# ACOUSTICAL ANALYSIS REPORT

**Dabbs Project**
**County of San Diego Tentative Map 5346**
**Old Highway 395**
**Bonsall, California 92028**

**Prepared For**

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# 1.0 EXECUTIVE SUMMARY

The proposed project, Dabbs TPM 5346, consists of the subdivision of 38.4 acres into nine residential parcels. The project site is located to the west of Old Highway 395, between West Lilac Road and Via Urnel Way, in the Community of Bonsall, County of San Diego, California. This analysis and report will focus on traffic noise impacts on the proposed subdivision from Old Highway 395.

The primary noise sources in the vicinity of the project site include automobile and truck traffic noise from Old Highway 395. Noise from Interstate 15 (I-15) is considered to be negligible due to distance from the project site and considerable intervening topographic features. The current calculated on-site traffic noise level at the northeastern corner of the project site, fronting and at grade level to Old Highway 395, is 67.4 Community Noise Equivalent Level (CNEL). The future (year 2030) on-site traffic noise level is expected to reach 74.4 CNEL at the same receiver location, fronting Old Highway 395.

Calculations show that the future traffic noise levels at the center of each proposed pad grade area will range from 43.6 to 59.1 CNEL, in compliance with the County of San Diego exterior residential land use noise limit of 60 CNEL. The project site lies significantly above the roadway grade of Old Highway 395 and I-15, providing considerable traffic noise attenuation to proposed project pad locations. Due to distance from I-15 and the significant intervening topography between the project site and I-15 and Old Highway 395, noise mitigation will not be necessary to reduce traffic noise levels to less than 60 CNEL, in compliance with the County of San Diego Noise Element of the General Plan.

Calculations show that the potential increase in noise levels at nearby sensitive receivers due to project-related traffic will be approximately 0.1 CNEL, and is considered to be negligible.

The County of San Diego Building Department and the State of California require buildings to be designed in order to attenuate, control, and maintain interior noise levels to below 45 CNEL in habitable residential space. As future noise impacts will exceed 60 CNEL at some of the second level exterior building facades, interior noise levels could exceed the 45 CNEL interior noise limit. Typical residential construction generally achieves at least 15 dB of noise attenuation in rooms, even with windows open. Prior to approval of final building plans, a supplemental exterior-to-interior acoustical analysis may be necessary to determine if special residential building design consideration (i.e. upgraded exterior walls, mechanical ventilation, and enhanced glazing) is necessary to achieve adequate noise attenuation and to comply with the interior residential California Code of Regulations, Title 24, Noise Insulation Standards.

It is determined that construction improvement activities will meet the San Diego temporary construction noise limit of 75 dBA at all adjacent property lines, with reasonable maintenance of equipment and conservative planning of simultaneous equipment operation. Given the construction noise limits at the relative property lines and beyond to the nearest residential structures, no mitigation is required for attenuating the brief construction noise impacts.

The Tentative Map has changed slightly from the map used for the original noise analysis. The pad of Lot 9 is closer to Old Highway 395 on the updated Tentative Map; however, the lot will still remain outside of the future 60 CNEL Contour, and therefore, noise levels at the updated pad location of Lot 9 will still remain under 60 CNEL.

# 2.0 INTRODUCTION

This report is submitted to satisfy the County of San Diego acoustical analysis requirements for a Tentative Parcel Map (TPM 5346) application. Its purpose is to assess future noise impacts from adjacent and nearby roadway vehicle traffic and other possible noise sources that may impact the proposed project. This study is conducted to determine if mitigation is necessary and feasible to reduce exterior noise levels to below 60 CNEL, the County of San Diego exterior residential land use noise limit. Feasibility of interior noise mitigation will also be addressed.

All noise level or sound level values presented herein are expressed in terms of decibels, with A-weighting to approximate the hearing sensitivity of humans. Time-averaged noise levels are expressed by the symbol $L_{EQ}$, for a specified duration. The Community Noise Equivalent Level is a 24-hour average, where sound levels during evening hours of 7 p.m. to 10 p.m. have an added 5 dB weighting, and sound levels during nighttime hours of 10 p.m. to 7 a.m. have an added 10 dB weighting. Sound levels expressed in CNEL are always based on A-weighted decibels. This is similar to the Day-Night sound level, which is a 24-hour average with an added 10 dB weighting on the same nighttime hours but no added weighting on the evening hours. These metrics are used to express noise levels for both measurement and municipal regulations, for land use guidelines and enforcement of noise ordinances. Some of the data may be presented as octave-band filtered sound levels. Further explanation can be provided upon request.

The State of California and County of San Diego noise regulations require interior noise levels in habitable residential space to be at or below 45 CNEL and that noise levels at outdoor use areas be at or below 60 CNEL. An exterior-to-interior acoustical analysis be conducted for new projects exposed to exterior noise levels in excess of 60 CNEL.

Section ~~36.410 (b)~~ / 36.409 of the County of San Diego Noise Ordinance states that ~~construction equipment shall not be operated so as to cause noise at a level in excess of 75 dBA for more than 8 hours during any 24-hour period, when measured at the property lines. The County of San Diego Noise Specialist, John Bennett, has requested that this regulation be interpreted as follows: the average eight-hour equivalent noise level of the construction equipment shall not exceed 75 dBA~~ / it is unlawful to operate construction equipment that exceeds an average sound level of 75 decibels for an eight-hour period, between 7 a.m. and 7 p.m., when measured at the boundary line of the property where the noise is being received. Please refer to Appendix A: ~~Sections 36.410 and 36.417~~ / Pertinent Sections of the County of San Diego Noise Ordinance.

In urbanized residential areas with an existing conditions less than 60 CNEL, an increase in CNEL conditions due to the project related traffic noise is considered potentially significant whenever the noise sensitive areas exceed 60 CNEL due to the project related traffic noise. For a noise sensitive area with existing conditions of 60 CNEL or more, a net increase of 3 or more CNEL due to the project related traffic noise would be considered potentially significant.

## 2.1 Project Location

The project site is located to the west of Old Highway 395, between West Lilac Road and Via Urnel Way, in the Community of Bonsall, County of San Diego, California. The Assessor's Parcel Number (APN) for the property is 127-071-38-00. The property has an overall site area of approximately 38.4 acres.

The subject site is currently zoned for agricultural use. The existing noise generated by agricultural activities occurs only during daytime hours and are therefore exempt from the County of San Diego Noise Ordinance, according to section 36.417. Located on the adjacent property to the north is the Rainbow Valley Water District facility. No information is available on the operation of the Rainbow Valley Water District facility and therefore is not included in this analysis. Please refer to Appendix A: Sections 36.410 and 36.417 of the County of San Diego Noise Ordinance. Proposed land use for the property, as well as neighboring land uses in the proximity of the proposed project is residential. The project location is shown on the Thomas Guide Map, Figure 1, following this report. An Assessor's parcel map, a satellite aerial photograph, a topographic map and a planned land use map of this area are also provided in Figures 2 through 5.

### 2.2 Project Description

The proposed project, known as the Dabbs Project, proposes a minor subdivision of a single property into 9 parcels in the County of San Diego, California. The site is currently a farm. The location of the pad on Lot 9 is shown closer to Old Highway 395 on the updated Tentative Map than the Tentative Map used for the original noise analysis. Although future noise levels are expected to be slightly higher at this new pad location, they will remain in compliance with the County of San Diego exterior residential land use noise limit of 60 CNEL. Please refer to Figure 8 for a graphical representation of the future noise contour locations.

## 3.0 ENVIRONMENTAL SETTING

### 3.1 Existing Noise Environment

The present noise environment at the project site is primarily the result of automobile and truck traffic traveling on Old Highway 395. Noise from Interstate 15 is considered to be negligible due to distance from the project site and considerable intervening topographic features between the roadway and project site. The project site lies significantly above the roadway grade of Old Highway 395 and I-15, providing considerable traffic noise attenuation to proposed project pad locations. I-15 was, however, included in the future (year 2030) Sound32 traffic model to determine if there were impacts to the project site at higher elevations, which might have a more direct line of sight of I-15. The existing noise generated by agricultural activities occurs only during daytime hours and is therefore exempt from the County of San Diego Noise Ordinance, according to section 36.417. Located on the adjacent property to the north is the Rainbow Valley Water District facility. No information is available on the operation of the Rainbow Valley Water District facility and therefore is not included in this analysis. No other noise source is considered significant. Please refer to Figures 6 and 7: Map of Project Site Showing 3-Dimensional Topography.

Old Highway 395 is a two-lane, two-way rural collector running north-south, with bike lanes, curbs and no sidewalks, median or center turning lane. Parallel parking is not permitted on either side of the street in the vicinity of the project. The paved roadway width is approximately 30 feet. The posted speed limit is 50 mph in the vicinity of the project site. The actual speed of vehicles traveling on Old Highway 395 is estimated to be 55 mph for traffic traveling northbound, uphill and 60 mph for traffic traveling southbound, downhill. Old Highway 395, south of West Lilac Road, currently carries a traffic volume of approximately 3,000 Average Daily Trips (ADT), according to the San Diego Association of Governments (SanDAG) Traffic Forecast Information Center.

I-15 is a six-lane, two-way highway running north-south. The posted speed limit is 70 mph. The actual speed of vehicles traveling on I-15 in the vicinity of the project site is estimated to be 70 mph. I-15, in the vicinity of the project site, currently carries a traffic volume of approximately 90,000 ADT for both eastbound and westbound traffic, according to the SanDAG Traffic Forecast Information Center.

Traffic volumes for the roadway sections near the project site are shown in Table 1, below. For more information, please refer to the Appendix A: Sound32 Data and Results. The current calculated on-site traffic noise level at the northeastern corner of the project site, fronting and at grade level to Old Highway 395, is 67.4 CNEL.

**Table 1. Overall Traffic Information**

| Roadway Name | Speed Limit | | Current ADT | Future (2030) ADT |
|---|---|---|---|---|
| | Current | Future | | |
| Old Highway 395 | 50 | 50 | 3,000 | 22,000 |
| I-15 | 70 | 70 | 90,000 | 223,000 |

### 3.1.1 Measured Noise Level

An on-site inspection and traffic noise measurement were made on the Thursday, March 31, 2005. The weather conditions were as follows: clear skies, low humidity, temperatures in the mid 70's with calm winds from the west. A "one-hour" equivalent measurement was made on the project site fronting Old Highway 395. The microphone position was located on the property line, approximately five feet above the existing roadway grade. Traffic volumes were recorded for automobiles, medium-size trucks, and large trucks during the measurement period. After a continuous 15-minute sound level measurement, there was no change in the $L_{EQ}$ and results were then recorded. The measured noise level and related weather conditions are found below in Table 2. The calculated equivalent hourly vehicle traffic count adjustment and a complete tabular listing of all traffic data recorded during the on-site traffic noise measurement are found in Appendix A: Sound32 Data and Results.

**Table 2. On-Site Noise Measurement Conditions and Results**

| | |
|---|---|
| **Date** | Thursday, March 31, 2005 |
| **Time** | 4:15 p.m. - 4:30 p.m. |
| **Conditions** | Clear Skies, Winds from the West @ 2-4 mph,<br>Temperature Mid 70's with Low Humidity |
| **Measured Noise Level** | 73.4 dBA $L_{EQ}$ |

### 3.1.2 Calculated Noise Level

Noise levels were calculated for the site using the methodology described in Section 4.1 (see next page) for the location, conditions, and traffic volumes counted during the noise measurements. The calculated noise levels ($L_{EQ}$) were compared with the measured on-site noise level to determine if adjustments or corrections (calibration) should be applied to the traffic noise prediction model,

Sound32. Adjustments are intended to account for site-specific differences, such as reflection and absorption, which may be greater or lesser than accounted for in the model.

I-15 was not visible from the project site. An ambient noise measurement was taken to determine the significance of noise impacts to the project site from this roadway. The noise measurement was one-minute in duration and taken when no roadway traffic was present on Old Highway 395. The measured ambient noise level from I-15 was 55.8 dBA $L_{EQ}$, more than 10 dB less than the measured traffic noise level from Old Highway 395. Therefore, the traffic noise level from I-15 does not contribute to the overall traffic noise level at the project site because the logarithmic sum of two values that are 10 dB different is the greater of the two values. I-15 was included in the future (year 2030) Sound32 traffic model to determine if there were impacts to the project site at higher elevations, which might have a more direct line of sight of I-15.

The measured noise level of 73.4 dBA $L_{EQ}$ for Old Highway 395 was compared to the calculated (modeled) noise level of 73.5 dBA $L_{EQ}$, for the same conditions and traffic flow. As there was only a 0.1 dBA difference between the measured and the calculated noise level, no adjustment was deemed necessary to model future noise levels for this location. Please refer to Table 3, below.

**Table 3. Noise Level Comparison Using Traffic Model versus On-Site Noise Measurement**

| Roadway | Model | Measured | Difference | Correction |
|---|---|---|---|---|
| Old Highway 395 | 73.5 dBA $L_{EQ}$ | 73.4 dBA $L_{EQ}$ | 0.1 dB | None |

Truck percentages for the roadway section of Old Highway 395 and I-15 in the vicinity of the project site were obtained from The County of San Diego Planning Department Scoping Letter, Dated August 10, 2005, a mix of 12% medium trucks and 5.5% heavy trucks was used for modeling Old Highway 395, a mix of 4.7% medium trucks and 8.5% heavy trucks was used for modeling I-15.

## 3.2 Future Noise Environment

The future noise environment will be a result of vehicle traffic traveling on Old Highway 395. The future (year 2030) traffic volume for Old Highway 395 is projected to be 22,000 ADT, according to the SanDAG Traffic Forecast Information Center. The roadway alignment, roadbed, and speed limit are expected to remain the same for this section of Old Highway 395, according to Nick Ortiz, (858) 874-4204, Associate Transportation Specialist, Public Works Department, County of San Diego. The same truck percentages from the existing traffic volumes were used for future traffic volume modeling.

I-15 was included in the future (year 2030) Sound32 traffic model to determine if there were impacts to the project site at higher elevations, which might have a more direct line of sight of I-15. The future (year 2030) traffic volume for I-15 is projected to be 223,000 ADT, according to the SanDAG Traffic Forecast Information Center. The roadway alignment, roadbed, and speed limit are expected to remain the same for this section of I-15. The same truck percentages from the existing traffic volumes were used for future traffic volume modeling.

The future (year 2030) traffic noise level at the northeastern corner of the project site, fronting and at grade level to Old Highway 395, is expected to increase to 74.4 CNEL. For the purposes of this noise analysis, project related traffic volume was assumed to be 10 ADT per proposed single family residence, in total the project related traffic is therefore assumed to be 90 ADT. The access road for this project connects to Old Highway 395, therefore the project related traffic was added to the

current and future traffic volumes for Old Highway 395. Calculations show that the net change in CNEL conditions is ~~negligible~~ / expected to be approximately 0.1 CNEL, and is determined to be negligible. Please refer to Appendix A: Sound32 Data and Results. Refer to Section 5.3.2 for more details.

The future first level exterior 60 CNEL traffic noise contour will run parallel to Old Highway 395 about 375 feet west of the Old Highway 395 centerline. The future second level exterior 60 CNEL traffic noise contour will run parallel to Old Highway 395 about 450 feet west of the Old Highway 395 centerline.

# 4.0 METHODOLOGY AND EQUIPMENT

## 4.1 Methodology

### 4.1.1 Field Measurement

Typically, a "one-hour" equivalent sound level measurement ($L_{EQ}$, A-Weighted) is recorded for at least one noise-sensitive location on the site. During the on-site noise measurement, start and end times are recorded, vehicle counts are made for cars, medium trucks (double-tires/two axles), and heavy trucks (three or more axles) for the corresponding road segment(s). Supplemental sound measurements of one hour or less in duration are often made to further describe the noise environment of the site.

For measurements of less than one hour duration, the measurement time is long enough for a representative traffic volume to occur and the noise level $L_{EQ}$ to stabilize; 15 minutes is usually sufficient for this purpose. The vehicle counts are then converted to one-hour equivalent volumes by using the appropriate multiplier.

Other field data gathered includes measuring or estimating distances, angles-of-view, slopes, elevations, roadway grades, and vehicle speeds. This data was checked against the available maps and records.

### 4.1.2 Roadway Noise Calculations

The Sound32 Release 1.41 program released by the California Department of Transportation, Division of New Technology, Materials and Research was used to calculate the future daytime average hourly noise level (HNL) at various locations at the project site. The daytime average hourly traffic volume is calculated as 0.058 times the ADT, based on the studies made by Wyle Laboratories (see reference). The HNL is equivalent to the $L_{EQ}$, and both are converted to the CNEL by adding 2.0 decibels, as shown in the Wyle Study. Future CNEL is calculated for desired receptor locations using future road alignment, elevations, lane configurations, projected traffic volumes, estimated truck mixes, and vehicle speeds. Noise attenuation methods may be analyzed, tested, and planned with Sound32, as required. Further explanation can be supplied on request.

## 4.2 Equipment

Some or all of the following equipment was used at the site to measure existing noise levels:

- Larson Davis Model 820 Integrating Sound Level Meter, Type 1, Serial # 0316
- Larson Davis Model CA200 Calibrator, Serial # 0292
- Hand-bearing magnetic compass, microphone with windscreen, tripods
- Distance measurement wheel, digital camera

The sound level meter was field-calibrated immediately prior to the noise measurement and checked afterward, to ensure accuracy. All sound level measurements conducted and presented in this report, in accordance with the regulations, were made with a sound level meter that conforms to the American National Standards Institute specifications for sound level meters ANSI SI.4-1983 (R2001). All instruments are maintained with National Bureau of Standards traceable calibration, per the manufacturers' standards.

# 5.0 IMPACTS

## 5.1 Exterior

The future exterior noise impacts will primarily result from vehicle traffic traveling on Old Highway 395. Noise from I-15 is considered negligible due to distance from the project site and considerable intervening topographic features. The future first level exterior 60 CNEL traffic noise contour will run parallel to Old Highway 395 about 375 feet west of the Old Highway 395 centerline. The future second level exterior 60 CNEL traffic noise contour will run parallel to Old Highway 395 about 450 feet west of the Old Highway 395 centerline. Please refer to Figure 8: Tentative Parcel Map Showing First and Second Level Future Traffic CNEL Contour and Noise Measurement Location.

Calculations show that first level future traffic noise impacts at the center of each of the nine proposed pad grade areas (outdoor use areas) will range from 43.6 to 59.1 CNEL. Please refer to Figure 9: Tentative Parcel Map Showing Future Traffic CNEL at Various Receiver Locations. Table 4, on the following page, lists the calculated unmitigated future exterior traffic noise levels at the center point of the nine proposed lots at the first and second levels, based on pad grade.

| Table 4. Future Exterior Traffic CNEL at Outdoor Use Areas and Second Level Receivers | | | |
|---|---|---|---|
| **Receiver** | **Parcel #** | **Level** | **Unmitigated CNEL** |
| 1 | 1 | 1st Level | 58.3 |
| 2 | 2 | 1st Level | 59.1 |
| 3 | 3 | 1st Level | 57.6 |
| 4 | 4 | 1st Level | 58.9 |
| 5 | 5 | 1st Level | 48.0 |
| 6 | 6 | 1st Level | 43.8 |
| 7 | 7 | 1st Level | 43.6 |
| 8 | 8 | 1st Level | 45.7 |
| 9 | 9 | 1st Level | 55.5 |
| 10 | 1 | 2nd Level | 62.0 |
| 11 | 2 | 2nd Level | 63.5 |
| 12 | 3 | 2nd Level | 62.4 |
| 13 | 4 | 2nd Level | 63.0 |
| 14 | 5 | 2nd Level | 49.3 |
| 15 | 6 | 2nd Level | 44.1 |
| 16 | 7 | 2nd Level | 43.7 |
| 17 | 8 | 2nd Level | 46.1 |
| 18 | 9 | 2nd Level | 55.7 |

## 5.2 Interior

The State of California and County of San Diego noise regulations require interior noise levels in habitable residential space to be at or below 45 CNEL and that an exterior-to-interior acoustical analysis be conducted for new projects exposed to exterior noise levels in excess of 60 CNEL. The maximum exterior noise level to impact the nine proposed lots is ~~64.0~~/63.5 CNEL, at a second-level receiver elevation on Lot 2. Current building code generally expects that residential construction will achieve at least 15 decibels of exterior-to-interior noise attenuation, with windows open.

## 5.3 Project Related Exterior Noise Impacts

### 5.3.1 Project Related Construction Noise Impacts

Section ~~36.410 (b)~~ / 36.409 of the County of San Diego Noise Ordinance states that ~~construction equipment shall not be operated so as to cause noise at a level in excess of 75 dBA for more than 8 hours during any 24-hour period, when measured at the property lines. The County of San Diego Noise Specialist, John Bennett, has requested that this regulation be interpreted as follows: the average eight-hour equivalent noise level of the construction equipment shall not exceed 75 dBA~~ / it is unlawful to operate construction equipment that exceeds an average sound level of 75 decibels for an eight-hour period, between 7 a.m. and 7 p.m., when measured at the boundary line of the

property where the noise is being received. Please refer to ~~Appendix B: Section 36.410 (b)~~ / Appendix A: Pertinent Sections of the County of San Diego Noise Ordinance.

Details of the anticipated grading operations and schedule are outlined in a questionnaire from Gary Piro, Project Engineer, which is included in Appendix C. The grading operations for this project will involve the on-site handling of approximately 20,700 cubic yards of soil. There are no anticipated large rocks on the site and, therefore, no blasting, excavators, rams, or other means will be employed for rock removal. For further details on Construction Equipment Noise Levels refer to Appendix D.

| Table 5. Construction Equipment Noise Levels* | | | |
|---|---|---|---|
| **Equipment** | ~~Range of Noise Level at 50 feet~~ | Duty Cycle (%) | **Nominal Noise Level, Leq, at 50 feet** |
| Grader | ~~71 to 96 dBA~~ | 40 | 85 dBA |
| Backhoe~~, 200 HP~~ | ~~71 to 93 dBA~~ | 40 | ~~85 dBA~~ / 78 dBA |
| Concrete Mixer | ~~70 to 90 dBA~~ | 40 | ~~85 dBA~~ / 79 dBA |
| Concrete Pump | ~~74 to 84 dBA~~ | 20 | ~~82 dBA~~ / 81 dBA |
| Front Loader~~, 300 HP~~ | ~~71 to 96 dBA~~ | 40 | ~~82 dBA~~ / 79 dBA |
| Scraper | ~~73 to 95 dBA~~ | 40 | ~~88 dBA~~ / 84dBA |
| ~~Truck/Trailer, 200 HP~~ / Dump Truck | ~~70 to 92 dBA~~ | 40 | ~~82 dBA~~ / 76 dBA |
| Paver | ~~80 to 92 dBA~~ | 50 | ~~89 dBA~~ / 77dBA |
| Dozer | - | 40 | 82 dBA |
| Excavator | - | 40 | 81 dBA |

*Source: U.S. Department of Transportation Federal Highway Administration, Construction Equipment Noise Levels and Ranges.

Construction activities shall be limited to the following hours: 7 a.m. to 7 p.m., Monday through ~~Friday (except legal holidays), and 7 a.m. to 6 p.m. on~~ Saturday. There will be no construction activity on Sundays or on legal holidays. Fences and gates will be installed as a control feature to limit after hours access to the construction site.

Temporary construction noise generated from the proposed construction on the project site is expected to be controllable by standard construction noise management methods. According to Gary Piro of Piro Engineering, the first phase of construction will include site clearing and grading along the main access road, as well as the installation of utility lines, and will likely be performed using an excavator, two (2) dozers, a scraper, a front loader, a backhoe, and a dump truck. This equipment may be in operation simultaneously during this phase of construction, and is expected to operate eight hours a day. The next phase of construction consists of paving the main access road and pouring concrete. At this time, equipment operating on site will include a paver, backhoe, a concrete mixer, and a concrete pump. This equipment may be in operation simultaneously during this phase of construction, and is expected to operate eight hours a day. The next phase of construction consists of the grading of individual lots, and paving of driveways, which will be

performed by the purchaser of each lot, and will likely be performed using a dozer, a backhoe, a dump truck, and a paver.

Noise sensitive receivers are located to the north, south, east and west. To approximate noise levels at these locations, the noise source was calculated from the center of the construction area to each receiver to account for varying distance from source to receiver as equipment moves around the property. For the third phase of construction, the noise source was calculated from the center of the construction area of lots 9, 5, 4 and 6, the closest lots to sensitive receivers to the north, south, east, and west, respectively, for a worst-case analysis. Noise levels for each phase of construction are shown in Table 6. Detailed calculations can be found in Appendix E: Equipment Noise Calculations.

**Table 6. Temporary Construction Noise Levels at Neighboring Properties**

| Phase | Equipment Used | Receiver Location | 8-Hour Average Noise Level (dBA) |
|---|---|---|---|
| PHASE I: GRADING, ROADS AND UTILITIES | Excavator, 2 Dozers, Scraper, Front Loader, Dump Truck, Backhoe | North | 63.1 |
| | | South | 64.8 |
| | | East | 62.7 |
| | | West | 63.2 |
| PHASE II: PAVING AND CONCRETE | Paver, Concrete Mixer, Concrete Pump, Backhoe | North | 58.0 |
| | | South | 59.7 |
| | | East | 57.6 |
| | | West | 58.0 |
| PHASE III: INDIVIDUAL LOT GRADING | Dozer, Backhoe, Dump Truck, Paver | North | 70.4 |
| | | South | 72.8 |
| | | East | 69.1 |
| | | West | 66.4 |

It is determined that construction improvement activities will meet the San Diego temporary construction noise limit of 75 dBA at all adjacent property lines, with reasonable maintenance of equipment and conservative planning of simultaneous equipment operation. Given the construction noise limits at the relative property lines and beyond to the nearest residential structures, no mitigation is required for attenuating the brief construction noise impacts. Construction noise levels during individual lot grading were evaluated by calculating noise levels from the nearest lot to each respective property line. As this worst-case analysis shows that noise levels will remain in compliance at the worst-case locations, it can be assumed that all construction activity on remaining lots will also remain in compliance at all surrounding property lines.

Equipment used in construction shall be maintained in proper operating condition, and engines shall be equipped with appropriate mufflers. With these recommendations, and controlled access to the site, it is expected that construction equipment noise levels will be at or below an average eight-hour equivalent noise level of 75 dBA, in compliance with County of San Diego regulations.

### 5.3.2 Project Related Traffic Noise Impacts

For the purposes of this noise analysis the project related traffic was assumed to be 10 ADT per proposed single family residence. In total the project related traffic is therefore assumed to be 90 ADT. The access road for this project connects to Old Highway 395, therefore the project related traffic was added to the current and future traffic volumes for Old Highway 395. Calculations show that the net change in CNEL conditions is negligible. Results are presented in ~~Table 6~~ / Table 7.

**~~Table 6~~ / Table 7. Current and Future Traffic Volumes for Old Highway 395 Including Project Related Traffic and Net Changes to CNEL Conditions**

| Year | Non-Project Related Traffic Volumes (ADT) | Project Related Traffic Volume (ADT) | Commutative Traffic Volume (ADT) | Net Change in CNEL Conditions |
|---|---|---|---|---|
| Current (2000) | 3,000 | 90 | 3,090 | 0.1 |
| Future (2030) | 22,000 | 90 | 22,090 | 0.0 |

# 6.0 MITIGATION

## 6.1 Exterior

Calculations show that first level future traffic noise impacts from Old Highway 395, at the center of each of the nine proposed pad grade areas (outdoor use areas), will be below 60 CNEL, the maximum acceptable exterior residential land use noise level for the County of San Diego. No mitigation is required as a result of this analysis.

## 6.2 Interior

Calculations show that the overall future noise impacts will exceed 60 CNEL at lots 1, 2, 3 and 4 second level receivers. Prior to approval of building plans, a supplemental acoustical analysis of the exterior building design elements is needed to ensure adequate noise attenuation to achieve interior noise levels below 45 CNEL in habitable residential space. The analysis of exterior-to-interior sound attenuation will not be possible until final detailed building plans become available. Any mitigation required to attenuate interior noise levels to within allowable limits will be determined at that time.

## 7.0 CERTIFICATION

The findings and recommendations of this acoustical analysis report are a true and factual analysis of the potential acoustical impacts associated with the proposed Dabbs TPM 5346. This report was prepared by Michael Burrill, Ian Brewe, Jessica Rasmussen, and Douglas Eilar, and updated by Jonathan Brothers and Douglas Eilar.

Jonathan Brothers, Acoustical Consultant

Douglas Eilar, Principal

# 8.0 REFERENCES


1. 2001 California Noise Insulation Standards, effective 11/01/02, Based on 1997 Uniform Building Code, California Code of Regulations, Title 24.

2. California Department of Transportation, Sound32 Traffic Noise Model.

3. County of San Diego Noise Element to the General Plan.

4. County of San Diego Noise Ordinance.

5. Federal Highway Administration, Road Construction Noise Model (RCNM 1.0).

6. Wyle Laboratories, Development of Ground Transportation Systems Noise Contours for the San Diego Region, December 1973.

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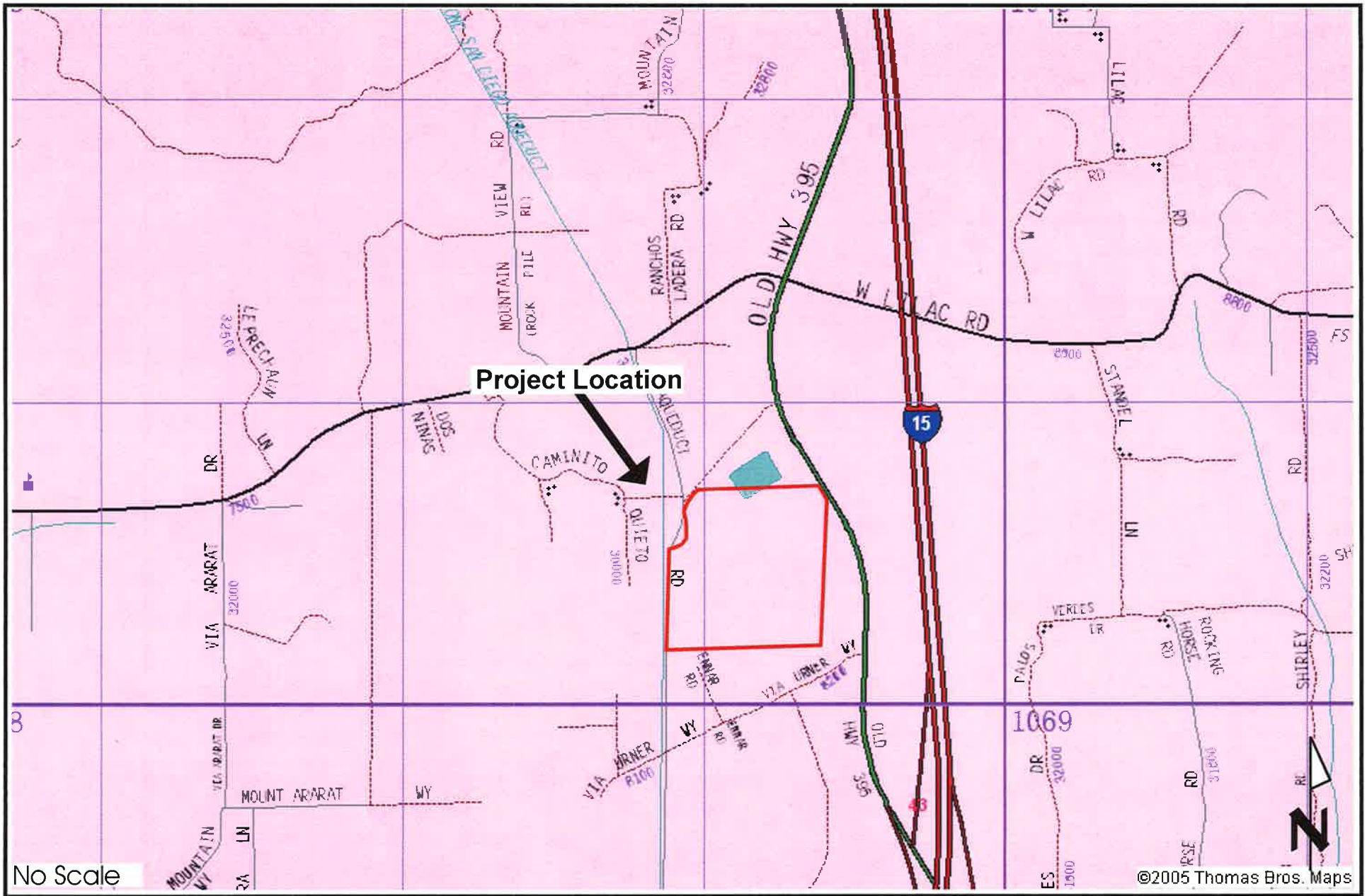
9. Irvine, Leland K., Richards, Roy L., Acoustics and Noise Control Handbook for Architects and Builders, Kreiger Publishing Company, 1998.

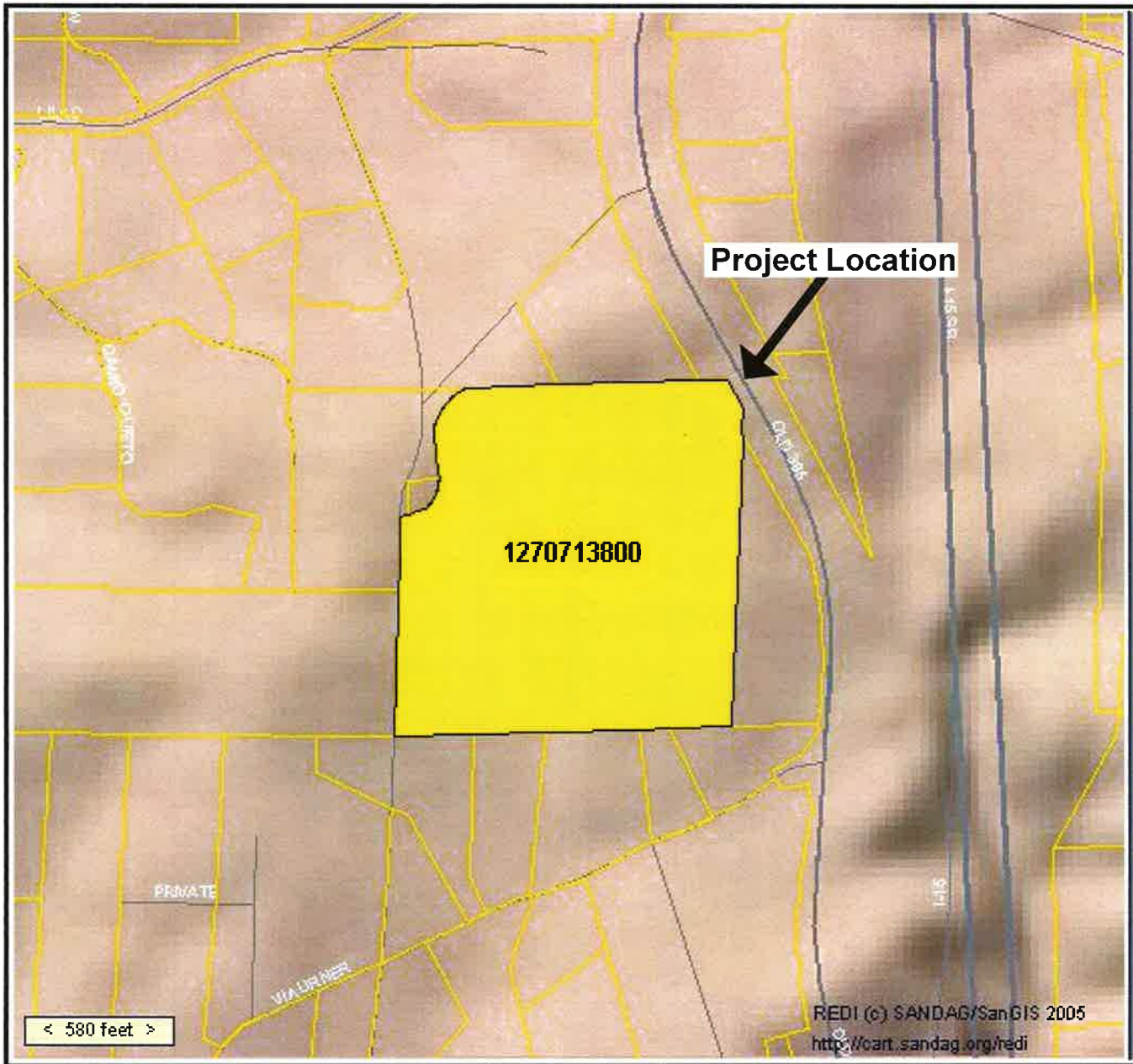
10. NBS Building Sciences Series 77, Acoustical and Thermal Performance on Exterior Residential Walls, U.S. Department of Commerce/National Bureau of Standards, November 1976.

11. San Diego Association of Governments (SanDAG) Transportation Forecast Information Center, 2004.

# FIGURES




| | | |
|---|---|---|
| **Eilar Associates**<br>**539 Encinitas Boulevard, Suite 206**<br>**Encinitas, California 92024**<br>**760-753-1865** | **Thomas Guide Map**<br>**Job # A91106N1** | **Figure 1** |




LEGEND

Reference Layers

Parcels

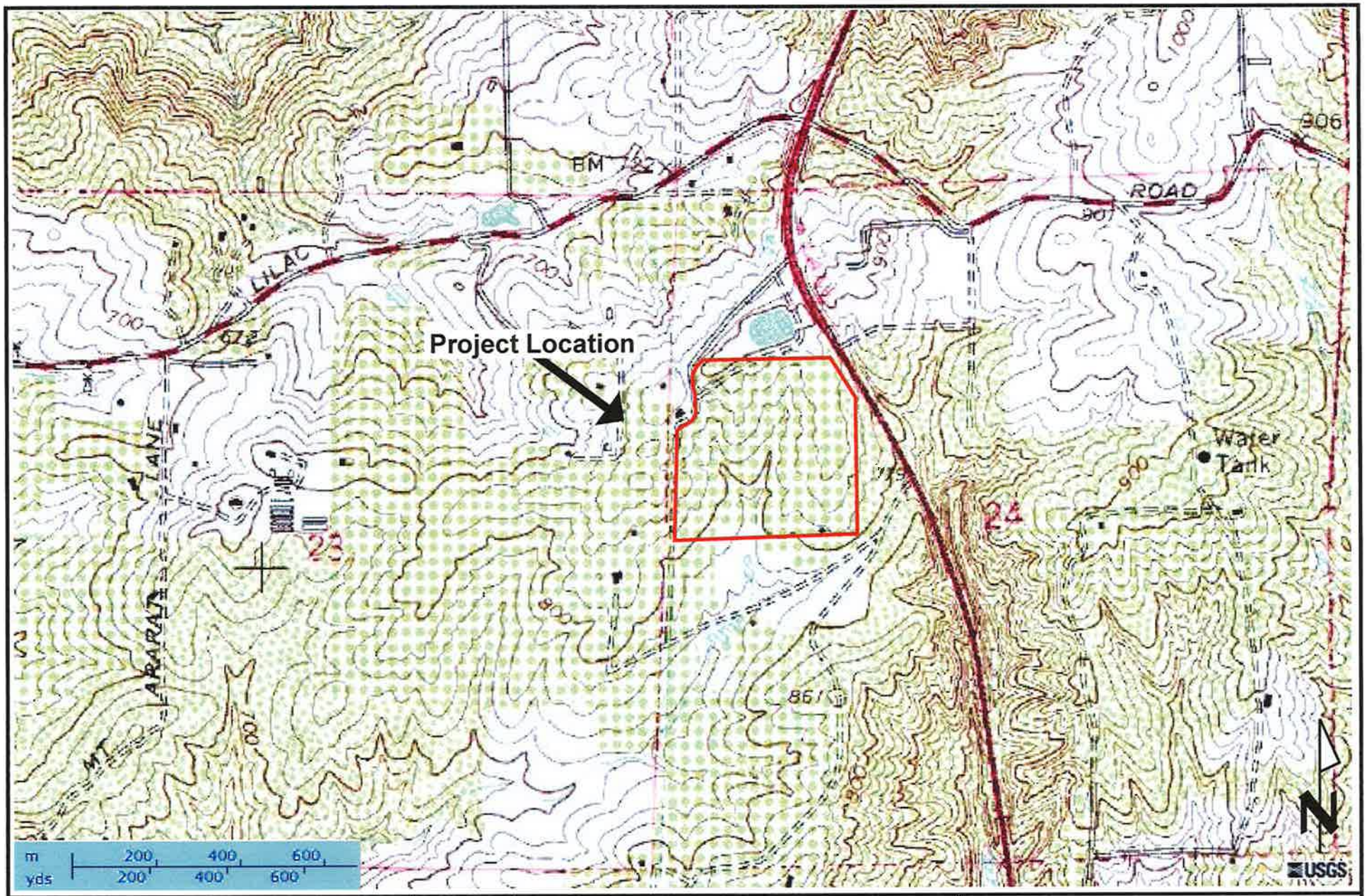
Roads

APN: 127-071-38-00

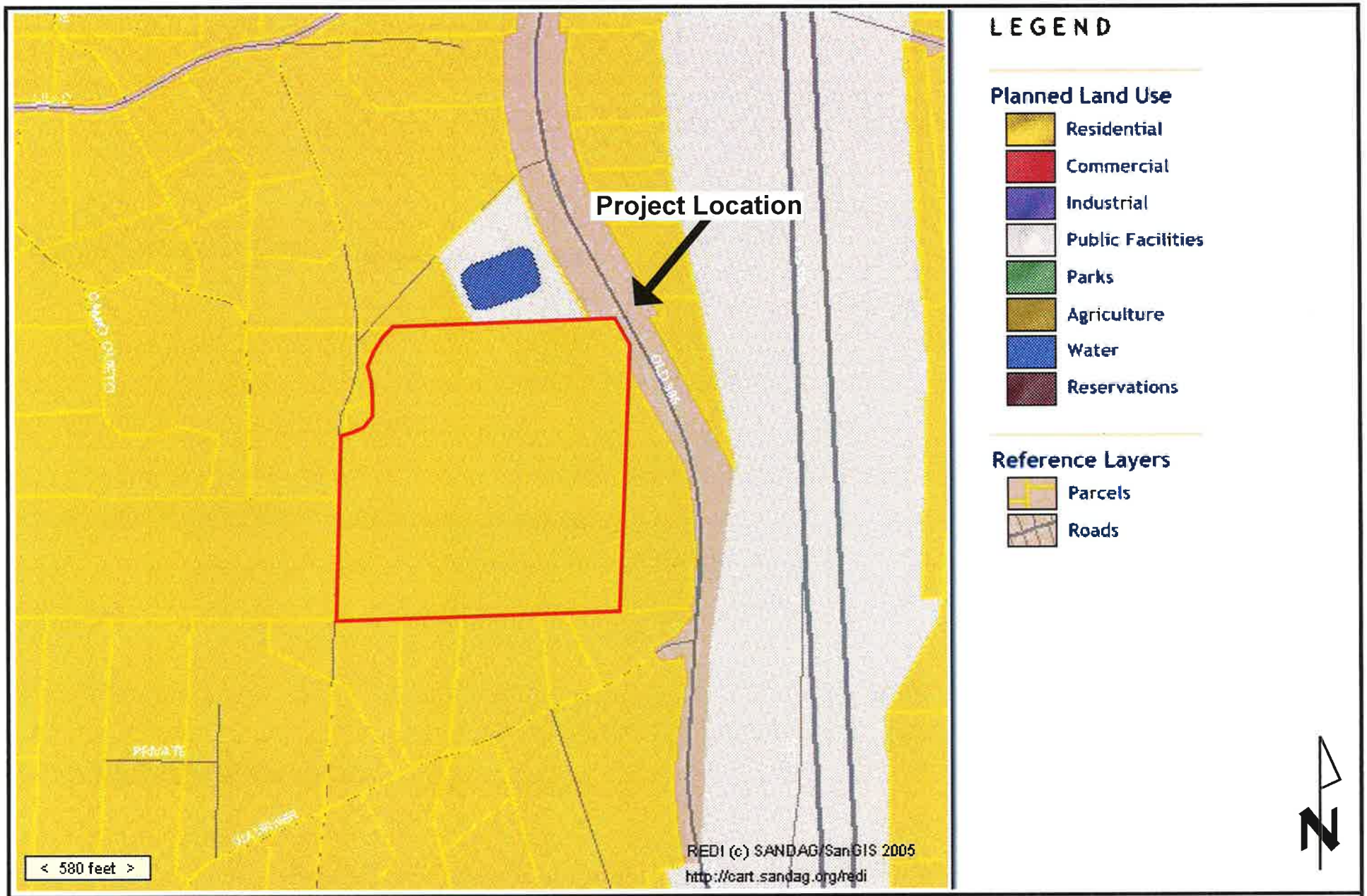
N

| | | |
|---|---|---|
| Eilar Associates<br>539 Encinitas Boulevard, Suite 206<br>Encinitas, California 92024<br>760-753-1865 | Assessor's Parcel Map<br>Job # A91106N1 | Figure 2 |


| | | |
|---|---|---|
| Eilar Associates<br>539 Encinitas Boulevard, Suite 206<br>Encinitas, California 92024<br>760-753-1865 | Satellite Aerial Photograph<br>Job # A91106N1 | Figure 3 |

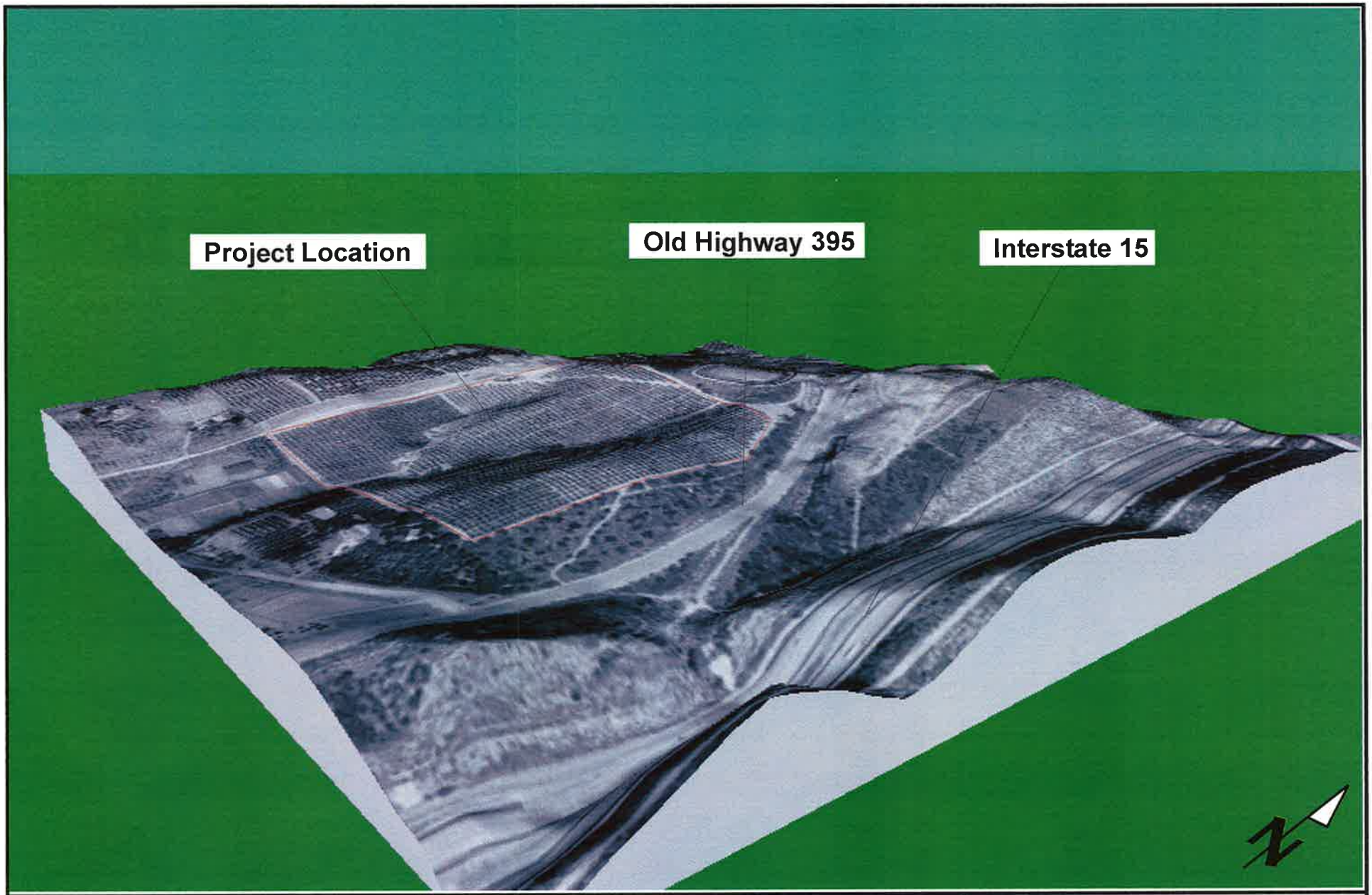



| | | |
|---|---|---|
| **Eilar Associates**<br>**539 Encinitas Boulevard, Suite 206**<br>**Encinitas, California 92024**<br>**760-753-1865** | **Topographic Map**<br>**Job # A91106N1** | **Figure 4** |

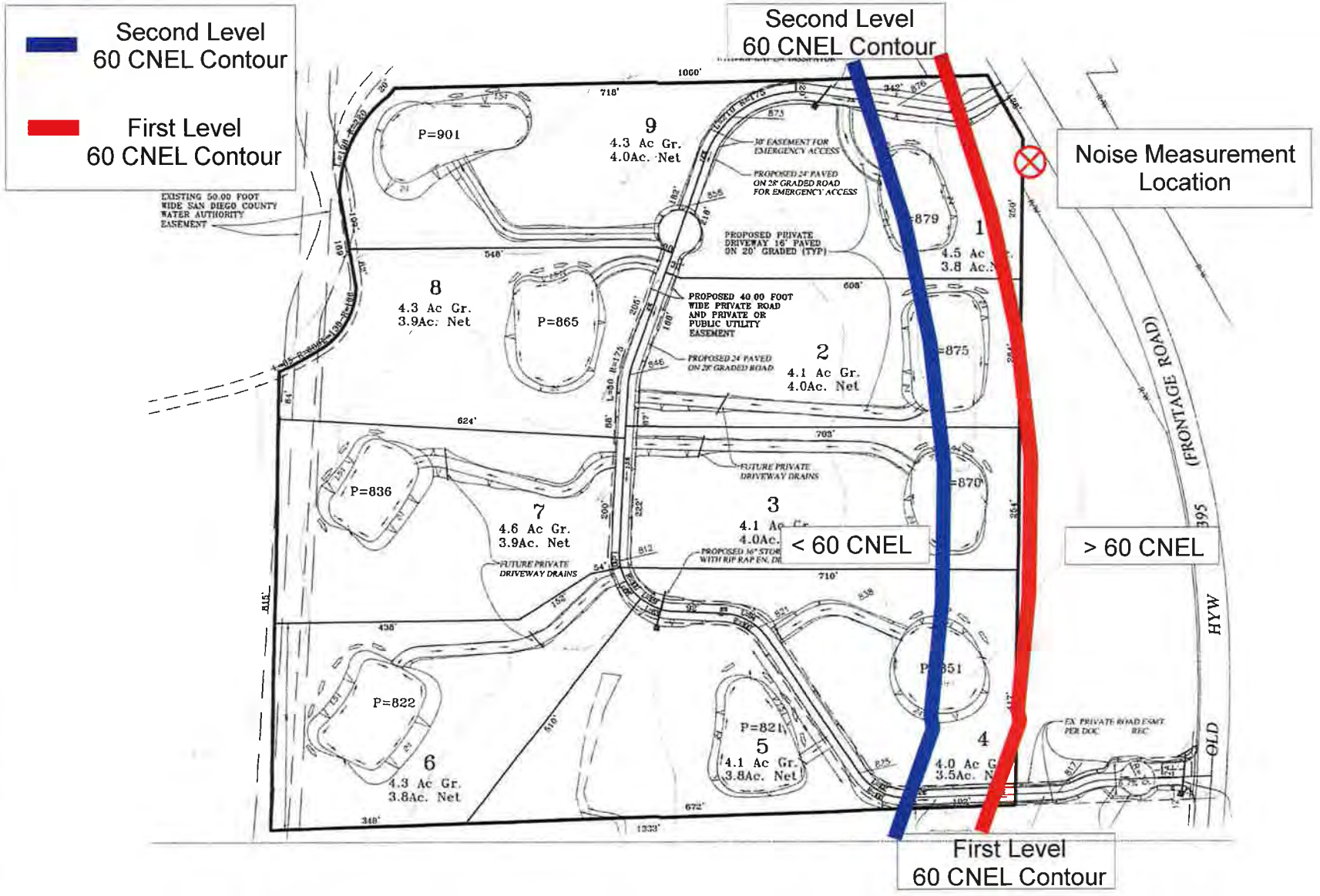



| | | |
|---|---|---|
| Eilar Associates<br>539 Encinitas Boulevard, Suite 206<br>Encinitas, California 92024<br>760-753-1865 | Planned Land Use Map<br>Job # A91106N1 | Figure 5 |


| | | |
|---|---|---|
| Eilar Associates<br>539 Encinitas Boulevard, Suite 206<br>Encinitas, California 92024<br>760-753-1865 | Map of Project Site Showing<br>3-Dimensional Topography<br>Job # A91106N1 | Figure 6 |

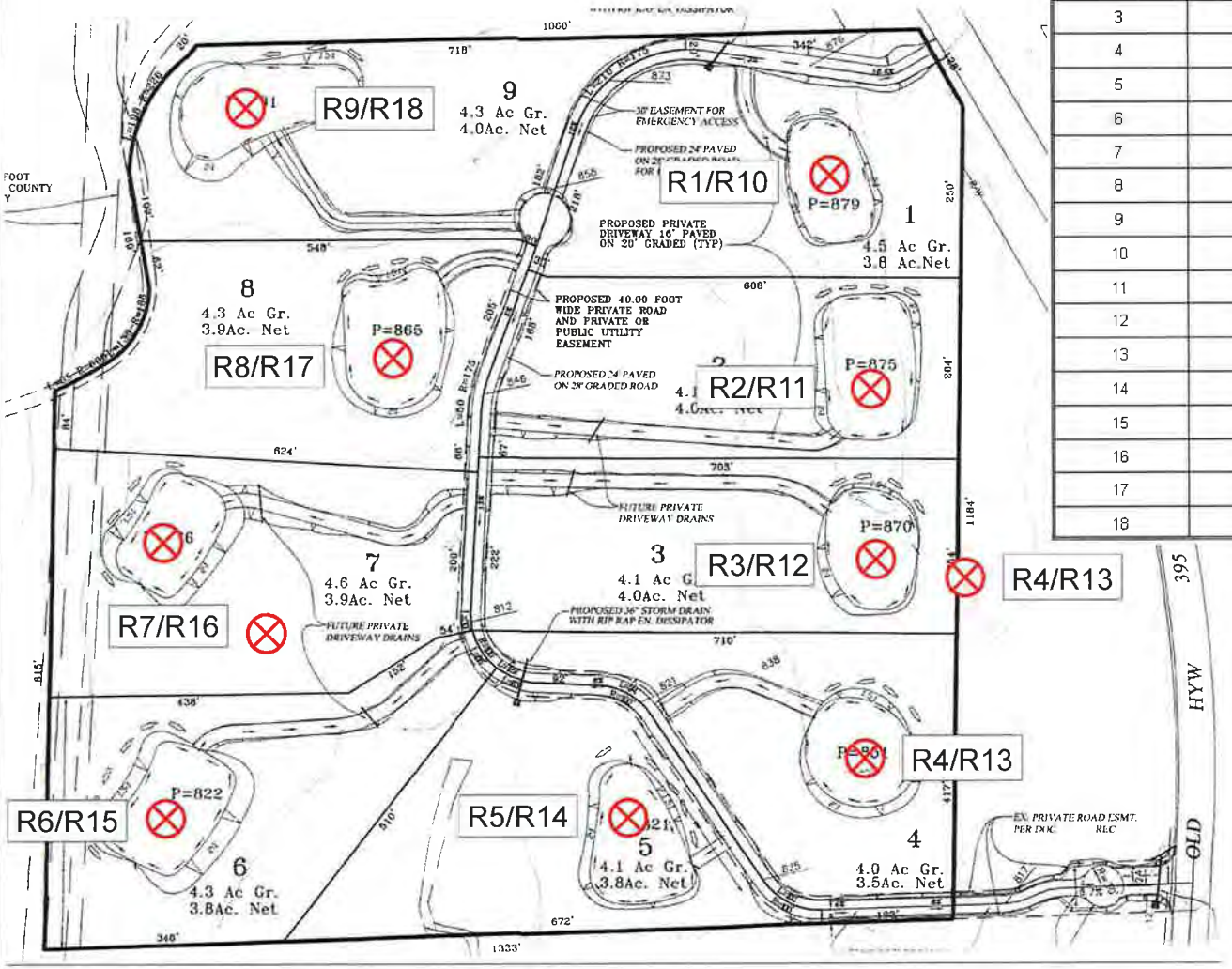



| | | |
|---|---|---|
| Eilar Associates<br>539 Encinitas Boulevard, Suite 206<br>Encinitas, California 92024<br>760-753-1865 | Map of Project Site Showing<br>3-Dimensional Topography<br>Job # A91106N1 | Figure 7 |




No Scale

| | | |
|---|---|---|
| **Eilar Associates**<br>**539 Encinitas Boulevard, Suite 206**<br>**Encinitas, California 92024**<br>**760-753-1865** | **Tentative Parcel Map Showing**<br>**First and Second Level**<br>**Future Traffic CNEL Contours**<br>**and Noise Measurement Location**<br>**Job # A91106N1** | **Figure 8** |




| Future Exterior Traffic CNEL at Outdoor Use Areas and Second Level Receivers | | | |
|---|---|---|---|
| Receiver | Parcel # | Level | Unmitigated CNEL |
| 1 | 1 | 1st Level | 58.3 |
| 2 | 2 | 1st Level | 59.1 |
| 3 | 3 | 1st Level | 57.6 |
| 4 | 4 | 1st Level | 58.9 |
| 5 | 5 | 1st Level | 48.0 |
| 6 | 6 | 1st Level | 43.8 |
| 7 | 7 | 1st Level | 43.6 |
| 8 | 8 | 1st Level | 45.7 |
| 9 | 9 | 1st Level | 55.5 |
| 10 | 1 | 2nd Level | 62.0 |
| 11 | 2 | 2nd Level | 63.5 |
| 12 | 3 | 2nd Level | 62.4 |
| 13 | 4 | 2nd Level | 63.0 |
| 14 | 5 | 2nd Level | 49.3 |
| 15 | 6 | 2nd Level | 44.1 |
| 16 | 7 | 2nd Level | 43.7 |
| 17 | 8 | 2nd Level | 46.1 |
| 18 | 9 | 2nd Level | 55.7 |

No Scale


**Eilar Associates**
**539 Encinitas Boulevard, Suite 206**
**Encinitas, California 92024**
**760-753-1865**


**Tentative Parcel Map Showing**
**Future Traffic CNEL at**
**Various Receiver Locations**
**Job # A91106N1**

**Figure 9**

# APPENDIX A

## Pertinent Sections of the County of San Diego Noise Ordinance

**SEC. 36.408. HOURS OF OPERATION OF CONSTRUCTION EQUIPMENT.**

Except for emergency work, it shall be unlawful for any person to operate or cause to be operated, construction equipment:

(a) Between 7 p.m. and 7 a.m.

(b) On a Sunday or a holiday. For purposes of this section, a holiday means January 1st, the last Monday in May, July 4th, the first Monday in September, December 25th and any day appointed by the President as a special national holiday or the Governor of the State as a special State holiday. A person may, however, operate construction equipment on a Sunday or holiday between the hours of 10 a.m. and 5 p.m. at the person's residence or for the purpose of constructing a residence for himself or herself, provided that the operation of construction equipment is not carried out for financial consideration or other consideration of any kind and does not violate the limitations in sections 36.409 and 36.410.

(Amended by Ord. No. 9962 (N.S.), effective 1-9-09)

**SEC. 36.409. SOUND LEVEL LIMITATIONS ON CONSTRUCTION EQUIPMENT.**

Except for emergency work, it shall be unlawful for any person to operate construction equipment or cause construction equipment to be operated, that exceeds an average sound level of 75 decibels for an eight-hour period, between 7 a.m. and 7 p.m., when measured at the boundary line of the property where the noise source is located or on any occupied property where the noise is being received.

(Amended by Ord. No. 9700 (N.S.), effective 2-4-05; amended by Ord. No. 9962 (N.S.), effective 1-9-09)

**SEC. 36.410. SOUND LEVEL LIMITATIONS ON IMPULSIVE NOISE.**

In addition to the general limitations on sound levels in section 36.404 and the limitations on construction equipment in section 36.409, the following additional sound level limitations shall apply:

(a) Except for emergency work or work on a public road project, no person shall produce or cause to be produced an impulsive noise that exceeds the maximum sound level shown in Table 36.410A, when measured at the boundary line of the property where the noise source is located or on any occupied property where the noise is received, for 25 percent of the minutes in the measurement period, as described in subsection (c) below. The maximum sound level depends on the use being made of the occupied property. The uses in Table 36.410A are as described in the County Zoning Ordinance.

**TABLE 36.410A.**
**MAXIMUM SOUND LEVEL (IMPULSIVE) MEASURED AT OCCUPIED PROPERTY IN DECIBELS (dBA)**

| OCCUPIED PROPERTY USE | DECIBELS (dBA) |
|---|---|
| Residential, village zoning or civic use | 82 |
| Agricultural, commercial or industrial use | 85 |

(b) Except for emergency work, no person working on a public road project shall produce or cause to be produced an impulsive noise that exceeds the maximum sound level shown in Table 36.410B, when measured at the boundary line of the property where the noise source is located or on any occupied property where the noise is received, for 25 percent of the minutes in the measurement period, as described in subsection (c) below. The maximum sound level depends on the use being made of the occupied property. The uses in Table 36.410B are as described in the County Zoning Ordinance.

(6) Owning, possessing or harboring an animal which by any frequent or long continued noise causes annoyance or discomfort to a person of normal sensitivity in the vicinity. The written affirmation by two persons having separate residences that an animal has caused frequent or long continued noise, that has caused them annoyance or discomfort shall be prima facie evidence of a violation of this section. This subsection does not apply to animal noise emanating from a legally operated animal hospital, humane society, County Department of Animal Services facility, farm or other agricultural facility where keeping animals is allowed.

(7) Operating or causing to be operated or used any steam whistle attached to a stationary boiler, except to give notice of the time to start or stop work or as a signal of imminent danger.

(8) Using or allowing the use of a motor vehicle to knowingly produce a noise that causes annoyance or discomfort to a person of normal sensitivity in the vicinity of the noise by backfiring the engine, screeching the tires, operating without a muffler, altering the muffler or any other action that causes a disturbing, excessive or offensive noise.

(Amended by Ord. No. 9962 (N.S.), effective 1-9-09)

**SEC. 36.415. BURGLAR ALARMS.**

(a) No person shall install or operate a burglar alarm in a residence or any other building that is not equipped with a functioning automatic cutoff device that terminates any noise emanating from the alarm within 15 minutes from the time the alarm is activated.

(b) No motor vehicle owner shall install or have in his or her possession a motor vehicle that is not equipped with a functioning automatic cutoff device that terminates any noise emanating from the alarm within 15 minutes from the time the alarm is activated.

(c) Notwithstanding the requirements of this section, a law enforcement officer may deactivate a building or motor vehicle alarm after the alarm is activated.

(Amended by Ord. No. 9962 (N.S.), effective 1-9-09)

**SEC. 36.416. NOISE FROM OFF-ROAD RECREATIONAL VEHICLES.**

In addition to the general limitations on sound levels in section 36.404, no person shall operate or allow the operation of an off-road recreational vehicle on private property that produces a noise when measured at the boundary line of the property where the noise source is located or on any occupied property where the noise is received, that at any time exceeds the following maximum sound levels: 82 decibels between the hours of 7 a.m. and 7 p.m., 77 decibels between the hours of 7 p.m. and 10 p.m. and 55 decibels between the hours of 10 p.m. and 7 a.m.

(Added by Ord. No. 9962 (N.S.), effective 1-9-09)

**SEC. 36.417. EXEMPTIONS.**

(a) This chapter shall not apply to:

(1) Emergency work, as defined in this chapter, provided that (A) the person performing the work notifies noise control officer in advance, or as soon as practicable after the emergency and (B) any vehicle, device, apparatus or equipment used, related to or connected with the emergency work is designed, modified or equipped to reduce noise produced to the lowest possible level consistent with effective operation of the vehicle, device, apparatus or equipment.

(2) Noise reasonably related to authorized school: (A) bands, (B) athletic activities and (C) entertainments events.

(3) Sporting, entertainment and public events which are conducted pursuant to a license or permit issued by the County, within the scope of the license or permit. This section is not intended to excuse the act of an individual not participating in the event who violates this chapter.

(4) The operation of an emergency generator after a power failure, by an employee or agent of a law enforcement agency, fire department, hospital or other medical or surgical facility that is providing emergency medical services.

(5) The reasonable testing of an emergency generator by any person provided that the testing is conducted between the hours of 7 a.m. and 7 p.m.

(6) Any activity preempted by State or federal law.

(b) Section 36.404 shall not apply to:

(1) Noise associated with routine property maintenance used either in part or in whole for residential purposes, provided activity takes place between 7 a.m. and 8 p.m. on any day except Sunday or between 10 a.m. and 8 p.m. on Sunday.

(2) Equipment associated with agricultural operations, provided that each piece of equipment and machinery powered by an internal-combustion engine is equipped with an appropriate muffler and air intake silencer in good working order and one of the following applies:

(A) Operations do not take place between 7 p.m. and 7 a.m. of the following day.

(B) The operations and equipment are utilized for the preparation, planting, harvesting, protection or salvage of agricultural crops during periods of potential or actual frost damage or other adverse weather conditions.

(C) The operations and equipment are used for agricultural pest control in accordance with regulations and procedures administered by the County Department of Agriculture.

(Amended by Ord. No. 7428 (N.S.), effective 2-4-88; amended by Ord. No. 9962 (N.S.), effective 1-9-09)

**SEC. 36.418. RESPONSIBILITY FOR ENFORCEMENT.**

The Sheriff shall have primary responsibility for enforcing sections 36.405, 36.407, 36.411, 36.412, 36.413, 36.414 and 36.415. When this chapter requires measurements to enforce these sections, the noise control officer shall assist the Sheriff. The noise control officer shall have primary responsibility for enforcing all other sections of this chapter. Pursuant to Penal Code section 836.5, a person authorized to enforce this chapter may arrest a person without a warrant if he or she has reasonable cause to believe that the person has committed a misdemeanor in his or her presence that violates this chapter.

(Amended by Ord. No. 9962 (N.S.), effective 1-9-09)

**State law reference(s)--**Arrest without warrant, Penal Code, § 836.5.

**SEC. 36.419. ADDITIONAL REMEDIES.**

The noise control officer may order a person to cease violating any section of this chapter that the noise control officer enforces. The noise control officer may, in addition to using any remedy provided in section 11.121 of this code, summarily abate a public nuisance caused by any act that violates this chapter if the noise control officer determines there is an immediate threat to the health or safety of any person.

# APPENDIX B

## Sound32 Data and Results

# Sound 32 Data and Results

## Dabbs Tentative Map 5346

| On-Site Noise Measurement Conditions and Results | |
|---|---|
| Date | Thursday, March 31, 2005 |
| Time | 4:15 p.m. - 4:30 p.m. |
| Conditions | Clear Skies, Winds from the West @ 2-4 mph, Temperature Mid 70's |
| Measured Noise Level | 73.4 dBA $L_{EQ}$ |

| Traffic Count During On-Site Noise Measurement | | | | | | |
|---|---|---|---|---|---|---|
| Roadway | | Duration | Autos | Medium | Heavy | Totals |
| Hwy 395 Northbound | Measured | 15 Min. | 42 | 5 | 2 | 49 |
| | Overall | 60 Min. | 168 | 20 | 8 | 196 |
| Hwy 395 Southbound | Measured | 15 Min. | 33 | 6 | 3 | 42 |
| | Overall | 60 Min. | 132 | 24 | 12 | 168 |

| Noise Level Comparison Using Traffic Model versus On-Site Noise Measurement | | | | |
|---|---|---|---|---|
| Roadway | Model | Measured | Difference | Correction |
| Old Highway 395 | 73.5 dBA $L_{EQ}$ | 73.4 dBA $L_{EQ}$ | 0.1 dB | none |

**Current Traffic Reference Information**

- Current traffic ADTs for Old Highway 395 were obtained from the San Diego Association of Government (SanDAG) 2000 Traffic Volume Forecast, Series 10, as listed in the Transportation Forecast Information Center on the SanDAG website at http://www.sandag.com, according to Ziying Ouyang, zou@sandag.org.
- Current traffic ADTs for I-15 were obtained from the San Diego Association of Government (SanDAG) 2000 Traffic Volume Forecast, Series 10, as listed in the Transportation Forecast Information Center on the SanDAG website at http://www.sandag.com, according to Ziying Ouyang, zou@sandag.org.

**Future Traffic Reference Information**

- Future traffic (year 2030) ADTs for Old Highway 395 were obtained from the San Diego Association of Government (SanDAG) 2030 Traffic Volume Forecast, Series 10, as listed in the Transportation Forecast Information Center on the SanDAG website at http://www.sandag.com, according to Ziying Ouyang, zou@sandag.org.
- Future traffic (year 2030) ADTs for I-15 were obtained from the San Diego Association of Government (SanDAG) 2030 Traffic Volume Forecast, Series 10, as listed in the Transportation Forecast Information Center on the SanDAG website at http://www.sandag.com, according to Ziying Ouyang, zou@sandag.org.

| Overall Traffic Information | | | | |
|---|---|---|---|---|
| Roadway Name | Speed Limit | | Current ADT | Future (2030) ADT |
| | Current | Future | | |
| Old Highway 395 | 50 | 50 | 3,000 | 22,000 |
| I-15 | 70 | 70 | 90,000 | 223,000 |

| Current (2003) Traffic Conditions | | | | | |
|---|---|---|---|---|---|
| Roadway Name | Condition | Total % ADT | Autos (Hourly) | Medium (Hourly) | Heavy (Hourly) |
| Old Highway 395 | Current | 100 | 82.5% | 12.0% | 5.5% |
| | | 3,000 | 143 | 20 | 9 |
| I-15 | Current | 100 | 86.8% | 4.7% | 8.5% |
| | | 90,000 | 4530 | 245 | 443 |

| Future (2030) Traffic Conditions | | | | | |
|---|---|---|---|---|---|
| Roadway Name | Condition | Total % ADT | Autos (Hourly) | Medium (Hourly) | Heavy (Hourly) |
| Old Highway 395 | Future | 100 | 82.5% | 12.0% | 5.5% |
| | | 22,000 | 1052 | 153 | 70 |
| I-15 | Future | 100 | 86.8% | 4.7% | 8.5% |
| | | 223,000 | 11226 | 607 | 1099 |

**********

SOUND32 PROGRAM DATA FOR CALTRANS VERSION OF STAMINA2/OPTIMA

**********

Measured On-Site Traffic Noise Data for Calibration

* * SOUND32 (CALTRANS VERSION OF STAMINA2/OPTIMA) * *

INPUT DATA FILE : MEAS.TXT
BARRIER COST FILE : CALIF$.DTA
DATE : 04-04-2005

MEAS.TXT

TRAFFIC DATA

| LANE NO. | AUTO VPH | AUTO MPH | MEDIUM TRKS VPH | MEDIUM TRKS MPH | HEAVY TRKS VPH | HEAVY TRKS MPH | DESCRIPTION |
|---|---|---|---|---|---|---|---|
| 1 | 168 | 55 | 20 | 55 | 2 | 55 | HIGHWAY 395 |
| 2 | 132 | 60 | 24 | 60 | 12 | 60 | HIGHWAY 395 |

LANE DATA

| LANE NO. | SEG. NO. | GRADE COR. | X | Y | Z | SEGMENT DESCRIPTION |
|---|---|---|---|---|---|---|
| 1 | 1 | YES | 1632.7 | -150.0 | 769.0 | L1 P1 |
| | 2 | YES | 1694.6 | 452.0 | 771.0 | L1 P2 |
| | 3 | YES | 1564.6 | 832.0 | 778.0 | L1 P3 |
| | | | 1096.3 | 1750.0 | 859.0 | L1 P4 |
| 2 | 1 | YES | 1618.0 | -150.0 | 769.0 | L2 P1 |
| | 2 | YES | 1680.0 | 452.0 | 771.0 | L2 P2 |
| | 3 | YES | 1550.6 | 832.0 | 778.0 | L2 P3 |
| | | | 1082.3 | 1750.0 | 859.0 | L2 P4 |

RECEIVER DATA

| REC. NO. | X | Y | Z | DNL | PEOPLE | ID |
|---|---|---|---|---|---|---|
| 1 | 1393.0 | 1111.0 | 818.0 | 67 | 500 | R-1 |

DROP-OFF RATES

ALL LANE/RECEIVER PAIRS = 3.0 DBA

K - CONSTANTS

ALL LANE RECEIVER/PAIRS = 0.0 DBA

| RECEIVER | LEQ |
|---|---|
| R-1 | 73.5 |

**********

## Future Traffic ADT Homes to Produce 1st Level Noise Contours

**********

* * SOUND32 (CALTRANS VERSION OF STAMINA2/OPTIMA) * *

INPUT DATA FILE : FUTCONT.TXT
BARRIER COST FILE : CALIF$.DTA
DATE : 02-02-2006

FUTCONT.TXT

TRAFFIC DATA

| LANE NO. | AUTO VPH | AUTO MPH | MEDIUM TRKS VPH | MEDIUM TRKS MPH | HEAVY TRKS VPH | HEAVY TRKS MPH | DESCRIPTION |
|---|---|---|---|---|---|---|---|
| 1 | 526 | 55 | 77 | 55 | 35 | 55 | HIGHWAY 395 |
| 2 | 526 | 60 | 76 | 60 | 70 | 60 | HIGHWAY 395 |
| 3 | 5613 | 65 | 304 | 65 | 550 | 65 | I-15 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 4 | 5613 | 65 | 303 | 65 | 549 | 65 I-15 |

LANE DATA

| LANE NO. | SEG. NO. | GRADE COR. | X | Y | Z | SEGMENT DESCRIPTION |
|---|---|---|---|---|---|---|
| 1 | 1 | NO | 1618.7 | -150.0 | 769.0 | L1 P1 |
| | 2 | NO | 1680.6 | 452.0 | 771.0 | L1 P2 |
| | 3 | NO | 1550.6 | 832.0 | 778.0 | L1 P3 |
| | | | 1082.3 | 1750.0 | 859.0 | L1 P4 |
| 2 | 1 | NO | 1632.0 | -150.0 | 769.0 | L2 P1 |
| | 2 | NO | 1694.0 | 452.0 | 771.0 | L2 P2 |
| | 3 | NO | 1564.6 | 832.0 | 778.0 | L2 P3 |
| | | | 1096.3 | 1750.0 | 859.0 | L2 P4 |
| 3 | 1 | NO | 2260.6 | -250.0 | 705.0 | L3 P1 |
| | | | 2210.3 | 1750.7 | 705.0 | L3 P2 |
| 4 | 1 | NO | 2110.6 | -150.0 | 705.0 | L4 P1 |
| | | | 2060.3 | 1750.7 | 705.0 | L4 P2 |

BARRIER DATA

Barrier No. 1 Description: EAST HILLSIDE
Type - (1)BERM
Height Increment (DELZ)= 0.0 No. Height Changes (P)=0

| SEG. | X | Y | GROUND (Z0) | TOP (Z) | BARRIER HEIGHTS AT ENDS |
|---|---|---|---|---|---|
| 1 | 1638.0 | -150.0 | 0.0 | 769.0 *B1 P1 | * %769 |
| 2 | 1700.0 | 452.0 | 0.0 | 771.0 *B1 P2 | * %771 |
| 3 | 1570.6 | 832.0 | 0.0 | 778.0 *B1 P3 | * %778 |
| | 1102.3 | 1750.0 | 0.0 | 859.0 *B1 P4 | * %859 |

Barrier No. 2 Description: PROJECT HILLSIDE
Type - (1)BERM
Height Increment (DELZ)= 0.0 No. Height Changes (P)=0

| SEG. | X | Y | GROUND (Z0) | TOP (Z) | BARRIER HEIGHTS AT ENDS |
|---|---|---|---|---|---|
| 1 | 850.0 | 12.0 | 0.0 | 815.0 *B2 P1 | * %815 |
| 2 | 1025.0 | 15.0 | 0.0 | 820.0 *B2 P2 | * %820 |
| 3 | 1270.0 | 162.0 | 0.0 | 840.0 *B2 P3 | * %840 |
| 4 | 1300.0 | 305.0 | 0.0 | 850.0 *B2 P4 | * %850 |
| 5 | 1280.0 | 397.0 | 0.0 | 860.0 *B2 P5 | * %860 |
| 6 | 1310.0 | 587.0 | 0.0 | 870.0 *B2 P6 | * %870 |
| 7 | 1315.0 | 810.0 | 0.0 | 870.0 *B2 P7 | * %870 |
| 8 | 1285.0 | 1111.0 | 0.0 | 865.0 *B2 P8 | * %865 |
| 9 | 1180.0 | 1217.0 | 0.0 | 875.0 *B2 P9 | * %875 |
| 10 | 1140.0 | 1283.0 | 0.0 | 880.0 *B2 P10 | * %880 |
| | 620.0 | 1320.0 | 0.0 | 900.0 *B2 P11 | * %900 |

RECEIVER DATA

| REC. NO. | X | Y | Z | DNL | PEOPLE | ID |
|---|---|---|---|---|---|---|
| 1 | 300.0 | 250.0 | 802.0 | 67 | 500 | R-1 |
| 2 | 300.0 | 500.0 | 830.0 | 67 | 500 | R-2 |
| 3 | 300.0 | 750.0 | 848.0 | 67 | 500 | R-3 |
| 4 | 300.0 | 1000.0 | 868.0 | 67 | 500 | R-4 |
| 5 | 300.0 | 1250.0 | 898.0 | 67 | 500 | R-5 |
| 6 | 500.0 | 250.0 | 802.0 | 67 | 500 | R-6 |
| 7 | 500.0 | 500.0 | 828.0 | 67 | 500 | R-7 |
| 8 | 500.0 | 750.0 | 855.0 | 67 | 500 | R-8 |
| 9 | 500.0 | 1000.0 | 870.0 | 67 | 500 | R-9 |
| 10 | 500.0 | 1250.0 | 904.0 | 67 | 500 | R-10 |
| 11 | 700.0 | 250.0 | 810.0 | 67 | 500 | R-11 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 12 | 700.0 | 500.0 | 815.0 | 67 | 500 | R-12 |
| 13 | 700.0 | 750.0 | 823.0 | 67 | 500 | R-13 |
| 14 | 700.0 | 1000.0 | 850.0 | 67 | 500 | R-14 |
| 15 | 700.0 | 1250.0 | 878.0 | 67 | 500 | R-15 |
| 16 | 900.0 | 250.0 | 835.0 | 67 | 500 | R-16 |
| 17 | 900.0 | 500.0 | 852.0 | 67 | 500 | R-17 |
| 18 | 900.0 | 750.0 | 858.0 | 67 | 500 | R-18 |
| 19 | 900.0 | 1000.0 | 872.0 | 67 | 500 | R-19 |
| 20 | 900.0 | 1250.0 | 881.0 | 67 | 500 | R-20 |
| 21 | 1100.0 | 250.0 | 851.0 | 67 | 500 | R-21 |
| 22 | 1100.0 | 500.0 | 877.0 | 67 | 500 | R-22 |
| 23 | 1100.0 | 750.0 | 883.0 | 67 | 500 | R-23 |
| 24 | 1100.0 | 1000.0 | 884.0 | 67 | 500 | R-24 |
| 25 | 1100.0 | 1250.0 | 884.0 | 67 | 500 | R-25 |
| 26 | 1300.0 | 250.0 | 824.0 | 67 | 500 | R-26 |
| 27 | 1300.0 | 500.0 | 855.0 | 67 | 500 | R-27 |
| 28 | 1300.0 | 750.0 | 863.0 | 67 | 500 | R-28 |
| 29 | 1300.0 | 1000.0 | 852.0 | 67 | 500 | R-29 |
| 30 | 1300.0 | 1250.0 | 848.0 | 67 | 500 | R-30 |

DROP-OFF RATES

ALL LANE/RECEIVER PAIRS = 3.0 DBA

K - CONSTANTS

ALL LANE RECEIVER/PAIRS = 0.0 DBA

| REC | REC ID | DNL | PEOPLE | LEQ(CAL) |
|---|---|---|---|---|
| 1 | R-1 | 67. | 500. | 41.8 |
| 2 | R-2 | 67. | 500. | 42.0 |
| 3 | R-3 | 67. | 500. | 42.1 |
| 4 | R-4 | 67. | 500. | 42.3 |
| 5 | R-5 | 67. | 500. | 53.3 |
| 6 | R-6 | 67. | 500. | 42.7 |
| 7 | R-7 | 67. | 500. | 43.0 |
| 8 | R-8 | 67. | 500. | 43.3 |
| 9 | R-9 | 67. | 500. | 43.5 |
| 10 | R-10 | 67. | 500. | 52.4 |
| 11 | R-11 | 67. | 500. | 43.9 |
| 12 | R-12 | 67. | 500. | 44.1 |
| 13 | R-13 | 67. | 500. | 44.3 |
| 14 | R-14 | 67. | 500. | 44.5 |
| 15 | R-15 | 67. | 500. | 45.9 |
| 16 | R-16 | 67. | 500. | 46.0 |
| 17 | R-17 | 67. | 500. | 46.0 |
| 18 | R-18 | 67. | 500. | 46.0 |
| 19 | R-19 | 67. | 500. | 47.5 |
| 20 | R-20 | 67. | 500. | 49.9 |
| 21 | R-21 | 67. | 500. | 52.0 |
| 22 | R-22 | 67. | 500. | 53.8 |
| 23 | R-23 | 67. | 500. | 53.2 |
| 24 | R-24 | 67. | 500. | 55.2 |
| 25 | R-25 | 67. | 500. | 60.0 |
| 26 | R-26 | 67. | 500. | 67.3 |
| 27 | R-27 | 67. | 500. | 71.5 |
| 28 | R-28 | 67. | 500. | 52.3 |
| 29 | R-29 | 67. | 500. | 73.0 |
| 30 | R-30 | 67. | 500. | 76.4 |

**********

## Future Traffic ADT Homes to Produce 2nd Level Noise Contours

**********

* * SOUND32 (CALTRANS VERSION OF STAMINA2/OPTIMA) * *

INPUT DATA FILE : FUTCNT2.TXT
BARRIER COST FILE : CALIF$.DTA
DATE : 02-02-2006

TRAFFIC DATA

| LANE NO. | AUTO VPH | AUTO MPH | MEDIUM TRKS VPH | MEDIUM TRKS MPH | HEAVY TRKS VPH | HEAVY TRKS MPH | DESCRIPTION |
|---|---|---|---|---|---|---|---|
| 1 | 526 | 55 | 77 | 55 | 35 | 55 | HIGHWAY 395 |
| 2 | 526 | 60 | 76 | 60 | 70 | 60 | HIGHWAY 395 |
| 3 | 5613 | 65 | 304 | 65 | 550 | 65 | I-15 |
| 4 | 5613 | 65 | 303 | 65 | 549 | 65 | I-15 |

LANE DATA

| LANE NO. | SEG. NO. | GRADE COR. | X | Y | Z | SEGMENT DESCRIPTION |
|---|---|---|---|---|---|---|
| 1 | 1 | NO | 1618.7 | -150.0 | 769.0 | L1 P1 |
| | 2 | NO | 1680.6 | 452.0 | 771.0 | L1 P2 |
| | 3 | NO | 1550.6 | 832.0 | 778.0 | L1 P3 |
| | | | 1082.3 | 1750.0 | 859.0 | L1 P4 |
| 2 | 1 | NO | 1632.0 | -150.0 | 769.0 | L2 P1 |
| | 2 | NO | 1694.0 | 452.0 | 771.0 | L2 P2 |
| | 3 | NO | 1564.6 | 832.0 | 778.0 | L2 P3 |
| | | | 1096.3 | 1750.0 | 859.0 | L2 P4 |
| 3 | 1 | NO | 2260.6 | -250.0 | 705.0 | L3 P1 |
| | | | 2210.3 | 1750.7 | 705.0 | L3 P2 |
| 4 | 1 | NO | 2110.6 | -150.0 | 705.0 | L4 P1 |
| | | | 2060.3 | 1750.7 | 705.0 | L4 P2 |

BARRIER DATA

Barrier No. 1 Description: EAST HILLSIDE
Type - (1)BERM
Height Increment (DELZ)= 0.0 No. Height Changes (P)=0

| SEG. | X | Y | GROUND (ZO) | TOP (Z) | BARRIER HEIGHTS AT ENDS |
|---|---|---|---|---|---|
| 1 | 1638.0 | -150.0 | 0.0 | 769.0 *B1 P1 | * %769 |
| 2 | 1700.0 | 452.0 | 0.0 | 771.0 *B1 P2 | * %771 |
| 3 | 1570.6 | 832.0 | 0.0 | 778.0 *B1 P3 | * %778 |
| | 1102.3 | 1750.0 | 0.0 | 859.0 *B1 P4 | * %859 |

Barrier No. 2 Description: PROJECT HILLSIDE
Type - (1)BERM
Height Increment (DELZ)= 0.0 No. Height Changes (P)=0

| SEG. | X | Y | GROUND (ZO) | TOP (Z) | BARRIER HEIGHTS AT ENDS |
|---|---|---|---|---|---|
| 1 | 850.0 | 12.0 | 0.0 | 815.0 *B2 P1 | * %815 |
| 2 | 1025.0 | 15.0 | 0.0 | 820.0 *B2 P2 | * %820 |
| 3 | 1270.0 | 162.0 | 0.0 | 840.0 *B2 P3 | * %840 |
| 4 | 1300.0 | 305.0 | 0.0 | 850.0 *B2 P4 | * %850 |
| 5 | 1280.0 | 397.0 | 0.0 | 860.0 *B2 P5 | * %860 |
| 6 | 1310.0 | 587.0 | 0.0 | 870.0 *B2 P6 | * %870 |
| 7 | 1315.0 | 810.0 | 0.0 | 870.0 *B2 P7 | * %870 |
| 8 | 1285.0 | 1111.0 | 0.0 | 865.0 *B2 P8 | * %865 |
| 9 | 1180.0 | 1217.0 | 0.0 | 875.0 *B2 P9 | * %875 |
| 10 | 1140.0 | 1283.0 | 0.0 | 880.0 *B2 P10 | * %880 |
| | 620.0 | 1320.0 | 0.0 | 900.0 *B2 P11 | * %900 |

RECEIVER DATA

| REC. NO. | X | Y | Z | DNL | PEOPLE | ID |
|---|---|---|---|---|---|---|

| | | | | | | |
|---|---|---|---|---|---|---|
| 1 | 300.0 | 250.0 | 812.0 | 67 | 500 | R-1 |
| 2 | 300.0 | 500.0 | 840.0 | 67 | 500 | R-2 |
| 3 | 300.0 | 750.0 | 858.0 | 67 | 500 | R-3 |
| 4 | 300.0 | 1000.0 | 878.0 | 67 | 500 | R-4 |
| 5 | 300.0 | 1250.0 | 908.0 | 67 | 500 | R-5 |
| 6 | 500.0 | 250.0 | 812.0 | 67 | 500 | R-6 |
| 7 | 500.0 | 500.0 | 838.0 | 67 | 500 | R-7 |
| 8 | 500.0 | 750.0 | 865.0 | 67 | 500 | R-8 |
| 9 | 500.0 | 1000.0 | 880.0 | 67 | 500 | R-9 |
| 10 | 500.0 | 1250.0 | 914.0 | 67 | 500 | R-10 |
| 11 | 700.0 | 250.0 | 820.0 | 67 | 500 | R-11 |
| 12 | 700.0 | 500.0 | 825.0 | 67 | 500 | R-12 |
| 13 | 700.0 | 750.0 | 833.0 | 67 | 500 | R-13 |
| 14 | 700.0 | 1000.0 | 860.0 | 67 | 500 | R-14 |
| 15 | 700.0 | 1250.0 | 888.0 | 67 | 500 | R-15 |
| 16 | 900.0 | 250.0 | 845.0 | 67 | 500 | R-16 |
| 17 | 900.0 | 500.0 | 862.0 | 67 | 500 | R-17 |
| 18 | 900.0 | 750.0 | 868.0 | 67 | 500 | R-18 |
| 19 | 900.0 | 1000.0 | 882.0 | 67 | 500 | R-19 |
| 20 | 900.0 | 1250.0 | 891.0 | 67 | 500 | R-20 |
| 21 | 1100.0 | 250.0 | 861.0 | 67 | 500 | R-21 |
| 22 | 1100.0 | 500.0 | 887.0 | 67 | 500 | R-22 |
| 23 | 1100.0 | 750.0 | 893.0 | 67 | 500 | R-23 |
| 24 | 1100.0 | 1000.0 | 894.0 | 67 | 500 | R-24 |
| 25 | 1100.0 | 1250.0 | 894.0 | 67 | 500 | R-25 |
| 26 | 1300.0 | 250.0 | 834.0 | 67 | 500 | R-26 |
| 27 | 1300.0 | 500.0 | 865.0 | 67 | 500 | R-27 |
| 28 | 1300.0 | 750.0 | 873.0 | 67 | 500 | R-28 |
| 29 | 1300.0 | 1000.0 | 862.0 | 67 | 500 | R-29 |
| 30 | 1300.0 | 1250.0 | 858.0 | 67 | 500 | R-30 |

DROP-OFF RATES

ALL LANE/RECEIVER PAIRS = 3.0 DBA

K - CONSTANTS

ALL LANE RECEIVER/PAIRS = 0.0 DBA

| REC | REC ID | DNL | PEOPLE | LEQ(CAL) |
|---|---|---|---|---|
| 1 | R-1 | 67. | 500. | 41.9 |
| 2 | R-2 | 67. | 500. | 42.1 |
| 3 | R-3 | 67. | 500. | 42.2 |
| 4 | R-4 | 67. | 500. | 42.5 |
| 5 | R-5 | 67. | 500. | 53.4 |
| 6 | R-6 | 67. | 500. | 42.8 |
| 7 | R-7 | 67. | 500. | 43.1 |
| 8 | R-8 | 67. | 500. | 43.4 |
| 9 | R-9 | 67. | 500. | 43.9 |
| 10 | R-10 | 67. | 500. | 53.3 |
| 11 | R-11 | 67. | 500. | 44.0 |
| 12 | R-12 | 67. | 500. | 44.1 |
| 13 | R-13 | 67. | 500. | 44.3 |
| 14 | R-14 | 67. | 500. | 44.6 |
| 15 | R-15 | 67. | 500. | 47.7 |
| 16 | R-16 | 67. | 500. | 47.0 |
| 17 | R-17 | 67. | 500. | 46.8 |
| 18 | R-18 | 67. | 500. | 46.7 |
| 19 | R-19 | 67. | 500. | 48.9 |
| 20 | R-20 | 67. | 500. | 53.7 |
| 21 | R-21 | 67. | 500. | 55.6 |
| 22 | R-22 | 67. | 500. | 57.3 |
| 23 | R-23 | 67. | 500. | 56.4 |
| 24 | R-24 | 67. | 500. | 58.7 |
| 25 | R-25 | 67. | 500. | 67.5 |
| 26 | R-26 | 67. | 500. | 69.1 |
| 27 | R-27 | 67. | 500. | 71.5 |
| 28 | R-28 | 67. | 500. | 63.7 |
| 29 | R-29 | 67. | 500. | 73.0 |
| 30 | R-30 | 67. | 500. | 76.0 |

**********

## Future Traffic ADT with Receivers at Centers of Lots for Exterior Noise Levels

**********

* * SOUND32 (CALTRANS VERSION OF STAMINA2/OPTIMA) * *

INPUT DATA FILE : FUT.TXT
BARRIER COST FILE : CALIF$.DTA
DATE : 02-02-2006

FUT.TXT

==========

TRAFFIC DATA

| LANE NO. | AUTO VPH | AUTO MPH | MEDIUM TRKS VPH | MEDIUM TRKS MPH | HEAVY TRKS VPH | HEAVY TRKS MPH | DESCRIPTION |
|---|---|---|---|---|---|---|---|
| 1 | 526 | 55 | 77 | 55 | 35 | 55 | HIGHWAY 395 |
| 2 | 526 | 60 | 76 | 60 | 70 | 60 | HIGHWAY 395 |
| 3 | 5613 | 65 | 304 | 65 | 550 | 65 | I-15 |
| 4 | 5613 | 65 | 303 | 65 | 549 | 65 | I-15 |

==========

LANE DATA

| LANE NO. | SEG. NO. | GRADE COR. | X | Y | Z | SEGMENT DESCRIPTION |
|---|---|---|---|---|---|---|
| 1 | 1 | NO | 1618.7 | -150.0 | 769.0 | L1 P1 |
| | 2 | NO | 1680.6 | 452.0 | 771.0 | L1 P2 |
| | 3 | NO | 1550.6 | 832.0 | 778.0 | L1 P3 |
| | | | 1082.3 | 1750.0 | 859.0 | L1 P4 |
| 2 | 1 | NO | 1632.0 | -150.0 | 769.0 | L2 P1 |
| | 2 | NO | 1694.0 | 452.0 | 771.0 | L2 P2 |
| | 3 | NO | 1564.6 | 832.0 | 778.0 | L2 P3 |
| | | | 1096.3 | 1750.0 | 859.0 | L2 P4 |
| 3 | 1 | NO | 2260.6 | -250.0 | 705.0 | L3 P1 |
| | | | 2210.3 | 1750.7 | 705.0 | L3 P2 |
| 4 | 1 | NO | 2110.6 | -150.0 | 705.0 | L4 P1 |
| | | | 2060.3 | 1750.7 | 705.0 | L4 P2 |

==========

BARRIER DATA

Barrier No. 1 Description: EAST HILLSIDE
Type - (1)BERM
Height Increment (DELZ)= 0.0 No. Height Changes (P)=0

| SEG. | X | Y | GROUND (Z0) | TOP (Z) | BARRIER HEIGHTS AT ENDS |
|---|---|---|---|---|---|
| 1 | 1638.0 | -150.0 | 0.0 | 769.0 *B1 P1 | * %769 |
| 2 | 1700.0 | 452.0 | 0.0 | 771.0 *B1 P2 | * %771 |
| 3 | 1570.6 | 832.0 | 0.0 | 778.0 *B1 P3 | * %778 |
| | 1102.3 | 1750.0 | 0.0 | 859.0 *B1 P4 | * %859 |

---

Barrier No. 2 Description: PROJECT HILLSIDE
Type - (1)BERM

Height Increment (DELZ)= 0.0 No. Height Changes (P)=0

| SEG. | X | Y | GROUND (Z0) | TOP (Z) | BARRIER HEIGHTS AT ENDS |
|---|---|---|---|---|---|
| 1 | 850.0 | 12.0 | 0.0 | 815.0 *B2 P1 | * %815 |
| 2 | 1025.0 | 15.0 | 0.0 | 820.0 *B2 P2 | * %820 |
| 3 | 1270.0 | 162.0 | 0.0 | 840.0 *B2 P3 | * %840 |
| 4 | 1300.0 | 305.0 | 0.0 | 850.0 *B2 P4 | * %850 |
| 5 | 1280.0 | 397.0 | 0.0 | 860.0 *B2 P5 | * %860 |
| 6 | 1310.0 | 587.0 | 0.0 | 870.0 *B2 P6 | * %870 |
| 7 | 1315.0 | 810.0 | 0.0 | 870.0 *B2 P7 | * %870 |
| 8 | 1285.0 | 1111.0 | 0.0 | 870.0 *B2 P8 | * %870 |
| 9 | 1180.0 | 1217.0 | 0.0 | 875.0 *B2 P9 | * %875 |
| 10 | 1140.0 | 1283.0 | 0.0 | 880.0 *B2 P10 | * %880 |
| | 620.0 | 1320.0 | 0.0 | 900.0 *B2 P11 | * %900 |

RECEIVER DATA

| REC. NO. | X | Y | Z | DNL | PEOPLE | ID |
|---|---|---|---|---|---|---|
| 1 | 1117.0 | 1107.0 | 884.0 | 67 | 500 | R-1 |
| 2 | 1196.0 | 827.0 | 880.0 | 67 | 500 | R-2 |
| 3 | 1192.0 | 577.0 | 875.0 | 67 | 500 | R-3 |
| 4 | 1172.0 | 265.0 | 856.0 | 67 | 500 | R-4 |
| 5 | 866.0 | 156.0 | 826.0 | 67 | 500 | R-5 |
| 6 | 195.0 | 211.0 | 827.0 | 67 | 500 | R-6 |
| 7 | 203.0 | 608.0 | 841.0 | 67 | 500 | R-7 |
| 8 | 530.0 | 889.0 | 870.0 | 67 | 500 | R-8 |
| 9 | 343.0 | 1250.0 | 906.0 | 67 | 500 | R-9 |
| 10 | 1117.0 | 1107.0 | 894.0 | 67 | 500 | R-10 |
| 11 | 1196.0 | 827.0 | 890.0 | 67 | 500 | R-11 |
| 12 | 1192.0 | 577.0 | 885.0 | 67 | 500 | R-12 |
| 13 | 1172.0 | 265.0 | 866.0 | 67 | 500 | R-13 |
| 14 | 866.0 | 156.0 | 836.0 | 67 | 500 | R-14 |
| 15 | 195.0 | 211.0 | 837.0 | 67 | 500 | R-15 |
| 16 | 203.0 | 608.0 | 851.0 | 67 | 500 | R-16 |
| 17 | 530.0 | 889.0 | 880.0 | 67 | 500 | R-17 |
| 18 | 343.0 | 1250.0 | 916.0 | 67 | 500 | R-18 |

DROP-OFF RATES

ALL LANE/RECEIVER PAIRS = 3.0 DBA

K - CONSTANTS

ALL LANE RECEIVER/PAIRS = 0.0 DBA

| REC | REC ID | DNL | PEOPLE | LEQ(CAL) |
|---|---|---|---|---|
| 1 | R-1 | 67. | 500. | 56.3 |
| 2 | R-2 | 67. | 500. | 57.1 |
| 3 | R-3 | 67. | 500. | 55.6 |
| 4 | R-4 | 67. | 500. | 56.9 |
| 5 | R-5 | 67. | 500. | 46.0 |
| 6 | R-6 | 67. | 500. | 41.8 |
| 7 | R-7 | 67. | 500. | 41.6 |
| 8 | R-8 | 67. | 500. | 43.7 |
| 9 | R-9 | 67. | 500. | 53.5 |
| 10 | R-10 | 67. | 500. | 60.0 |
| 11 | R-11 | 67. | 500. | 61.5 |
| 12 | R-12 | 67. | 500. | 60.4 |
| 13 | R-13 | 67. | 500. | 61.0 |
| 14 | R-14 | 67. | 500. | 47.3 |

| | | | | |
|---|---|---|---|---|
| 15 | R-15 | 67. | 500. | 42.1 |
| 16 | R-16 | 67. | 500. | 41.7 |
| 17 | R-17 | 67. | 500. | 44.1 |
| 18 | R-18 | 67. | 500. | 53.7 |

# APPENDIX C

## Construction Noise Questionnaire from Gary Piro

TO: Ian Brewe
(FAX: 753-2597)
From: Gary Piro

Subj: **Construction letter.doc**
Date: 2/2/2006 11:12:01 AM Pacific Standard Time
From: ibrewe@eilarassociates.com
To: piroengr@cs.com
*Received from Internet: click here for more information*

Gary,

If you could complete this form about construction noise issues associated with this project it would be greatly appreciated.

Regards,

Ian Brewe
Acoustical Consultant
539 Encinitas Blvd. #206
ph: 760-753-1865
fx: 760-753-2597
ibrewe@eilarassociates.com
www.eilarassociates.com

# EILAR ASSOCIATES
## ACOUSTICAL & ENVIRONMENTAL CONSULTING

February 2, 2006
Gary Piro
Piro Engineering
930 Boardwalk, Suite D
San Marcos, CA 92069
Phone: 760-744-3700

**Project #A50310N2**

**Subject: Questionnaire for the TM 5346, Don Dabbs Project Construction**

At your request, we are preparing a report regarding the worst-case noise impacts for the proposed Tentative Parcel Map 5346, in Fallbrook, California. In order for this report to be accurately completed, we require the following information:

1. What is the anticipated quantity of material handling (in cubic yards)?
41,000 c.y. (i.e. 40,600 CY CUT
40,600 CY FILL
400 CY EXPORT)

2. How much dirt will they be exporting off the site?
400 c.y.

3. How much dirt will be imported onto the site?
   None

4. How much dirt will be handled on site? (i.e. pushing it from Point A to Point B)
   40,600 cy.

5. Does the soils report indicate large rocks onsite?
   No

6. Will there be blasting on site to break up large boulders?
   No

7. Will there be the use of an excavator with a ram or other mechanical equipment to break up large boulders?
   No

8. What types of trucks (i.e. dumptrucks, bulldozers, rams, etc.) will be used on site? Please include any and all heavy machinery:
   Excavators, Backhoes, Loaders, Blades, Dumptrucks, Pavers, cement trucks.

9. Are there any other significant sources of noise which will be generated onsite?
   No

10. Is a construction schedule available at this time?
    No

# APPENDIX D

## Construction Equipment Noise Levels

# 9.0 CONSTRUCTION EQUIPMENT NOISE LEVELS AND RANGES

## 9.1 Equipment Type Inventory and Related Emission Levels

Noise levels generated by individual pieces of construction equipment and specific construction operations form the basis for the prediction of construction-related noise levels. A variety of information exists related to sound emissions related to such equipment and operations. This data transcends the period beginning in the 1970s thru 2006. This information exists for both stationary and mobile sources and for steady, intermittent, and impulse type generators of noise.

### 9.1.1 Stationary Equipment

Stationary equipment consists of equipment that generates noise from one general area and includes items such as pumps, generators, compressors, etc. These types of equipment operate at a constant noise level under normal operation and are classified as non-impact equipment. Other types of stationary equipment such as pile drivers, jackhammers, pavement breakers, blasting operations, etc., produce variable and sporadic noise levels and often produce impact-type noises. Impact equipment is equipment that generates impulsive noise, where impulsive noise is defined as noise of short duration (generally less than one second), high intensity, abrupt onset, rapid decay, and often rapidly changing spectral composition. For impact equipment, the noise is produced by the impact of a mass on a surface, typically repeating over time.

### 9.1.2 Mobile Equipment

Mobile equipment such as dozers, scrapers, graders, etc., may operate in a cyclic fashion in which a period of full power is followed by a period of reduced power. Other equipment such as compressors, although generally considered to be stationary when operating, can be readily relocated to another location for the next operation.

## 9.2 Sources of Information

Construction-related equipment and operation noise level data may be provided by numerous sources, including suppliers, manufacturers, agencies, organizations, etc. Some information is included in this document, and many web-based links are given for equipment manufacturers.

## 9.3 Specifics of Construction Equipment and Operation Noise Inventories

Details included in each specific inventory of construction equipment and operation noise emission levels are often variable in terms of how data is represented. Some inventories include ranges of noise levels while others present single numbers for each equipment type. Others provide levels for specific models of each type of construction equipment. Often, different noise descriptors are used, such as $L_{Aeq}$, $L_{max}$, $L_{10}$, sound power level, etc. As such, the array of data does not readily lend itself to being combined into a single table or easily compared. As such, this Handbook attempts to summarize a variety of such inventories and provide links to each, thereby providing the reader with a variety of sources from which to choose the appropriate levels for use in his or her respective analysis.

## 9.4 Summaries of Referenced Inventories

Included below are examples of several inventories of construction-related noise emission values. These and additional inventories are included on the companion CD-ROM.

### 9.4.1 RCNM Inventory

Equipment and operation noise levels in this inventory are expressed in terms of $L_{max}$ noise levels and are accompanied by a usage factor value. They have been recently updated and are based on extensive measurements taken in conjunction with the Central Artery/Tunnel (CA/T) Project. Table 9.1 summarizes the equipment noise emissions database used by the CA/T Project. While these values represent the "default" values for use in the RCNM, user-defined equipment and corresponding noise levels can be added.

**Table 9.1 RCNM Default Noise Emission Reference Levels and Usage Factors.**

| Equipment Description | Impact Device? | Acoustical Usage Factor (%) | Spec. 721.560 $L_{max}$ @ 50 feet (dBA, slow) | Actual Measured $L_{max}$ @ 50 feet (dBA, slow) (Samples Averaged) | Number of Actual Data Samples (Count) |
|---|---|---|---|---|---|
| All Other Equipment > 5 HP | No | 50 | 85 | N/A | 0 |
| Auger Drill Rig | No | 20 | 85 | 84 | 36 |
| Backhoe | No | 40 | 80 | 78 | 372 |
| Bar Bender | No | 20 | 80 | N/A | 0 |
| Blasting | Yes | N/A | 94 | N/A | 0 |
| Boring Jack Power Unit | No | 50 | 80 | 83 | 1 |
| Chain Saw | No | 20 | 85 | 84 | 46 |
| Clam Shovel (dropping) | Yes | 20 | 93 | 87 | 4 |
| Compactor (ground) | No | 20 | 80 | 83 | 57 |
| Compressor (air) | No | 40 | 80 | 78 | 18 |
| Concrete Batch Plant | No | 15 | 83 | N/A | 0 |
| Concrete Mixer Truck | No | 40 | 85 | 79 | 40 |
| Concrete Pump Truck | No | 20 | 82 | 81 | 30 |
| Concrete Saw | No | 20 | 90 | 90 | 55 |
| Crane | No | 16 | 85 | 81 | 405 |
| Dozer | No | 40 | 85 | 82 | 55 |
| Drill Rig Truck | No | 20 | 84 | 79 | 22 |
| Drum Mixer | No | 50 | 80 | 80 | 1 |
| Dump Truck | No | 40 | 84 | 76 | 31 |
| Excavator | No | 40 | 85 | 81 | 170 |
| Flat Bed Truck | No | 40 | 84 | 74 | 4 |
| Front End Loader | No | 40 | 80 | 79 | 96 |
| Generator | No | 50 | 82 | 81 | 19 |
| Generator (<25KVA, VMS Signs) | No | 50 | 70 | 73 | 74 |
| Gradall | No | 40 | 85 | 83 | 70 |

| | | | | | |
|---|---|---|---|---|---|
| Grader | No | 40 | 85 | N/A | 0 |
| Grapple (on backhoe) | No | 40 | 85 | 87 | 1 |
| Horizontal Boring Hydraulic Jack | No | 25 | 80 | 82 | 6 |
| Hydra Break Ram | Yes | 10 | 90 | N/A | 0 |
| Impact Pile Driver | Yes | 20 | 95 | 101 | 11 |
| Jackhammer | Yes | 20 | 85 | 89 | 133 |
| Man Lift | No | 20 | 85 | 75 | 23 |
| Mounted Impact Hammer (hoe ram) | Yes | 20 | 90 | 90 | 212 |
| Pavement Scarifier | No | 20 | 85 | 90 | 2 |
| Paver | No | 50 | 85 | 77 | 9 |
| Pickup Truck | No | 40 | 55 | 75 | 1 |
| Pneumatic Tools | No | 50 | 85 | 85 | 90 |
| Pumps | No | 50 | 77 | 81 | 17 |
| Refrigerator Unit | No | 100 | 82 | 73 | 3 |
| Rivit Buster/Chipping Gun | Yes | 20 | 85 | 79 | 19 |
| Rock Drill | No | 20 | 85 | 81 | 3 |
| Roller | No | 20 | 85 | 80 | 16 |
| Sand Blasting (single nozzle) | No | 20 | 85 | 96 | 9 |
| Scraper | No | 40 | 85 | 84 | 12 |
| Sheers (on backhoe) | No | 40 | 85 | 96 | 5 |
| Slurry Plant | No | 100 | 78 | 78 | 1 |
| Slurry Trenching Machine | No | 50 | 82 | 80 | 75 |
| Soil Mix Drill Rig | No | 50 | 80 | N/A | 0 |
| Tractor | No | 40 | 84 | N/A | 0 |
| Vacuum Excavator (Vac-Truck) | No | 40 | 85 | 85 | 149 |
| Vacuum Street Sweeper | No | 10 | 80 | 82 | 19 |
| Ventilation Fan | No | 100 | 85 | 79 | 13 |
| Vibrating Hopper | No | 50 | 85 | 87 | 1 |
| Vibratory Concrete Mixer | No | 20 | 80 | 80 | 1 |
| Vibratory Pile Driver | No | 20 | 95 | 101 | 44 |
| | | | | | |

| | | | | | |
|---|---|---|---|---|---|
| Warning Horn | No | 5 | 85 | 83 | 12 |
| Welder/Torch | No | 40 | 73 | 74 | 5 |

For each generic type of equipment listed in Table 9.1, the following information is provided:

- an indication as to whether or not the equipment is an impact device;
- the acoustical usage factor to assume for modeling purposes;
- the specification "Spec" limit for each piece of equipment expressed as an $L_{max}$ level in dBA "slow" at a reference distance of 50 foot from the loudest side of the equipment;
- the measured "Actual" emission level at 50 feet for each piece of equipment based on hundreds of emission measurements performed on CA/T work sites; and
- the number of samples that were averaged together to compute the "Actual" emission level.

A comparison of the "Spec" emission limits against the "Actual" emission levels reveals that the Spec limits were set, in general, to realistically obtainable noise levels based on the equipment used by contractors on the CA/T Project. When measured in the field, some equipment such as pile drivers, sand blasting, demolition shears, and pumps tended to exceed their applicable emission limit. As such, these noisy devices needed to have some form of noise mitigation in place in order to comply with the Spec emission limits. Other equipment, such as clamshell shovels, concrete mixer trucks, truck-mounted drill rigs, man-lifts, chipping guns, ventilation fans, pavers, dump trucks, and flatbed trucks, easily complied. Therefore, the Spec emission limits for these devices could have been reduced somewhat further. It is recommended that the user review the RCNM User's Guide contained in Appendix A for detailed guidance regarding application of values contained in Table 9.1.

## 9.4.2 FHWA Special Report Inventories

Appendix A of the 1977 Handbook provides tables of construction equipment noise levels and ranges. The majority of the data were provided by the American Road Builders Association. These data were taken during a 1973 survey in which member contractors were asked to secure readings of noise exposure to operators of various types of equipment. Additionally, the contractors were asked to take readings at 50 feet from the machinery. These 50-foot peak readings are provided in Tables 9.2 through 9.8. Though the data were produced under varying conditions and degrees of expertise, the values are relatively consistent.

**Table 9.2 Construction Equipment Noise Levels Based on Limited Data Samples - Cranes.**

| Manufacturer | Type or Model | Peak Noise Level (dBA) | Remarks |
|---|---|---|---|
| Northwestern | 80D | 77 | Within 15m 1958 mod |
| Northwestern | 8 | 84 | Within 15m 1940 mod |
| Northwestern | 6 | 72 | Within 15m 1965 mod |
| American | 7260 | 82 | Within 15m 1967 mod |
| American | 599 | 76 | Within 15m 1969 mod |
| American | 5299 | 70 | Within 15m 1972 mod |
| American | 4210 | 82 | Within 15m 1968 mod |
| Buck Eye | 45C | 79 | Within 15m 1972 mod |
| Buck Eye | 308 | 74 | Within 15m 1968 mod |
| Buck Eye | 30B | 73 | Within 15m 1965 mod |
| Buck Eye | 30B | 70 | Within 15m 1959 mod |
| Link Belt | LS98 | 76 | Within 15m 1956 mod |
| Manitowoc | 4000 | 94 | Within 15m 1956 mod |
| | | | |

# APPENDIX E

## Equipment Noise Calculations

## Noise Attenuation by Distance Calculation

Job: Dabbs Project
Job #: A91106N1
Date: 12/1/2009
Source: Excavator
Receiver: North - Phase I

**Noise Source**

Noise Level (dBA) 81 at 50 feet

**Distances**

Source Elevation 830 feet at 5 feet above grade
Receiver Elevation: 890 feet at 5 feet above grade
Source to Receiver Distance: 650 feet

**Path Calculation**

Source to Receiver Direct Path Distance: **653** feet

**Sound Pressure Level** **58.7** at 653 feet
Hours of Use: **8**
Duty Cycle (%): **40**
Level During 8 Hour day: **54.7**

**Summation**

Number of Sources: 6

Level during 8 hour day: **63.1**

## Noise Attenuation by Distance Calculation

Job: Dabbs Project
Job #: A91106N1
Date: 12/1/2009
Source: Two Dozers
Receiver: North - Phase I

**Noise Source**

Noise Level (dBA) 85 at 50 feet

**Distances**

Source Elevation 830 feet at 5 feet above grade
Receiver Elevation: 890 feet at 5 feet above grade
Source to Receiver Distance: 650 feet

**Path Calculation**

Source to Receiver Direct Path Distance: **653** feet

**Sound Pressure Level** **62.7** at 653 feet
Hours of Use: **8**
Duty Cycle (%): **40**
Level During 8 Hour day: **58.7**

## Noise Attenuation by Distance Calculation

Job: Dabbs Project
Job #: A91106N1
Date: 12/1/2009
Source: Scraper
Receiver: North - Phase I

**Noise Source**

Noise Level (dBA) 84 at 50 feet

**Distances**

| | | | | | |
|---|---|---|---|---|---|
| Source Elevation | 830 | feet | at | 5 | feet above grade |
| Receiver Elevation: | 890 | feet | at | 5 | feet above grade |
| Source to Receiver Distance: | 650 | feet | | | |

**Path Calculation**

Source to Receiver Direct Path Distance: **653** feet

| | | | | |
|---|---|---|---|---|
| **Sound Pressure Level** | **61.7** | at | 653 | feet |
| Hours of Use: | **8** | | | |
| Duty Cycle (%): | **40** | | | |
| Level During 8 Hour day: | **57.7** | | | |

## Noise Attenuation by Distance Calculation

Job: Dabbs Project
Job #: A91106N1
Date: 12/1/2009
Source: Front Loader
Receiver: North - Phase I

**Noise Source**

Noise Level (dBA) 79 at 50 feet

**Distances**

| | | | | | |
|---|---|---|---|---|---|
| Source Elevation | 830 | feet | at | 5 | feet above grade |
| Receiver Elevation: | 890 | feet | at | 5 | feet above grade |
| Source to Receiver Distance: | 650 | feet | | | |

**Path Calculation**

Source to Receiver Direct Path Distance: **653** feet

| | | | | |
|---|---|---|---|---|
| **Sound Pressure Level** | **56.7** | at | 653 | feet |
| Hours of Use: | **8** | | | |
| Duty Cycle (%): | **40** | | | |
| Level During 8 Hour day: | **52.7** | | | |

## Noise Attenuation by Distance Calculation

Job: Dabbs Project
Job #: A91106N1
Date: 12/1/2009
Source: Dump Truck
Receiver: North - Phase I

**Noise Source**

| | | | | |
|---|---|---|---|---|
| Noise Level (dBA) | 76 | at | 50 | feet |

**Distances**

| | | | | | |
|---|---|---|---|---|---|
| Source Elevation | 830 | feet | at | 5 | feet above grade |
| Receiver Elevation: | 890 | feet | at | 5 | feet above grade |
| Source to Receiver Distance: | 650 | feet | | | |

**Path Calculation**

| | | |
|---|---|---|
| Source to Receiver Direct Path Distance: | **653** | feet |

| | | | | |
|---|---|---|---|---|
| **Sound Pressure Level** | **53.7** | at | 653 | feet |
| Hours of Use: | **8** | | | |
| Duty Cycle (%): | **40** | | | |
| Level During 8 Hour day: | **49.7** | | | |

## Noise Attenuation by Distance Calculation

Job: Dabbs Project
Job #: A91106N1
Date: 12/1/2009
Source: Backhoe
Receiver: North - Phase I

**Noise Source**

Noise Level (dBA) 78 at 50 feet

**Distances**

Source Elevation 830 feet at 5 feet above grade
Receiver Elevation: 890 feet at 5 feet above grade
Source to Receiver Distance: 650 feet

**Path Calculation**

Source to Receiver Direct Path Distance: **653** feet

**Sound Pressure Level** **55.7** at 653 feet
Hours of Use: **8**
Duty Cycle (%): **40**
Level During 8 Hour day: **51.7**

## Noise Attenuation by Distance Calculation

Job: Dabbs Project
Job #: A91106N1
Date: 12/1/2009
Source: Excavator
Receiver: South - Phase I

**Noise Source**

Noise Level (dBA) 81 at 50 feet

**Distances**

Source Elevation 830 feet at 5 feet above grade
Receiver Elevation: 785 feet at 5 feet above grade
Source to Receiver Distance: 534 feet

**Path Calculation**

Source to Receiver Direct Path Distance: **536** feet

**Sound Pressure Level** **60.4** at 536 feet
Hours of Use: **8**
Duty Cycle (%): **40**
Level During 8 Hour day: **56.4**

**Summation**

Number of Sources: 6

Level during 8 hour day: **64.8**

## Noise Attenuation by Distance Calculation

Job: Dabbs Project
Job #: A91106N1
Date: 12/1/2009
Source: Two Dozers
Receiver: South - Phase I

**Noise Source**

Noise Level (dBA) 85 at 50 feet

**Distances**

| | | | | | |
|---|---|---|---|---|---|
| Source Elevation | 830 | feet | at | 5 | feet above grade |
| Receiver Elevation: | 785 | feet | at | 5 | feet above grade |
| Source to Receiver Distance: | 534 | feet | | | |

**Path Calculation**

Source to Receiver Direct Path Distance: **536** feet

| | | | | |
|---|---|---|---|---|
| **Sound Pressure Level** | **64.4** | at | 536 | feet |
| Hours of Use: | **8** | | | |
| Duty Cycle (%): | **40** | | | |
| Level During 8 Hour day: | **60.4** | | | |

## Noise Attenuation by Distance Calculation

Job: Dabbs Project
Job #: A91106N1
Date: 12/1/2009
Source: Scraper
Receiver: South - Phase I

**Noise Source**

| | | | | |
|---|---|---|---|---|
| Noise Level (dBA) | 84 | at | 50 | feet |

**Distances**

| | | | | | |
|---|---|---|---|---|---|
| Source Elevation | 830 | feet | at | 5 | feet above grade |
| Receiver Elevation: | 785 | feet | at | 5 | feet above grade |
| Source to Receiver Distance: | 534 | feet | | | |

**Path Calculation**

| | | |
|---|---|---|
| Source to Receiver Direct Path Distance: | **536** | feet |

| | | | | |
|---|---|---|---|---|
| **Sound Pressure Level** | **63.4** | at | 536 | feet |
| Hours of Use: | **8** | | | |
| Duty Cycle (%): | **40** | | | |
| Level During 8 Hour day: | **59.4** | | | |

## Noise Attenuation by Distance Calculation

Job: Dabbs Project
Job #: A91106N1
Date: 12/1/2009
Source: Front Loader
Receiver: South - Phase I

**Noise Source**

| | | | | |
|---|---|---|---|---|
| Noise Level (dBA) | 79 | at | 50 | feet |

**Distances**

| | | | | | |
|---|---|---|---|---|---|
| Source Elevation | 830 | feet | at | 5 | feet above grade |
| Receiver Elevation: | 785 | feet | at | 5 | feet above grade |
| Source to Receiver Distance: | 534 | feet | | | |

**Path Calculation**

| | | |
|---|---|---|
| Source to Receiver Direct Path Distance: | **536** | feet |

| | | | | |
|---|---|---|---|---|
| **Sound Pressure Level** | **58.4** | at | 536 | feet |
| Hours of Use: | **8** | | | |
| Duty Cycle (%): | **40** | | | |
| Level During 8 Hour day: | **54.4** | | | |

## Noise Attenuation by Distance Calculation

Job: Dabbs Project
Job #: A91106N1
Date: 12/1/2009
Source: Dump Truck
Receiver: South - Phase I

**Noise Source**

Noise Level (dBA) 76 at 50 feet

**Distances**

Source Elevation 830 feet at 5 feet above grade
Receiver Elevation: 785 feet at 5 feet above grade
Source to Receiver Distance: 534 feet

**Path Calculation**

Source to Receiver Direct Path Distance: **536** feet

**Sound Pressure Level** **55.4** at 536 feet
Hours of Use: **8**
Duty Cycle (%): **40**
Level During 8 Hour day: **51.4**

## Noise Attenuation by Distance Calculation

Job: Dabbs Project
Job #: A91106N1
Date: 12/1/2009
Source: Backhoe
Receiver: South - Phase I

**Noise Source**

Noise Level (dBA) 78 at 50 feet

**Distances**

Source Elevation 830 feet at 5 feet above grade
Receiver Elevation: 785 feet at 5 feet above grade
Source to Receiver Distance: 534 feet

**Path Calculation**

Source to Receiver Direct Path Distance: **536** feet

**Sound Pressure Level** **57.4** at 536 feet
Hours of Use: **8**
Duty Cycle (%): **40**
Level During 8 Hour day: **53.4**

## Noise Attenuation by Distance Calculation

Job: Dabbs Project
Job #: A91106N1
Date: 12/1/2009
Source: Excavator
Receiver: East - Phase I

**Noise Source**

Noise Level (dBA) 81 at 50 feet

**Distances**

Source Elevation 830 feet at 5 feet above grade
Receiver Elevation: 864 feet at 5 feet above grade
Source to Receiver Distance: 683 feet

**Path Calculation**

Source to Receiver Direct Path Distance: **684** feet

**Sound Pressure Level** **58.3** at 684 feet
Hours of Use: **8**
Duty Cycle (%): **40**
Level During 8 Hour day: **54.3**

**Summation**

Number of Sources: 6

Level during 8 hour day: **62.7**

## Noise Attenuation by Distance Calculation

Job: Dabbs Project
Job #: A91106N1
Date: 12/1/2009
Source: Two Dozers
Receiver: East - Phase I

**Noise Source**

Noise Level (dBA) 85 at 50 feet

**Distances**

Source Elevation 830 feet at 5 feet above grade
Receiver Elevation: 864 feet at 5 feet above grade
Source to Receiver Distance: 683 feet

**Path Calculation**

Source to Receiver Direct Path Distance: **684** feet

**Sound Pressure Level** **62.3** at 684 feet
Hours of Use: **8**
Duty Cycle (%): **40**
Level During 8 Hour day: **58.3**

## Noise Attenuation by Distance Calculation

Job: Dabbs Project
Job #: A91106N1
Date: 12/1/2009
Source: Scraper
Receiver: East - Phase I

**Noise Source**

Noise Level (dBA) 84 at 50 feet

**Distances**

Source Elevation 830 feet at 5 feet above grade
Receiver Elevation: 864 feet at 5 feet above grade
Source to Receiver Distance: 683 feet

**Path Calculation**

Source to Receiver Direct Path Distance: **684** feet

**Sound Pressure Level** **61.3** at 684 feet
Hours of Use: **8**
Duty Cycle (%): **40**
Level During 8 Hour day: **57.3**

## Noise Attenuation by Distance Calculation

Job: Dabbs Project
Job #: A91106N1
Date: 12/1/2009
Source: Front Loader
Receiver: East - Phase I

**Noise Source**

| | | | | |
|---|---|---|---|---|
| Noise Level (dBA) | 79 | at | 50 | feet |

**Distances**

| | | | | | |
|---|---|---|---|---|---|
| Source Elevation | 830 | feet | at | 5 | feet above grade |
| Receiver Elevation: | 864 | feet | at | 5 | feet above grade |
| Source to Receiver Distance: | 683 | feet | | | |

**Path Calculation**

| | | |
|---|---|---|
| Source to Receiver Direct Path Distance: | **684** | feet |

| | | | | |
|---|---|---|---|---|
| **Sound Pressure Level** | **56.3** | at | 684 | feet |
| Hours of Use: | **8** | | | |
| Duty Cycle (%): | **40** | | | |
| Level During 8 Hour day: | **52.3** | | | |

## Noise Attenuation by Distance Calculation

Job: Dabbs Project
Job #: A91106N1
Date: 12/1/2009
Source: Dump Truck
Receiver: East - Phase I

**Noise Source**

| | | | | |
|---|---|---|---|---|
| Noise Level (dBA) | 76 | at | 50 | feet |

**Distances**

| | | | | | |
|---|---|---|---|---|---|
| Source Elevation | 830 | feet | at | 5 | feet above grade |
| Receiver Elevation: | 864 | feet | at | 5 | feet above grade |
| Source to Receiver Distance: | 683 | feet | | | |

**Path Calculation**

| | | |
|---|---|---|
| Source to Receiver Direct Path Distance: | **684** | feet |

| | | | | |
|---|---|---|---|---|
| **Sound Pressure Level** | **53.3** | at | 684 | feet |
| Hours of Use: | **8** | | | |
| Duty Cycle (%): | **40** | | | |
| Level During 8 Hour day: | **49.3** | | | |

## Noise Attenuation by Distance Calculation

Job: Dabbs Project
Job #: A91106N1
Date: 12/1/2009
Source: Backhoe
Receiver: East - Phase I

**Noise Source**

Noise Level (dBA) 78 at 50 feet

**Distances**

Source Elevation 830 feet at 5 feet above grade
Receiver Elevation: 864 feet at 5 feet above grade
Source to Receiver Distance: 683 feet

**Path Calculation**

Source to Receiver Direct Path Distance: **684** feet

**Sound Pressure Level** **55.3** at 684 feet
Hours of Use: **8**
Duty Cycle (%): **40**
Level During 8 Hour day: **51.3**

## Noise Attenuation by Distance Calculation

Job: Dabbs Project
Job #: A91106N1
Date: 12/1/2009
Source: Excavator
Receiver: West - Phase I

**Noise Source**

Noise Level (dBA) 81 at 50 feet

**Distances**

Source Elevation 830 feet at 5 feet above grade
Receiver Elevation: 862 feet at 5 feet above grade
Source to Receiver Distance: 650 feet

**Path Calculation**

Source to Receiver Direct Path Distance: **651** feet

**Sound Pressure Level** **58.7** at 651 feet
Hours of Use: **8**
Duty Cycle (%): **40**
Level During 8 Hour day: **54.7**

**Summation**

Number of Sources: 6

Level during 8 hour day: **63.2**

## Noise Attenuation by Distance Calculation

Job: Dabbs Project
Job #: A91106N1
Date: 12/1/2009
Source: Two Dozers
Receiver: West - Phase I

**Noise Source**

Noise Level (dBA) 85 at 50 feet

**Distances**

Source Elevation 830 feet at 5 feet above grade
Receiver Elevation: 862 feet at 5 feet above grade
Source to Receiver Distance: 650 feet

**Path Calculation**

Source to Receiver Direct Path Distance: **651** feet

**Sound Pressure Level** **62.7** at 651 feet
Hours of Use: **8**
Duty Cycle (%): **40**
Level During 8 Hour day: **58.7**

## Noise Attenuation by Distance Calculation

Job: Dabbs Project
Job #: A91106N1
Date: 12/1/2009
Source: Scraper
Receiver: West - Phase I

**Noise Source**

Noise Level (dBA) 84 at 50 feet

**Distances**

| | | | | | |
|---|---|---|---|---|---|
| Source Elevation | 830 | feet | at | 5 | feet above grade |
| Receiver Elevation: | 862 | feet | at | 5 | feet above grade |
| Source to Receiver Distance: | 650 | feet | | | |

**Path Calculation**

Source to Receiver Direct Path Distance: **651** feet

| | | | | |
|---|---|---|---|---|
| **Sound Pressure Level** | **61.7** | at | 651 | feet |
| Hours of Use: | **8** | | | |
| Duty Cycle (%): | **40** | | | |
| Level During 8 Hour day: | **57.7** | | | |

## Noise Attenuation by Distance Calculation

Job: Dabbs Project
Job #: A91106N1
Date: 12/1/2009
Source: Front Loader
Receiver: West - Phase I

**Noise Source**

Noise Level (dBA) 79 at 50 feet

**Distances**

Source Elevation 830 feet at 5 feet above grade
Receiver Elevation: 862 feet at 5 feet above grade
Source to Receiver Distance: 650 feet

**Path Calculation**

Source to Receiver Direct Path Distance: **651** feet

**Sound Pressure Level** **56.7** at 651 feet
Hours of Use: **8**
Duty Cycle (%): **40**
Level During 8 Hour day: **52.7**

## Noise Attenuation by Distance Calculation

Job: Dabbs Project
Job #: A91106N1
Date: 12/1/2009
Source: Dump Truck
Receiver: West - Phase I

**Noise Source**

Noise Level (dBA) 76 at 50 feet

**Distances**

Source Elevation 830 feet at 5 feet above grade
Receiver Elevation: 862 feet at 5 feet above grade
Source to Receiver Distance: 650 feet

**Path Calculation**

Source to Receiver Direct Path Distance: **651** feet

**Sound Pressure Level** **53.7** at 651 feet
Hours of Use: **8**
Duty Cycle (%): **40**
Level During 8 Hour day: **49.7**

## Noise Attenuation by Distance Calculation

Job: Dabbs Project
Job #: A91106N1
Date: 12/1/2009
Source: Backhoe
Receiver: West - Phase I

**Noise Source**

Noise Level (dBA) 78 at 50 feet

**Distances**

Source Elevation 830 feet at 5 feet above grade
Receiver Elevation: 862 feet at 5 feet above grade
Source to Receiver Distance: 650 feet

**Path Calculation**

Source to Receiver Direct Path Distance: **651** feet

**Sound Pressure Level** 55.7 at 651 feet
Hours of Use: **8**
Duty Cycle (%): **40**
Level During 8 Hour day: **51.7**

## Noise Attenuation by Distance Calculation

Job: Dabbs Project
Job #: A91106N1
Date: 12/1/2009
Source: Paver
Receiver: North - Phase II

**Noise Source**

Noise Level (dBA) 77 at 50 feet

**Distances**

Source Elevation 830 feet at 5 feet above grade
Receiver Elevation: 890 feet at 5 feet above grade
Source to Receiver Distance: 650 feet

**Path Calculation**

Source to Receiver Direct Path Distance: **653** feet

**Sound Pressure Level** **54.7** at 653 feet
Hours of Use: **8**
Duty Cycle (%): **50**
Level During 8 Hour day: **51.7**

**Summation**

Number of Sources: 4

Level during 8 hour day: **58.0**

## Noise Attenuation by Distance Calculation

Job: Dabbs Project
Job #: A91106N1
Date: 12/1/2009
Source: Concrete Mixer
Receiver: North - Phase II

**Noise Source**

Noise Level (dBA) 79 at 50 feet

**Distances**

Source Elevation 830 feet at 5 feet above grade
Receiver Elevation: 890 feet at 5 feet above grade
Source to Receiver Distance: 650 feet

**Path Calculation**

Source to Receiver Direct Path Distance: **653** feet

**Sound Pressure Level** **56.7** at 653 feet
Hours of Use: **8**
Duty Cycle (%): **40**
Level During 8 Hour day: **52.7**

## Noise Attenuation by Distance Calculation

Job: Dabbs Project
Job #: A91106N1
Date: 12/1/2009
Source: Concrete Pump
Receiver: North - Phase II

**Noise Source**

| | | | | |
|---|---|---|---|---|
| Noise Level (dBA) | 81 | at | 50 | feet |

**Distances**

| | | | | | |
|---|---|---|---|---|---|
| Source Elevation | 830 | feet | at | 5 | feet above grade |
| Receiver Elevation: | 890 | feet | at | 5 | feet above grade |
| Source to Receiver Distance: | 650 | feet | | | |

**Path Calculation**

| | | |
|---|---|---|
| Source to Receiver Direct Path Distance: | **653** | feet |

| | | | | |
|---|---|---|---|---|
| **Sound Pressure Level** | **58.7** | at | 653 | feet |
| Hours of Use: | **8** | | | |
| Duty Cycle (%): | **20** | | | |
| Level During 8 Hour day: | **51.7** | | | |

## Noise Attenuation by Distance Calculation

Job: Dabbs Project
Job #: A91106N1
Date: 12/1/2009
Source: Backhoe
Receiver: North - Phase II

**Noise Source**

Noise Level (dBA) 78 at 50 feet

**Distances**

Source Elevation 830 feet at 5 feet above grade
Receiver Elevation: 890 feet at 5 feet above grade
Source to Receiver Distance: 650 feet

**Path Calculation**

Source to Receiver Direct Path Distance: **653** feet

**Sound Pressure Level** **55.7** at 653 feet
Hours of Use: **8**
Duty Cycle (%): **40**
Level During 8 Hour day: **51.7**

## Noise Attenuation by Distance Calculation

Job: Dabbs Project
Job #: A91106N1
Date: 12/1/2009
Source: Paver
Receiver: South - Phase II

**Noise Source**

Noise Level (dBA) 77 at 50 feet

**Distances**

Source Elevation 830 feet at 5 feet above grade
Receiver Elevation: 785 feet at 5 feet above grade
Source to Receiver Distance: 534 feet

**Path Calculation**

Source to Receiver Direct Path Distance: **536** feet

**Sound Pressure Level** **56.4** at 536 feet
Hours of Use: **8**
Duty Cycle (%): **50**
Level During 8 Hour day: **53.4**

**Summation**

Number of Sources: 4

Level during 8 hour day: **59.7**

## Noise Attenuation by Distance Calculation

Job: Dabbs Project
Job #: A91106N1
Date: 12/1/2009
Source: Concrete Mixer
Receiver: South - Phase II

**Noise Source**

Noise Level (dBA) 79 at 50 feet

**Distances**

Source Elevation 830 feet at 5 feet above grade
Receiver Elevation: 785 feet at 5 feet above grade
Source to Receiver Distance: 534 feet

**Path Calculation**

Source to Receiver Direct Path Distance: **536** feet

**Sound Pressure Level** **58.4** at 536 feet
Hours of Use: **8**
Duty Cycle (%): **40**
Level During 8 Hour day: **54.4**

## Noise Attenuation by Distance Calculation

Job: Dabbs Project
Job #: A91106N1
Date: 12/1/2009
Source: Concrete Pump
Receiver: South - Phase II

**Noise Source**

| | | | | |
|---|---|---|---|---|
| Noise Level (dBA) | 81 | at | 50 | feet |

**Distances**

| | | | | | |
|---|---|---|---|---|---|
| Source Elevation | 830 | feet | at | 5 | feet above grade |
| Receiver Elevation: | 785 | feet | at | 5 | feet above grade |
| Source to Receiver Distance: | 534 | feet | | | |

**Path Calculation**

| | | |
|---|---|---|
| Source to Receiver Direct Path Distance: | **536** | feet |

| | | | | |
|---|---|---|---|---|
| **Sound Pressure Level** | **60.4** | at | 536 | feet |
| Hours of Use: | **8** | | | |
| Duty Cycle (%): | **20** | | | |
| Level During 8 Hour day: | **53.4** | | | |

## Noise Attenuation by Distance Calculation

Job: Dabbs Project
Job #: A91106N1
Date: 12/1/2009
Source: Backhoe
Receiver: South - Phase II

**Noise Source**

Noise Level (dBA) 78 at 50 feet

**Distances**

Source Elevation 830 feet at 5 feet above grade
Receiver Elevation: 785 feet at 5 feet above grade
Source to Receiver Distance: 534 feet

**Path Calculation**

Source to Receiver Direct Path Distance: **536** feet

**Sound Pressure Level** **57.4** at 536 feet
Hours of Use: **8**
Duty Cycle (%): **40**
Level During 8 Hour day: **53.4**

## Noise Attenuation by Distance Calculation

Job: Dabbs Project
Job #: A91106N1
Date: 12/1/2009
Source: Paver
Receiver: East - Phase II

**Noise Source**

Noise Level (dBA) 77 at 50 feet

**Distances**

Source Elevation 830 feet at 5 feet above grade
Receiver Elevation: 864 feet at 5 feet above grade
Source to Receiver Distance: 683 feet

**Path Calculation**

Source to Receiver Direct Path Distance: **684** feet

**Sound Pressure Level** **54.3** at 684 feet
Hours of Use: **8**
Duty Cycle (%): **50**
Level During 8 Hour day: **51.3**

**Summation**

Number of Sources: 4

Level during 8 hour day: **57.6**

## Noise Attenuation by Distance Calculation

Job: Dabbs Project
Job #: A91106N1
Date: 12/1/2009
Source: Concrete Mixer
Receiver: East - Phase II

**Noise Source**

Noise Level (dBA) 79 at 50 feet

**Distances**

Source Elevation 830 feet at 5 feet above grade
Receiver Elevation: 864 feet at 5 feet above grade
Source to Receiver Distance: 683 feet

**Path Calculation**

Source to Receiver Direct Path Distance: **684** feet

**Sound Pressure Level** **56.3** at 684 feet
Hours of Use: **8**
Duty Cycle (%): **40**
Level During 8 Hour day: **52.3**

## Noise Attenuation by Distance Calculation

Job: Dabbs Project
Job #: A91106N1
Date: 12/1/2009
Source: Concrete Pump
Receiver: East - Phase II

**Noise Source**

| | | | | |
|---|---|---|---|---|
| Noise Level (dBA) | 81 | at | 50 | feet |

**Distances**

| | | | | | |
|---|---|---|---|---|---|
| Source Elevation | 830 | feet | at | 5 | feet above grade |
| Receiver Elevation: | 864 | feet | at | 5 | feet above grade |
| Source to Receiver Distance: | 683 | feet | | | |

**Path Calculation**

| | | |
|---|---|---|
| Source to Receiver Direct Path Distance: | **684** | feet |

| | | | | |
|---|---|---|---|---|
| **Sound Pressure Level** | **58.3** | at | 684 | feet |
| Hours of Use: | **8** | | | |
| Duty Cycle (%): | **20** | | | |
| Level During 8 Hour day: | **51.3** | | | |

## Noise Attenuation by Distance Calculation

Job: Dabbs Project
Job #: A91106N1
Date: 12/1/2009
Source: Backhoe
Receiver: East - Phase II

**Noise Source**

Noise Level (dBA) 78 at 50 feet

**Distances**

Source Elevation 830 feet at 5 feet above grade
Receiver Elevation: 864 feet at 5 feet above grade
Source to Receiver Distance: 683 feet

**Path Calculation**

Source to Receiver Direct Path Distance: **684** feet

**Sound Pressure Level** **55.3** at 684 feet
Hours of Use: **8**
Duty Cycle (%): **40**
Level During 8 Hour day: **51.3**

## Noise Attenuation by Distance Calculation

Job: Dabbs Project
Job #: A91106N1
Date: 12/1/2009
Source: Paver
Receiver: West - Phase II

**Noise Source**

Noise Level (dBA) 77 at 50 feet

**Distances**

Source Elevation 830 feet at 5 feet above grade
Receiver Elevation: 862 feet at 5 feet above grade
Source to Receiver Distance: 650 feet

**Path Calculation**

Source to Receiver Direct Path Distance: **651** feet

**Sound Pressure Level** **54.7** at 651 feet
Hours of Use: **8**
Duty Cycle (%): **50**
Level During 8 Hour day: **51.7**

**Summation**

Number of Sources: 4

Level during 8 hour day: **58.0**

## Noise Attenuation by Distance Calculation

Job: Dabbs Project
Job #: A91106N1
Date: 12/1/2009
Source: Concrete Mixer
Receiver: West - Phase II

**Noise Source**

Noise Level (dBA) 79 at 50 feet

**Distances**

Source Elevation 830 feet at 5 feet above grade
Receiver Elevation: 862 feet at 5 feet above grade
Source to Receiver Distance: 650 feet

**Path Calculation**

Source to Receiver Direct Path Distance: **651** feet

**Sound Pressure Level** **56.7** at 651 feet
Hours of Use: **8**
Duty Cycle (%): **40**
Level During 8 Hour day: **52.7**

## Noise Attenuation by Distance Calculation

Job: Dabbs Project
Job #: A91106N1
Date: 12/1/2009
Source: Concrete Pump
Receiver: West - Phase II

**Noise Source**

Noise Level (dBA) 81 at 50 feet

**Distances**

| | | | | | |
|---|---|---|---|---|---|
| Source Elevation | 830 | feet | at | 5 | feet above grade |
| Receiver Elevation: | 862 | feet | at | 5 | feet above grade |
| Source to Receiver Distance: | 650 | feet | | | |

**Path Calculation**

Source to Receiver Direct Path Distance: **651** feet

| | | | | |
|---|---|---|---|---|
| **Sound Pressure Level** | **58.7** | at | 651 | feet |
| Hours of Use: | **8** | | | |
| Duty Cycle (%): | **20** | | | |
| Level During 8 Hour day: | **51.7** | | | |

## Noise Attenuation by Distance Calculation

Job: Dabbs Project
Job #: A91106N1
Date: 12/1/2009
Source: Backhoe
Receiver: West - Phase II

**Noise Source**

Noise Level (dBA) 78 at 50 feet

**Distances**

| | | | | | |
|---|---|---|---|---|---|
| Source Elevation | 830 | feet | at | 5 | feet above grade |
| Receiver Elevation: | 862 | feet | at | 5 | feet above grade |
| Source to Receiver Distance: | 650 | feet | | | |

**Path Calculation**

Source to Receiver Direct Path Distance: **651** feet

| | | | | |
|---|---|---|---|---|
| **Sound Pressure Level** | **55.7** | at | 651 | feet |
| Hours of Use: | **8** | | | |
| Duty Cycle (%): | **40** | | | |
| Level During 8 Hour day: | **51.7** | | | |

## Noise Attenuation by Distance Calculation

Job: Dabbs Project
Job #: A91106N1
Date: 12/1/2009
Source: Dozer
Receiver: North - Phase III

**Noise Source**

Noise Level (dBA) 82 at 50 feet

**Distances**

Source Elevation 878 feet at 5 feet above grade
Receiver Elevation: 898 feet at 5 feet above grade
Source to Receiver Distance: 170 feet

**Path Calculation**

Source to Receiver Direct Path Distance: **171** feet

**Sound Pressure Level** **71.3** at 171 feet
Hours of Use: **8**
Duty Cycle (%): **40**
Level During 8 Hour day: **67.3**

**Summation**

Number of Sources: 4

Level during 8 hour day: **70.4**

## Noise Attenuation by Distance Calculation

Job: Dabbs Project
Job #: A91106N1
Date: 12/1/2009
Source: Dump Truck
Receiver: North - Phase III

**Noise Source**

Noise Level (dBA) 76 at 50 feet

**Distances**

Source Elevation 878 feet at 5 feet above grade
Receiver Elevation: 898 feet at 5 feet above grade
Source to Receiver Distance: 170 feet

**Path Calculation**

Source to Receiver Direct Path Distance: **171** feet

**Sound Pressure Level** **65.3** at 171 feet
Hours of Use: **8**
Duty Cycle (%): **40**
Level During 8 Hour day: **61.3**

## Noise Attenuation by Distance Calculation

Job: Dabbs Project
Job #: A91106N1
Date: 12/1/2009
Source: Paver
Receiver: North - Phase III

**Noise Source**

Noise Level (dBA) 77 at 50 feet

**Distances**

| | | | | | |
|---|---|---|---|---|---|
| Source Elevation | 878 | feet | at | 5 | feet above grade |
| Receiver Elevation: | 898 | feet | at | 5 | feet above grade |
| Source to Receiver Distance: | 170 | feet | | | |

**Path Calculation**

Source to Receiver Direct Path Distance: **171** feet

| | | | | |
|---|---|---|---|---|
| **Sound Pressure Level** | **66.3** | at | 171 | feet |
| Hours of Use: | **8** | | | |
| Duty Cycle (%): | **50** | | | |
| Level During 8 Hour day: | **63.3** | | | |

## Noise Attenuation by Distance Calculation

Job: Dabbs Project
Job #: A91106N1
Date: 12/1/2009
Source: Dozer
Receiver: South - Phase III

**Noise Source**

Noise Level (dBA) 82 at 50 feet

**Distances**

Source Elevation 822 feet at 5 feet above grade
Receiver Elevation: 814 feet at 5 feet above grade
Source to Receiver Distance: 130 feet

**Path Calculation**

Source to Receiver Direct Path Distance: **130** feet

**Sound Pressure Level** **73.7** at 130 feet
Hours of Use: **8**
Duty Cycle (%): **40**
Level During 8 Hour day: **69.7**

**Summation**

Number of Sources: 4

Level during 8 hour day: **72.8**

## Noise Attenuation by Distance Calculation

Job: Dabbs Project
Job #: A91106N1
Date: 12/1/2009
Source: Backhoe
Receiver: South - Phase III

**Noise Source**

Noise Level (dBA) 78 at 50 feet

**Distances**

Source Elevation 822 feet at 5 feet above grade
Receiver Elevation: 814 feet at 5 feet above grade
Source to Receiver Distance: 130 feet

**Path Calculation**

Source to Receiver Direct Path Distance: **130** feet

**Sound Pressure Level** **69.7** at 130 feet
Hours of Use: **8**
Duty Cycle (%): **40**
Level During 8 Hour day: **65.7**

## Noise Attenuation by Distance Calculation

Job: Dabbs Project
Job #: A91106N1
Date: 12/1/2009
Source: Dump Truck
Receiver: South - Phase III

**Noise Source**

Noise Level (dBA) 76 at 50 feet

**Distances**

| | | | | | |
|---|---|---|---|---|---|
| Source Elevation | 822 | feet | at | 5 | feet above grade |
| Receiver Elevation: | 814 | feet | at | 5 | feet above grade |
| Source to Receiver Distance: | 130 | feet | | | |

**Path Calculation**

Source to Receiver Direct Path Distance: **130** feet

| | | | | |
|---|---|---|---|---|
| **Sound Pressure Level** | **67.7** | at | 130 | feet |
| Hours of Use: | **8** | | | |
| Duty Cycle (%): | **40** | | | |
| Level During 8 Hour day: | **63.7** | | | |

## Noise Attenuation by Distance Calculation

Job: Dabbs Project
Job #: A91106N1
Date: 12/1/2009
Source: Dozer
Receiver: East - Phase III

**Noise Source**

Noise Level (dBA) 82 at 50 feet

**Distances**

Source Elevation 850 feet at 5 feet above grade
Receiver Elevation: 846 feet at 5 feet above grade
Source to Receiver Distance: 200 feet

**Path Calculation**

Source to Receiver Direct Path Distance: **200** feet

**Sound Pressure Level** **70.0** at 200 feet
Hours of Use: **8**
Duty Cycle (%): **40**
Level During 8 Hour day: **66.0**

**Summation**

Number of Sources: 4

Level during 8 hour day: **69.1**

## Noise Attenuation by Distance Calculation

Job: Dabbs Project
Job #: A91106N1
Date: 12/1/2009
Source: Backhoe
Receiver: East - Phase III

**Noise Source**

Noise Level (dBA) 78 at 50 feet

**Distances**

Source Elevation 850 feet at 5 feet above grade
Receiver Elevation: 846 feet at 5 feet above grade
Source to Receiver Distance: 200 feet

**Path Calculation**

Source to Receiver Direct Path Distance: **200** feet

**Sound Pressure Level** **66.0** at 200 feet
Hours of Use: **8**
Duty Cycle (%): **40**
Level During 8 Hour day: **62.0**

## Noise Attenuation by Distance Calculation

Job: Dabbs Project
Job #: A91106N1
Date: 12/1/2009
Source: Dump Truck
Receiver: East - Phase III

**Noise Source**

| | | | | |
|---|---|---|---|---|
| Noise Level (dBA) | 76 | at | 50 | feet |

**Distances**

| | | | | | |
|---|---|---|---|---|---|
| Source Elevation | 850 | feet | at | 5 | feet above grade |
| Receiver Elevation: | 846 | feet | at | 5 | feet above grade |
| Source to Receiver Distance: | 200 | feet | | | |

**Path Calculation**

| | | |
|---|---|---|
| Source to Receiver Direct Path Distance: | **200** | feet |

| | | | | |
|---|---|---|---|---|
| **Sound Pressure Level** | **64.0** | at | 200 | feet |
| Hours of Use: | **8** | | | |
| Duty Cycle (%): | **40** | | | |
| Level During 8 Hour day: | **60.0** | | | |

## Noise Attenuation by Distance Calculation

Job: Dabbs Project
Job #: A91106N1
Date: 12/1/2009
Source: Paver
Receiver: East - Phase III

**Noise Source**

Noise Level (dBA) 77 at 50 feet

**Distances**

| | | | | | |
|---|---|---|---|---|---|
| Source Elevation | 850 | feet | at | 5 | feet above grade |
| Receiver Elevation: | 846 | feet | at | 5 | feet above grade |
| Source to Receiver Distance: | 200 | feet | | | |

**Path Calculation**

Source to Receiver Direct Path Distance: **200** feet

| | | | | |
|---|---|---|---|---|
| **Sound Pressure Level** | **65.0** | at | 200 | feet |
| Hours of Use: | **8** | | | |
| Duty Cycle (%): | **50** | | | |
| Level During 8 Hour day: | **61.9** | | | |

## Noise Attenuation by Distance Calculation

Job: Dabbs Project
Job #: A91106N1
Date: 12/1/2009
Source: Dozer
Receiver: West - Phase III

**Noise Source**

Noise Level (dBA) 82 at 50 feet

**Distances**

Source Elevation 812 feet at 5 feet above grade
Receiver Elevation: 850 feet at 5 feet above grade
Source to Receiver Distance: 270 feet

**Path Calculation**

Source to Receiver Direct Path Distance: **273** feet

**Sound Pressure Level** **67.3** at 273 feet
Hours of Use: **8**
Duty Cycle (%): **40**
Level During 8 Hour day: **63.3**

**Summation**

Number of Sources: 4

Level during 8 hour day: **66.4**

## Noise Attenuation by Distance Calculation

Job: Dabbs Project
Job #: A91106N1
Date: 12/1/2009
Source: Paver
Receiver: West - Phase III

**Noise Source**

Noise Level (dBA) 77 at 50 feet

**Distances**

| | | | | | |
|---|---|---|---|---|---|
| Source Elevation | 812 | feet | at | 5 | feet above grade |
| Receiver Elevation: | 850 | feet | at | 5 | feet above grade |
| Source to Receiver Distance: | 270 | feet | | | |

**Path Calculation**

Source to Receiver Direct Path Distance: **273** feet

| | | | | |
|---|---|---|---|---|
| **Sound Pressure Level** | **62.3** | at | 273 | feet |
| Hours of Use: | **8** | | | |
| Duty Cycle (%): | **50** | | | |
| Level During 8 Hour day: | **59.3** | | | |