 | | | | | 0.0 | 5.00 | a | 6143332.37 | 2353440.83 | 5.00 |
| POINTSOURCE | | AC08 | 73.0 | 73.0 | 73.0 | Lw | 73 | | | | | 0.0 | 5.00 | a | 6143346.20 | 2353441.27 | 5.00 |
| POINTSOURCE | | AC09 | 73.0 | 73.0 | 73.0 | Lw | 73 | | | | | 0.0 | 5.00 | a | 6143483.27 | 2353454.36 | 5.00 |
| POINTSOURCE | | AC10 | 73.0 | 73.0 | 73.0 | Lw | 73 | | | | | 0.0 | 5.00 | a | 6143482.58 | 2353467.51 | 5.00 |
| POINTSOURCE | | AC11 | 73.0 | 73.0 | 73.0 | Lw | 73 | | | | | 0.0 | 5.00 | a | 6143457.68 | 2353602.74 | 5.00 |
| POINTSOURCE | | AC12 | 73.0 | 73.0 | 73.0 | Lw | 73 | | | | | 0.0 | 5.00 | a | 6143389.06 | 2353604.58 | 5.00 |
| POINTSOURCE | | AC13 | 73.0 | 73.0 | 73.0 | Lw | 73 | | | | | 0.0 | 5.00 | a | 6143374.10 | 2353604.16 | 5.00 |
| POINTSOURCE | | AC14 | 73.0 | 73.0 | 73.0 | Lw | 73 | | | | | 0.0 | 5.00 | a | 6143293.21 | 2353603.94 | 5.00 |
| POINTSOURCE | | AC15 | 73.0 | 73.0 | 73.0 | Lw | 73 | | | | | 0.0 | 5.00 | a | 6143280.33 | 2353605.74 | 5.00 |
| POINTSOURCE | | AC16 | 73.0 | 73.0 | 73.0 | Lw | 73 | | | | | 0.0 | 5.00 | a | 6143201.28 | 2353607.31 | 5.00 |
| POINTSOURCE | | AC17 | 73.0 | 73.0 | 73.0 | Lw | 73 | | | | | 0.0 | 5.00 | a | 6143186.30 | 2353605.52 | 5.00 |
| POINTSOURCE | | AC18 | 73.0 | 73.0 | 73.0 | Lw | 73 | | | | | 0.0 | 5.00 | a | 6143105.70 | 2353608.93 | 5.00 |
| POINTSOURCE | | AC19 | 73.0 | 73.0 | 73.0 | Lw | 73 | | | | | 0.0 | 5.00 | a | 6143091.89 | 2353609.39 | 5.00 |
| POINTSOURCE | | AC20 | 73.0 | 73.0 | 73.0 | Lw | 73 | | | | | 0.0 | 5.00 | a | 6143011.44 | 2353608.48 | 5.00 |
| POINTSOURCE | | AC21 | 73.0 | 73.0 | 73.0 | Lw | 73 | | | | | 0.0 | 5.00 | a | 6142978.68 | 2353600.65 | 5.00 |
| POINTSOURCE | | AC22 | 73.0 | 73.0 | 73.0 | Lw | 73 | | | | | 0.0 | 5.00 | a | 6142903.59 | 2353555.02 | 5.00 |
| POINTSOURCE | | AC23 | 73.0 | 73.0 | 73.0 | Lw | 73 | | | | | 0.0 | 5.00 | a | 6142892.10 | 2353545.25 | 5.00 |
| POINTSOURCE | | AC24 | 73.0 | 73.0 | 73.0 | Lw | 73 | | | | | 0.0 | 5.00 | a | 6142828.78 | 2353498.74 | 5.00 |
| POINTSOURCE | | AC25 | 73.0 | 73.0 | 73.0 | Lw | 73 | | | | | 0.0 | 5.00 | a | 6142818.45 | 2353490.53 | 5.00 |
| POINTSOURCE | | AC26 | 73.0 | 73.0 | 73.0 | Lw | 73 | | | | | 0.0 | 5.00 | a | 6142750.74 | 2353452.48 | 5.00 |
| POINTSOURCE | | AC27 | 73.0 | 73.0 | 73.0 | Lw | 73 | | | | | 0.0 | 5.00 | a | 6142737.80 | 2353450.89 | 5.00 |
| POINTSOURCE | | AC28 | 73.0 | 73.0 | 73.0 | Lw | 73 | | | | | 0.0 | 5.00 | a | 6142952.17 | 2353279.15 | 5.00 |
| POINTSOURCE | | AC29 | 73.0 | 73.0 | 73.0 | Lw | 73 | | | | | 0.0 | 5.00 | a | 6142939.22 | 2353276.87 | 5.00 |
| POINTSOURCE | | AC30 | 73.0 | 73.0 | 73.0 | Lw | 73 | | | | | 0.0 | 5.00 | a | 6142858.83 | 2353279.37 | 5.00 |
| POINTSOURCE | | AC31 | 73.0 | 73.0 | 73.0 | Lw | 73 | | | | | 0.0 | 5.00 | a | 6142845.20 | 2353277.56 | 5.00 |
| POINTSOURCE | | AC32 | 73.0 | 73.0 | 73.0 | Lw | 73 | | | | | 0.0 | 5.00 | a | 6142764.60 | 2353280.96 | 5.00 |
| POINTSOURCE | | AC33 | 73.0 | 73.0 | 73.0 | Lw | 73 | | | | | 0.0 | 5.00 | a | 6142751.50 | 2353283.45 | 5.00 |
| POINTSOURCE | | AC34 | 73.0 | 73.0 | 73.0 | Lw | 73 | | | | | 0.0 | 5.00 | a | 6142657.09 | 2353448.17 | 5.00 |
| POINTSOURCE | | AC35 | 73.0 | 73.0 | 73.0 | Lw | 73 | | | | | 0.0 | 5.00 | a | 6142643.55 | 2353451.12 | 5.00 |
| POINTSOURCE | | AC36 | 73.0 | 73.0 | 73.0 | Lw | 73 | | | | | 0.0 | 5.00 | a | 6142670.80 | 2353280.96 | 5.00 |
| POINTSOURCE | | AC37 | 73.0 | 73.0 | 73.0 | Lw | 73 | | | | | 0.0 | 5.00 | a | 6142656.98 | 2353280.74 | 5.00 |
| POINTSOURCE | | AC38 | 73.0 | 73.0 | 73.0 | Lw | 73 | | | | | 0.0 | 5.00 | a | 6142576.62 | 2353285.27 | 5.00 |
| POINTSOURCE | | AC39 | 73.0 | 73.0 | 73.0 | Lw | 73 | | | | | 0.0 | 5.00 | a | 6142563.89 | 2353282.77 | 5.00 |
| POINTSOURCE | | AC40 | 73.0 | 73.0 | 73.0 | Lw | 73 | | | | | 0.0 | 5.00 | a | 6142563.12 | 2353451.58 | 5.00 |
| POINTSOURCE | | AC41 | 73.0 | 73.0 | 73.0 | Lw | 73 | | | | | 0.0 | 5.00 | a | 6142549.71 | 2353449.08 | 5.00 |
| POINTSOURCE | | AC42 | 73.0 | 73.0 | 73.0 | Lw | 73 | | | | | 0.0 | 5.00 | a | 6142482.72 | 2353279.16 | 5.00 |
| POINTSOURCE | | AC43 | 73.0 | 73.0 | 73.0 | Lw | 73 | | | | | 0.0 | 5.00 | a | 6142469.92 | 2353285.72 | 5.00 |
| POINTSOURCE | | AC44 | 73.0 | 73.0 | 73.0 | Lw | 73 | | | | | 0.0 | 5.00 | a | 6142469.36 | 2353453.62 | 5.00 |
| POINTSOURCE | | AC45 | 73.0 | 73.0 | 73.0 | Lw | 73 | | | | | 0.0 | 5.00 | a | 6142455.93 | 2353449.99 | 5.00 |
| POINTSOURCE | | AC46 | 73.0 | 73.0 | 73.0 | Lw | 73 | | | | | 0.0 | 5.00 | a | 6142389.05 | 2353287.09 | 5.00 |
| POINTSOURCE | | AC47 | 73.0 | 73.0 | 73.0 | Lw | 73 | | | | | 0.0 | 5.00 | a | 6142375.62 | 2353283.23 | 5.00 |
| POINTSOURCE | | AC48 | 73.0 | 73.0 | 73.0 | Lw | 73 | | | | | 0.0 | 5.00 | a | 6142376.01 | 2353453.38 | 5.00 |
| POINTSOURCE | | AC49 | 73.0 | 73.0 | 73.0 | Lw | 73 | | | | | 0.0 | 5.00 | a | 6142361.70 | 2353451.13 | 5.00 |
| POINTSOURCE | | AC50 | 73.0 | 73.0 | 73.0 | Lw | 73 | | | | | 0.0 | 5.00 | a | 6142297.24 | 2353283.88 | 5.00 |
| POINTSOURCE | | AC51 | 73.0 | 73.0 | 73.0 | Lw | 73 | | | | | 0.0 | 5.00 | a | 6142281.90 | 2353287.77 | 5.00 |
| POINTSOURCE | | AC52 | 73.0 | 73.0 | 73.0 | Lw | 73 | | | | | 0.0 | 5.00 | a | 6142200.99 | 2353286.19 | 5.00 |
| POINTSOURCE | | AC53 | 73.0 | 73.0 | 73.0 | Lw | 73 | | | | | 0.0 | 5.00 | a | 6142188.21 | 2353281.19 | 5.00 |
| POINTSOURCE | | AC54 | 73.0 | 73.0 | 73.0 | Lw | 73 | | | | | 0.0 | 5.00 | a | 6142082.10 | 2353289.79 | 5.00 |
| POINTSOURCE | | AC55 | 73.0 | 73.0 | 73.0 | Lw | 73 | | | | | 0.0 | 5.00 | a | 6142069.38 | 2353287.74 | 5.00 |
| POINTSOURCE | | AC56 | 73.0 | 73.0 | 73.0 | Lw | 73 | | | | | 0.0 | 5.00 | a | 6141988.30 | 2353289.56 | 5.00 |
| POINTSOURCE | | AC57 | 73.0 | 73.0 | 73.0 | Lw | 73 | | | | | 0.0 | 5.00 | a | 6141975.80 | 2353287.28 | 5.00 |
| POINTSOURCE | | AC58 | 73.0 | 73.0 | 73.0 | Lw | 73 | | | | | 0.0 | 5.00 | a | 6142281.09 | 2353454.31 | 5.00 |
| POINTSOURCE | | AC59 | 73.0 | 73.0 | 73.0 | Lw | 73 | | | | | 0.0 | 5.00 | a | 6142268.59 | 2353452.25 | 5.00 |
| POINTSOURCE | | AC60 | 73.0 | 73.0 | 73.0 | Lw | 73 | | | | | 0.0 | 5.00 | a | 6142187.78 | 2353456.57 | 5.00 |
| POINTSOURCE | | AC61 | 73.0 | 73.0 | 73.0 | Lw | 73 | | | | | 0.0 | 5.00 | a | 6142144.52 | 2353457.30 | 5.00 |
| POINTSOURCE | | AC62 | 73.0 | 73.0 | 73.0 | Lw | 73 | | | | | 0.0 | 5.00 | a | 6142063.87 | 2353457.53 | 5.00 |
| POINTSOURCE | | AC63 | 73.0 | 73.0 | 73.0 | Lw | 73 | | | | | 0.0 | 5.00 | a | 6142018.57 | 2353458.52 | 5.00 |
| POINTSOURCE | | AC64 | 73.0 | 73.0 | 73.0 | Lw | 73 | | | | | 0.0 | 5.00 | a | 6141971.86 | 2353456.59 | 5.00 |
| POINTSOURCE | | AC65 | 73.0 | 73.0 | 73.0 | Lw | 73 | | | | | 0.0 | 5.00 | a | 6141956.64 | 2353454.13 | 5.00 |
| POINTSOURCE | | PARK01 | 75.0 | 75.0 | 75.0 | Lw | 75 | | 900.00 | 0.00 | 0.00 | 0.0 | 5.00 | a | 6142008.82 | 2353257.27 | 5.00 |
| POINTSOURCE | | PARK02 | 75.0 | 75.0 | 75.0 | Lw | 75 | | 900.00 | 0.00 | 0.00 | 0.0 | 5.00 | a | 6142139.83 | 2353287.22 | 5.00 |
| POINTSOURCE | | PARK03 | 75.0 | 75.0 | 75.0 | Lw | 75 | | 900.00 | 0.00 | 0.00 | 0.0 | 5.00 | a | 6142130.95 | 2353338.35 | 5.00 |
| POINTSOURCE | | PARK04 | 75.0 | 75.0 | 75.0 | Lw | 75 | | 900.00 | 0.00 | 0.00 | 0.0 | 5.00 | a | 6141890.71 | 2353387.50 | 5.00 |
| POINTSOURCE | | PARK05 | 75.0 | 75.0 | 75.0 | Lw | 75 | | 900.00 | 0.00 | 0.00 | 0.0 | 5.00 | a | 6141890.18 | 2353422.63 | 5.00 |
| POINTSOURCE | | PARK06 | 75.0 | 75.0 | 75.0 | Lw | 75 | | 900.00 | 0.00 | 0.00 | 0.0 | 5.00 | a | 6142158.94 | 2353412.19 | 5.00 |
| POINTSOURCE | | PARK07 | 75.0 | 75.0 | 75.0 | Lw | 75 | | 900.00 | 0.00 | 0.00 | 0.0 | 5.00 | a | 6142170.46 | 2353437.15 | 5.00 |
| POINTSOURCE | | PARK08 | 75.0 | 75.0 | 75.0 | Lw | 75 | | 900.00 | 0.00 | 0.00 | 0.0 | 5.00 | a | 6142165.57 | 2353455.81 | 5.00 |
| POINTSOURCE | | PARK09 | 75.0 | 75.0 | 75.0 | Lw | 75 | | 900.00 | 0.00 | 0.00 | 0.0 | 5.00 | a | 6141904.99 | 2353441.18 | 5.00 |
| POINTSOURCE | | PARK10 | 75.0 | 75.0 | 75.0 | Lw | 75 | | 900.00 | 0.00 | 0.00 | 0.0 | 5.00 | a | 6141904.68 | 2353409.24 | 5.00 |
| POINTSOURCE | | PARK11 | 75.0 | 75.0 | 75.0 | Lw | 75 | | 900.00 | 0.00 | 0.00 | 0.0 | 5.00 | a | 6143110.54 | 2353412.63 | 5.00 |
| POINTSOURCE | | PARK12 | 75.0 | 75.0 | 75.0 | Lw | 75 | | 900.00 | 0.00 | 0.00 | 0.0 | 5.00 | a | 6143216.84 | 2353415.14 | 5.00 |
| POINTSOURCE | | PARK13 | 75.0 | 75.0 | 75.0 | Lw | 75 | | 900.00 | 0.00 | 0.00 | 0.0 | 5.00 | a | 6143314.39 | 2353409.41 | 5.00 |
| POINTSOURCE | | PARK14 | 75.0 | 75.0 | 75.0 | Lw | 75 | | 900.00 | 0.00 | 0.00 | 0.0 | 5.00 | a | 6143441.16 | 2353554.69 | 5.00 |

| Name | M. | ID | Result. PWL | | | Lw / Li | | | Operating Time | | | K0 | Height | | Coordinates | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Day | Evening | Night | Type | Value | norm. | Day | Special | Night | | | | X | Y | Z |
| | | | (dBA) | (dBA) | (dBA) | | | dB(A) | (min) | (min) | (min) | (dB) | (ft) | | (ft) | (ft) | (ft) |
| POINTSOURCE | | PARK15 | 75.0 | 75.0 | 75.0 | Lw | 75 | | 900.00 | 0.00 | 0.00 | 0.0 | 5.00 | a | 6143438.04 | 2353569.11 | 5.00 |
| POINTSOURCE | | PARK16 | 75.0 | 75.0 | 75.0 | Lw | 75 | | 900.00 | 0.00 | 0.00 | 0.0 | 5.00 | a | 6143436.36 | 2353589.11 | 5.00 |
| POINTSOURCE | | PARK17 | 75.0 | 75.0 | 75.0 | Lw | 75 | | 900.00 | 0.00 | 0.00 | 0.0 | 5.00 | a | 6143441.72 | 2353600.92 | 5.00 |
| POINTSOURCE | | PARK18 | 75.0 | 75.0 | 75.0 | Lw | 75 | | 900.00 | 0.00 | 0.00 | 0.0 | 5.00 | a | 6142136.44 | 2353310.98 | 5.00 |
| POINTSOURCE | | PARK19 | 75.0 | 75.0 | 75.0 | Lw | 75 | | 900.00 | 0.00 | 0.00 | 0.0 | 5.00 | a | 6141952.24 | 2353236.43 | 5.00 |
| POINTSOURCE | | PARK20 | 75.0 | 75.0 | 75.0 | Lw | 75 | | 900.00 | 0.00 | 0.00 | 0.0 | 5.00 | a | 6141990.78 | 2353232.41 | 5.00 |
| POINTSOURCE | | PARK21 | 75.0 | 75.0 | 75.0 | Lw | 75 | | 900.00 | 0.00 | 0.00 | 0.0 | 5.00 | a | 6141986.74 | 2353205.99 | 5.00 |
| POINTSOURCE | | PARK22 | 75.0 | 75.0 | 75.0 | Lw | 75 | | 900.00 | 0.00 | 0.00 | 0.0 | 5.00 | a | 6141947.26 | 2353207.56 | 5.00 |

## Barrier(s)

| Name | Sel. | M. | ID | Absorption | | Z-Ext. | Cantilever | | Height | | | | Coordinates | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | left | right | | horz. | vert. | Begin | | End | | x | y | z | Ground |
| | | | | | | (ft) | (ft) | (ft) | (ft) | | (ft) | | (ft) | (ft) | (ft) | (ft) |
| BARRIEREXISTING | | | 0 | | | | | | 6.00 | a | | | 6141940.55 | 2353333.42 | 6.00 | 0.00 |
| | | | | | | | | | | | | | 6141934.89 | 2353333.51 | 6.00 | 0.00 |
| | | | | | | | | | | | | | 6141933.87 | 2353273.26 | 6.00 | 0.00 |
| | | | | | | | | | | | | | 6142122.57 | 2353271.43 | 6.00 | 0.00 |
| | | | | | | | | | | | | | 6142123.10 | 2353329.65 | 6.00 | 0.00 |
| | | | | | | | | | | | | | 6142117.89 | 2353329.74 | 6.00 | 0.00 |
| BARRIEREXISTING | | | 0 | | | | | | 6.00 | a | | | 6142153.33 | 2353327.31 | 6.00 | 0.00 |
| | | | | | | | | | | | | | 6142147.72 | 2353327.18 | 6.00 | 0.00 |
| | | | | | | | | | | | | | 6142147.12 | 2353265.68 | 6.00 | 0.00 |
| | | | | | | | | | | | | | 6142522.84 | 2353262.47 | 6.00 | 0.00 |
| | | | | | | | | | | | | | 6142945.23 | 2353258.69 | 6.00 | 0.00 |
| | | | | | | | | | | | | | 6142992.36 | 2353257.90 | 6.00 | 0.00 |
| | | | | | | | | | | | | | 6142993.26 | 2353324.32 | 6.00 | 0.00 |
| | | | | | | | | | | | | | 6142987.65 | 2353324.42 | 6.00 | 0.00 |
| BARRIEREXISTING | | | 0 | | | | | | 6.00 | a | | | 6143016.37 | 2353482.86 | 6.00 | 0.00 |
| | | | | | | | | | | | | | 6143011.20 | 2353482.95 | 6.00 | 0.00 |
| | | | | | | | | | | | | | 6143010.04 | 2353427.30 | 6.00 | 0.00 |
| | | | | | | | | | | | | | 6143057.60 | 2353426.04 | 6.00 | 0.00 |
| | | | | | | | | | | | | | 6143057.49 | 2353432.56 | 6.00 | 0.00 |
| | | | | | | | | | | | | | 6143385.81 | 2353427.68 | 6.00 | 0.00 |
| | | | | | | | | | | | | | 6143386.92 | 2353479.96 | 6.00 | 0.00 |
| | | | | | | | | | | | | | 6143381.76 | 2353480.05 | 6.00 | 0.00 |
| BARRIEREXISTING | | | 0 | | | | | | 6.00 | a | | | 6143443.59 | 2353419.96 | 6.00 | 0.00 |
| | | | | | | | | | | | | | 6143443.73 | 2353414.80 | 6.00 | 0.00 |
| | | | | | | | | | | | | | 6143496.47 | 2353414.13 | 6.00 | 0.00 |
| | | | | | | | | | | | | | 6143497.36 | 2353506.37 | 6.00 | 0.00 |
| | | | | | | | | | | | | | 6143449.56 | 2353507.18 | 6.00 | 0.00 |
| | | | | | | | | | | | | | 6143449.91 | 2353501.57 | 6.00 | 0.00 |
| BARRIEREXISTING | | | 0 | | | | | | 6.00 | a | | | 6141920.92 | 2353415.42 | 6.00 | 0.00 |
| | | | | | | | | | | | | | 6141915.54 | 2353415.73 | 6.00 | 0.00 |
| | | | | | | | | | | | | | 6141916.28 | 2353472.74 | 6.00 | 0.00 |
| BARRIEREXISTING | | | 0 | | | | | | 6.00 | a | | | 6142151.01 | 2353428.81 | 6.00 | 0.00 |
| | | | | | | | | | | | | | 6142151.03 | 2353470.11 | 6.00 | 0.00 |
| BARRIEREXISTING | | | 0 | | | | | | 6.00 | a | | | 6142180.42 | 2353429.21 | 6.00 | 0.00 |
| | | | | | | | | | | | | | 6142181.33 | 2353469.83 | 6.00 | 0.00 |
| BARRIEREXISTING | | | 0 | | | | | | 6.00 | a | | | 6143421.15 | 2353565.80 | 6.00 | 0.00 |
| | | | | | | | | | | | | | 6143426.54 | 2353565.94 | 6.00 | 0.00 |
| | | | | | | | | | | | | | 6143427.62 | 2353616.87 | 6.00 | 0.00 |
| BARRIEREXISTING | | | 0 | | | | | | 6.00 | a | | | 6143450.95 | 2353576.07 | 6.00 | 0.00 |
| | | | | | | | | | | | | | 6143451.64 | 2353616.69 | 6.00 | 0.00 |
| BARRIEREXISTING | | | 0 | | | | | | 6.00 | a | | | 6143492.48 | 2353563.02 | 6.00 | 0.00 |
| | | | | | | | | | | | | | 6143498.32 | 2353563.15 | 6.00 | 0.00 |
| | | | | | | | | | | | | | 6143498.77 | 2353616.12 | 6.00 | 0.00 |
| BARRIEREXISTING | | | 0 | | | | | | 6.00 | a | | | 6141810.74 | 2353254.13 | 6.00 | 0.00 |
| | | | | | | | | | | | | | 6141878.16 | 2353253.51 | 6.00 | 0.00 |
| | | | | | | | | | | | | | 6141879.89 | 2353453.52 | 6.00 | 0.00 |

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# APPENDIX G

# CONSTRUCTION NOISE LEVEL CALCULATIONS

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# 14896 - Upland Colonies

**CadnaA Noise Prediction Model:** 14896-03_Construction.cna
**Date:** 19.06.23
**Analyst:** B. Lawson

## Calculation Configuration

| Configuration | |
|---|---|
| Parameter | Value |
| General | |
| Max. Error (dB) | 0.00 |
| Max. Search Radius (#(Unit,LEN)) | 2000.01 |
| Min. Dist Src to Rcvr | 0.00 |
| Partition | |
| Raster Factor | 0.50 |
| Max. Length of Section (#(Unit,LEN)) | 999.99 |
| Min. Length of Section (#(Unit,LEN)) | 1.01 |
| Min. Length of Section (%) | 0.00 |
| Proj. Line Sources | On |
| Proj. Area Sources | On |
| Ref. Time | |
| Daytime Penalty (dB) | 0.00 |
| Recr. Time Penalty (dB) | 5.00 |
| Night-time Penalty (dB) | 10.00 |
| DTM | |
| Standard Height (m) | 0.00 |
| Model of Terrain | Triangulation |
| Reflection | |
| max. Order of Reflection | 2 |
| Search Radius Src | 100.00 |
| Search Radius Rcvr | 100.00 |
| Max. Distance Source - Rcvr | 1000.00 1000.00 |
| Min. Distance Rvcr - Reflector | 1.00 1.00 |
| Min. Distance Source - Reflector | 0.10 |
| Industrial (ISO 9613) | |
| Lateral Diffraction | some Obj |
| Obst. within Area Src do not shield | On |
| Screening | Incl. Ground Att. over Barrier |
| | Dz with limit (20/25) |
| Barrier Coefficients C1,2,3 | 3.0 20.0 0.0 |
| Temperature (#(Unit,TEMP)) | 10 |
| rel. Humidity (%) | 70 |
| Ground Absorption G | 0.50 |
| Wind Speed for Dir. (#(Unit,SPEED)) | 3.0 |
| Roads (RLS-90) | |
| Strictly acc. to RLS-90 | |
| Railways (FTA/FRA) | |
| Aircraft (???) | |
| Strictly acc. to AzB | |

## Receiver Noise Levels

| Name | M. | ID | Level Lr | | | Limit. Value | | | Land Use | | | Height | | Coordinates | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Day | Night | CNEL | Day | Night | CNEL | Type | Auto | Noise Type | | | X | Y | Z |
| | | | (dBA) | (dBA) | (dBA) | (dBA) | (dBA) | (dBA) | | | | (ft) | | (ft) | (ft) | (ft) |
| RECEIVERS | | R01 | 58.3 | 58.3 | 64.9 | 80.0 | 0.0 | 0.0 | | | | 5.00 | a | 6142210.48 | 2353699.29 | 5.00 |
| RECEIVERS | | R02 | 59.3 | 59.3 | 65.9 | 80.0 | 0.0 | 0.0 | | | | 5.00 | a | 6142953.70 | 2353783.32 | 5.00 |
| RECEIVERS | | R03 | 51.2 | 51.2 | 57.8 | 80.0 | 0.0 | 0.0 | | | | 5.00 | a | 6144631.55 | 2353746.43 | 5.00 |
| RECEIVERS | | R04 | 56.5 | 56.5 | 63.2 | 80.0 | 0.0 | 0.0 | | | | 5.00 | a | 6144399.08 | 2353347.84 | 5.00 |
| RECEIVERS | | R05 | 64.7 | 64.7 | 71.4 | 80.0 | 0.0 | 0.0 | | | | 5.00 | a | 6143420.50 | 2353349.82 | 5.00 |
| RECEIVERS | | R06 | 66.9 | 66.9 | 73.5 | 80.0 | 0.0 | 0.0 | | | | 5.00 | a | 6143159.29 | 2353363.44 | 5.00 |
| RECEIVERS | | R07 | 62.5 | 62.5 | 69.1 | 80.0 | 0.0 | 0.0 | | | | 5.00 | a | 6142773.82 | 2353163.07 | 5.00 |
| RECEIVERS | | R08 | 63.7 | 63.7 | 70.3 | 80.0 | 0.0 | 0.0 | | | | 5.00 | a | 6141897.50 | 2353158.34 | 5.00 |
| RECEIVERS | | R09 | 61.9 | 61.9 | 68.5 | 80.0 | 0.0 | 0.0 | | | | 5.00 | a | 6141338.47 | 2353287.11 | 5.00 |
| RECEIVERS | | R10 | 66.6 | 66.6 | 73.3 | 80.0 | 0.0 | 0.0 | | | | 5.00 | a | 6141867.68 | 2353376.72 | 5.00 |

## Area Source(s)

| Name | M. | ID | Result. PWL | | | Result. PWL'' | | | Lw / Li | | | Operating Time | | | Height |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Day | Evening | Night | Day | Evening | Night | Type | Value | norm. | Day | Special | Night | (ft) |
| | | | (dBA) | (dBA) | (dBA) | (dBA) | (dBA) | (dBA) | | | dB(A) | (min) | (min) | (min) | |
| SITEBOUNDARY | | CONSTRUCTION | 115.0 | 115.0 | 115.0 | 68.4 | 68.4 | 68.4 | Lw | 115 | | | | | 8 |

| Name | ID | Height | | | | Coordinates | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Begin | | End | | x | y | z | Ground |
| | | (ft) | | (ft) | | (ft) | (ft) | (ft) | (ft) |
| SITEBOUNDARY | CONSTRUCTION | 8.00 | a | | | 6141878.16 | 2353253.51 | 8.00 | 0.00 |
| | | | | | | 6141880.05 | 2353472.85 | 8.00 | 0.00 |
| | | | | | | 6142760.14 | 2353463.84 | 8.00 | 0.00 |
| | | | | | | 6142974.44 | 2353623.31 | 8.00 | 0.00 |

| Name | ID | Height | | Coordinates | | | |
|---|---|---|---|---|---|---|---|
| | | Begin | End | x | y | z | Ground |
| | | (ft) | (ft) | (ft) | (ft) | (ft) | (ft) |
| | | | | 6143499.92 | 2353615.86 | 8.00 | 0.00 |
| | | | | 6143497.49 | 2353452.52 | 8.00 | 0.00 |
| | | | | 6143912.97 | 2353453.05 | 8.00 | 0.00 |
| | | | | 6144505.51 | 2353450.84 | 8.00 | 0.00 |
| | | | | 6145117.59 | 2353449.34 | 8.00 | 0.00 |
| | | | | 6145462.69 | 2353448.19 | 8.00 | 0.00 |
| | | | | 6145467.81 | 2353448.35 | 8.00 | 0.00 |
| | | | | 6145472.88 | 2353447.65 | 8.00 | 0.00 |
| | | | | 6145477.77 | 2353446.11 | 8.00 | 0.00 |
| | | | | 6145480.76 | 2353443.20 | 8.00 | 0.00 |
| | | | | 6145483.27 | 2353439.88 | 8.00 | 0.00 |
| | | | | 6145485.26 | 2353436.22 | 8.00 | 0.00 |
| | | | | 6145486.68 | 2353432.30 | 8.00 | 0.00 |
| | | | | 6145487.48 | 2353428.21 | 8.00 | 0.00 |
| | | | | 6145487.67 | 2353424.05 | 8.00 | 0.00 |
| | | | | 6145487.22 | 2353419.90 | 8.00 | 0.00 |
| | | | | 6145486.82 | 2353417.75 | 8.00 | 0.00 |
| | | | | 6145486.07 | 2353415.69 | 8.00 | 0.00 |
| | | | | 6145484.99 | 2353413.79 | 8.00 | 0.00 |
| | | | | 6145483.61 | 2353412.09 | 8.00 | 0.00 |
| | | | | 6145481.96 | 2353410.65 | 8.00 | 0.00 |
| | | | | 6145480.10 | 2353409.50 | 8.00 | 0.00 |
| | | | | 6145478.07 | 2353408.68 | 8.00 | 0.00 |
| | | | | 6145475.94 | 2353408.20 | 8.00 | 0.00 |
| | | | | 6145473.75 | 2353408.08 | 8.00 | 0.00 |
| | | | | 6145471.58 | 2353408.33 | 8.00 | 0.00 |
| | | | | 6145469.47 | 2353408.94 | 8.00 | 0.00 |
| | | | | 6145467.50 | 2353409.89 | 8.00 | 0.00 |
| | | | | 6145465.71 | 2353411.15 | 8.00 | 0.00 |
| | | | | 6145461.73 | 2353417.25 | 8.00 | 0.00 |
| | | | | 6145456.95 | 2353422.75 | 8.00 | 0.00 |
| | | | | 6145451.45 | 2353427.54 | 8.00 | 0.00 |
| | | | | 6143497.16 | 2353429.95 | 8.00 | 0.00 |
| | | | | 6143496.52 | 2353387.31 | 8.00 | 0.00 |
| | | | | 6143496.35 | 2353375.91 | 8.00 | 0.00 |
| | | | | 6143077.90 | 2353381.22 | 8.00 | 0.00 |
| | | | | 6143076.78 | 2353241.37 | 8.00 | 0.00 |
| | | | | 6142047.65 | 2353251.80 | 8.00 | 0.00 |
| | | | | 6142040.97 | 2353249.09 | 8.00 | 0.00 |
| | | | | 6142034.83 | 2353245.33 | 8.00 | 0.00 |
| | | | | 6142029.38 | 2353240.61 | 8.00 | 0.00 |
| | | | | 6142024.78 | 2353235.08 | 8.00 | 0.00 |
| | | | | 6142021.13 | 2353228.86 | 8.00 | 0.00 |
| | | | | 6142018.55 | 2353222.14 | 8.00 | 0.00 |
| | | | | 6142017.11 | 2353215.08 | 8.00 | 0.00 |
| | | | | 6142016.83 | 2353207.88 | 8.00 | 0.00 |
| | | | | 6142016.47 | 2353186.63 | 8.00 | 0.00 |
| | | | | 6141877.50 | 2353186.85 | 8.00 | 0.00 |
| | | | | 6141877.78 | 2353219.85 | 8.00 | 0.00 |
| | | | | 6141010.69 | 2353228.15 | 8.00 | 0.00 |
| | | | | 6141009.30 | 2353219.84 | 8.00 | 0.00 |
| | | | | 6141006.60 | 2353211.87 | 8.00 | 0.00 |
| | | | | 6141002.63 | 2353204.44 | 8.00 | 0.00 |
| | | | | 6140997.52 | 2353197.74 | 8.00 | 0.00 |
| | | | | 6140991.40 | 2353191.96 | 8.00 | 0.00 |
| | | | | 6140984.42 | 2353187.25 | 8.00 | 0.00 |
| | | | | 6140976.77 | 2353183.72 | 8.00 | 0.00 |
| | | | | 6140968.66 | 2353181.47 | 8.00 | 0.00 |
| | | | | 6140960.28 | 2353180.57 | 8.00 | 0.00 |
| | | | | 6140950.83 | 2353182.21 | 8.00 | 0.00 |
| | | | | 6140941.78 | 2353185.38 | 8.00 | 0.00 |
| | | | | 6140933.37 | 2353189.99 | 8.00 | 0.00 |
| | | | | 6140925.82 | 2353195.92 | 8.00 | 0.00 |
| | | | | 6140919.35 | 2353203.00 | 8.00 | 0.00 |
| | | | | 6140914.13 | 2353211.04 | 8.00 | 0.00 |
| | | | | 6140910.29 | 2353219.83 | 8.00 | 0.00 |
| | | | | 6140911.19 | 2353229.10 | 8.00 | 0.00 |
| | | | | 6140913.26 | 2353237.87 | 8.00 | 0.00 |
| | | | | 6140920.00 | 2353245.56 | 8.00 | 0.00 |
| | | | | 6140927.96 | 2353251.98 | 8.00 | 0.00 |
| | | | | 6140936.90 | 2353256.93 | 8.00 | 0.00 |
| | | | | 6140946.56 | 2353260.28 | 8.00 | 0.00 |
| | | | | 6140956.66 | 2353261.91 | 8.00 | 0.00 |
| | | | | 6140966.88 | 2353261.79 | 8.00 | 0.00 |
| | | | | 6141218.52 | 2353259.50 | 8.00 | 0.00 |