ACOUSTICAL SITE ASSESSMENT
RAMONA 10-LOT SUBDIVISON – RAMONA, CA

Submitted to:

Mr. Chuck Wilson
H&W Custom Builders
14511 Olde Highway 80
El Cajon, CA 92021

Prepared by:

Investigative Science and Engineering, Inc.
Scientific, Environmental, and Forensic Consultants

16486 Bernardo Center Drive, Suite 278
San Diego, California 92128
(858) 451-3505
www.ise.us

ISE Project #07-022

October 4, 2007 (Revised)

INTRODUCTION AND DEFINITIONS

Existing Site Characterization

The project site consists of approximately 2.06 acres located within the unincorporated town of Ramona within the County of San Diego, California. Currently, the proposed site resides as mostly undisturbed open space. The project is located approximately south of State Route 78 (SR 78) as can be seen in Figure 1 below.

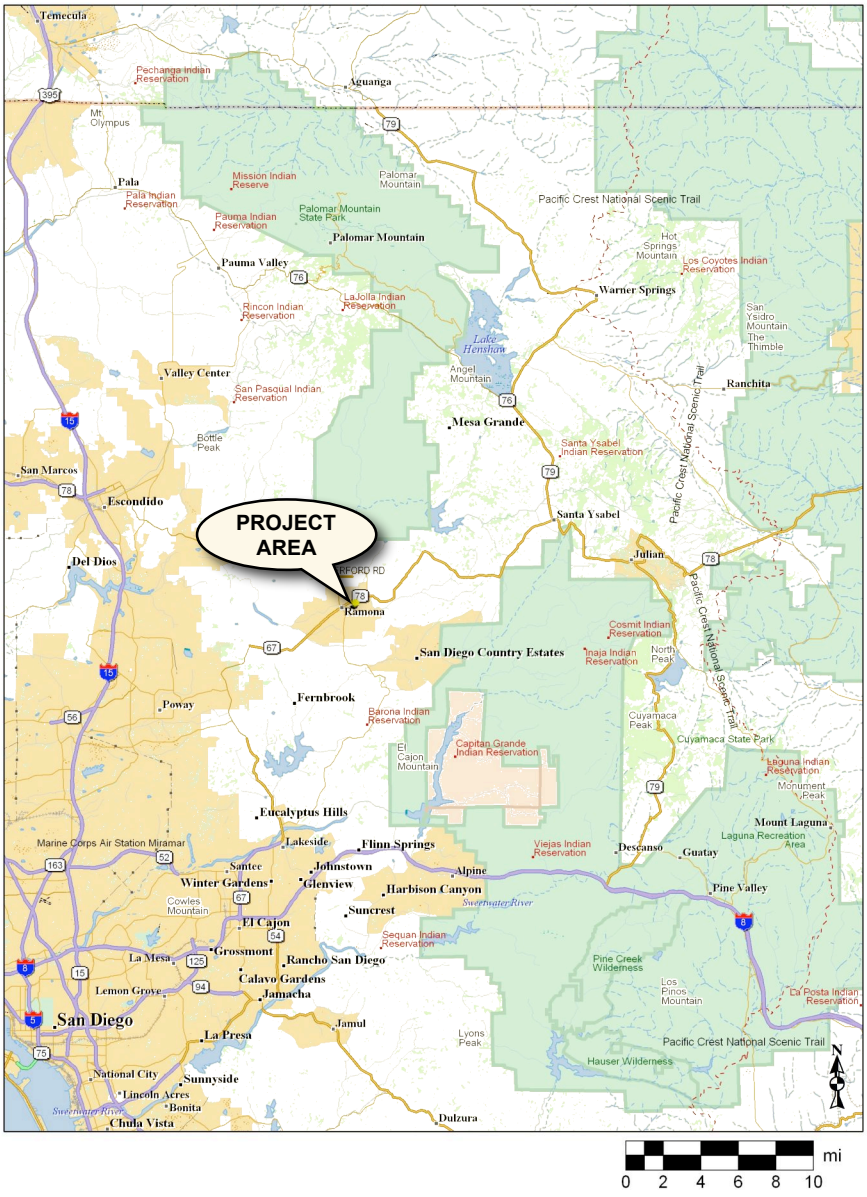

FIGURE 1: Project Vicinity Map – Ramona 10-Lot Subdivision (ISE 5/07)

Project Description

The proposed development plan calls for the subdivision of a 2.06-acre lot into 10 individual lots ranging from 6,400 to 7,288 square feet. Third Street provides regional access to the project area via State Route 78 (SR 78) to the north as can be seen in Figure 2 below. Elevations on the entire property range from approximately 1,475 to 1,495 feet above mean sea level (MSL). The proposed project zoning will be RS-7 single family residential. The proposed site development plan can be seen in Figure 3 on the following page.

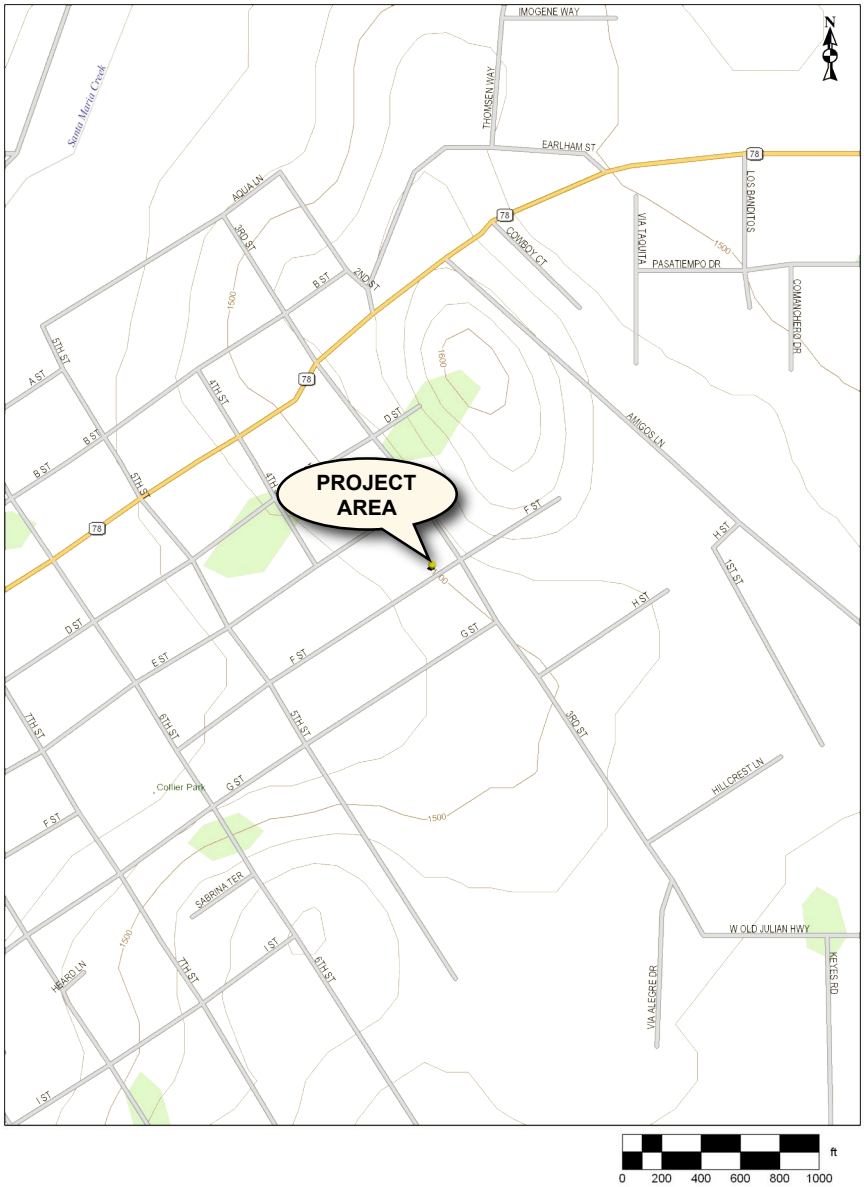

FIGURE 2: Project Site Location Map – Ramona 10-Lot Subdivision (ISE 5/07)

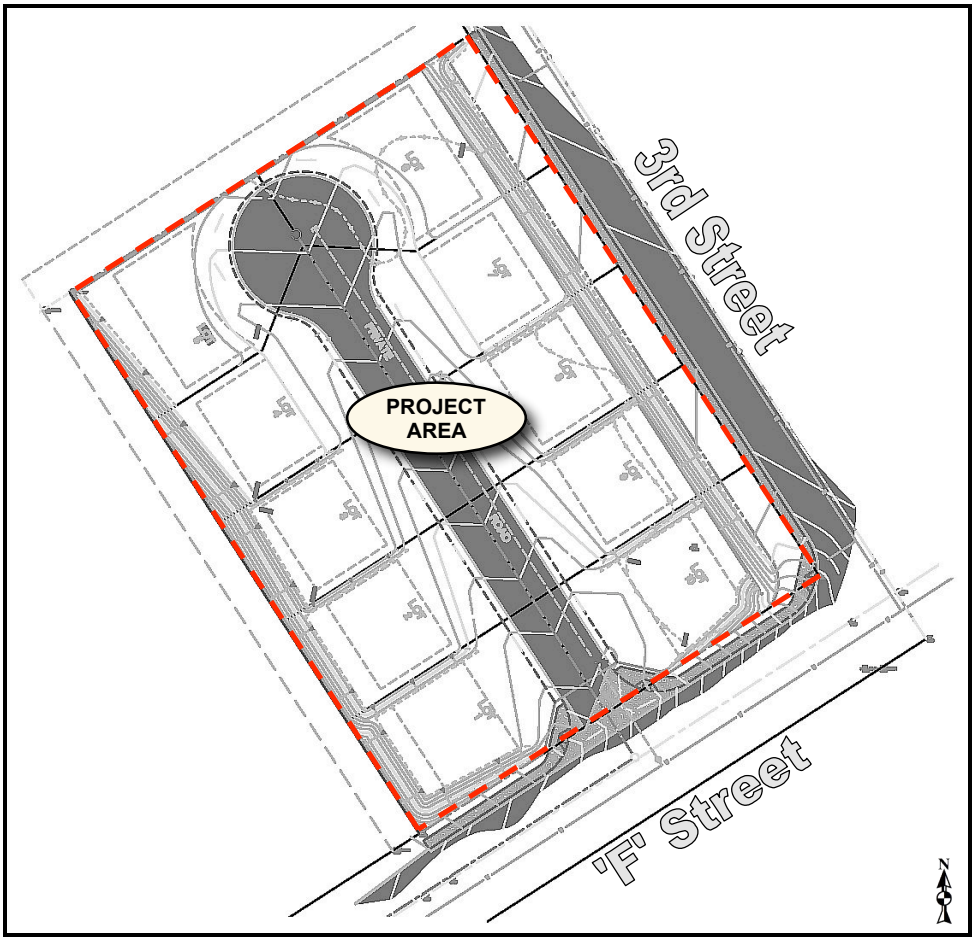

FIGURE 3: Proposed Site Plan – Ramona 10-Lot Subdivision (Snipes-Dye Associates 1/07)

Acoustical Definitions

Sound waves are linear mechanical waves. They can be propagated in solids, liquids, and gases. The material transmitting such a wave oscillates in the direction of propagation of the wave itself. Sound waves originate from some sort of vibrating surface. Whether this surface is the vibrating string of a violin or a person's vocal cords, a vibrating column of air from an organ or clarinet, or a vibrating panel from a loudspeaker, drum, or aircraft, the sound waves generated are all similar. All of these vibrating elements alternatively compress the surrounding air on a forward movement and expand it on a backward movement.

There is a large range of frequencies within which linear waves can be generated, sound waves being confined to the frequency range that can stimulate the auditory organs to the sensation of hearing. For humans this range is from about 20 Hertz (Hz or cycles per second) to about 20,000 Hz. The air transmits these frequency disturbances outward from the source of the wave. Sound waves, if unimpeded, will

spread out in all directions from a source. Upon entering the auditory organs, these waves produce the sensation of sound. Waveforms that are approximately periodic or consist of a small number of periodic components can give rise to a pleasant sensation (assuming the intensity is not too high), for example, as in a musical composition.

Noise, on the other hand, can be represented as a superposition of periodic waves with a large number of components and is generally defined as unwanted or annoying sound that is typically associated with human activity and which interferes with or disrupts normal activities. Although exposure to high noise levels has been demonstrated to cause hearing loss, the principal human response to environmental noise is annoyance. The response of individuals to similar noise events is diverse and influenced by the type of noise, the perceived importance of the noise and its appropriateness in the setting, the time of day, and the sensitivity of the individual hearing the sound.

Airborne sound is a rapid fluctuation of air pressure above and below atmospheric levels. The loudest sounds that the human ear can hear comfortably are approximately one trillion (or $1x10^{12}$) times the acoustic energy that the ear can barely detect. Because of this vast range, any attempt to represent the acoustic intensity of a particular sound on a linear scale becomes unwieldy. As a result, a logarithmic ratio originally conceived for radio work known as the decibel (dB) is commonly employed[1].

A sound level of zero “0” dB is scaled such that it is defined as the threshold of human hearing and would be barely audible to a human of normal hearing under extremely quiet listening conditions. Such conditions can only be generated in anechoic or “dead rooms”. Typically, the quietest environmental conditions (extreme rural areas with extensive shielding) yield sound levels of approximately 20 decibels. Normal speech has a sound level of approximately 60 dB. Sound levels above 120 dB roughly correspond to the threshold of pain.

The minimum change in sound level that the human ear can detect is approximately 3.0 dBA[2]. A change in sound level of 10 dB is usually perceived by the average person as a doubling (or halving) of the sounds loudness[3]. A change in sound level of 10 dB actually represents an approximate 90 percent change in the sound intensity, but only about a 50 percent change in the perceived loudness. This is due to the nonlinear response of the human ear to sound.

As mentioned above, most of the sounds we hear in the environment do not consist of a single frequency, but rather a broad band of frequencies differing in sound level. The intensities of each frequency add to generate the sound we hear. The method commonly used to quantify environmental sounds consists of determining all of the

[1] A unit used to express the intensity of a sound wave. This level is defined as being equal to 20 times the common logarithm of the ratio of the pressure produced by a sound wave of interest to a ‘reference’ pressure wave (which is defined as 1 micro Pascal measured at a distance of 1 meter).

[2] Every 3 dB equates to a 50% of drop (or increase) in wave strength, therefore a 6 dB drop/increase = a loss/increase of 75% of total signal strength and so on.

[3] This is a subjective reference based upon the nonlinear nature of the human ear.

frequencies of a sound according to a weighting system that reflects the nonlinear response characteristics of the human ear. This is called "A" weighting, and the decibel level measured is called the A-weighted sound level (or dBA). In practice, the level of a noise source is conveniently measured using a sound level meter that includes a filter corresponding to the dBA curve.

Although the A-weighted sound level may adequately indicate the level of environmental noise at any instant in time, community noise levels vary continuously. Most environmental noise includes a conglomeration of sounds from distant sources that create a relatively steady background noise in which no particular source is identifiable. For this type of noise, a single descriptor called the Leq (or equivalent sound level) is used. Leq is the energy-mean A-weighted sound level during a measured time interval. It is the 'equivalent' constant sound level that would have to be produced by a given source to equal the average of the fluctuating level measured. For most acoustical studies, the monitoring interval is generally taken as one-hour and is abbreviated *Leq-h*.

To describe the time-varying character of environmental noise, the statistical noise descriptors L10, L50, and L90 are commonly used. They are the noise levels equaled or exceeded during 10 percent, 50 percent, and 90 percent of a stated time. Sound levels associated with the L10 typically describe transient or short-term events, while levels associated with the L90 describe the steady state (or most prevalent) noise conditions. In addition, it is often desirable to know the acoustic range of the noise source being measured. This is accomplished through the maximum and minimum measured sound level (Lmax and Lmin) indicators. The Lmin value obtained for a particular monitoring location is often called the *acoustic floor* for that location.

Finally, another sound measure employed by the State of California and the County of San Diego is known as the Community Noise Equivalence Level (CNEL) is defined as the "A" weighted average sound level for a 24-hour day. It is calculated by adding a 5-decibel penalty to sound levels in the evening (7:00 p.m. to 10:00 p.m.), and a 10-decibel penalty to sound levels in the night (10:00 p.m. to 7:00 a.m.) to compensate for the increased sensitivity to noise during the quieter evening and nighttime hours.

APPLICABLE SIGNIFICANCE CRITERIA

Ramona Community Plan Noise Guidelines

The Ramona Community Plan allocates residential land use designations in a range of densities from 24 dwelling units per acre down to one unit per acre and one unit per two acres. Properties on one acre or Single-family residential development will not be permitted in areas that have close proximity to airports or major roads, where projected noise levels are greater than 55 dBA {CNEL}, without adequate mitigation measures.

Vehicular/Transportation Noise Impact Thresholds

Transportation noise levels, such as those produced by vehicles traveling to and from the project site, would typically be governed under Policy 4b of the *County of San Diego's Noise Element of the County's General Plan (as revised 7/06)*. The relevant sections of the Noise Element are cited below:

> Because exterior community noise equivalent levels (CNEL) above 60 decibels and/or interior CNEL above 45 decibels may have an adverse effect on public health and welfare, it is the policy of the County of San Diego that:
>
> 1. Whenever it appears that new *development* may result in any (existing or future) *noise sensitive land use* being subject to noise levels of CNEL equal to 60 *decibels (A)* or greater, an acoustical analysis shall be required.
> 2. If the acoustical analysis shows that noise levels at any *noise sensitive land use* will exceed CNEL equal to 60 decibels, modifications shall be made to the *development* which reduce the *exterior noise* level to less than CNEL of 60 *decibels (A)* and the *interior noise* level to less than CNEL of 45 *decibels (A)*[4].
> 3. If modifications are not made to the *development* in accordance with paragraph 2 above, the *development* shall not be approved unless a finding is made that there are specifically identified overriding social or economic considerations which warrant approval of the development without such modification; provided, however, if the acoustical study shows that sound levels for any noise sensitive land use will exceed a CNEL equal to 75 *decibels (A) even* with such modifications, the *development* shall not be approved irrespective of such social or economic considerations.
>
> Definitions, Notes and Exceptions
>
> *"Decibels (A)"* refers to A-weighted sound levels as noted on Page VIII-2 within the Element.
>
> *"Development"* means any physical development including but not limited to residences, commercial, or industrial facilities, roads, civic buildings, hospitals, schools, airports, or similar facilities.
>
> "*Exterior noise*":
>
> (a) For single family detached dwelling projects, "exterior noise" means noise measured at an outdoor living area which adjoins and is on the same lot as the dwelling, and which contains at least the following minimum area:
>
> (i) Net lot area up to 4,000 sq. ft.: 400 square feet.
> (ii) Net lot area 4,000 sq. ft. to 10 ac.: 10% of net lot area.

[4] **Action Program 4b1:** Recommend programs to soundproof buildings or redevelop areas where it is impossible to reduce existing source noise to acceptable levels.

Action Program 4b2: Study the feasibility of extending the application of Section 1092, California Administrative Code dealing with noise insulation standards to single-family dwellings, and incorporating higher standards for reduction of exterior noise intrusion into structures.

Action Program 4b3: Require present and projected noise level data to be included in Environmental Impact Reports. Designs to mitigate adverse noise impacts shall also be used.

(iii) Net lot area over 10 ac.: 1 ac.

(b) For all other projects, "exterior noise" means noise measured at all exterior areas, which are provided for group or private usable, *open space* purposes.

(c) For County road construction projects, the exterior noise level due to vehicular traffic impacting a noise sensitive area should not exceed the following values:

(i) Federally funded projects: The Noise standard contained in applicable Federal Highway Administration Standards.

(ii) Other projects: 60 *decibels (A),* except if the existing or projected noise level without the project is 58 decibels (*A*) or greater, a 3 *decibel* (*A*) increase is allowed, up to the maximum permitted by Federal Highway Administration Standards.

"Group or Private Usable Open Space" shall mean: Usable open space intended for common use by occupants of a development, either privately owned and maintained or dedicated to a public agency, normally including swimming pools, recreation courts, patios, open landscaped areas, and greenbelts with pedestrian walkways and equestrian and bicycle trails, but not including off-street parking and loading areas or driveways (Group Usable Open Space); and usable open space intended for use of occupants of one dwelling unit, normally including yards, decks and balconies (Private Usable Open Space).

"Interior noise": The following exception shall apply: For rooms which are usually occupied only a part of the day (schools, libraries, or similar), the interior one-hour average sound level, due to noise outside, should not exceed 50 *decibels (A)*.

"Noise sensitive land use" means any residence, hospital, school, hotel, resort, library or any other facility where quiet is an important attribute of the environment.

State of California CCR Title 24

The California Code of Regulations (CCR), Title 24, Noise Insulation Standards, states that multi-family dwellings, hotels, and motels located where the CNEL exceeds 60 dBA, must obtain an acoustical analysis showing that the proposed design will limit interior noise to less than 45 dBA CNEL. Interior noise standards are typically applied to sensitive areas within the structure where low noise levels are desirable (such as living rooms, dining rooms, bedrooms, and dens or studies).

Worst-case noise levels, either existing or future, must be used for this determination. Future noise levels must be predicted at least ten years from the time of building permit application. The County of San Diego has adopted the CCR Title 24 standards and applies them within Policy 4b as identified above. Thus, for the purposes of analysis, the applicable exterior noise design threshold is 55 dBA CNEL. The applicable interior noise standard is 45 dBA CNEL.

ANALYSIS METHODOLOGY

Existing Conditions Field Survey

A Quest Model 2900 ANSI Type 2 integrating sound level meter was used as the data collection device. The meter was mounted to a tripod five-feet above ground level in order to simulate the noise exposure of an average-height human being. Two short-term sound level measurements were taken on the proposed site as described below.

The first meter location (denoted as ML 1) was positioned in the southern portion of the project site roughly 50 feet northwest of 'F' Street. The second meter location (ML 2) was in the north portion of the site roughly 50 feet southwest of 3rd Street. Both locations are shown pictorially in Figure 4 below. The monitoring was performed in this manner to obtain an estimate of the worst-case existing onsite noise during normal daytime traffic conditions.

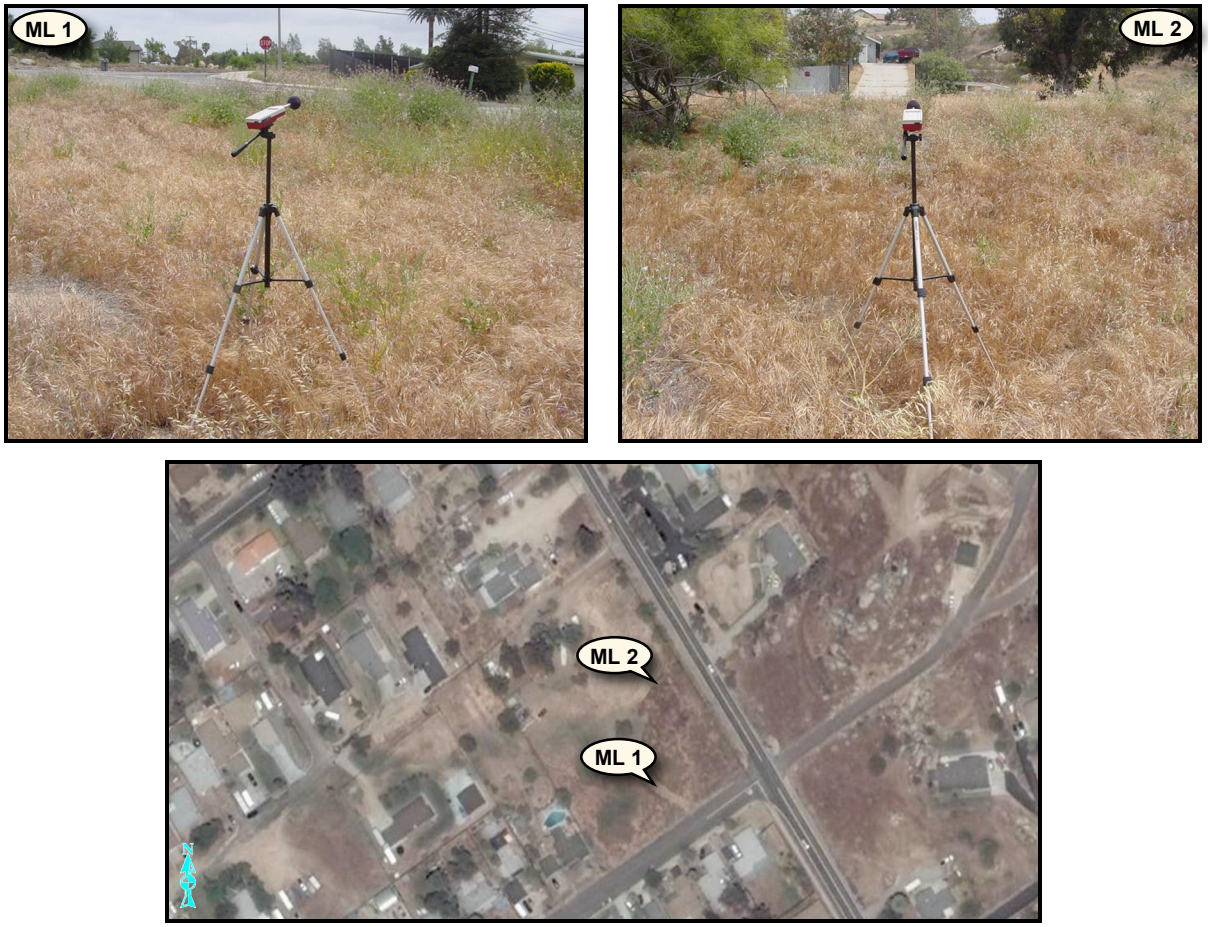

FIGURE 4: Ambient Monitoring Locations – Ramona 10-Lot Subdivision (ISE 5/07)

The measurements were performed on May 4, 2007. The monitoring site was spatially logged using a geographic positioning system (GPS) in order to maintain horizontal and vertical control. All equipment was calibrated before testing at ISE's acoustics and vibration laboratory to verify conformance with ANSI S1-4 1983 Type 2 and IEC 651 Type 2 standards.

Traffic Noise Impact Assessment Approach

The *Traffic Noise Model version 2.5* (TNM 2.5) based on FHWA-PD-96-010 and FHWA/CA/TL-87/03 standards was used to calculate future onsite vehicular traffic noise levels.[5] Currently TNM 2.5 is the only noise-modeling program accepted by Caltrans for use within the State of California.

Receptor elevations were considered five feet above the appropriate floor (pad) elevation and were taken near the building façades of each lot. Second floor receptor areas were modeled at 15 feet above the respective pad elevation. The receptor locations can be seen in Figure 5 on the following page. Input to the acoustical model consisted of the following:

- A digitized representation of all affected roadways (i.e., 3rd Street).
- Future Average Daily Trips (ADTs) for nearby major roadways.[6]
- A 94/4/2 (automobiles/medium/heavy) traffic mix in accordance with CALTRANS.
- A peak hour traffic percentage of 10% of the ADT.[7]
- Receptor and topographic elevations as identified in the project site plans.[8]
- A composite pavement type consisting of an average of Portland Cement Concrete (PCC) and Dense-Graded Asphaltic Concrete (DGAC) in accordance with TNM 2.5 test results (1998).

FINDINGS / RECOMMENDATIONS

Ambient Sound Measurement Results

Testing conditions during the monitoring period were sunny with an average barometric pressure reading of 30.01 in-Hg, an average westerly wind speed of 1 to 3 miles per hour (MPH) and an approximate mean temperature of 72 degrees Fahrenheit. The results of one-hour sound level monitoring are shown in Table 1 on the following page. The values for the energy equivalent sound level (Leq), the maximum and minimum measured sound levels (Lmax and Lmin), and the statistical indicators L10, L50, and L90, are given for each monitoring location.

[5] The TNM components are supported by a scientifically founded and experimentally calibrated acoustic computation methodology. The database is made up of over 6,000 individual pass-by events measured at forty sites across the country.

[6] Source: *SANDAG Series 10 – 2030 Enhanced Traffic Prediction Model*.

[7] For values between approximately 8 and 12 percent, the energy-mean A-weighted sound level is equivalent to the CNEL. Outside this range, a maximum variance of up to two dBA occurs between Leq-h and CNEL.

[8] Source: Snipes-Dye Associates – 5/07.

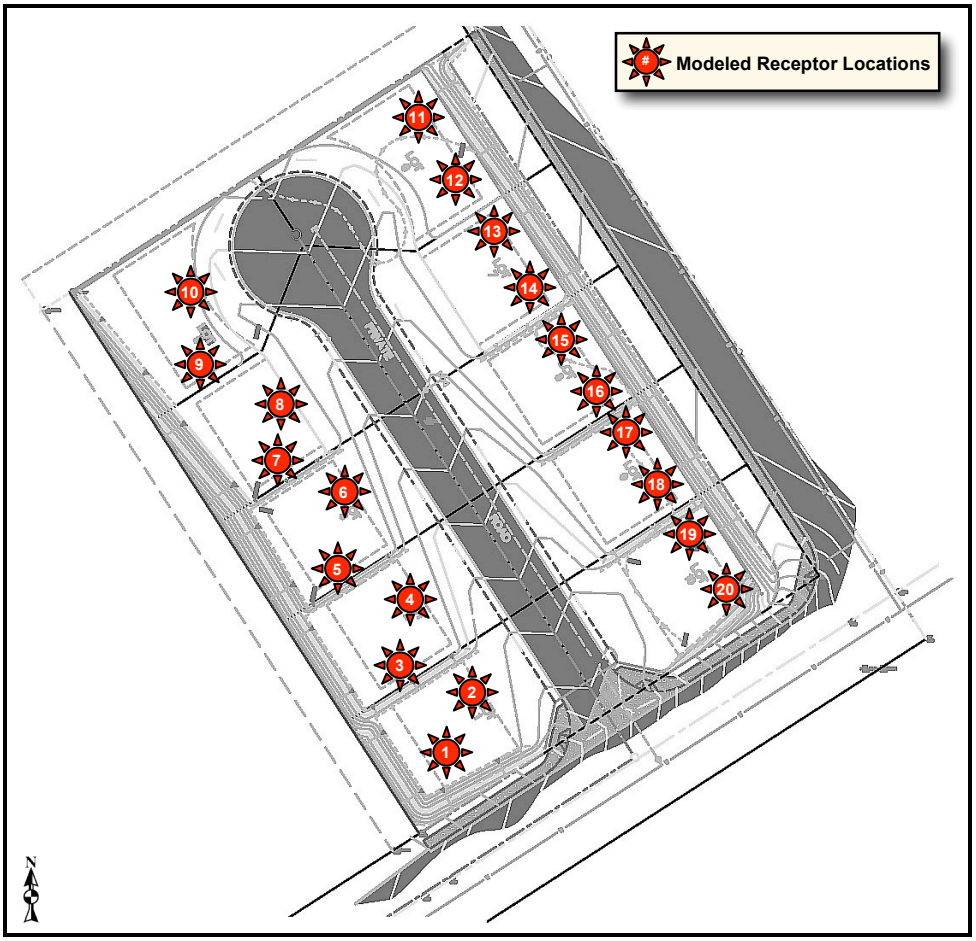

FIGURE 5: Modeled Receptor Locations for Ramona 10-Lot Subdivision (ISE 5/07)

TABLE 1: Measured Ambient Sound Levels – Ramona 10-Lot Subdivision

		1-Hour Noise Level Descriptors in dBA					
Site	**Start Time**	**Leq**	**Lmax**	**Lmin**	**L10**	**L50**	**L90**
ML 1	1:00 p.m.	55.1	66.2	42.0	60.4	49.5	45.0
ML 2	2:00 p.m.	54.6	68.8	43.1	58.6	48.6	44.7

Monitoring Location:

- ML 1: South portion of project site facing 'F' Street.
  GPS: 33°02.726'N x 116°51.357'W, EPE 10 ft.
- ML 2: North portion of project site facing 3rd Street.
  GPS: 33°02.747'N x 116°51.361'W, EPE 10 ft.

Measurements performed by ISE on May 4. EPE = Estimated Position Error.

Measurements collected at the monitoring locations ML 1 and ML 2 reflect the typical sound levels associated with the community setting with existing adjacent major roadway activities. The hourly average sound levels (or Leq-h) recorded over the monitoring period was 55.1 dBA at ML 1, and 54.6 dBA at ML 2 and was observed to be predominately due to surface street traffic.

As indicated by the monitoring equipment, at least 90 percent of the time (L90) the onsite sound levels at ML 1 and ML 2 were approximately 45.0 and 44.7 dBA, respectively (again indicating the relative infrequency of traffic along 3rd and 'F' Streets). The acoustic floor for the site, as seen by the Lmin indicator was found to be 42.0 dBA at ML 1 and 43.1 dBA at ML 2. This would be considered the lowest attainable sound levels for the project area near 3rd Street.

Future Traffic Noise Impacts

The primary source of future traffic noise near the project site would be from 3rd Street. Future traffic estimates for this roadway predict volumes as high as 10,000 ADT.[9] The future speed limits along this roadway are projected to be 55 MPH for automobiles, medium sized vehicles, and heavy sized vehicles. Peak hour traffic values are calculated for a 10% traffic flow pattern and a 94/4/2 (automobiles/medium/heavy vehicles) percent mix in accordance with Caltrans traffic forecasting practices and the observed traffic distribution.[10]

The results of the acoustical modeling for the selected lots are shown below in Table 2. The table output provides the unmitigated and mitigated first- and second-floor sound levels. All unit facades, which exceed the 55 dBA contour level, can be identified by the bold **red** text. Additionally, the undeveloped future 60 dBA CNEL noise contours for the project site can be seen in Figure 6 following this table.

TABLE 2: Predicted Transportation Noise Levels – Ramona 10-Lot Subdivision

Modeled Receptor No.	Corresponding Lot #	Unmitigated 1st Floor Sound Levels	Mitigated 1st Floor Sound Levels	Mitigated 2nd Floor Sound Levels
1	1	**57.3**	55.4	56.1
2	1	**57.5**	55.4	56.1
3	2	**57.1**	54.3	55.6
4	2	**57.7**	54.4	56.0
5	3	**57.3**	53.7	55.6
6	3	**57.7**	53.7	56.0
7	4	**57.2**	53.4	55.3
8	4	**57.5**	53.3	55.6
9	5	**56.6**	52.8	54.7
10	5	**56.7**	52.8	54.8
11	6	**58.7**	52.2	62.8

[9] Source: *SANDAG Series 10 - 2030 Traffic Volume Forecast.*

[10] For peak hour traffic percentages between approximately 8 and 12 percent, the energy-mean A-weighted sound level is equivalent to the Community Noise Equivalent Level (CNEL). Outside this range, a maximum variance of up to two dBA occurs between Leq-h and CNEL.

TABLE 2 (cont.): Predicted Transportation Noise Levels – Ramona 10-Lot Subdivision

Modeled Receptor No.	Corresponding Lot #	Unmitigated 1st Floor Sound Levels	Mitigated 1st Floor Sound Levels	Mitigated 2nd Floor Sound Levels
12	6	59.9	53.1	64.6
13	7	59.4	53.0	63.5
14	7	60.1	53.4	64.1
15	8	58.2	53.0	62.2
16	8	58.8	53.4	63.6
17	9	57.3	53.1	60.6
18	9	58.5	53.8	62.2
19	10	56.6	53.6	59.1
20	10	57.2	54.7	61.2

All levels given in dBA CNEL.

Based on the model results, the 60 dBA CNEL contour would vary from 55 to 75 feet from the centerline of 'F' Street and 98 to 183 feet from the centerline of 3rd Street from first and second floor respectively.

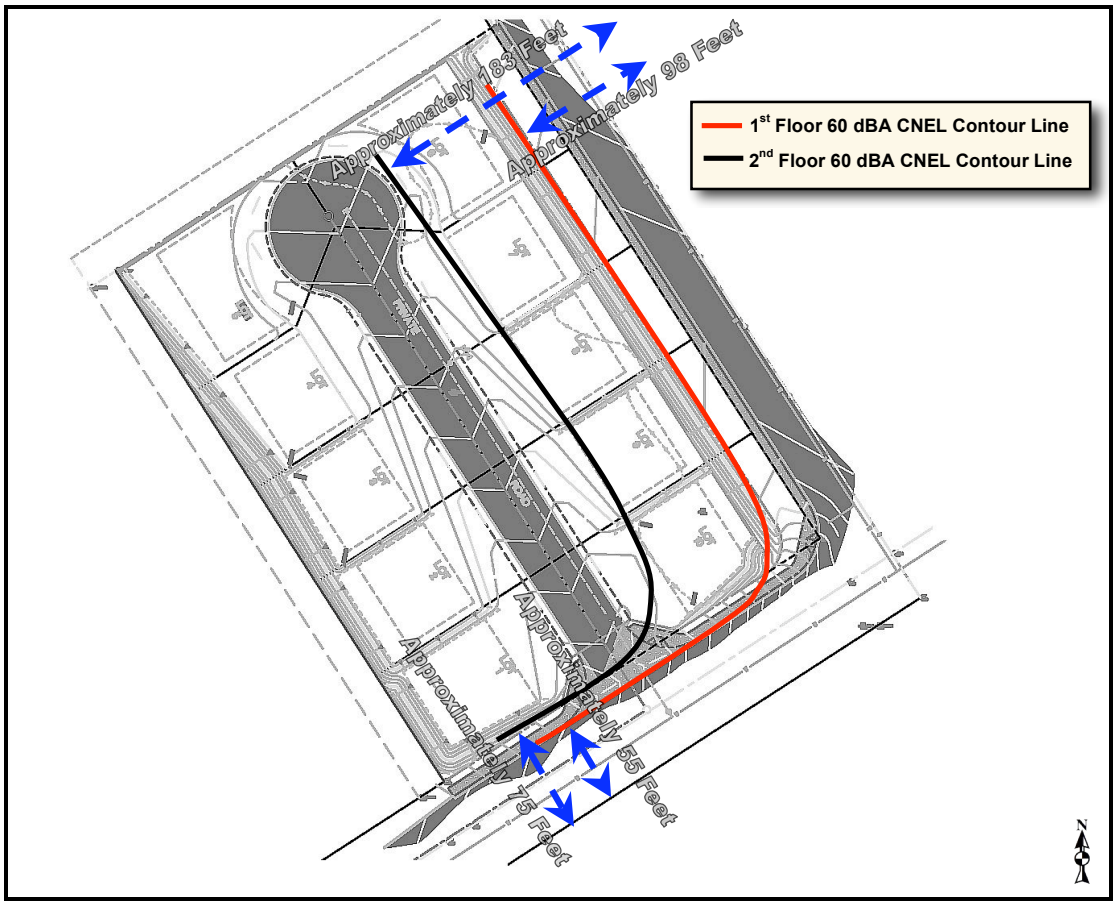

FIGURE 6: Unobstructed 60 dBA CNEL Contour from 3rd and 'F' Streets (ISE 5/07)

A proposed mitigation plan consisting of a four-foot-high wall was examined and found to be adequate to mitigate noise levels under the Community of Ramona noise thresholds. The recommended placement of this wall is shown below in Figure 7. The wall or earth-berm/wall combination should be approximately 330 feet long and should run along the proposed top-of-slope of the northeastern end of the proposed pad. The wall should be of solid construction (i.e., such as block or glass or a combination).

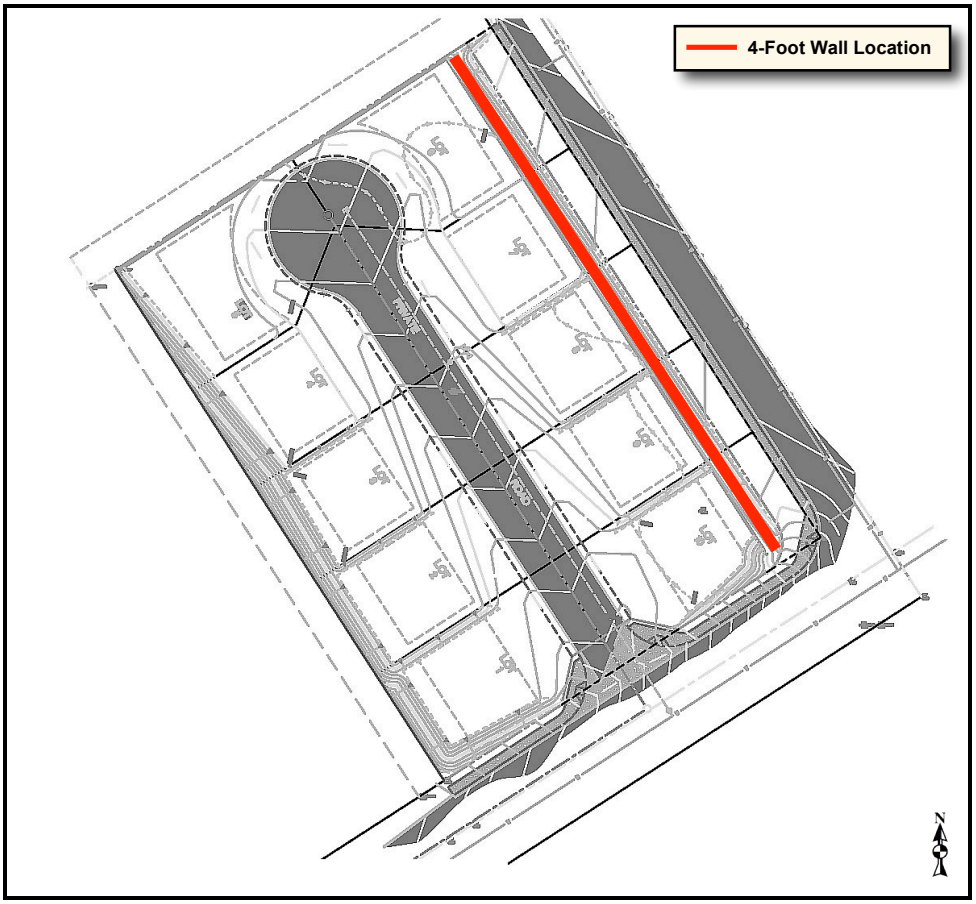

FIGURE 7: Proposed Mitigation Plan – Ramona 10-Lot Subdivision (ISE 5/07)

It should also be noted that some lots within the proposed development would exceed the 60 dBA CNEL noise abatement standard identified under CCR Title 24. Thus, prior to the issuance of building permits for the proposed project, an interior noise analysis compliant with the California Code of Regulations (CCR), Title 24, Noise Insulation Standards should be performed for all affected residential structures identified above. The acoustical analysis should demonstrate that the proposed architectural designs would limit interior noise to 45 dBA CNEL or less.

CERTIFICATION OF ACCURACY AND QUALIFICATIONS

This report was prepared by Investigative Science and Engineering, Inc. (ISE) located at 16486 Bernardo Center Drive, Suite 278, San Diego, CA 92128. The members of its professional staff contributing to the report are listed below:

Rick Tavares *(rtavares@ise.us)*	B.S. Aerospace Engineering / Engineering Mechanics M.S. Mechanical Engineering M.S. Structural Engineering Ph.D. Civil Engineering
Andre Estrada *(aestrada@ise.us)*	B.S. Mechanical Engineering

ISE affirms to the best of its knowledge and belief that the statements and information contained herein are in all respects true and correct as of the date of this report. Should the reader have any questions regarding the findings and conclusions presented in this report, please do not hesitate to contact ISE at (858) 451-3505.

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Approved as to Form and Content:

Rick Tavares, Ph.D.
Project Principal
Investigative Science and Engineering, Inc.

Attachments to this report: TNM 2.5 Model Input/Output Decks

ISE
Case van Genuchten

4 October 2007
TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS

PROJECT/CONTRACT: 07-022 10 Lot Subdivision
RUN: 1st Floor Unmitigated
BARRIER DESIGN: INPUT HEIGHTS
ATMOSPHERICS: 68 deg F, 50% RH

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h		Increase over existing		With Barrier Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Noise Reduction Goal	Noise Reduction Calculated minus Goal
				Calculated	Crit'n	Calculated	Crit'n Sub'l Inc					
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
Lot 1 A	1	1	0.0	57.3	55	57.3	10	Snd Lvl	57.3	0.0	8	-8.0
Lot 1 B	2	1	0.0	57.5	55	57.5	10	Snd Lvl	57.5	0.0	8	-8.0
Lot 2 A	3	1	0.0	57.1	55	57.1	10	Snd Lvl	57.1	0.0	8	-8.0
Lot 2 B	4	1	0.0	57.7	55	57.7	10	Snd Lvl	57.7	0.0	8	-8.0
Lot 3 A	5	1	0.0	57.3	55	57.3	10	Snd Lvl	57.3	0.0	8	-8.0
Lot 3 B	6	1	0.0	57.7	55	57.7	10	Snd Lvl	57.7	0.0	8	-8.0
Lot 4 A	7	1	0.0	57.2	55	57.2	10	Snd Lvl	57.2	0.0	8	-8.0
Lot 4 B	8	1	0.0	57.5	55	57.5	10	Snd Lvl	57.5	0.0	8	-8.0
Lot 5 A	9	1	0.0	56.6	55	56.6	10	Snd Lvl	56.6	0.0	8	-8.0
Lot 5 B	10	1	0.0	56.7	55	56.7	10	Snd Lvl	56.7	0.0	8	-8.0
Lot 6 A	11	1	0.0	58.7	55	58.7	10	Snd Lvl	58.7	0.0	8	-8.0
Lot 6 B	12	1	0.0	59.9	55	59.9	10	Snd Lvl	59.9	0.0	8	-8.0
Lot 7 A	13	1	0.0	59.4	55	59.4	10	Snd Lvl	59.4	0.0	8	-8.0
Lot 7 B	14	1	0.0	60.1	55	60.1	10	Snd Lvl	60.1	0.0	8	-8.0
Lot 8 A	15	1	0.0	58.2	55	58.2	10	Snd Lvl	58.2	0.0	8	-8.0
Lot 8 B	16	1	0.0	58.8	55	58.8	10	Snd Lvl	58.8	0.0	8	-8.0
Lot 9 A	17	1	0.0	57.3	55	57.3	10	Snd Lvl	57.3	0.0	8	-8.0
Lot 9 B	18	1	0.0	58.5	55	58.5	10	Snd Lvl	58.5	0.0	8	-8.0
Lot 10 A	19	1	0.0	56.6	55	56.6	10	Snd Lvl	56.6	0.0	8	-8.0
Lot 10 B	20	1	0.0	57.2	55	57.2	10	Snd Lvl	57.2	0.0	8	-8.0

Dwelling Units	# DUs	Noise Reduction Min	Noise Reduction Avg	Noise Reduction Max
		dB	dB	dB

ISE 4 October 2007
Case van Genuchten TNM 2.5

INPUT: TRAFFIC FOR LAeq1h Volumes
PROJECT/CONTRACT: 07-022 10 Lot Subdivision
RUN: 1st Floor Unmitigated

Roadway	Points		Segment									
Name	Name	No.	Autos		MTrucks		HTrucks		Buses		Motorcycles	
			V	S	V	S	V	S	V	S	V	S
			veh/hr	mph	veh/hr	mph	veh/hr	mph	veh/hr	mph	veh/hr	mph
F Street Westbound	point5	5	94	25	4	25	2	25	0	0	0	0
	point4	4	94	25	4	25	2	25	0	0	0	0
	point3	3	94	25	4	25	2	25	0	0	0	0
	point2	2	94	25	4	25	2	25	0	0	0	0
	point1	1										
3rd Street Southbound 2	point6	6	235	55	10	55	5	55	0	0	0	0
	point7	7	235	55	10	55	5	55	0	0	0	0
	point8	8	235	55	10	55	5	55	0	0	0	0
	point9	9										
F Street Eastbound	point10	10	94	25	4	25	2	25	0	0	0	0
	point11	11	94	25	4	25	2	25	0	0	0	0
	point12	12	94	25	4	25	2	25	0	0	0	0
	point13	13	94	25	4	25	2	25	0	0	0	0
	point14	14										
3rd Street Southbound 1	point18	18	235	55	10	55	5	55	0	0	0	0
	point17	17	235	55	10	55	5	55	0	0	0	0
	point16	16	235	55	10	55	5	55	0	0	0	0
	point15	15										
3rd Street Northbound 1	point19	19	235	55	10	55	5	55	0	0	0	0
	point20	20	235	55	10	55	5	55	0	0	0	0
	point21	21	235	55	10	55	5	55	0	0	0	0
	point22	22										
3rd Street Northbound 2	point23	23	235	55	10	55	5	55	0	0	0	0

	point24	24	235	55	10	55	5	55	0	0	0	0
	point25	25	235	55	10	55	5	55	0	0	0	0
	point26	26										

ISE			**4 October 2007**	
Case van Genuchten			**TNM 2.5**	
INPUT: TERRAIN LINES				
PROJECT/CONTRACT:	**07-022 10 Lot Subdivision**			
RUN:	**1st Floor Unmitigated**			
Terrain Line	**Points**			
Name	**No.**	**Coordinates (ground)**		
		X	**Y**	**Z**
		ft	ft	ft
Lot Terrain	1	260.0	529.0	1,495.00
	2	315.0	443.0	1,494.00
	3	386.0	332.0	1,492.00
	4	434.0	259.0	1,490.00
	5	424.0	229.0	1,484.00
	6	383.0	198.0	1,476.00
	7	314.0	158.0	1,478.00
	8	295.0	157.0	1,478.00
	9	248.0	132.0	1,478.00
	10	220.0	173.0	1,481.00
	11	215.0	180.0	1,481.00
	12	182.0	231.0	1,483.00
	13	183.0	236.0	1,483.00
	14	151.0	289.0	1,485.00
	15	153.0	293.0	1,485.00
	16	98.0	364.0	1,485.00
	17	62.0	402.0	1,486.00

ISE 4 October 2007
Case van Genuchten TNM 2.5

INPUT: ROADWAYS
PROJECT/CONTRACT: 07-022 10 Lot Subdivision
RUN: 1st Floor Unmitigated

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with the approval of FHWA

Roadway		Points					Flow Control			Segment	
Name	Width	Name	No.	Coordinates (pavement) X	Y	Z	Control Device	Speed Constraint	Percent Vehicles Affected	Pvmt Type	On Struct?
	ft			ft	ft	ft		mph	%		
F Street Westbound	12.0	point5	5	518.0	242.0	1,491.00				Average	
		point4	4	454.0	201.0	1,485.00				Average	
		point3	3	407.0	170.0	1,480.00				Average	
		point2	2	338.0	126.0	1,475.00				Average	
		point1	1	243.0	65.0	1,470.00					
3rd Street Southbound 2	12.0	point6	6	301.0	575.0	1,495.00				Average	
		point7	7	387.0	444.0	1,492.00				Average	
		point8	8	465.0	323.0	1,491.00				Average	
		point9	9	518.0	242.1	1,491.00					
F Street Eastbound	12.0	point10	10	243.0	50.0	1,470.00				Average	
		point11	11	338.0	111.0	1,475.00				Average	
		point12	12	407.0	155.0	1,480.00				Average	
		point13	13	454.0	186.0	1,485.00				Average	
		point14	14	535.8	237.9	1,491.00					
3rd Street Southbound 1	12.0	point18	18	535.9	238.0	1,491.00				Average	
		point17	17	480.0	323.0	1,491.00				Average	
		point16	16	403.0	444.0	1,492.00				Average	
		point15	15	316.0	575.0	1,495.00					
3rd Street Northbound 1	12.0	point19	19	551.0	238.0	1,491.00				Average	
		point20	20	495.0	323.0	1,491.00				Average	
		point21	21	418.0	444.0	1,492.00				Average	
		point22	22	331.0	575.0	1,495.00					
3rd Street Northbound 2	12.0	point23	23	566.0	238.0	1,491.00				Average	
		point24	24	510.0	323.0	1,491.00				Average	
		point25	25	433.0	444.0	1,492.00				Average	

		point26	26	346.0	575.0	1,495.00					

ISE 4 October 2007
Case van Genuchten TNM 2.5

INPUT: RECEIVERS
PROJECT/CONTRACT: 07-022 10 Lot Subdivision
RUN: 1st Floor Unmitigated

Receiver Name	No.	#DUs	Coordinates (ground) X	Y	Z	Height above Ground	Input Sound Levels and Criteria: Existing LAeq1h	Impact Criteria LAeq1h	Impact Criteria Sub'l	NR Goal	Active in Calc.
			ft	ft	ft	ft	dBA	dBA	dB	dB	
Lot 1 A	1	1	250.0	157.0	1,478.00	5.00	0.00	55	10.0	8.0	Y
Lot 1 B	2	1	260.0	184.0	1,478.00	5.00	0.00	55	10.0	8.0	Y
Lot 2 A	3	1	227.0	207.0	1,481.00	5.00	0.00	55	10.0	8.0	
Lot 2 B	4	1	241.6	230.8	1,481.00	5.00	0.00	55	10.0	8.0	
Lot 3 A	5	1	204.0	265.0	1,483.00	5.00	0.00	55	10.0	8.0	
Lot 3 B	6	1	210.0	289.0	1,483.00	5.00	0.00	55	10.0	8.0	
Lot 4 A	7	1	170.0	318.0	1,485.00	5.00	0.00	55	10.0	8.0	
Lot 4 B	8	1	172.0	344.0	1,485.00	5.00	0.00	55	10.0	8.0	
Lot 5 A	9	1	132.0	372.0	1,486.00	5.00	0.00	55	10.0	8.0	
Lot 5 B	10	1	130.0	396.0	1,486.00	5.00	0.00	55	10.0	8.0	
Lot 6 A	11	1	239.0	500.0	1,486.00	5.00	0.00	55	10.0	8.0	
Lot 6 B	12	1	266.0	461.0	1,486.00	5.00	0.00	55	10.0	8.0	
Lot 7 A	13	1	280.0	436.0	1,485.00	5.00	0.00	55	10.0	8.0	
Lot 7 B	14	1	295.0	408.0	1,485.00	5.00	0.00	55	10.0	8.0	
Lot 8 A	15	1	321.0	380.0	1,483.00	5.00	0.00	55	10.0	8.0	
Lot 8 B	16	1	339.0	352.0	1,483.00	5.00	0.00	55	10.0	8.0	
Lot 9 A	17	1	352.0	329.0	1,481.00	5.00	0.00	55	10.0	8.0	
Lot 9 B	18	1	373.0	297.0	1,481.00	5.00	0.00	55	10.0	8.0	
Lot 10 A	19	1	389.0	274.0	1,478.00	5.00	0.00	55	10.0	8.0	
Lot 10 B	20	1	406.0	248.0	1,478.00	5.00	0.00	55	10.0	8.0	

ISE				**4 October 2007**																
Case van Genuchten				**TNM 2.5**																
INPUT: BARRIERS																				
PROJECT/CONTRACT:	**07-022 10 Lot Subdivision**																			
RUN:	**1st Floor Unmitigated**																			
Barrier									**Points**											
Name	**Type**	**Height**		**If Wall**	**If Berm**			**Add'tnl**	**Name**	**No.**	**Coordinates (bottom)**			**Height**	**Segment**					
		Min	**Max**	**$ per**	**$ per**	**Top**	**Run:Rise**	**$ per**			**X**	**Y**	**Z**	**at**	**Seg Ht Perturbs**			**On**	**Important**	
				Unit	**Unit**	**Width**		**Unit**						**Point**	**Incre-**	**#Up**	**#Dn**	**Struct?**	**Reflec-**	
				Area	**Vol.**			**Length**							**ment**				**tions?**	
		ft	ft	$/sq ft	$/cu yd	ft	ft:ft	$/ft			ft	ft	ft	ft	ft					
Mitigation Wall	W	0.00	99.99	0.00				0.00	point3	3	260.0	529.0	1,495.00	0.00	0.00	0	0			
									point4	4	315.0	443.0	1,494.00	0.00	0.00	0	0			
									point5	5	386.0	332.0	1,492.00	0.00	0.00	0	0			
									point6	6	434.0	259.0	1,490.00	0.00	0.00	0	0			
									point7	7	424.0	229.0	1,484.00	0.00						

All Selected		20	0.0	0.0	0.0							
All Impacted		20	0.0	0.0	0.0							
All that meet NR Goal		0	0.0	0.0	0.0							

ISE
Case van Genuchten

4 October 2007
TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: 07-022 10 Lot Subdivision
RUN: 2nd Floor Mitigated
BARRIER DESIGN: INPUT HEIGHTS
ATMOSPHERICS: 68 deg F, 50% RH

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over existing Calculated	Increase over existing Crit'n Sub'l Inc	With Barrier Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Noise Reduction Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
Lot 1 A	1	1	0.0	56.1	55	56.1	10	Snd Lvl	56.1	0.0	8	-8.0
Lot 1 B	2	1	0.0	56.1	55	56.1	10	Snd Lvl	56.1	0.0	8	-8.0
Lot 2 A	3	1	0.0	55.6	55	55.6	10	Snd Lvl	55.6	0.0	8	-8.0
Lot 2 B	4	1	0.0	56.0	55	56.0	10	Snd Lvl	56.0	0.0	8	-8.0
Lot 3 A	5	1	0.0	55.6	55	55.6	10	Snd Lvl	55.6	0.0	8	-8.0
Lot 3 B	6	1	0.0	56.0	55	56.0	10	Snd Lvl	56.0	0.0	8	-8.0
Lot 4 A	7	1	0.0	55.3	55	55.3	10	Snd Lvl	55.3	0.0	8	-8.0
Lot 4 B	8	1	0.0	55.6	55	55.6	10	Snd Lvl	55.6	0.0	8	-8.0
Lot 5 A	9	1	0.0	54.7	55	54.7	10	----	54.7	0.0	8	-8.0
Lot 5 B	10	1	0.0	54.8	55	54.8	10	----	54.8	0.0	8	-8.0
Lot 6 A	11	1	0.0	62.8	55	62.8	10	Snd Lvl	62.8	0.0	8	-8.0
Lot 6 B	12	1	0.0	64.6	55	64.6	10	Snd Lvl	64.6	0.0	8	-8.0
Lot 7 A	13	1	0.0	63.5	55	63.5	10	Snd Lvl	63.5	0.0	8	-8.0
Lot 7 B	14	1	0.0	64.1	55	64.1	10	Snd Lvl	64.1	0.0	8	-8.0
Lot 8 A	15	1	0.0	62.2	55	62.2	10	Snd Lvl	62.2	0.0	8	-8.0
Lot 8 B	16	1	0.0	63.6	55	63.6	10	Snd Lvl	63.6	0.0	8	-8.0
Lot 9 A	17	1	0.0	60.6	55	60.6	10	Snd Lvl	60.6	0.0	8	-8.0
Lot 9 B	18	1	0.0	62.2	55	62.2	10	Snd Lvl	62.2	0.0	8	-8.0
Lot 10 A	19	1	0.0	59.1	55	59.1	10	Snd Lvl	59.1	0.0	8	-8.0
Lot 10 B	20	1	0.0	61.2	55	61.2	10	Snd Lvl	61.2	0.0	8	-8.0

Dwelling Units	# DUs	Noise Reduction Min	Noise Reduction Avg	Noise Reduction Max
		dB	dB	dB

ISE
Case van Genuchten

4 October 2007
TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: 07-022 10 Lot Subdivision
RUN: 1st Floor Mitigated
BARRIER DESIGN: INPUT HEIGHTS
ATMOSPHERICS: 68 deg F, 50% RH

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over existing Calculated	Increase over existing Crit'n Sub'l Inc	With Barrier Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Noise Reduction Goal	Noise Reduction Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
Lot 1 A	1	1	0.0	55.4	55	55.4	10	Snd Lvl	55.4	0.0	8	-8.0
Lot 1 B	2	1	0.0	55.4	55	55.4	10	Snd Lvl	55.4	0.0	8	-8.0
Lot 2 A	3	1	0.0	54.3	55	54.3	10	----	54.3	0.0	8	-8.0
Lot 2 B	4	1	0.0	54.4	55	54.4	10	----	54.4	0.0	8	-8.0
Lot 3 A	5	1	0.0	53.7	55	53.7	10	----	53.7	0.0	8	-8.0
Lot 3 B	6	1	0.0	53.7	55	53.7	10	----	53.7	0.0	8	-8.0
Lot 4 A	7	1	0.0	53.4	55	53.4	10	----	53.4	0.0	8	-8.0
Lot 4 B	8	1	0.0	53.3	55	53.3	10	----	53.3	0.0	8	-8.0
Lot 5 A	9	1	0.0	52.8	55	52.8	10	----	52.8	0.0	8	-8.0
Lot 5 B	10	1	0.0	52.8	55	52.8	10	----	52.8	0.0	8	-8.0
Lot 6 A	11	1	0.0	52.2	55	52.2	10	----	52.2	0.0	8	-8.0
Lot 6 B	12	1	0.0	53.1	55	53.1	10	----	53.1	0.0	8	-8.0
Lot 7 A	13	1	0.0	53.0	55	53.0	10	----	53.0	0.0	8	-8.0
Lot 7 B	14	1	0.0	53.4	55	53.4	10	----	53.4	0.0	8	-8.0
Lot 8 A	15	1	0.0	53.0	55	53.0	10	----	53.0	0.0	8	-8.0
Lot 8 B	16	1	0.0	53.4	55	53.4	10	----	53.4	0.0	8	-8.0
Lot 9 A	17	1	0.0	53.1	55	53.1	10	----	53.1	0.0	8	-8.0
Lot 9 B	18	1	0.0	53.8	55	53.8	10	----	53.8	0.0	8	-8.0
Lot 10 A	19	1	0.0	53.6	55	53.6	10	----	53.6	0.0	8	-8.0
Lot 10 B	20	1	0.0	54.7	55	54.7	10	----	54.7	0.0	8	-8.0

Dwelling Units	# DUs	Noise Reduction Min	Noise Reduction Avg	Noise Reduction Max
		dB	dB	dB

ISE 4 October 2007
Case van Genuchten TNM 2.5

INPUT: TRAFFIC FOR LAeq1h Volumes
PROJECT/CONTRACT: 07-022 10 Lot Subdivision
RUN: 1st Floor Mitigated

Roadway	Points		Segment									
Name	Name	No.	Autos		MTrucks		HTrucks		Buses		Motorcycles	
			V	S	V	S	V	S	V	S	V	S
			veh/hr	mph	veh/hr	mph	veh/hr	mph	veh/hr	mph	veh/hr	mph
F Street Westbound	point5	5	94	25	4	25	2	25	0	0	0	0
	point4	4	94	25	4	25	2	25	0	0	0	0
	point3	3	94	25	4	25	2	25	0	0	0	0
	point2	2	94	25	4	25	2	25	0	0	0	0
	point1	1										
3rd Street Southbound 2	point6	6	235	55	10	55	5	55	0	0	0	0
	point7	7	235	55	10	55	5	55	0	0	0	0
	point8	8	235	55	10	55	5	55	0	0	0	0
	point9	9										
F Street Eastbound	point10	10	94	25	4	25	2	25	0	0	0	0
	point11	11	94	25	4	25	2	25	0	0	0	0
	point12	12	94	25	4	25	2	25	0	0	0	0
	point13	13	94	25	4	25	2	25	0	0	0	0
	point14	14										
3rd Street Southbound 1	point18	18	235	55	10	55	5	55	0	0	0	0
	point17	17	235	55	10	55	5	55	0	0	0	0
	point16	16	235	55	10	55	5	55	0	0	0	0
	point15	15										
3rd Street Northbound 1	point19	19	235	55	10	55	5	55	0	0	0	0
	point20	20	235	55	10	55	5	55	0	0	0	0
	point21	21	235	55	10	55	5	55	0	0	0	0
	point22	22										
3rd Street Northbound 2	point23	23	235	55	10	55	5	55	0	0	0	0

	point24	24	235	55	10	55	5	55	0	0	0	0
	point25	25	235	55	10	55	5	55	0	0	0	0
	point26	26										

ISE			**4 October 2007**	
Case van Genuchten			**TNM 2.5**	
INPUT: TERRAIN LINES				
PROJECT/CONTRACT:	**07-022 10 Lot Subdivision**			
RUN:	**1st Floor Mitigated**			
Terrain Line	**Points**			
Name	**No.**	**Coordinates (ground)**		
		X	**Y**	**Z**
		ft	ft	ft
Lot Terrain	1	260.0	529.0	1,495.00
	2	315.0	443.0	1,494.00
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	15	153.0	293.0	1,485.00
	16	98.0	364.0	1,485.00
	17	62.0	402.0	1,486.00

ISE 4 October 2007
Case van Genuchten TNM 2.5

INPUT: ROADWAYS
PROJECT/CONTRACT: 07-022 10 Lot Subdivision
RUN: 1st Floor Mitigated

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with the approval of FHWA

Roadway		Points					Flow Control			Segment	
Name	Width	Name	No.	Coordinates (pavement) X	Y	Z	Control Device	Speed Constraint	Percent Vehicles Affected	Pvmt Type	On Struct?
	ft			ft	ft	ft		mph	%		
F Street Westbound	12.0	point5	5	518.0	242.0	1,491.00				Average	
		point4	4	454.0	201.0	1,485.00				Average	
		point3	3	407.0	170.0	1,480.00				Average	
		point2	2	338.0	126.0	1,475.00				Average	
		point1	1	243.0	65.0	1,470.00					
3rd Street Southbound 2	12.0	point6	6	301.0	575.0	1,495.00				Average	
		point7	7	387.0	444.0	1,492.00				Average	
		point8	8	465.0	323.0	1,491.00				Average	
		point9	9	518.0	242.1	1,491.00					
F Street Eastbound	12.0	point10	10	243.0	50.0	1,470.00				Average	
		point11	11	338.0	111.0	1,475.00				Average	
		point12	12	407.0	155.0	1,480.00				Average	
		point13	13	454.0	186.0	1,485.00				Average	
		point14	14	535.8	237.9	1,491.00					
3rd Street Southbound 1	12.0	point18	18	535.9	238.0	1,491.00				Average	
		point17	17	480.0	323.0	1,491.00				Average	
		point16	16	403.0	444.0	1,492.00				Average	
		point15	15	316.0	575.0	1,495.00					
3rd Street Northbound 1	12.0	point19	19	551.0	238.0	1,491.00				Average	
		point20	20	495.0	323.0	1,491.00				Average	
		point21	21	418.0	444.0	1,492.00				Average	
		point22	22	331.0	575.0	1,495.00					
3rd Street Northbound 2	12.0	point23	23	566.0	238.0	1,491.00				Average	
		point24	24	510.0	323.0	1,491.00				Average	
		point25	25	433.0	444.0	1,492.00				Average	

		point26	26	346.0	575.0	1,495.00					

ISE 4 October 2007
Case van Genuchten TNM 2.5

INPUT: RECEIVERS
PROJECT/CONTRACT: 07-022 10 Lot Subdivision
RUN: 1st Floor Mitigated

Receiver Name	No.	#DUs	Coordinates (ground) X	Y	Z	Height above Ground	Input Sound Levels and Criteria: Existing LAeq1h	Impact Criteria LAeq1h	Impact Criteria Sub'l	NR Goal	Active in Calc.
			ft	ft	ft	ft	dBA	dBA	dB	dB	
Lot 1 A	1	1	250.0	157.0	1,478.00	5.00	0.00	55	10.0	8.0	Y
Lot 1 B	2	1	260.0	184.0	1,478.00	5.00	0.00	55	10.0	8.0	Y
Lot 2 A	3	1	227.0	207.0	1,481.00	5.00	0.00	55	10.0	8.0	
Lot 2 B	4	1	241.6	230.8	1,481.00	5.00	0.00	55	10.0	8.0	
Lot 3 A	5	1	204.0	265.0	1,483.00	5.00	0.00	55	10.0	8.0	
Lot 3 B	6	1	210.0	289.0	1,483.00	5.00	0.00	55	10.0	8.0	
Lot 4 A	7	1	170.0	318.0	1,485.00	5.00	0.00	55	10.0	8.0	
Lot 4 B	8	1	172.0	344.0	1,485.00	5.00	0.00	55	10.0	8.0	
Lot 5 A	9	1	132.0	372.0	1,486.00	5.00	0.00	55	10.0	8.0	
Lot 5 B	10	1	130.0	396.0	1,486.00	5.00	0.00	55	10.0	8.0	
Lot 6 A	11	1	239.0	500.0	1,486.00	5.00	0.00	55	10.0	8.0	
Lot 6 B	12	1	266.0	461.0	1,486.00	5.00	0.00	55	10.0	8.0	
Lot 7 A	13	1	280.0	436.0	1,485.00	5.00	0.00	55	10.0	8.0	
Lot 7 B	14	1	295.0	408.0	1,485.00	5.00	0.00	55	10.0	8.0	
Lot 8 A	15	1	321.0	380.0	1,483.00	5.00	0.00	55	10.0	8.0	
Lot 8 B	16	1	339.0	352.0	1,483.00	5.00	0.00	55	10.0	8.0	
Lot 9 A	17	1	352.0	329.0	1,481.00	5.00	0.00	55	10.0	8.0	
Lot 9 B	18	1	373.0	297.0	1,481.00	5.00	0.00	55	10.0	8.0	
Lot 10 A	19	1	389.0	274.0	1,478.00	5.00	0.00	55	10.0	8.0	
Lot 10 B	20	1	406.0	248.0	1,478.00	5.00	0.00	55	10.0	8.0	

ISE				**4 October 2007**																
Case van Genuchten				**TNM 2.5**																
INPUT: BARRIERS																				
PROJECT/CONTRACT:	**07-022 10 Lot Subdivision**																			
RUN:	**1st Floor Mitigated**																			
Barrier									**Points**											
Name	**Type**	**Height**		**If Wall**	**If Berm**			**Add'tnl**	**Name**	**No.**	**Coordinates (bottom)**			**Height**	**Segment**					
		Min	**Max**	**$ per**	**$ per**	**Top**	**Run:Rise**	**$ per**			**X**	**Y**	**Z**	**at**	**Seg Ht Perturbs**			**On**	**Important**	
				Unit	**Unit**	**Width**		**Unit**						**Point**	**Incre-**	**#Up**	**#Dn**	**Struct?**	**Reflec-**	
				Area	**Vol.**			**Length**							**ment**				**tions?**	
		ft	ft	$/sq ft	$/cu yd	ft	ft:ft	$/ft			ft	ft	ft	ft	ft					
Mitigation Wall	W	0.00	99.99	0.00				0.00	point3	3	260.0	529.0	1,495.00	4.00	0.00	0	0			
									point4	4	315.0	443.0	1,494.00	4.00	0.00	0	0			
									point5	5	386.0	332.0	1,492.00	4.00	0.00	0	0			
									point6	6	434.0	259.0	1,490.00	4.00	0.00	0	0			
									point7	7	424.0	229.0	1,484.00	4.00						

All Selected		20	0.0	0.0	0.0							
All Impacted		2	0.0	0.0	0.0							
All that meet NR Goal		0	0.0	0.0	0.0							

ISE 4 October 2007
Case van Genuchten TNM 2.5

INPUT: TRAFFIC FOR LAeq1h Volumes
PROJECT/CONTRACT: 07-022 10 Lot Subdivision
RUN: 2nd Floor Mitigated

Roadway	Points		Segment									
Name	Name	No.	Autos		MTrucks		HTrucks		Buses		Motorcycles	
			V	S	V	S	V	S	V	S	V	S
			veh/hr	mph	veh/hr	mph	veh/hr	mph	veh/hr	mph	veh/hr	mph
F Street Westbound	point5	5	94	25	4	25	2	25	0	0	0	0
	point4	4	94	25	4	25	2	25	0	0	0	0
	point3	3	94	25	4	25	2	25	0	0	0	0
	point2	2	94	25	4	25	2	25	0	0	0	0
	point1	1										
3rd Street Southbound 2	point6	6	235	55	10	55	5	55	0	0	0	0
	point7	7	235	55	10	55	5	55	0	0	0	0
	point8	8	235	55	10	55	5	55	0	0	0	0
	point9	9										
F Street Eastbound	point10	10	94	25	4	25	2	25	0	0	0	0
	point11	11	94	25	4	25	2	25	0	0	0	0
	point12	12	94	25	4	25	2	25	0	0	0	0
	point13	13	94	25	4	25	2	25	0	0	0	0
	point14	14										
3rd Street Southbound 1	point18	18	235	55	10	55	5	55	0	0	0	0
	point17	17	235	55	10	55	5	55	0	0	0	0
	point16	16	235	55	10	55	5	55	0	0	0	0
	point15	15										
3rd Street Northbound 1	point19	19	235	55	10	55	5	55	0	0	0	0
	point20	20	235	55	10	55	5	55	0	0	0	0
	point21	21	235	55	10	55	5	55	0	0	0	0
	point22	22										
3rd Street Northbound 2	point23	23	235	55	10	55	5	55	0	0	0	0

	point24	24	235	55	10	55	5	55	0	0	0	0
	point25	25	235	55	10	55	5	55	0	0	0	0
	point26	26										

ISE			**4 October 2007**	
Case van Genuchten			**TNM 2.5**	
INPUT: TERRAIN LINES				
PROJECT/CONTRACT:	**07-022 10 Lot Subdivision**			
RUN:	**2nd Floor Mitigated**			
Terrain Line	**Points**			
Name	**No.**	**Coordinates (ground)**		
		X	**Y**	**Z**
		ft	ft	ft
Lot Terrain	1	260.0	529.0	1,495.00
	2	315.0	443.0	1,494.00
	3	386.0	332.0	1,492.00
	4	434.0	259.0	1,490.00
	5	424.0	229.0	1,484.00
	6	383.0	198.0	1,476.00
	7	314.0	158.0	1,478.00
	8	295.0	157.0	1,478.00
	9	248.0	132.0	1,478.00
	10	220.0	173.0	1,481.00
	11	215.0	180.0	1,481.00
	12	182.0	231.0	1,483.00
	13	183.0	236.0	1,483.00
	14	151.0	289.0	1,485.00
	15	153.0	293.0	1,485.00
	16	98.0	364.0	1,485.00
	17	62.0	402.0	1,486.00

ISE 4 October 2007
Case van Genuchten TNM 2.5

INPUT: ROADWAYS
PROJECT/CONTRACT: 07-022 10 Lot Subdivision
RUN: 2nd Floor Mitigated

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with the approval of FHWA

Roadway		Points					Flow Control			Segment	
Name	Width	Name	No.	Coordinates (pavement) X	Y	Z	Control Device	Speed Constraint	Percent Vehicles Affected	Pvmt Type	On Struct?
	ft			ft	ft	ft		mph	%		
F Street Westbound	12.0	point5	5	518.0	242.0	1,491.00				Average	
		point4	4	454.0	201.0	1,485.00				Average	
		point3	3	407.0	170.0	1,480.00				Average	
		point2	2	338.0	126.0	1,475.00				Average	
		point1	1	243.0	65.0	1,470.00					
3rd Street Southbound 2	12.0	point6	6	301.0	575.0	1,495.00				Average	
		point7	7	387.0	444.0	1,492.00				Average	
		point8	8	465.0	323.0	1,491.00				Average	
		point9	9	518.0	242.1	1,491.00					
F Street Eastbound	12.0	point10	10	243.0	50.0	1,470.00				Average	
		point11	11	338.0	111.0	1,475.00				Average	
		point12	12	407.0	155.0	1,480.00				Average	
		point13	13	454.0	186.0	1,485.00				Average	
		point14	14	535.8	237.9	1,491.00					
3rd Street Southbound 1	12.0	point18	18	535.9	238.0	1,491.00				Average	
		point17	17	480.0	323.0	1,491.00				Average	
		point16	16	403.0	444.0	1,492.00				Average	
		point15	15	316.0	575.0	1,495.00					
3rd Street Northbound 1	12.0	point19	19	551.0	238.0	1,491.00				Average	
		point20	20	495.0	323.0	1,491.00				Average	
		point21	21	418.0	444.0	1,492.00				Average	
		point22	22	331.0	575.0	1,495.00					
3rd Street Northbound 2	12.0	point23	23	566.0	238.0	1,491.00				Average	
		point24	24	510.0	323.0	1,491.00				Average	
		point25	25	433.0	444.0	1,492.00				Average	

		point26	26	346.0	575.0	1,495.00					

ISE 4 October 2007
Case van Genuchten TNM 2.5

INPUT: RECEIVERS
PROJECT/CONTRACT: 07-022 10 Lot Subdivision
RUN: 2nd Floor Mitigated

Receiver Name	No.	#DUs	Coordinates (ground) X	Y	Z	Height above Ground	Input Sound Levels and Criteria Existing LAeq1h	Impact Criteria LAeq1h	Impact Criteria Sub'l	NR Goal	Active in Calc.
			ft	ft	ft	ft	dBA	dBA	dB	dB	
Lot 1 A	1	1	250.0	157.0	1,478.00	15.00	0.00	55	10.0	8.0	Y
Lot 1 B	2	1	260.0	184.0	1,478.00	15.00	0.00	55	10.0	8.0	Y
Lot 2 A	3	1	227.0	207.0	1,481.00	15.00	0.00	55	10.0	8.0	
Lot 2 B	4	1	241.6	230.8	1,481.00	15.00	0.00	55	10.0	8.0	
Lot 3 A	5	1	204.0	265.0	1,483.00	15.00	0.00	55	10.0	8.0	
Lot 3 B	6	1	210.0	289.0	1,483.00	15.00	0.00	55	10.0	8.0	
Lot 4 A	7	1	170.0	318.0	1,485.00	15.00	0.00	55	10.0	8.0	
Lot 4 B	8	1	172.0	344.0	1,485.00	15.00	0.00	55	10.0	8.0	
Lot 5 A	9	1	132.0	372.0	1,486.00	15.00	0.00	55	10.0	8.0	
Lot 5 B	10	1	130.0	396.0	1,486.00	15.00	0.00	55	10.0	8.0	
Lot 6 A	11	1	239.0	500.0	1,486.00	15.00	0.00	55	10.0	8.0	
Lot 6 B	12	1	266.0	461.0	1,486.00	15.00	0.00	55	10.0	8.0	
Lot 7 A	13	1	280.0	436.0	1,485.00	15.00	0.00	55	10.0	8.0	
Lot 7 B	14	1	295.0	408.0	1,485.00	15.00	0.00	55	10.0	8.0	
Lot 8 A	15	1	321.0	380.0	1,483.00	15.00	0.00	55	10.0	8.0	
Lot 8 B	16	1	339.0	352.0	1,483.00	15.00	0.00	55	10.0	8.0	
Lot 9 A	17	1	352.0	329.0	1,481.00	15.00	0.00	55	10.0	8.0	
Lot 9 B	18	1	373.0	297.0	1,481.00	15.00	0.00	55	10.0	8.0	
Lot 10 A	19	1	389.0	274.0	1,478.00	15.00	0.00	55	10.0	8.0	
Lot 10 B	20	1	406.0	248.0	1,478.00	15.00	0.00	55	10.0	8.0	

ISE				**4 October 2007**																
Case van Genuchten				**TNM 2.5**																
INPUT: BARRIERS																				
PROJECT/CONTRACT:	**07-022 10 Lot Subdivision**																			
RUN:	**2nd Floor Mitigated**																			
Barrier									**Points**											
Name	**Type**	**Height**		**If Wall**	**If Berm**			**Add'tnl**	**Name**	**No.**	**Coordinates (bottom)**			**Height**	**Segment**					
		Min	**Max**	**$ per**	**$ per**	**Top**	**Run:Rise**	**$ per**			**X**	**Y**	**Z**	**at**	**Seg Ht Perturbs**			**On**	**Important**	
				Unit	**Unit**	**Width**		**Unit**						**Point**	**Incre-**	**#Up**	**#Dn**	**Struct?**	**Reflec-**	
				Area	**Vol.**			**Length**							**ment**				**tions?**		
		ft	ft	$/sq ft	$/cu yd	ft	ft:ft	$/ft			ft	ft	ft	ft	ft					
Mitigation Wall	W	0.00	99.99	0.00				0.00	point3	3	260.0	529.0	1,495.00	4.00	0.00	0	0			
									point4	4	315.0	443.0	1,494.00	4.00	0.00	0	0			
									point5	5	386.0	332.0	1,492.00	4.00	0.00	0	0			
									point6	6	434.0	259.0	1,490.00	4.00	0.00	0	0			
									point7	7	424.0	229.0	1,484.00	4.00						

All Selected		20	0.0	0.0	0.0							
All Impacted		18	0.0	0.0	0.0							
All that meet NR Goal		0	0.0	0.0	0.0							