Knox Business Park

NOISE IMPACT ANALYSIS

COUNTY OF RIVERSIDE

PREPARED BY:

Bill Lawson, PE, INCE
blawson@urbanxroads.com
(949) 660-1994 x203

Alex Wolfe
awolfe@urbanxroads.com
(949) 660-1994 x209

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LIST OF ABBREVIATED TERMS

(1)	Reference
ADT	Average Daily Traffic
ANFO	Ammonium nitrate/fuel oil
ANSI	American National Standards Institute
Calveno	California Vehicle Noise
CEQA	California Environmental Quality Act
CFR	Code of Federal Regulations
CNEL	Community Noise Equivalent Level
dBA	A-weighted decibels
EPA	Environmental Protection Agency
FHWA	Federal Highway Administration
FTA	Federal Transit Administration
INCE	Institute of Noise Control Engineering
Leq	Equivalent continuous (average) sound level
Lmax	Maximum level measured over the time interval
Lmin	Minimum level measured over the time interval
MM	Mitigation measure
mph	Miles per hour
OSMRE	Office of Surface Mining Reclamation and Enforcement
PPV	Peak particle velocity
Project	Knox Business Park
RCNM	Roadway Construction Noise Model
REMEL	Reference Energy Mean Emission Level
RMS	Root-mean-square
STC	Sound Transmission Class
VdB	Vibration Decibels

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EXECUTIVE SUMMARY

Urban Crossroads, Inc. has prepared this noise study to determine the noise exposure and the necessary noise mitigation measures for the proposed Knox Business Park development ("Project"). The Project site is located on the southeast corner of Decker Road and Oleander Avenue in unincorporated County of Riverside. The Project is proposed to consist of approximately 1,114,022 square feet of high-cube warehouse/distribution center uses divided over two buildings: Building D (703,040 square feet) and Building E (410,982 square feet). The purpose of this noise analysis is to ensure that the proposed development is compatible with the existing and future noise environment. This study has been prepared to satisfy the County of Riverside noise standards and to ensure that adequate noise abatement measures are incorporated into the Project's development.

OFF-SITE TRAFFIC NOISE ANALYSIS

Traffic generated by the proposed Project will influence the traffic noise levels in surrounding off-site areas. To quantify the off-site traffic noise increases on the surrounding off-site areas, the changes in traffic noise levels on 12 roadway segments surrounding the Project site were estimated based on the change in the average daily traffic (ADT) volumes. The traffic noise levels provided in this analysis are based on the traffic forecasts found in the *Knox Business Park Traffic Impact Analysis* prepared by Urban Crossroads, Inc. in June 2015. (1) To assess the off-site noise level impacts associated with the proposed Project, noise contour boundaries were developed for Existing, Year 2017, and Year 2035 traffic conditions. The off-site traffic noise analysis indicates that the Project's contributions to roadway noise levels at adjacent land uses will be *potentially significant* under Existing and Year 2017 conditions. However, these *potentially significant* impacts will be considered *less than significant* impacts by Year 2035 traffic conditions.

The Project-related increases must be compared with the cumulative noise level increases without the Project to determine if the Project noise level increases represent a *cumulatively considerable* impact. The Project's actual contribution to the cumulative noise level increases will range from 0.2 to 1.9 dBA CNEL, and will not exceed the *barely perceptible* significance threshold of 3 dBA or more for non-noise-sensitive land uses along the study area roadway segments. Therefore, since the Project-related off-site traffic noise level increases represent a *less than significant* contribution to the overall cumulative noise impacts at the adjacent land uses, the Project-related traffic noise level increases are *less than cumulatively considerable*.

OPERATIONAL NOISE ANALYSIS

Using reference noise levels to represent the noise sources from the Knox Business Park site, this analysis estimates the Project-related operational stationary-source noise levels at nearby sensitive receiver locations. The normal activities associated with the proposed Knox Business Park are anticipated to include idling trucks, delivery truck activities, parking, backup alarms, as well as loading and unloading of dry goods. With the recommended noise mitigation measures (MM), presented below, the operational noise analysis shows that the stationary-source noise levels due to the idling trucks, delivery truck activities, parking, backup alarms, as well as loading

and unloading of dry goods will not exceed the County of Riverside General Plan Noise Element noise level standards at the sensitive receivers adjacent to the Project site.

Further, this analysis demonstrates that the Project will not contribute an operational noise level impact to the existing ambient noise environment at any of the sensitive receiver locations. Therefore, the operational noise level impacts associated with the proposed 24-hour seven days per week Project activities, such as the idling trucks, delivery truck activities, parking, backup alarms, as well as loading and unloading of dry goods, will be *less than significant*.

CUMULATIVE OPERATIONAL NOISE ANALYSIS

To account for potential cumulative stationary-source noise impacts, cumulative developments in the Project study area were identified. The cumulative developments used in this analysis are consistent with those identified in the *Knox Business Park Traffic Impact Analysis*. (1) Each development's potential stationary noise sources were estimated based on their planned land use designation, and the stationary-source noise levels are determined using reference noise level measurements of similar land uses taken by Urban Crossroads, Inc.

The cumulative operational noise analysis shows that the cumulative development-related noise level contributions represent *less than significant* impacts during daytime conditions, and *significant* impacts during nighttime conditions. The cumulative nighttime noise level increases will range from 0.1 to 13.8 dBA Leq. Based on the significance criteria in Section 4, the cumulative noise level increases represent a *potentially significant* cumulative impact at receiver locations R1, and R3 to R5 during the nighttime hours. Since the Project-related nighttime noise level increases are *less than significant* and range from 0.0 to 0.8 dBA Leq, they represent a *less than cumulatively considerable* increase to the overall cumulative noise impacts. Further, the Project-related increase of 0.8 dBA is less than the *barely perceptible* 3 dBA increase identified in the significance criteria previously described in Section 4.

OPERATIONAL NOISE MITIGATION MEASURES

With the noise mitigation measures (MM) recommended below, the normal operation of the Project will not exceed the County of Riverside standards for stationary-source noise impacts. As shown by this analysis, the recommended 8-foot high noise barriers will reduce the noise levels at receiver location R6 by 11 dBA to satisfy the County of Riverside General Plan Noise Element 45 dBA Leq nighttime noise level standards. It is recommended that the Lead Agency require the following as Project Conditions of Approval:

MM Noise-1:

- Construct 8-foot high noise barriers at the southern property line of the Building D site at the top-of-slope elevation, as shown on Exhibit 9-A.
- All on-site operating equipment under the control of the building user that is used in outdoor areas (including but not limited to trucks, tractors, forklifts, and hostlers), shall be operated with properly functioning and well-maintained mufflers.
- Maintain quality pavement conditions on the property that are free of vertical deflection (i.e. speed bumps) to minimize truck noise.

- Should any of the buildings within the Project include special noise generators, such as outdoor compressors, air scrubbers, heavy materials handlings, HVAC units, emergency generators, or outdoor amplification (speakers), the following shall be required as conditions of the occupancy permit:
    - An acoustical study shall be required to determine the noise impacts, if any, to nearby sensitive receivers due to special noise generators and recommend any necessary noise mitigation measures.
        - The study shall analyze the noise levels received at adjacent sensitive land uses to satisfy the appropriate jurisdiction's noise level standards; and
        - The study shall determine the significance of noise level contributions from the operation of special noise generators based on the significance criteria below when the ambient noise levels at nearby sensitive receivers:
            - are less than 60 dBA and the project creates a *readily perceptible* 5 dBA or greater project related noise level increase; or
            - range from 60 to 65 dBA and the project creates a *barely perceptible* 3 dBA or greater project noise level increase; or
            - already exceed 65 dBA, and the project creates a community noise level impact of greater than 1.5 dBA.
        - The study shall identify the noise attenuation measures needed to meet the above performance standards, and Riverside County shall require the implementation of such measures.
- The truck access gates and loading docks within the truck court on the Project site shall be posted with signs which state:
    - Truck drivers shall turn off engines when not in use;
    - Diesel trucks servicing the Project shall not idle for more than five (5) minutes; and
    - Post telephone numbers of the building facilities manager to report violations.

CONSTRUCTION NOISE AND VIBRATION ANALYSIS

Construction noise represents a short-term increase on the ambient noise levels. Construction-related noise impacts are expected to create temporary and intermittent high-level noise conditions at receivers surrounding the Project site when certain activities occur at the Project site boundary. Using sample reference noise levels to represent the planned construction activities of the Knox Business Park site, this analysis estimates the Project-related construction noise levels at nearby sensitive receiver locations. With the recommended minimum 6-foot high temporary noise control barrier at the southern Project site boundary, the mitigated construction noise levels will satisfy the County of Riverside 65 dBA Leq construction noise level threshold at the nearby sensitive receivers. Therefore, the construction of the Project will result in a *less than significant* impact after mitigation with the recommended temporary noise control barrier.

Construction activity can result in varying degrees of ground vibration, depending on the equipment and methods used, distance to the affected structures and soil type. It is expected that ground-borne vibration from Project construction activities would cause only intermittent, localized intrusion. This analysis shows the construction vibration levels in RMS are expected to

approach 0.003 in/sec (RMS) at the eight receiver locations. Based on the County of Riverside vibration standards of 0.01 in/sec (RMS), the proposed Project construction activities will not include or require equipment, facilities, or activities that would result in a *barely perceptible* human response (annoyance), and therefore, impacts due to vibration are considered *less than significant.*

BLASTING NOISE AND VIBRATION IMPACTS

The worst-case blasting activities associated with Project construction are expected to include 15 sections of approximately 400 holes per blast over a two-month period. This equates to roughly 15 separate blasting events. Using conventional blasting methods, there will be one blast near the edge of the southern property line using holes as deep as 15 to 20 feet. The explosive charges are placed in each hole to fragment the rocks into smaller, crushable pieces. The charges will be made up of ammonium nitrate/fuel oil (ANFO) which consists of 94 percent ammonium nitrate and 6 percent diesel fuel. Further, the blasts will be single-event noise sources which occur over a few seconds, with multiple small blasts in each hole occurring milliseconds apart from each other. Once the blast is completed, normal construction grading activities will resume. An electric rock crusher will later break down the fragmented rocks at the Project site and will be powered by a 300-horsepower diesel generator. The noise and vibration levels expected due to blasting activities during Project construction are discussed below.

Since the County of Riverside General Plan and Municipal Code do not identify specific construction noise level limits for blasting activities, the Office of Surface Mining Reclamation and Enforcement (OSMRE) and the Code of Federal Regulations (CFR) *Airblast Limits* (30 CFR 816.67(b)) are used. Section 816.2 of Title 30 of the CFR indicates that the blasting regulations are *intended to ensure that all surface mining activities are conducted in a manner which preserves and enhances environmental and other values in accordance with the Act*. (2) While the OSMRE regulates mining activities, the blasting activities at the Project site represent surface mining activities which, to satisfy California Environmental Quality Act (CEQA) guidelines, must demonstrate that they do not adversely affect the existing environment. Therefore, the OSMRE blasting regulations are applied to the blasting activities anticipated at the Project site. For mining operations, which require larger blasts than that of the Project, the lowest noise level threshold identified in the CFR is a maximum noise level 129 dBA Lmax for blasting activity measured *at the location of any dwelling, public building, school, church, or community or institutional building outside the permit area*... (2) The Lmax threshold used in the noise analysis is suitable for single-event noise levels, such as blasting activities, since other noise regulations in Leq (energy average), for example, average out a reference noise level over a given time period which reduces the single-event noise level over a longer period of time. The Lmax, therefore, allows for the shorter-duration single-event noise levels to be evaluated against an appropriate threshold.

Using a reference noise level for explosive blasting measured by Urban Crossroads, Inc. of 81.5 dBA Lmax at 370 feet, the blasting noise levels at the nearby sensitive residential homes were calculated. Based on the reference blasting noise level of 81.5 dBA Lmax at 370 feet, the closest residential receiver at 191 feet to the Project site will experience noise levels approaching 80.5

dBA Lmax over the course of the blast, which will likely occur for only a few seconds. While some blasting noise may be noticeable by nearby residents, the single-event, temporary noise levels generated by the blast will not exceed the OSMRE and the CFR standards for airblasts, and therefore, will result in a *less than significant* noise impact.

Further, the blasting contractor shall design the blasts when located within 200 feet of existing residential structures to reduce vibration velocity levels from each blast below the Caltrans-identified damage threshold of 3.0 in/sec. (3) A blast signal shall be used to notify nearby residents that blasting is about to occur. Lastly, all complaints must be responded to and investigated as they occur. The major source of vibration due to rock blasting is expected to be from the charges placed in each drill hole within the Project site. Due to the ability of the blasting contractor to limit the ground-borne vibration levels, the vibration velocity levels at 191 feet to the nearest sensitive receiver are expected to be *less than significant*.

CONSTRUCTION NOISE AND VIBRATION MITIGATION MEASURES

Though construction noise is temporary, intermittent and of short duration, and will not present any long-term impacts, the following practices would reduce any noise level increases produced by the construction equipment to the nearby noise-sensitive residential land uses:

MM Noise-2:

- Prior to approval of grading plans and/or issuance of building permits, plans shall include a note indicating that noise-generating Project construction activities that would create noise levels of greater than 45 dBA Leq at sensitive receivers shall only occur between the hours of 6:00 a.m. and 6:00 p.m., during the months of June through September, and 7:00 a.m. and 6:00 p.m., during the months of October through May. The Project construction supervisor shall ensure compliance with the note and the County shall conduct periodic inspection at its discretion.
- Install a minimum 6-foot high temporary noise control barrier, as shown on Exhibit 10-A, at the southern Project site boundaries near receiver location R6. The noise control barrier must present a solid face from top to bottom. The noise control barrier must be a minimum height of 6-feet.
    - The noise barrier may be constructed using an acoustical blanket (e.g. vinyl acoustic curtains or quilted blankets) attached to the construction site perimeter fence or equivalent temporary fence posts.
    - The noise barriers must be maintained and any damage promptly repaired. Gaps, holes, or weaknesses in the barrier or openings between the barrier and the ground shall be promptly repaired.
    - The noise control barriers and associated elements shall be completely removed and the site appropriately restored upon the conclusion of the construction activity.
- During all Project site construction, the construction contractors shall equip all construction equipment, fixed or mobile, with properly operating and maintained mufflers, consistent with manufacturers' standards. The construction contractor shall place all stationary construction equipment so that emitted noise is directed away from the noise sensitive receptors nearest the Project site.

- The construction contractor shall locate equipment staging in areas that will create the greatest distance between construction-related noise sources and noise-sensitive receivers nearest the Project site (i.e., to the center) during all Project construction.
- The construction contractor shall limit haul truck deliveries to the same hours specified for construction equipment (between the hours of 6:00 a.m. and 6:00 p.m., during the months of June through September, and 7:00 a.m. and 6:00 p.m., during the months of October through May). The contractor shall prepare a haul route exhibit and shall design delivery routes to minimize the exposure of sensitive land uses or residential dwellings to delivery truck-related noise.
- The following blasting noise and vibration monitoring and abatement plan shall be adopted and submitted to the County prior to commencement of blasting activities:
    - Pre-blasting inspections shall be offered to property owners within 200 feet of the blast site.
    - Existing damage of each structure shall be documented.
    - Post-blasting inspections shall be offered to assess new or additional damage to each structure once blasting activities have ceased for those property owners who accepted pre-blast inspections.
    - Property owners within at least 200 feet of the blast site shall be notified via postings on the construction site at least 24 hours before the occurrence of major construction-related noise and vibration impacts (such as grading and rock blasting) which may affect them.
    - The County may impose conditions and procedures on the blasting operations as necessary. The construction contractor shall comply with these measures for the duration of the blasting permit. The County may inspect the blast site and materials at any reasonable time (County of Riverside Ordinance No. 787).

1 INTRODUCTION

This noise analysis has been completed to determine the noise impacts associated with the development of the proposed Knox Business Park ("Project"). This noise study briefly describes the proposed Project, provides information regarding noise fundamentals, describes the local regulatory setting, provides the study methods and procedures for traffic noise analysis, and evaluates the future exterior noise environment. In addition, this study includes an analysis of the potential Project-related long-term operational and short-term construction noise impacts.

1.1 SITE LOCATION

The proposed Knox Business Park site is located south of Oleander Avenue and on either side of Decker Road in unincorporated County of Riverside, as shown on Exhibit 1-A. The Project site is mostly vacant with one vacant structure within the southern portion of the site. Nearby existing residential land uses are located west and south of the Project site. An existing high-cube warehouse/distribution land use is located northeast of the Project site along Oleander Avenue.

1.2 PROJECT DESCRIPTION

The Project is proposed to consist of approximately 1,114,022 square feet of high-cube warehouse/distribution center uses divided over two buildings: Building D (703,040 square feet) and Building E (410,982 square feet), as shown on Exhibit 1-B. Access to Building E would be provided via two proposed driveways on Oleander Avenue. The western driveway would provide access to passenger cars only and the eastern driveway would provide access to trucks only. It is our understanding that a 3rd driveway may potentially provide access to passenger cars only and would be located approximately mid-point between the western and eastern driveways for Building E. At the time this noise analysis was prepared, the future tenants of the proposed Project were unknown. To present the potential worst-case noise conditions, this analysis assumes the Project would be operational 24 hours per day, seven days per week. This analysis does not account for the noise associated with tenants that require cold storage (refrigeration).

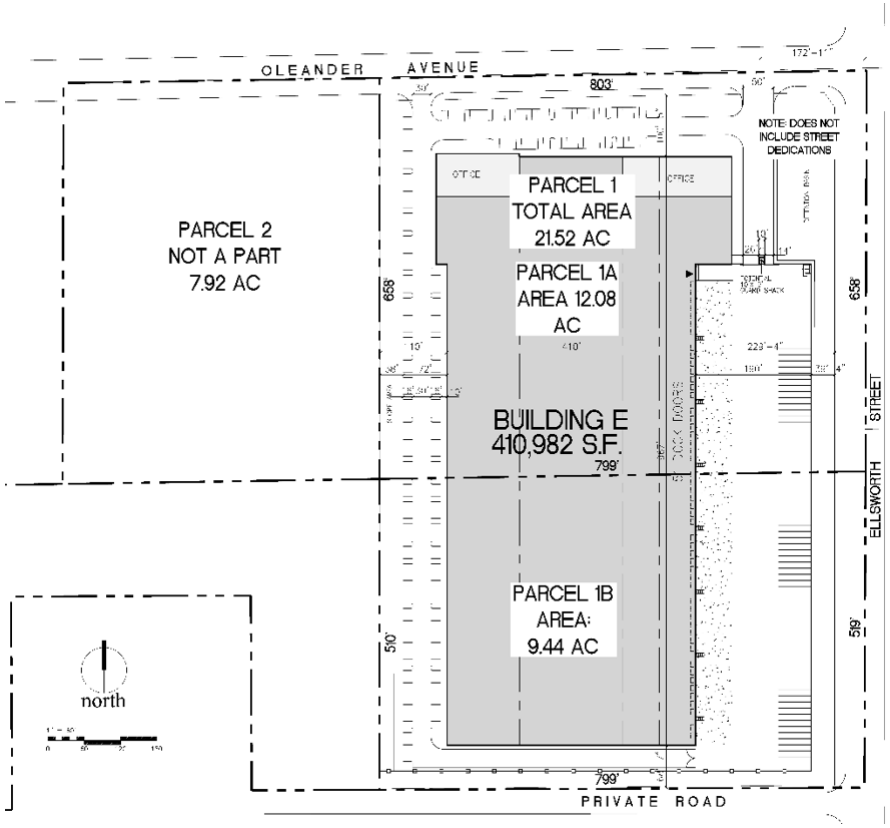
According to the *Knox Business Park Traffic Impact Analysis* prepared by Urban Crossroads, Inc., the Project is expected to generate a net total of approximately 2,155 trip-ends per day (actual vehicles) with 138 AM peak hour trips and 151 PM peak hour trips. (1) The net Project trip generation includes 806 truck trip-ends per day with 38 AM peak hour truck trips and 50 PM peak hour truck trips. While the traffic volumes presented in the *Knox Business Park Traffic Impact Analysis* are expressed as Passenger Car Equivalent (PCE) trips, the Knox Business Park Noise Impact Analysis relies on the net Project trips to accurately account for the effect of individual truck trips on the study area roadway network.

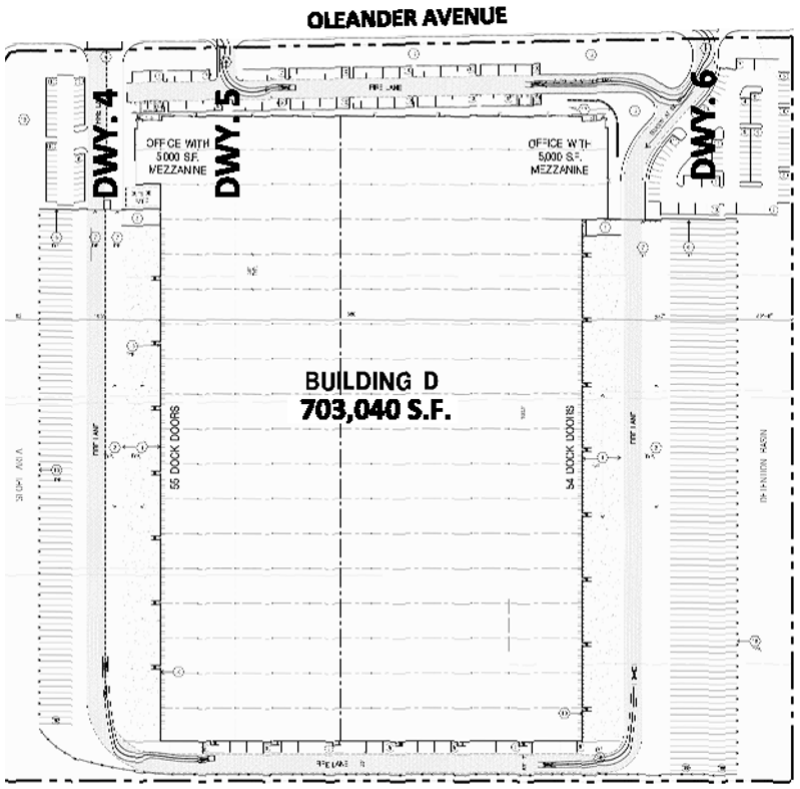
Business operations would primarily be conducted within the enclosed buildings, except for traffic movement, parking, and the loading and unloading of trucks at designated loading bays. The on-site Project-related noise sources are expected to include: idling trucks, delivery truck activities, parking, backup alarms, as well as loading and unloading of dry goods. This analysis does not account for any special noise generators that may be needed to accommodate the

needs of specific Knox Business Park building tenants. Special noise generators may consist of outdoor compressors, air scrubbers, heavy materials handlings, HVAC units, emergency generators, etc. This noise analysis is intended to describe noise level impacts associated with the expected typical warehouse and distribution storage activities at the Project site.

EXHIBIT 1-A: LOCATION MAP

EXHIBIT 1-B: SITE PLAN





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2 FUNDAMENTALS

Noise has been simply defined as "unwanted sound." Sound becomes unwanted when it interferes with normal activities, when it causes actual physical harm or when it has adverse effects on health. Noise is measured on a logarithmic scale of sound pressure level known as a decibel (dB). A-weighted decibels (dBA) approximate the subjective response of the human ear to broad frequency noise source by discriminating against very low and very high frequencies of the audible spectrum. They are adjusted to reflect only those frequencies which are audible to the human ear. Exhibit 2-A presents a summary of the typical noise levels and their subjective loudness and effects that are described in more detail below.

EXHIBIT 2-A: TYPICAL NOISE LEVELS

COMMON OUTDOOR ACTIVITIES	COMMON INDOOR ACTIVITIES	A - WEIGHTED SOUND LEVEL dBA	SUBJECTIVE LOUDNESS	EFFECTS OF NOISE
THRESHOLD OF PAIN		140	INTOLERABLE OR DEAFENING	HEARING LOSS
NEAR JET ENGINE		130		
		120		
JET FLY-OVER AT 300m (1000 ft)	ROCK BAND	110		
LOUD AUTO HORN		100	VERY NOISY	
GAS LAWN MOWER AT 1m (3 ft)		90		
DIESEL TRUCK AT 15m (50 ft), at 80 km/hr (50 mph)	FOOD BLENDER AT 1m (3 ft)	80		SPEECH INTERFERENCE
NOISY URBAN AREA, DAYTIME	VACUUM CLEANER AT 3m (10 ft)	70	LOUD	
HEAVY TRAFFIC AT 90m (300 ft)	NORMAL SPEECH AT 1m (3 ft)	60		
QUIET URBAN DAYTIME	LARGE BUSINESS OFFICE	50	MODERATE	SLEEP DISTURBANCE
QUIET URBAN NIGHTTIME	THEATER, LARGE CONFERENCE ROOM (BACKGROUND)	40		
QUIET SUBURBAN NIGHTTIME	LIBRARY	30	FAINT	NO EFFECT
QUIET RURAL NIGHTTIME	BEDROOM AT NIGHT, CONCERT HALL (BACKGROUND)	20		
	BROADCAST/RECORDING STUDIO	10	VERY FAINT	
LOWEST THRESHOLD OF HUMAN HEARING	LOWEST THRESHOLD OF HUMAN HEARING	0		

Source: Environmental Protection Agency Office of Noise Abatement and Control, Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety (EPA/ONAC 550/9-74-004) March 1974.

2.1 RANGE OF NOISE

Since the range of intensities that the human ear can detect is so large, the scale frequently used to measure intensity is a scale based on multiples of 10, the logarithmic scale. The scale for measuring intensity is the decibel scale. Each interval of 10 decibels indicates a sound energy ten times greater than before, which is perceived by the human ear as being roughly twice as loud. (4) The most common sounds vary between 40 dBA (very quiet) to 100 dBA (very loud). Normal conversation at three feet is roughly at 60 dBA, while loud jet engine noises equate to 110 dBA

at approximately 100 feet, which can cause serious discomfort. (5) Another important aspect of noise is the duration of the sound and the way it is described and distributed in time.

2.2 NOISE DESCRIPTORS

Environmental noise descriptors are generally based on averages, rather than instantaneous, noise levels. The most commonly used figure is the equivalent level (Leq). Equivalent sound levels are not measured directly but are calculated from sound pressure levels typically measured in A-weighted decibels (dBA). The equivalent sound level (Leq) represents a steady state sound level containing the same total energy as a time varying signal over a given sample period and is commonly used to describe the "average" noise levels within the environment.

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

2.3 SOUND PROPAGATION

When sound propagates over a distance, it changes in level and frequency content. The way noise reduces with distance depends on the following factors.

2.3.1 GEOMETRIC SPREADING

Sound from a localized source (i.e., a stationary point source) propagates uniformly outward in a spherical pattern. The sound level attenuates (or decreases) at a rate of 6 dB for each doubling of distance from a point source. Highways consist of several localized noise sources on a defined path and hence can be treated as a line source, which approximates the effect of several point sources. Noise from a line source propagates outward in a cylindrical pattern, often referred to as cylindrical spreading. Sound levels attenuate at a rate of 3 dB for each doubling of distance from a line source.

2.3.2 GROUND ABSORPTION

The propagation path of noise from a highway to a receptor is usually very close to the ground. Noise attenuation from ground absorption and reflective wave canceling adds to the attenuation associated with geometric spreading. Traditionally, the excess attenuation has also been expressed in terms of attenuation per doubling of distance. This approximation is usually

sufficiently accurate for distances of less than 200 ft. For acoustically hard sites (i.e., sites with a reflective surface between the source and the receptor, such as a parking lot or body of water), no excess ground attenuation is assumed. For acoustically absorptive or soft sites (i.e., those sites with an absorptive ground surface between the source and the receptor such as soft dirt, grass, or scattered bushes and trees), an excess ground attenuation value of 1.5 dB per doubling of distance is normally assumed. When added to the cylindrical spreading, the excess ground attenuation results in an overall drop-off rate of 4.5 dB per doubling of distance from a line source.

2.3.3 ATMOSPHERIC EFFECTS

Receptors located downwind from a source can be exposed to increased noise levels relative to calm conditions, whereas locations upwind can have lowered noise levels. Sound levels can be increased at large distances (e.g., more than 500 ft) due to atmospheric temperature inversion (i.e., increasing temperature with elevation). Other factors such as air temperature, humidity, and turbulence can also have significant effects.

2.3.4 SHIELDING

A large object or barrier in the path between a noise source and a receptor can substantially attenuate noise levels at the receptor. The amount of attenuation provided by shielding depends on the size of the object and the frequency content of the noise source. Shielding by trees and other such vegetation typically only has an "out of sight, out of mind" effect. That is, the perception of noise impact tends to decrease when vegetation blocks the line-of-sight to nearby resident. However, for vegetation to provide a substantial, or even noticeable, noise reduction, the vegetation area must be at least 15 feet in height, 100 feet wide and dense enough to completely obstruct the line-of sight between the source and the receiver. This size of vegetation may provide up to 5 dBA of noise reduction. The FHWA does not consider the planting of vegetation to be a noise abatement measure.

2.4 TRAFFIC NOISE PREDICTION

Vehicle noise is a combination of the noise produced by the engine, exhaust, and tires on the roadway. Per the *Highway Traffic Noise Analysis and Abatement Policy and Guidance,* provided by the Federal Highway Administration (FHWA), the level of traffic noise depends on three primary factors: the volume of the traffic, the speed of the traffic, and the vehicle mix within the flow of traffic. Generally, the loudness of traffic noise is increased by heavier traffic volumes, higher speeds, and a greater number of trucks. (6) A doubling of the traffic volume, if the speed and vehicle mix do not change, results in a noise level increase of 3 dBA. The vehicle mix on a given roadway may also influence community noise levels. As the number of medium and heavy trucks increases and becomes a larger percentage of the vehicle mix, adjacent noise level impacts will increase.

2.5 NOISE CONTROL

Noise control is the process of obtaining an acceptable noise environment for an observation point or receptor by controlling the noise source, transmission path, receptor, or all three. This concept is known as the source-path-receptor concept. In general, noise control measures can be applied to these three elements.

2.6 NOISE BARRIER ATTENUATION

Effective noise barriers can reduce noise levels by 10 to 15 dBA, cutting the loudness of traffic noise in half. A noise barrier is most effective when placed close to the noise source or receptor. Noise barriers, however, do have limitations. For a noise barrier to work, it must be high enough and long enough to block the path of the noise source. (6)

2.7 LAND USE COMPATIBILITY WITH NOISE

Some land uses are more tolerant of noise than others. For example, schools, hospitals, churches, and residences are more sensitive to noise intrusion than are commercial or industrial developments and related activities. As ambient noise levels affect the perceived amenity or livability of a development, so too can the mismanagement of noise impacts impair the economic health and growth potential of a community by reducing the area's desirability as a place to live, shop and work. For this reason, land use compatibility with the noise environment is an important consideration in the planning and design process. The FHWA encourages State and Local government to regulate land development in such a way that noise-sensitive land uses are either prohibited from being located adjacent to a highway, or that the developments are planned, designed, and constructed in such a way that noise impacts are minimized. (7)

2.8 COMMUNITY RESPONSE TO NOISE

Community responses to noise may range from registering a complaint by telephone or letter, to initiating court action, depending upon everyone's susceptibility to noise and personal attitudes about noise. Several factors are related to the level of community annoyance including:

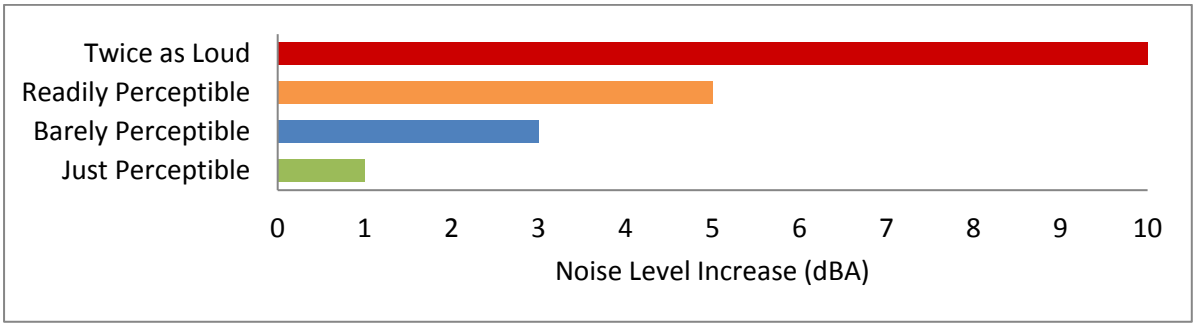
- Fear associated with noise producing activities;
- Socio-economic status and educational level;
- Perception that those affected are being unfairly treated;
- Attitudes regarding the usefulness of the noise-producing activity;
- Belief that the noise source can be controlled.

Approximately ten percent of the population has a very low tolerance for noise and will object to any noise not of their making. Consequently, even in the quietest environment, some complaints will occur. Another twenty-five percent of the population will not complain even in very severe noise environments. Thus, a variety of reactions can be expected from people exposed to any given noise environment. (8) Surveys have shown that about ten percent of the people exposed to traffic noise of 60 dBA will report being highly annoyed with the noise, and each increase of

one dBA is associated with approximately two percent more people being highly annoyed. When traffic noise exceeds 60 dBA or aircraft noise exceeds 55 dBA, people may begin to complain. (8)

Despite this variability in behavior on an individual level, the population can be expected to exhibit the following responses to changes in noise levels as shown on Exhibit 2-B. An increase or decrease of 1 dBA cannot be perceived except in carefully controlled laboratory experiments, a change of 3 dBA are considered *barely perceptible*, and changes of 5 dBA are considered *readily perceptible*. (6)

EXHIBIT 2-B: NOISE LEVEL INCREASE PERCEPTION



2.9 VIBRATION

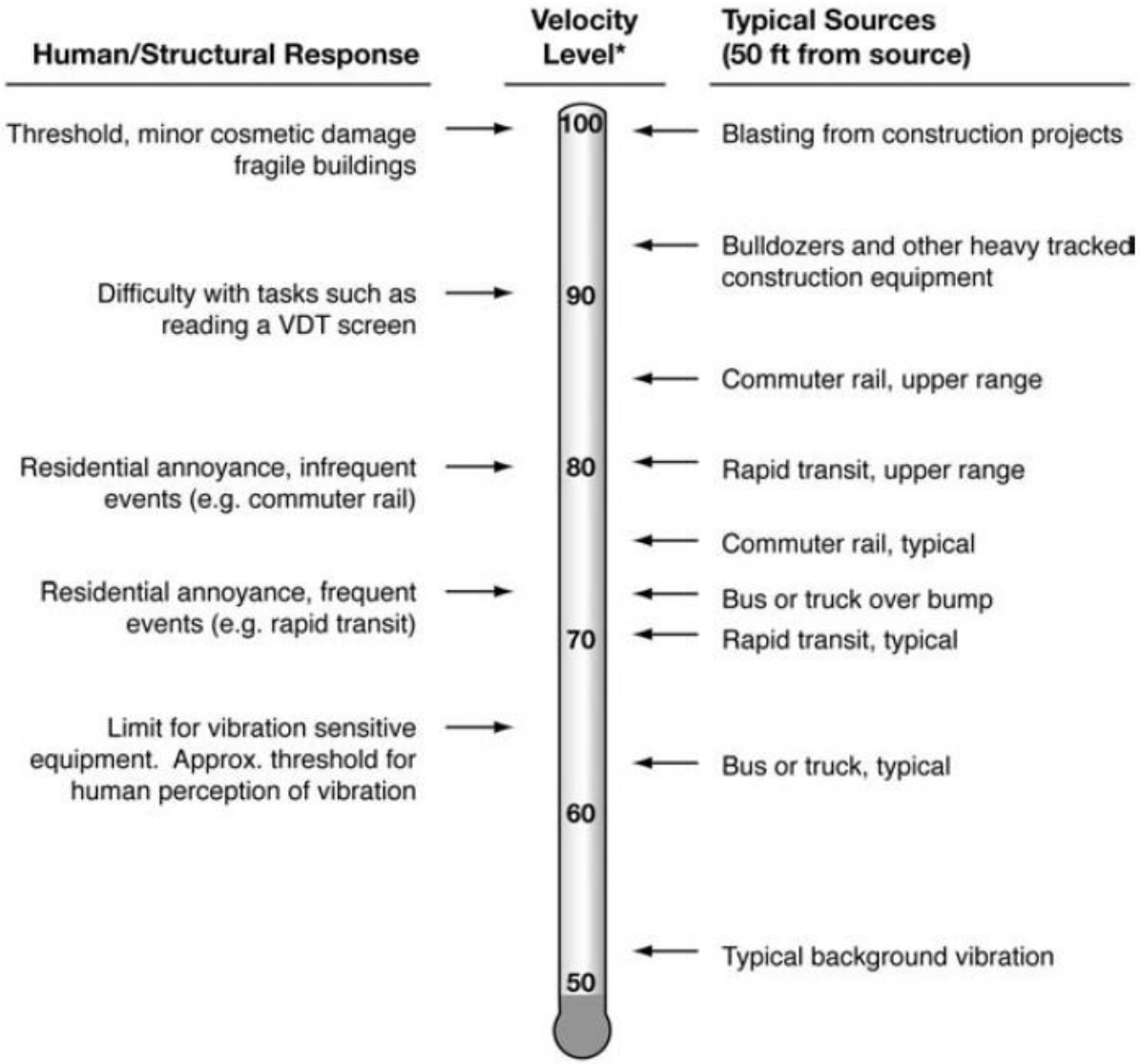
Per the Federal Transit Administration (FTA) *Transit Noise Impact and Vibration Assessment* (9), vibration is the periodic oscillation of a medium or object. The rumbling sound caused by the vibration of room surfaces is called structure borne noise. Sources of ground-borne vibrations include natural phenomena (e.g., earthquakes, volcanic eruptions, sea waves, landslides) or human-made causes (e.g., explosions, machinery, traffic, trains, construction equipment). Vibration sources may be continuous, such as factory machinery, or transient, such as explosions. As is the case with airborne sound, ground-borne vibrations may be described by amplitude and frequency.

Vibration is usually expressed in peak particle velocity (PPV) in inches per second (in/sec) and discussed in decibel (dB) units to compress the range of numbers required to describe vibration. Vibration impacts are generally associated with activities such as train operations, construction, and heavy truck movements. Although PPV is appropriate for evaluating the potential for building damage, it is not always suitable for evaluating human response (annoyance). It takes some time for the human body to respond to vibration signals. In a sense, the human body responds to average vibration amplitude often described as the root-mean-square (RMS). The RMS of a signal is the average of the squared amplitude of the signal, typically calculated over a 1-second period. As with airborne sound, the RMS velocity is often expressed in decibel notation as vibration decibels (VdB), which serves to reduce the range of numbers used to describe human response to vibration.

The background vibration-velocity level in residential areas is generally 50 VdB. Ground-borne vibration is normally perceptible to humans at approximately 65 VdB. For most people, a vibration-velocity level of 75 VdB is the approximate dividing line between barely perceptible and

distinctly perceptible levels. Typical outdoor sources of perceptible ground-borne vibration are construction equipment, steel-wheeled trains, and traffic on rough roads. If a roadway is smooth, the ground-borne vibration is rarely perceptible. The range of interest is from approximately 50 VdB, which is the typical background vibration-velocity level, to 100 VdB, which is the general threshold where minor damage can occur in fragile buildings. Exhibit 2-B illustrates common vibration sources and the human and structural response to ground-borne vibration.

EXHIBIT 2-B: TYPICAL LEVELS OF GROUND-BORNE VIBRATION



** RMS Vibration Velocity Level in VdB relative to 10^{-6} inches/second*

Source: Federal Transit Administration (FTA) Transit Noise Impact and Vibration Assessment.

3 REGULATORY SETTING

To limit population exposure to physically and/or psychologically damaging as well as intrusive noise levels, the federal government, the State of California, various county governments, and most municipalities in the state have established standards and ordinances to control noise. In most areas, automobile and truck traffic is the major source of environmental noise. Traffic activity generally produces an average sound level that remains fairly constant with time. Air and rail traffic, and commercial and industrial activities are also major sources of noise in some areas. Federal, state, and local agencies regulate different aspects of environmental noise. Federal and state agencies generally set noise standards for mobile sources such as aircraft and motor vehicles, while regulation of stationary sources is left to local agencies.

3.1 STATE OF CALIFORNIA NOISE REQUIREMENTS

The State of California regulates freeway noise, sets standards for sound transmission, provides occupational noise control criteria, identifies noise standards, and provides guidance for local land use compatibility. State law requires that each county and city adopt a General Plan that includes a Noise Element which is to be prepared per guidelines adopted by the Governor's Office of Planning and Research. (10) The purpose of the Noise Element is to *limit the exposure of the community to excessive noise levels*.

3.2 STATE OF CALIFORNIA GREEN BUILDING STANDARDS CODE

The 2014 State of California's Green Building Standards Code contains mandatory measures for non-residential building construction in Section 5.506 on Environmental Comfort. (11) These noise standards are applied to new construction in California for controlling interior noise levels resulting from exterior noise sources. The regulations specify that acoustical studies must be prepared when non-residential structures are developed in areas where the exterior noise levels exceed 65 dBA CNEL, such as within a noise contour of an airport, freeway, railroad, and other areas where noise contours are not readily available. If the development falls within an airport or freeway 65 dBA CNEL noise contour, the combined sound transmission class (STC) rating of the wall and roof-ceiling assemblies must be at least 50. For those developments in areas where noise contours are not readily available and the noise level exceeds 65 dBA Leq for any hour of operation, a wall and roof-ceiling combined STC rating of 45, and exterior windows with a minimum STC rating of 40 are required (Section 5.507.4.1).

3.3 COUNTY OF RIVERSIDE GENERAL PLAN NOISE ELEMENT

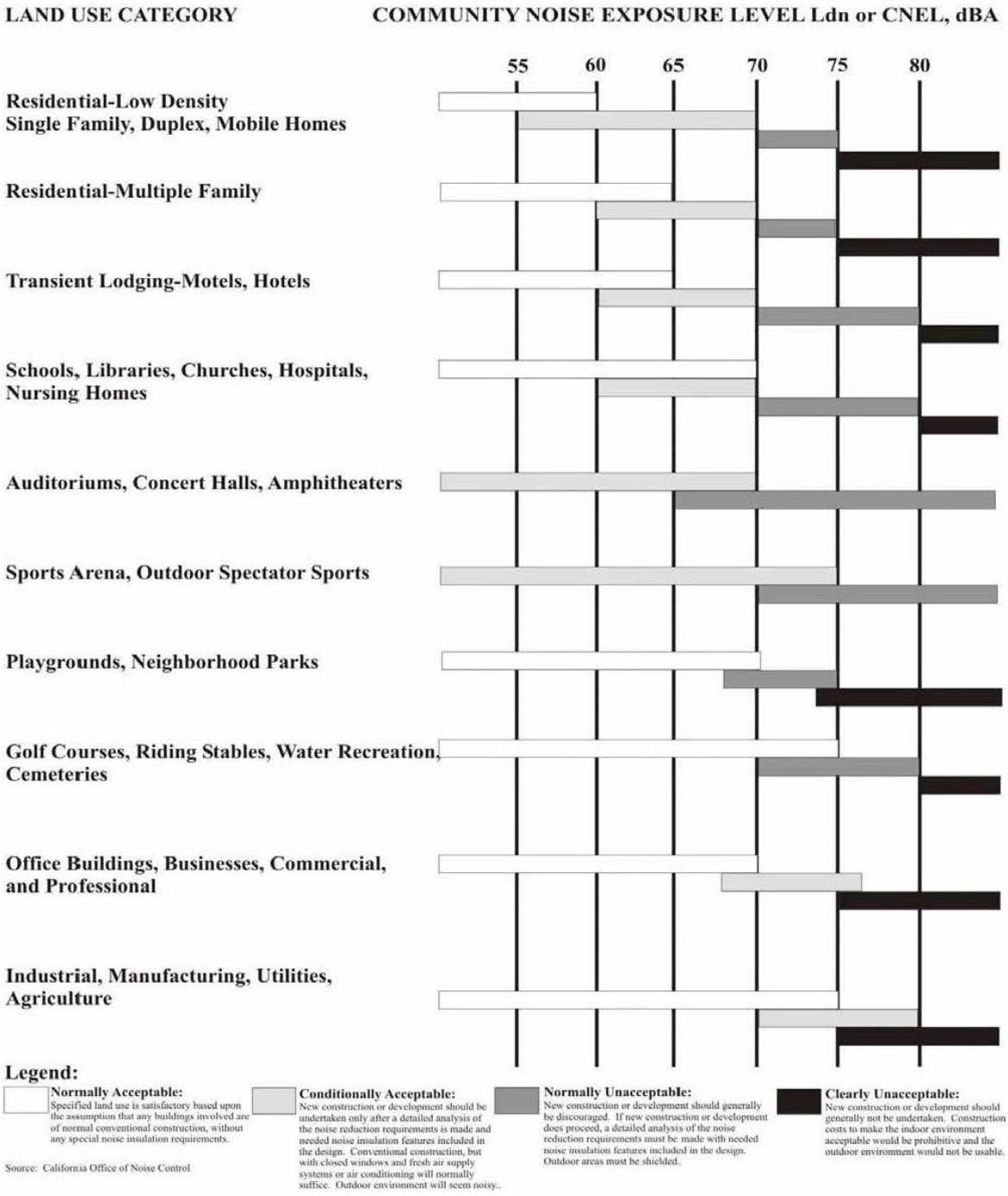
The County of Riverside has adopted a Noise Element of the General Plan to control and abate environmental noise, and to protect the citizens of the County of Riverside from excessive exposure to noise. The Noise Element identifies two separate types of noise sources: (1) transportation and (2) stationary, and establishes guidelines for acceptable transportation and stationary community noise levels in the County of Riverside General Plan. (12)

3.3.1 TRANSPORTATION NOISE STANDARDS

The Noise Element specifies the maximum noise levels allowable for new developments impacted by transportation noise sources such as arterial roads, freeways, airports, and railroads. For the purposes of this Project, the noise impacts associated with traffic are controlled by the General Plan Noise Element. The County General Plan standards are derived from standards contained in the General Plan Guidelines, a publication of the California Office of Planning and Research prepared in October, 2003. These standards are used by many California cities and counties. The Noise Element includes standards for land use compatibility for community noise exposure. For single family residential areas, the exterior noise levels should remain below 65 dBA CNEL, and the interior noise levels should remain below 45 dBA CNEL.

For industrial uses, the *Land Use Compatibility for Community Noise Exposure* matrix sets guidelines per the predicted noise exposure level. Exhibit 3-A presents the General Plan *Land Use Compatibility for Community Noise Exposure* matrix. Per the noise compatibility matrix, an ambient noise level of up to 75 dBA CNEL is considered *normally acceptable* for the development of industrial uses.

EXHIBIT 3-A: LAND USE COMPATIBILITY FOR COMMUNITY NOISE EXPOSURE



Source: County of Riverside General Plan Noise Element, Table N-1.

3.3.2 STATIONARY NOISE STANDARDS

The County of Riverside has set exterior noise limits to control idling trucks, delivery truck activities, parking, backup alarms, as well as loading and unloading of dry goods associated with projects like the proposed Knox Business Park. The County considers noise generated by the use of motor vehicles to be a stationary noise source when operated on private property such as at a truck terminal or warehousing facility. These facility-related noises, as projected to any portion of any surrounding property containing a *habitable dwelling, hospital, school, library or nursing home*, must not exceed the following worst-case noise levels.

Policy N 4.1 of the Noise Element sets an exterior noise limit not to be exceeded for a cumulative period of more than ten minutes in any hour of 65 dBA Leq for daytime hours of 7:00 a.m. to 10:00 p.m., and 45 dBA Leq during the noise-sensitive nighttime hours of 10:00 p.m. to 7:00 a.m. These stationary-source noise level standards are consistent with the County of Riverside Office of Industrial Hygiene guidelines for noise studies within the County. Policy N 4.8 of the Noise Element requires that loading docks of industrial land uses minimize the potential noise impacts of vehicles on the site, as well on the adjacent land uses. (12) The County of Riverside operational noise standards used in this analysis are shown on Table 3-1.

TABLE 3-1: OPERATIONAL NOISE STANDARDS

Jurisdiction	Land Use	Time Period	Exterior Noise Level Standards (dBA Leq)[2]
County of Riverside[1]	Residential	Daytime (7:00 a.m. - 10:00 p.m.)	65
		Nighttime (10:00 p.m. - 7:00 a.m.)	45

[1] Source: County of Riverside General Plan Noise Element, Table N-2.
[2] Leq represents a steady state sound level containing the same total energy as a time varying signal over a given sample period.

3.4 CONSTRUCTION NOISE STANDARDS

To control noise impacts associated with the construction of the proposed Project, the County has established limits to the hours of operation. Section 9.52.020 of the County's Noise Regulation ordinance, provided in Appendix 3.1, indicates that noise associated with any private construction activity located within one-quarter of a mile from an inhabited dwelling is considered exempt between the hours of 6:00 a.m. and 6:00 p.m., during the months of June through September, and 7:00 a.m. and 6:00 p.m., during the months of October through May. (13) Neither the County's General Plan nor Municipal Code establish numeric maximum acceptable construction source noise levels at potentially affected receivers, which would allow for a quantified determination of what CEQA constitutes a *substantial temporary or periodic noise increase*.

To allow for a quantified determination of what the Noise Control Ordinance constitutes as noise that *may jeopardize the health, safety or general welfare of Riverside County residents and degrade their quality of life* due to Project construction activity, relevant quantified stationary

source noise standards established in the General Plan, Policy N 4.1, are used in this analysis to assess the Project construction noise levels at nearby sensitive receivers. Therefore, the daytime noise level standard of 65 dBA Leq is used to evaluate the potential Project-related construction noise impacts. (12)

3.5 CONSTRUCTION VIBRATION STANDARDS

The County of Riverside does not have vibration standards for temporary construction, but the County's General Plan Noise Element does contain the human reaction to typical vibration levels. Vibration levels with peak particle velocity of 0.787 inches per second are considered readily perceptible and above 0.1968 in/sec are considered annoying to people in buildings. Further, County of Riverside General Plan Policy 15.3 identifies a motion velocity perception threshold for vibration due to passing trains of 0.01 inches per second (in/sec) over the range of one to 100 Hz. (12) For the purposes of this analysis, the perception threshold of 0.01 in/sec shall be used to assess the potential impacts due to Project construction at nearby sensitive receiver locations.

3.5.1 HUMAN PERCEPTION OF VIBRATION

Typically, the human response at the perception threshold for vibration includes annoyance in residential areas as previously shown on Exhibit 2-B, when vibration levels expressed in vibration decibels (VdB) approach 75 VdB. The County of Riverside, however, identifies a vibration perception threshold of 0.01 in/sec. For vibration levels expressed in velocity, the human body responds to the average vibration amplitude often described as the root-mean-square (RMS). The RMS of a signal is the average of the squared amplitude of the signal, typically calculated over a one-second period. As with airborne sound, the RMS velocity is often expressed in decibel notation as vibration decibels (VdB), which serves to reduce the range of numbers used to describe human response to vibration. Therefore, the County of Riverside vibration standard of 0.01 in/sec in RMS velocity levels is used in this analysis to assess the human perception of vibration levels due to Project-related construction activities.

3.6 BLASTING REGULATIONS

The construction of the proposed Project will include blasting of hard rock areas, which is a major source of potential noise and vibration impacts to nearby residential receivers. Since the County of Riverside General Plan and Municipal Code do not identify specific construction noise level limits for blasting activities, the Office of Surface Mining Reclamation and Enforcement (OSMRE) and the Code of Federal Regulations (CFR) *Airblast Limits* (30 CFR 816.67(b)) are used. Section 816.2 of Title 30 of the CFR indicates that the blasting regulations are *intended to ensure that all surface mining activities are conducted in a manner which preserves and enhances environmental and other values in accordance with the Act*. (2) While the OSMRE regulates mining activities, the blasting activities at the Project site represent surface mining activities which, to satisfy California Environmental Quality Act (CEQA) guidelines, must demonstrate that they do not adversely affect the existing environment. Therefore, the OSMRE blasting regulations are applied to the blasting activities anticipated at the Project site. For mining operations, which require larger blasts than that of the Project, the lowest noise level threshold identified in the CFR is a

maximum noise level 129 dBA Lmax for blasting activity measured *at the location of any dwelling, public building, school, church, or community or institutional building outside the permit area*... (2) The Lmax threshold used in the noise analysis is suitable for single-event noise levels, such as blasting activities, since other noise regulations in Leq (energy average), for example, average out a reference noise level over a given time period which reduces the single-event noise level over a longer period of time. The Lmax, therefore, allows for the shorter-duration single-event noise levels to be evaluated against an appropriate threshold.

The Caltrans *Transportation and Construction Vibration Guidance Manual* vibration velocity levels for various building materials susceptibility to damage are used to evaluate the potential vibration impacts due to blasting at the Project site. For residential structures, the threshold of damage for vibration is approximately 3.0 in/sec (PPV) for cosmetic cracking and damage. (3)

4 SIGNIFICANCE CRITERIA

The following significance criteria are based on guidance provided by Appendix G of the California Environmental Quality Act (CEQA) Guidelines. For the purposes of this report, impacts would be potentially significant if the Project is determined to result in or cause:

A. Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies;

B. Exposure of persons to or generation of excessive ground-borne vibration or ground-borne noise levels.

C. A substantial permanent increase in ambient noise levels in the Project vicinity above existing levels without the proposed Project; or

D. A substantial temporary or periodic increase in ambient noise levels in the Project vicinity above noise levels existing without the proposed Project.

While the CEQA Guidelines and the County of Riverside General Plan Guidelines provide direction on noise compatibility and establish noise standards by land use type that are sufficient to assess the significance of noise impacts under the first threshold, they do not define the levels at which increases are considered substantial for use under the second, third and fourth threshold.

4.1 NOISE-SENSITIVE RECEIVERS

Noise level increases resulting from the Project are evaluated based on the Appendix G CEQA Guidelines described above at the closest sensitive receiver locations. Under CEQA, consideration must be given to the magnitude of the increase, the existing ambient noise levels, and the location of noise-sensitive receivers in order to determine if a noise increase represents a significant adverse environmental impact. This approach recognizes *that there is no single noise increase that renders the noise impact significant.* (14)

Unfortunately, there is no completely satisfactory way to measure the subjective effects of noise or of the corresponding human reactions of annoyance and dissatisfaction. This is primarily because of the wide variation in individual thresholds of annoyance and differing individual experiences with noise. Thus, an important way of determining a person's subjective reaction to a new noise is the comparison of it to the existing environment to which one has adapted—the so-called *ambient* environment.

In general, the more a new noise exceeds the previously existing ambient noise level, the less acceptable the new noise will typically be judged. The Federal Interagency Committee on Noise (FICON) (15) developed guidance to be used for the assessment of project-generated increases in noise levels that consider the ambient noise level. The FICON recommendations are based on studies that relate aircraft noise levels to the percentage of persons highly annoyed by aircraft noise. Although the FICON recommendations were specifically developed to assess aircraft noise impacts, these recommendations are often used in environmental noise impact assessments involving the use of cumulative noise exposure metrics, such as the average-daily noise level (i.e., CNEL).

For example, if the ambient noise environment is quiet (<60 dBA) and the new noise source greatly increases the noise levels, an impact may occur if the noise criteria may be exceeded. Therefore, for this analysis, FICON identifies a *readily perceptible* 5 dBA or greater project related noise level increase is considered a significant impact when the noise criteria for a given land use is exceeded. Per the FICON, in areas where the without project noise levels range from 60 to 65 dBA, a 3 dBA *barely perceptible* noise level increase appears to be appropriate for most people. When the without project noise levels already exceed 65 dBA, any increase in community noise louder than 1.5 dBA or greater is considered a significant impact if the noise criteria for a given land use is exceeded, since it likely contributes to an existing noise exposure exceedance. Table 4.1 below provides a summary of the potential noise impact significance criteria, based on guidance from FICON.

TABLE 4-1: SIGNIFICANCE OF NOISE IMPACTS AT NOISE-SENSITIVE RECEIVERS

Without Project Noise Level	Potential Significant Impact
< 60 dBA	5 dBA or more
60 - 65 dBA	3 dBA or more
> 65 dBA	1.5 dBA or more

Federal Interagency Committee on Noise (FICON), 1992.

4.2 NON-NOISE-SENSITIVE RECEIVERS

The County of Riverside General Plan Noise Element, Table N-1, *Land Use Compatibility for Community Noise Exposure* was used to establish the satisfactory noise levels of significance for non-noise-sensitive land uses in the Project study area, such as Business Park and Industrial land uses. As previously shown on Exhibit 3-A, the *normally acceptable* exterior noise levels for non-noise-sensitive land uses is 70 dBA CNEL. Noise levels greater than 70 dBA CNEL are considered *conditionally acceptable* per the *Land Use Compatibility for Community Noise Exposure*. (12)

To determine if Project-related traffic noise level increases are significant at off-site non-noise-sensitive land uses, a *readily perceptible* 5 dBA and *barely perceptible* 3 dBA criteria were used. When the without Project noise levels at the non-noise-sensitive land uses are below the *normally acceptable* 70 dBA CNEL compatibility criteria, a *readily perceptible* 5 dBA or greater noise level increase is considered a significant impact. When the without Project noise levels are greater than the *normally acceptable* 70 dBA CNEL land use compatibility criteria, a *barely perceptible* 3 dBA or greater noise level increase is considered a significant impact since the noise level criteria is already exceeded. The noise level increases used to determine significant impacts for non-noise-sensitive land uses is generally consistent with the FICON noise level increase thresholds s for noise-sensitive land uses but instead rely on the County of Riverside General Plan Noise Element, Table N-1, *Land Use Compatibility for Community Noise Exposure normally acceptable* 70 dBA CNEL exterior noise level criteria. Table 4.2 provides a summary of the noise impact significance criteria.

Noise impacts shall be considered significant if any of the following occur as a direct result of the proposed development. Table 4-2 shows the significance criteria summary matrix.

OFF-SITE TRAFFIC NOISE

- When the noise levels at existing and future noise-sensitive land uses (e.g. residential, etc.):
    - are less than 60 dBA and the Project creates a *readily perceptible* 5 dBA or greater Project related noise level increase; or
    - range from 60 to 65 dBA and the Project creates a *barely perceptible* 3 dBA or greater Project noise level increase; or
    - already exceed 65 dBA, and the Project creates a community noise level impact of greater than 1.5 dBA (FICON, 1992).
- When the noise levels at existing and future non-noise-sensitive land uses (e.g. business park, industrial, etc.):
    - are less than the County of Riverside General Plan Noise Element, Table N-1, *normally acceptable* 70 dBA and the Project creates a *readily perceptible* 5 dBA or greater Project related noise level increase; or
    - are greater than the County of Riverside General Plan Noise Element, Table N-1, *normally acceptable* 70 dBA and the Project creates a *barely perceptible* 3 dBA or greater Project noise level increase.

OPERATIONAL NOISE

- If Project-related operational (stationary source) noise levels exceed the exterior 65 dBA Leq daytime or 45 dBA Leq nighttime noise level standards at nearby sensitive residential land uses (County of Riverside General Plan, Policy N 4.1).
- If the cumulative operational (stationary source) noise levels at nearby noise-sensitive receivers near the Project site:
    - are less than 60 dBA and the project creates a *readily perceptible* 5 dBA or greater project related noise level increase (Cumulatively Considerable Impact); or
    - range from 60 to 65 dBA and the project creates a *barely perceptible* 3 dBA or greater project noise level increase (Cumulatively Considerable Impact); or
    - already exceed 65 dBA, and the project creates a community noise level impact of greater than 1.5 dBA (Cumulatively Considerable Impact).

CONSTRUCTION NOISE AND VIBRATION

- If Project-related construction activities:
    - occur at any time other than the permitted hours of 6:00 a.m. and 6:00 p.m., during the months of June through September, and 7:00 a.m. and 6:00 p.m., during the months of October through May (County of Riverside Municipal Code, Section 9.52.020) and would create noise levels of greater than 45 dBA Leq at sensitive receivers;
    - create noise levels which exceed the County of Riverside 65 dBA Leq acceptable noise level threshold at the nearby sensitive receiver locations (Based on the County of Riverside General Plan, Policy N 4.1).

- If short-term Project generated construction vibration levels exceed the County of Riverside acceptable vibration standard of 0.01 in/sec (RMS) at sensitive receiver locations (County of Riverside General Plan, Policy N 15.3).
- If noise due to blasting exceeds the Office of Surface Mining Reclamation and Enforcement and Code of Federal Regulations, Section 30 CFR 816.67(b), *Use of Explosives: Control of Adverse Effects* lowest maximum noise level standard of 129 dBA Lmax at nearby sensitive receiver locations.
- If vibration due to blasting exceeds 3.0 in/sec (PPV) at nearby sensitive receiver locations (Caltrans *Transportation and Construction Vibration Guidance Manual*).

TABLE 4-2: SIGNIFICANCE CRITERIA SUMMARY

Noise Analysis	Land Use	Condition(s)	Significance Criteria	
			Daytime	Nighttime
Off-Site	Noise-Sensitive	if ambient is < 60 dBA CNEL	≥ 5 dBA CNEL Project increase	
		if ambient is 60 - 65 dBA CNEL	≥ 3 dBA CNEL Project increase	
		if ambient is > 65 dBA CNEL	≥ 1.5 dBA CNEL Project increase	
	Non-Noise-Sensitive	if ambient is < 70 dBA CNEL	≥ 5 dBA CNEL Project increase	
		if ambient is > 70 dBA CNEL	≥ 3 dBA CNEL Project increase	
Operational	Noise-Sensitive	Exterior residential land use	65 dBA Leq	45 dBA Leq
		if ambient is < 60 dBA Leq	≥ 5 dBA Leq Project increase	
		if ambient is 60 - 65 dBA Leq	≥ 3 dBA Leq Project increase	
		if ambient is > 65 dBA Leq	≥ 1.5 dBA Leq Project increase	
Construction	Noise-Sensitive	Permitted hours of 6:00 a.m. and 6:00 p.m., during the months of June through September, and 7:00 a.m. and 6:00 p.m., during the months of October through May		
		Noise level threshold	65 dBA Leq	45 dBA Leq
		Vibration level threshold	0.01 in/sec (RMS)	n/a
		Blasting Noise Threshold	129 dBA Lmax	n/a
		Blasting Vibration Threshold	3.0 in/sec (PPV)	n/a

"Daytime" = 7:00 a.m. - 10:00 p.m.; "Nighttime" = 10:00 p.m. - 7:00 a.m.; "n/a" = No nighttime construction activity is permitted and therefore, no nighttime construction noise level threshold is identified.

5 EXISTING NOISE LEVEL MEASUREMENTS

To assess the existing noise level environment, seven 24-hour noise level measurements were taken at sensitive receiver locations in the Project study area. The receiver locations were selected to describe and document the existing noise environment within the Project study area. Exhibit 5-A provides the boundaries of the Project study area and the noise level measurement locations. To fully describe the existing noise conditions, noise level measurements were collected by Urban Crossroads, Inc. from Tuesday, March 31st to Wednesday, April 1st, 2015. Appendix 5.1 includes study area photos.

5.1 MEASUREMENT PROCEDURE AND CRITERIA

To describe the existing noise environment, the hourly noise levels were measured during typical weekday conditions over a 24-hour period. By collecting individual hourly noise level measurements, it is possible to describe the daytime and nighttime hourly noise levels and calculate the 24-hour CNEL. The long-term noise readings were recorded using Piccolo Type 2 integrating sound level meter and dataloggers. The Piccolo sound level meters were calibrated using a Larson-Davis calibrator, Model CAL 150. All noise meters were programmed in "slow" mode to record noise levels in "A" weighted form. The sound level meters and microphones were equipped with a windscreen during all measurements. All noise level measurement equipment satisfies the American National Standards Institute (ANSI) standard specifications for sound level meters ANSI S1.4-2014/IEC 61672-1:2013. (16)

5.2 NOISE MEASUREMENT LOCATIONS

The long-term noise level measurements were positioned at the nearest sensitive receiver locations to assess the existing ambient hourly noise levels surrounding the Project site. To describe the existing noise environment, it is not necessary to collect measurements at each individual building or residence, because each receiver measurement represents a group of buildings that share acoustical equivalence. In other words, the area represented by the receiver shares similar shielding, terrain, and geometric relationship to the reference noise source. Receivers represent a location of noise sensitive areas and are used to estimate the future noise level impacts. Collecting reference ambient noise level measurements at the nearby sensitive receiver locations allows for a comparison of the before and after Project noise levels and is necessary to assess potential cumulative noise impacts.

EXHIBIT 5-A: NOISE MEASUREMENT LOCATIONS

5.3 NOISE MEASUREMENT RESULTS

To describe the existing ambient noise environment, the noise measurements presented below focus on the average or equivalent sound levels (Leq). The equivalent sound level (Leq) represents a steady state sound level containing the same total energy as a time varying signal over a given sample period. Table 5-1 identifies the hourly daytime (7:00 a.m. to 10:00 p.m.) and nighttime (10:00 p.m. to 7:00 a.m.) noise levels at each noise level measurement location. Appendix 5.2 provides a summary of the existing hourly ambient noise levels described below:

- Location L1 represents the noise levels along at the northwest corner of Corson Avenue and Day Street near existing residential homes, northwest of the Project site. The noise level measurements collected show an overall 24-hour exterior noise level of 58.4 dBA CNEL. The hourly noise levels measured at location L1 ranged from 44.5 to 63.6 dBA Leq during the daytime hours and from 41.8 to 47.5 dBA Leq during the nighttime hours. The energy (logarithmic) average daytime noise level was calculated at 56.4 dBA Leq with an average nighttime noise level of 45.2 dBA Leq.
- Location L2 represents the noise levels along Day Street south of Burch Street at existing residential homes located west of the Project site. The noise level measurements collected show an overall 24-hour exterior noise level of 61.2 dBA CNEL. The hourly noise levels measured at location L2 ranged from 51.6 to 63.7 dBA Leq during the daytime hours and from 45.3 to 54.3 dBA Leq during the nighttime hours. The energy (logarithmic) average daytime noise level was calculated at 58.2 dBA Leq with an average nighttime noise level of 51.7 dBA Leq.
- Location L3 represents the noise levels southwest of the Project site along Nance Street adjacent to existing residential homes. The 24-hour CNEL indicates that the overall exterior noise level is 57.6 dBA CNEL. At location L3 the background ambient noise levels ranged from 39.6 to 63.3 dBA Leq during the daytime hours to levels of 39.7 to 46.3 dBA Leq during the nighttime hours. The energy (logarithmic) average daytime noise level was calculated at 56.1 dBA Leq with an average nighttime noise level of 57.6 dBA Leq.
- Located at the future southwest property line of Building D, location L4 represents the existing noise levels adjacent to existing residential homes along Redwood Drive. The noise level measurements collected show an overall 24-hour exterior noise level of 56.8 dBA CNEL. The hourly noise levels measured at location L4 ranged from 40.8 to 61.8 dBA Leq during the daytime hours and from 42.6 to 47.2 dBA Leq during the nighttime hours. The energy (logarithmic) average daytime noise level was calculated at 55.9 dBA Leq with an average nighttime noise level of 44.6 dBA Leq.
- Location L5 represents the noise levels on Old Oleander Avenue, northeast of the Project site near an existing cell tower with electrical generators and a residential home. The noise level measurements collected show an overall 24-hour exterior noise level of 66.5 dBA CNEL. The hourly noise levels measured at location L5 ranged from 57.3 to 67.3 dBA Leq during the daytime hours and from 51.4 to 62.6 dBA Leq during the nighttime hours. The energy (logarithmic) average daytime noise level was calculated at 63.0 dBA Leq with an average nighttime noise level of 58.2 dBA Leq.
- Location L6 represents the noise levels at the northwest corner of Markham Street and Decker Road near existing residential homes. The noise level measurements collected show an overall 24-hour exterior noise level of 68.2 dBA CNEL. The hourly noise levels measured at location L6

ranged from 60.8 to 65.9 dBA Leq during the daytime hours and from 53.2 to 64.2 dBA Leq during the nighttime hours. The energy (logarithmic) average daytime noise level was calculated at 63.7 dBA Leq with an average nighttime noise level of 60.6 dBA Leq.

- Location L7 represents the noise levels along Markham Street near existing residential homes, south of the Project site. The 24-hour CNEL indicates that the overall exterior noise level is 73.9 dBA CNEL. At location L7 the background ambient noise levels ranged from 66.0 to 72.1 dBA Leq during the daytime hours to levels of 59.7 to 69.5 dBA Leq during the nighttime hours. The energy (logarithmic) average daytime noise level was calculated at 69.5 dBA Leq with an average nighttime noise level of 66.3 dBA Leq.

Table 5-1 provides the (energy average) noise levels used to describe the daytime and nighttime ambient conditions. These daytime and nighttime energy average noise levels represent the average of all hourly noise levels observed during these time periods expressed as a single number. Appendix 5.2 provides a summary of the hourly noise levels for each hour as well as the minimum and maximum noise level observed during the daytime and nighttime period. The background ambient noise levels in the Project study area are dominated by the transportation related noise associated with the arterial roadway network and March Air Reserve Base. This includes auto, heavy truck, and aircraft activities near the noise level measurement locations. Secondary background ambient noise is also included in the noise level measurements from existing stationary noise sources in the Project study area, such as the existing high-cube warehouse/distribution center use northeast of the Project site along Oleander Avenue. The 24-hour existing noise level measurements shown on Table 5-1 present the worst-case existing ambient noise conditions.

TABLE 5-1: 24-HOUR AMBIENT NOISE LEVEL MEASUREMENTS

Location[1]	Distance To Project Site Boundary	Description	Hourly Noise Level (dBA Leq)[2]		CNEL
			Daytime	Nighttime	
L1	1,920'	Located at the northwest corner of Corson Avenue and Day Street near existing residential homes.	56.4	45.2	58.4
L2	1,770'	Located along Day Street south of Burch Street near existing residential homes.	58.2	51.7	61.2
L3	225'	Located southwest of the Project site along Nance Street adjacent to existing residential homes.	56.1	42.9	57.6
L4	0'	Located at the future southwest property line of Building D, adjacent to existing residential homes on Redwood Drive.	55.9	44.6	56.8
L5	1,074'	Located on Old Oleander Avenue, northeast of the Project site near an existing cell tower with electrical generators and residential home.	63.0	58.2	66.5
L6	1,285'	Located at the northwest corner of Markham Street and Decker Road near existing residential homes.	63.7	60.6	68.2
L7	1,282'	Located along Markham Street near existing residential homes, south of the Project site.	69.5	66.3	73.9

[1] See Exhibit 5-A for the noise level measurement locations.
[2] Energy (logarithmic) average hourly levels. The long-term 24-hour measurement printouts are included in Appendix 5.2.
"Daytime" = 7:00 a.m. to 10:00 p.m.; "Nighttime" = 10:00 p.m. to 7:00 a.m.

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6 METHODS AND PROCEDURES

The following section outlines the methods and procedures used to model and analyze the future traffic noise environment.

6.1 FHWA TRAFFIC NOISE PREDICTION MODEL

The estimated roadway noise impacts from vehicular traffic were calculated using a computer program that replicates the Federal Highway Administration (FHWA) Traffic Noise Prediction Model- FHWA-RD-77-108. (17) The FHWA Model arrives at a predicted noise level through a series of adjustments to the Reference Energy Mean Emission Level (REMEL). In California the national REMELs are substituted with the California Vehicle Noise (Calveno) Emission Levels. (18) Adjustments are then made to the REMEL to account for: the roadway classification (e.g., collector, secondary, major or arterial), the roadway active width (i.e., the distance between the center of the outermost travel lanes on each side of the roadway), the total average daily traffic (ADT), the travel speed, the percentages of automobiles, medium trucks, and heavy trucks in the traffic volume, the roadway grade, the angle of view (e.g., whether the roadway view is blocked), the site conditions ("hard" or "soft" relates to the absorption of the ground, pavement, or landscaping), and the percentage of total ADT which flows each hour throughout a 24-hour period.

6.2 OFF-SITE TRAFFIC NOISE PREDICTION MODEL INPUTS

Table 6-1 presents the roadway parameters used to assess the Project's off-site transportation noise impacts. Table 6-1 identifies the 12 study area roadway segments, the distance from the centerline to adjacent land use based on the functional roadway classifications per the County of Riverside General Plan Circulation Elements, and the posted vehicle speeds. For the purpose of this analysis, soft site conditions were used to analyze the traffic noise impacts within the Project study area. Soft site conditions account for the sound propagation loss over natural surfaces such as normal earth and ground vegetation.

The Existing, Year 2017, and Year 2035 average daily traffic volumes used for this study are presented on Table 6-2 and were provided by the *Knox Business Park Traffic Impact Analysis* prepared by Urban Crossroads, Inc. (1) Table 6-3 provides the time of day (daytime, evening, and nighttime) vehicle splits.

TABLE 6-1: OFF-SITE ROADWAY PARAMETERS

ID	Roadway	Segment	Adjacent Planned Land Use[1]	Distance from Centerline to Nearest Adjacent Land Use (Feet)[2]	Posted Vehicle Speed (MPH)
1	Harvill Av.	s/o Harley Knox Bl.	Business Park	59'	50
2	Harvill Av.	n/o Oleander Av.	Business Park	59'	50
3	Harvill Av.	s/o Oleander Av.	Business Park	59'	50
4	I-215 SB Fwy	n/o Harley Knox Bl.	Light Industrial	85'	65
5	I-215 SB Fwy	s/o Harley Knox Bl.	Light Industrial	85'	65
6	I-215 NB Fwy	n/o Harley Knox Bl.	Light Industrial	85'	65
7	I-215 NB Fwy	s/o Harley Knox Bl.	Light Industrial	85'	65
8	Harley Knox Bl.	e/o Harvill Av.	Business Park	76'	45
9	Harley Knox Bl.	e/o I-215 SB Fwy Ramps	Light Industrial	76'	45
10	Harley Knox Bl.	e/o I-215 NB Fwy Ramps	Light Industrial	76'	45
11	Oleander Av.	e/o Driveway 6	Business Park	50'	40
12	Oleander Av.	w/o Harvill Av.	Business Park	50'	40

[1] Source: County of Riverside General Plan, Mead Valley Area Plan Land Use Plan, Figure 3.
[2] Distance to adjacent land use is based upon the right-of-way distances for each functional roadway classification provided in the General Plan Circulation Elements.

TABLE 6-2: AVERAGE DAILY TRAFFIC VOLUMES

ID	Roadway	Segment	Average Daily Traffic (1,000s)[1]					
			Existing		Year 2017		Year 2035	
			No Project	With Project	No Project	With Project	No Project	With Project
1	Harvill Av.	s/o Harley Knox Bl.	9.7	11.5	11.9	13.7	23.6	25.4
2	Harvill Av.	n/o Oleander Av.	9.1	10.9	11.7	13.5	23.6	25.4
3	Harvill Av.	s/o Oleander Av.	8.8	9.1	10.9	11.2	28.6	28.9
4	I-215 SB Fwy	n/o Harley Knox Bl.	38.6	38.6	51.0	51.0	68.6	68.6
5	I-215 SB Fwy	s/o Harley Knox Bl.	34.5	34.9	47.4	47.8	62.4	62.8
6	I-215 NB Fwy	n/o Harley Knox Bl.	32.5	33.7	44.7	45.9	69.4	70.6
7	I-215 NB Fwy	s/o Harley Knox Bl.	27.8	27.8	34.9	34.9	52.9	52.9
8	Harley Knox Bl.	e/o Harvill Av.	9.9	11.7	12.5	14.3	34.0	35.8
9	Harley Knox Bl.	e/o I-215 SB Fwy Ramps	12.2	13.6	22.0	23.4	28.0	29.4
10	Harley Knox Bl.	e/o I-215 NB Fwy Ramps	15.6	15.8	31.0	31.2	36.4	36.6
11	Oleander Av.	e/o Driveway 6	0.1	2.2	0.1	2.2	6.6	8.7
12	Oleander Av.	w/o Harvill Av.	0.5	2.6	0.5	2.6	6.6	8.7

[1] Source: Knox Business Park Traffic Impact Analysis, Urban Crossroads, Inc., June 2015.

TABLE 6-3: TIME OF DAY VEHICLE SPLITS

Vehicle Type	Time of Day Splits			Total Of Time Of Day Splits
	Daytime	Evening	Nighttime	
Autos	77.5%	12.9%	9.6%	100.0%
Medium Trucks	84.8%	4.9%	10.3%	100.0%
Heavy Trucks	86.5%	2.7%	10.8%	100.0%

Source: County of Riverside Office of Industrial Hygiene.
"Daytime" = 7:00 a.m. to 7:00 p.m.; "Evening" = 7:00 p.m. to 10:00 p.m.; "Nighttime" = 10:00 p.m. to 7:00 a.m.

According to the *Knox Business Park Traffic Impact Analysis* prepared by Urban Crossroads, Inc., the Project is expected to generate a net total of approximately 2,155 trip-ends per day (actual vehicles) with 138 AM peak hour trips and 151 PM peak hour trips. (1) The net Project trip generation includes 806 truck trip-ends per day with 38 AM peak hour truck trips and 50 PM peak hour truck trips. While the traffic volumes presented in the *Knox Business Park Traffic Impact Analysis* are expressed as Passenger Car Equivalent (PCE) trips, the Knox Business Park Noise Impact Analysis relies on the net Project trips to accurately account for the effect of individual truck trips on the study area roadway network.

To quantify the off-site noise levels, the Project related truck trips were added to the heavy truck category in the FHWA noise prediction model. The addition of the Project related truck trips increases the percentage of heavy trucks in the vehicle mix. This approach recognizes that the FHWA noise prediction model is significantly influenced by the number of heavy trucks in the vehicle mix.

The 806 daily Project truck trip-ends trucks were assigned to the 12 individual off-site study area roadway segments based on the estimated Project truck trip distribution percentages. Using the Project truck trips in combination with the Project trip distribution, it is possible to calculate the number of additional Project truck trips and vehicle mix percentages for each of the study area roadway segments. Tables 6-4 to 6-6 describe the distribution of traffic flow by vehicle type (vehicle mix) by roadway segment for each of the off-site Project traffic conditions.

TABLE 6-4: EXISTING CONDITIONS TRAFFIC FLOW BY VEHICLE TYPE (VEHICLE MIX)

ID	Roadway	Segment	No Project[1]				With Project[2]			
			Autos	Medium Trucks	Heavy Trucks	Total	Autos	Medium Trucks	Heavy Trucks	Total
1	Harvill Av.	s/o Harley Knox Bl.	93.82%	1.09%	5.09%	100.00%	88.14%	2.37%	9.48%	100.00%
2	Harvill Av.	n/o Oleander Av.	93.82%	1.09%	5.09%	100.00%	87.83%	2.45%	9.72%	100.00%
3	Harvill Av.	s/o Oleander Av.	93.82%	1.09%	5.09%	100.00%	93.59%	1.15%	5.27%	100.00%
4	I-215 SB Fwy	n/o Harley Knox Bl.	93.82%	1.09%	5.09%	100.00%	93.82%	1.09%	5.09%	100.00%
5	I-215 SB Fwy	s/o Harley Knox Bl.	93.82%	1.09%	5.09%	100.00%	93.44%	1.17%	5.39%	100.00%
6	I-215 NB Fwy	n/o Harley Knox Bl.	93.82%	1.09%	5.09%	100.00%	92.36%	1.42%	6.23%	100.00%
7	I-215 NB Fwy	s/o Harley Knox Bl.	93.82%	1.09%	5.09%	100.00%	93.82%	1.09%	5.09%	100.00%
8	Harley Knox Bl.	e/o Harvill Av.	93.82%	1.09%	5.09%	100.00%	88.24%	2.35%	9.41%	100.00%
9	Harley Knox Bl.	e/o I-215 SB Fwy Ramps	93.82%	1.09%	5.09%	100.00%	90.01%	1.95%	8.04%	100.00%
10	Harley Knox Bl.	e/o I-215 NB Fwy Ramps	93.82%	1.09%	5.09%	100.00%	93.66%	1.12%	5.21%	100.00%
11	Oleander Av.	e/o Driveway 6	93.82%	1.09%	5.09%	100.00%	63.33%	8.04%	28.63%	100.00%
12	Oleander Av.	w/o Harvill Av.	93.82%	1.09%	5.09%	100.00%	68.00%	6.98%	25.03%	100.00%

[1] Source: Based on existing PM peak hour classification counts by vehicle type taken by Urban Crossroads, Inc. on 4/15/2015 at Harvill Avenue and Harley Knox Boulevard.
[2] Source: Knox Business Park Traffic Impact Analysis, Urban Crossroads, Inc., June 2015.

TABLE 6-5: YEAR 2017 CONDITIONS TRAFFIC FLOW BY VEHICLE TYPE (VEHICLE MIX)

ID	Roadway	Segment	No Project[1]				With Project[2]			
			Autos	Medium Trucks	Heavy Trucks	Total	Autos	Medium Trucks	Heavy Trucks	Total
1	Harvill Av.	s/o Harley Knox Bl.	93.82%	1.09%	5.09%	100.00%	89.06%	2.17%	8.78%	100.00%
2	Harvill Av.	n/o Oleander Av.	93.82%	1.09%	5.09%	100.00%	88.99%	2.18%	8.83%	100.00%
3	Harvill Av.	s/o Oleander Av.	93.82%	1.09%	5.09%	100.00%	93.63%	1.13%	5.24%	100.00%
4	I-215 SB Fwy	n/o Harley Knox Bl.	93.82%	1.09%	5.09%	100.00%	93.82%	1.09%	5.09%	100.00%
5	I-215 SB Fwy	s/o Harley Knox Bl.	93.82%	1.09%	5.09%	100.00%	93.54%	1.15%	5.31%	100.00%
6	I-215 NB Fwy	n/o Harley Knox Bl.	93.82%	1.09%	5.09%	100.00%	92.75%	1.33%	5.92%	100.00%
7	I-215 NB Fwy	s/o Harley Knox Bl.	93.82%	1.09%	5.09%	100.00%	93.82%	1.09%	5.09%	100.00%
8	Harley Knox Bl.	e/o Harvill Av.	93.82%	1.09%	5.09%	100.00%	89.26%	2.12%	8.62%	100.00%
9	Harley Knox Bl.	e/o I-215 SB Fwy Ramps	93.82%	1.09%	5.09%	100.00%	91.61%	1.59%	6.81%	100.00%
10	Harley Knox Bl.	e/o I-215 NB Fwy Ramps	93.82%	1.09%	5.09%	100.00%	93.74%	1.11%	5.15%	100.00%
11	Oleander Av.	e/o Driveway 6	93.82%	1.09%	5.09%	100.00%	63.33%	8.04%	28.63%	100.00%
12	Oleander Av.	w/o Harvill Av.	93.82%	1.09%	5.09%	100.00%	68.00%	6.98%	25.03%	100.00%

[1] Source: Based on existing PM peak hour classification counts by vehicle type taken by Urban Crossroads, Inc. on 4/15/2015 at Harvill Avenue and Harley Knox Boulevard.
[2] Source: Knox Business Park Traffic Impact Analysis, Urban Crossroads, Inc., June 2015.

TABLE 6-6: YEAR 2035 CONDITIONS TRAFFIC FLOW BY VEHICLE TYPE (VEHICLE MIX)

ID	Roadway	Segment	No Project[1]				With Project[2]			
			Autos	Medium Trucks	Heavy Trucks	Total	Autos	Medium Trucks	Heavy Trucks	Total
1	Harvill Av.	s/o Harley Knox Bl.	93.82%	1.09%	5.09%	100.00%	91.25%	1.67%	7.08%	100.00%
2	Harvill Av.	n/o Oleander Av.	93.82%	1.09%	5.09%	100.00%	91.25%	1.67%	7.08%	100.00%
3	Harvill Av.	s/o Oleander Av.	93.82%	1.09%	5.09%	100.00%	93.75%	1.10%	5.15%	100.00%
4	I-215 SB Fwy	n/o Harley Knox Bl.	93.82%	1.09%	5.09%	100.00%	93.82%	1.09%	5.09%	100.00%
5	I-215 SB Fwy	s/o Harley Knox Bl.	93.82%	1.09%	5.09%	100.00%	93.61%	1.13%	5.26%	100.00%
6	I-215 NB Fwy	n/o Harley Knox Bl.	93.82%	1.09%	5.09%	100.00%	93.12%	1.24%	5.63%	100.00%
7	I-215 NB Fwy	s/o Harley Knox Bl.	93.82%	1.09%	5.09%	100.00%	93.82%	1.09%	5.09%	100.00%
8	Harley Knox Bl.	e/o Harvill Av.	93.82%	1.09%	5.09%	100.00%	92.00%	1.50%	6.50%	100.00%
9	Harley Knox Bl.	e/o I-215 SB Fwy Ramps	93.82%	1.09%	5.09%	100.00%	92.06%	1.49%	6.46%	100.00%
10	Harley Knox Bl.	e/o I-215 NB Fwy Ramps	93.82%	1.09%	5.09%	100.00%	93.75%	1.10%	5.14%	100.00%
11	Oleander Av.	e/o Driveway 6	93.82%	1.09%	5.09%	100.00%	86.07%	2.85%	11.07%	100.00%
12	Oleander Av.	w/o Harvill Av.	93.82%	1.09%	5.09%	100.00%	86.07%	2.85%	11.07%	100.00%

[1] Source: Based on existing PM peak hour classification counts by vehicle type taken by Urban Crossroads, Inc. on 4/15/2015 at Harvill Avenue and Harley Knox Boulevard.
[2] Source: Knox Business Park Traffic Impact Analysis, Urban Crossroads, Inc., June 2015.

6.3 VIBRATION ASSESSMENT

This analysis focuses on the potential ground-borne vibration associated with vehicular traffic and construction activities. Ground-borne vibration levels from automobile traffic are generally overshadowed by vibration generated by heavy trucks that roll over the same uneven roadway surfaces. However, due to the rapid drop-off rate of ground-borne vibration and the short duration of the associated events, vehicular traffic-induced ground-borne vibration is rarely perceptible beyond the roadway right-of-way, and rarely results in vibration levels that cause damage to buildings in the vicinity.

However, while vehicular traffic is rarely perceptible, construction has the potential to result in varying degrees of temporary ground vibration, depending on the specific construction activities and equipment used. Ground vibration levels associated with various types of construction equipment are summarized on Table 6-7. Based on the representative vibration levels presented for various construction equipment types, it is possible to estimate the human response (annoyance) using the following vibration assessment methods defined by the FTA. To describe the human response (annoyance) associated with vibration impacts the FTA provides the following equation: $PPV_{equip} = PPV_{ref} \times (25/D)^{1.5}$

TABLE 6-7: VIBRATION SOURCE LEVELS FOR CONSTRUCTION EQUIPMENT

Equipment	PPV (in/sec) at 25 feet
Small bulldozer	0.003
Jackhammer	0.035
Loaded Trucks	0.076
Large bulldozer	0.089

Source: Federal Transit Administration, Transit Noise and Vibration Impact Assessment, May 2006.

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7 OFF-SITE TRANSPORTATION NOISE IMPACTS

To assess the off-site transportation CNEL noise level impacts associated with development of the proposed Project, noise contours were developed based on the *Knox Business Park Traffic Impact Analysis*. (1) Noise contour boundaries represent the equal levels of noise exposure and are measured in CNEL from the center of the roadway. Noise contours were developed for the following traffic scenarios:

- Existing Without / With Project: This scenario refers to the existing present-day noise conditions, without and with the proposed Preferred Project.
- Year (2017) Without / With Project: This scenario refers to the background noise conditions at future Year 2017 without and with the proposed Preferred Project.
- Year (2035) Without / With Project: This scenario refers to the background noise conditions at future Year 2035 without and with the proposed Project. This scenario corresponds to 2035 conditions, and includes all cumulative projects identified in the Traffic Impact Analysis.

7.1 TRAFFIC NOISE CONTOURS

To quantify the Project's traffic noise impacts on the surrounding areas, the changes in traffic noise levels on 12 roadway segments surrounding the Project were calculated based on the changes in the average daily traffic volumes. Based on the noise impact significance criteria described in Section 4 and shown on Table 4-2, a significant off-site traffic noise level impact occurs:

- When the noise levels at existing and future noise-sensitive land uses (e.g. residential, etc.):
    - are less than 60 dBA and the Project creates a *readily perceptible* 5 dBA or greater Project related noise level increase; or
    - range from 60 to 65 dBA and the Project creates a *barely perceptible* 3 dBA or greater Project noise level increase; or
    - already exceed 65 dBA, and the Project creates a community noise level impact of greater than 1.5 dBA (FICON, 1992).
- When the noise levels at existing and future non-noise-sensitive land uses (e.g. business park, industrial, etc.):
    - are less than the County of Riverside General Plan Noise Element, Table N-1, *normally acceptable* 70 dBA and the Project creates a *readily perceptible* 5 dBA or greater Project related noise level increase; or
    - are greater than the County of Riverside General Plan Noise Element, Table N-1, *normally acceptable* 70 dBA and the Project creates a *barely perceptible* 3 dBA or greater Project noise level increase.

Since the land uses adjacent to the study area roadways conveying Project traffic consist mostly of non-noise-sensitive business park/industrial uses, as shown on Table 7-1, the non-noise-sensitive significance criteria shall apply. Noise contours were used to assess the Project's incremental traffic-related noise impacts at land uses adjacent to roadways conveying Project traffic. The noise contours represent the distance to noise levels of a constant value and are

measured from the center of the roadway for the 70, 65, and 60 dBA noise levels. The noise contours do not consider the effect of any existing noise barriers or topography that may affect ambient noise levels. In addition, since the noise contours reflect modeling of vehicular noise along area roadways, they appropriately do not reflect noise contributions from the surrounding stationary noise sources within the Project study area. Tables 7-1 through 7-6 present a summary of the unmitigated exterior traffic noise levels for the 12 study area roadway segments analyzed from the without Project to the with Project conditions in each of the three timeframes: Existing, Year 2017, and Year 2035 conditions. Appendix 7.1 includes a summary of the traffic noise level contours for each of the six traffic scenarios.

TABLE 7-1: EXISTING WITHOUT PROJECT CONDITIONS NOISE CONTOURS

ID	Road	Segment	Adjacent Planned Land Use[1]	CNEL at Nearest Adjacent Land Use (dBA)[2]	Distance to Contour from Centerline (Feet)		
					70 dBA CNEL	65 dBA CNEL	60 dBA CNEL
1	Harvill Av.	s/o Harley Knox Bl.	Business Park	65.9	RW	115	247
2	Harvill Av.	n/o Oleander Av.	Business Park	65.6	RW	110	237
3	Harvill Av.	s/o Oleander Av.	Business Park	65.5	RW	107	231
4	I-215 SB Fwy	n/o Harley Knox Bl.	Light Industrial	74.3	194	418	901
5	I-215 SB Fwy	s/o Harley Knox Bl.	Light Industrial	73.8	180	388	836
6	I-215 NB Fwy	n/o Harley Knox Bl.	Light Industrial	73.6	173	373	803
7	I-215 NB Fwy	s/o Harley Knox Bl.	Light Industrial	72.9	156	336	724
8	Harley Knox Bl.	e/o Harvill Av.	Business Park	65.1	RW	102	220
9	Harley Knox Bl.	e/o I-215 SB Fwy Ramps	Light Industrial	66.0	RW	117	253
10	Harley Knox Bl.	e/o I-215 NB Fwy Ramps	Light Industrial	67.1	RW	138	298
11	Oleander Av.	e/o Driveway 6	Business Park	44.1	RW	RW	RW
12	Oleander Av.	w/o Harvill Av.	Business Park	51.0	RW	RW	RW

[1] Sources: County of Riverside General Plan, Mead Valley Area Plan Land Use Plan, Figure 3.
[2] The CNEL is calculated at the boundary of the right-of-way of each roadway and the property line of the nearest adjacent land use.
"RW" = Location of the respective noise contour falls within the right-of-way of the road.

TABLE 7-2: EXISTING WITH PROJECT CONDITIONS NOISE CONTOURS

ID	Road	Segment	Adjacent Planned Land Use[1]	CNEL at Nearest Adjacent Land Use (dBA)[2]	Distance to Contour from Centerline (Feet)		
					70 dBA CNEL	65 dBA CNEL	60 dBA CNEL
1	Harvill Av.	s/o Harley Knox Bl.	Business Park	68.5	80	172	371
2	Harvill Av.	n/o Oleander Av.	Business Park	68.4	78	168	362
3	Harvill Av.	s/o Oleander Av.	Business Park	65.7	RW	111	240
4	I-215 SB Fwy	n/o Harley Knox Bl.	Light Industrial	74.3	194	418	901
5	I-215 SB Fwy	s/o Harley Knox Bl.	Light Industrial	74.0	185	400	861
6	I-215 NB Fwy	n/o Harley Knox Bl.	Light Industrial	74.2	191	412	888
7	I-215 NB Fwy	s/o Harley Knox Bl.	Light Industrial	72.9	156	336	724
8	Harley Knox Bl.	e/o Harvill Av.	Business Park	67.8	RW	154	332
9	Harley Knox Bl.	e/o I-215 SB Fwy Ramps	Light Industrial	67.9	RW	157	338
10	Harley Knox Bl.	e/o I-215 NB Fwy Ramps	Light Industrial	67.2	RW	141	304
11	Oleander Av.	e/o Driveway 6	Business Park	63.8	RW	83	179
12	Oleander Av.	w/o Harvill Av.	Business Park	64.0	RW	86	184

[1] Sources: County of Riverside General Plan, Mead Valley Area Plan Land Use Plan, Figure 3.

[2] The CNEL is calculated at the boundary of the right-of-way of each roadway and the property line of the nearest adjacent land use.

"RW" = Location of the respective noise contour falls within the right-of-way of the road.

TABLE 7-3: YEAR 2017 WITHOUT PROJECT CONDITIONS NOISE CONTOURS

ID	Road	Segment	Adjacent Planned Land Use[1]	CNEL at Nearest Adjacent Land Use (dBA)[2]	Distance to Contour from Centerline (Feet)		
					70 dBA CNEL	65 dBA CNEL	60 dBA CNEL
1	Harvill Av.	s/o Harley Knox Bl.	Business Park	66.8	61	131	283
2	Harvill Av.	n/o Oleander Av.	Business Park	66.7	60	130	280
3	Harvill Av.	s/o Oleander Av.	Business Park	66.4	RW	124	267
4	I-215 SB Fwy	n/o Harley Knox Bl.	Light Industrial	75.5	234	503	1085
5	I-215 SB Fwy	s/o Harley Knox Bl.	Light Industrial	75.2	223	479	1033
6	I-215 NB Fwy	n/o Harley Knox Bl.	Light Industrial	75.0	214	461	993
7	I-215 NB Fwy	s/o Harley Knox Bl.	Light Industrial	73.9	181	391	842
8	Harley Knox Bl.	e/o Harvill Av.	Business Park	66.1	RW	119	257
9	Harley Knox Bl.	e/o I-215 SB Fwy Ramps	Light Industrial	68.6	81	174	374
10	Harley Knox Bl.	e/o I-215 NB Fwy Ramps	Light Industrial	70.1	101	218	471
11	Oleander Av.	e/o Driveway 6	Business Park	44.1	RW	RW	RW
12	Oleander Av.	w/o Harvill Av.	Business Park	51.0	RW	RW	RW

[1] Sources: County of Riverside General Plan, Mead Valley Area Plan Land Use Plan, Figure 3.

[2] The CNEL is calculated at the boundary of the right-of-way of each roadway and the property line of the nearest adjacent land use.

"RW" = Location of the respective noise contour falls within the right-of-way of the road.

TABLE 7-4: YEAR 2017 WITH PROJECT CONDITIONS NOISE CONTOURS

ID	Road	Segment	Adjacent Planned Land Use[1]	CNEL at Nearest Adjacent Land Use (dBA)[2]	Distance to Contour from Centerline (Feet)		
					70 dBA CNEL	65 dBA CNEL	60 dBA CNEL
1	Harvill Av.	s/o Harley Knox Bl.	Business Park	69.0	86	186	401
2	Harvill Av.	n/o Oleander Av.	Business Park	69.0	86	185	398
3	Harvill Av.	s/o Oleander Av.	Business Park	66.6	59	128	275
4	I-215 SB Fwy	n/o Harley Knox Bl.	Light Industrial	75.5	234	503	1085
5	I-215 SB Fwy	s/o Harley Knox Bl.	Light Industrial	75.4	227	490	1055
6	I-215 NB Fwy	n/o Harley Knox Bl.	Light Industrial	75.4	231	497	1070
7	I-215 NB Fwy	s/o Harley Knox Bl.	Light Industrial	73.9	181	391	842
8	Harley Knox Bl.	e/o Harvill Av.	Business Park	68.4	78	168	363
9	Harley Knox Bl.	e/o I-215 SB Fwy Ramps	Light Industrial	69.7	96	207	447
10	Harley Knox Bl.	e/o I-215 NB Fwy Ramps	Light Industrial	70.2	102	221	476
11	Oleander Av.	e/o Driveway 6	Business Park	63.8	RW	83	179
12	Oleander Av.	w/o Harvill Av.	Business Park	64.0	RW	86	184

[1] Sources: County of Riverside General Plan, Mead Valley Area Plan Land Use Plan, Figure 3.

[2] The CNEL is calculated at the boundary of the right-of-way of each roadway and the property line of the nearest adjacent land use.

"RW" = Location of the respective noise contour falls within the right-of-way of the road.

TABLE 7-5: YEAR 2035 WITHOUT PROJECT CONDITIONS NOISE CONTOURS

ID	Road	Segment	Adjacent Planned Land Use[1]	CNEL at Nearest Adjacent Land Use (dBA)[2]	Distance to Contour from Centerline (Feet)		
					70 dBA CNEL	65 dBA CNEL	60 dBA CNEL
1	Harvill Av.	s/o Harley Knox Bl.	Business Park	69.7	96	207	447
2	Harvill Av.	n/o Oleander Av.	Business Park	69.7	96	207	447
3	Harvill Av.	s/o Oleander Av.	Business Park	70.6	109	236	508
4	I-215 SB Fwy	n/o Harley Knox Bl.	Light Industrial	76.8	285	613	1321
5	I-215 SB Fwy	s/o Harley Knox Bl.	Light Industrial	76.4	267	576	1241
6	I-215 NB Fwy	n/o Harley Knox Bl.	Light Industrial	76.9	287	618	1332
7	I-215 NB Fwy	s/o Harley Knox Bl.	Light Industrial	75.7	239	516	1111
8	Harley Knox Bl.	e/o Harvill Av.	Business Park	70.5	108	232	500
9	Harley Knox Bl.	e/o I-215 SB Fwy Ramps	Light Industrial	69.6	95	204	440
10	Harley Knox Bl.	e/o I-215 NB Fwy Ramps	Light Industrial	70.8	113	243	524
11	Oleander Av.	e/o Driveway 6	Business Park	62.3	RW	66	141
12	Oleander Av.	w/o Harvill Av.	Business Park	62.3	RW	66	141

[1] Sources: County of Riverside General Plan, Mead Valley Area Plan Land Use Plan, Figure 3.

[2] The CNEL is calculated at the boundary of the right-of-way of each roadway and the property line of the nearest adjacent land use.

"RW" = Location of the respective noise contour falls within the right-of-way of the road.

TABLE 7-6: YEAR 2035 WITH PROJECT CONDITIONS NOISE CONTOURS

ID	Road	Segment	Adjacent Planned Land Use[1]	CNEL at Nearest Adjacent Land Use (dBA)[2]	Distance to Contour from Centerline (Feet)		
					70 dBA CNEL	65 dBA CNEL	60 dBA CNEL
1	Harvill Av.	s/o Harley Knox Bl.	Business Park	71.0	117	253	544
2	Harvill Av.	n/o Oleander Av.	Business Park	71.0	117	253	544
3	Harvill Av.	s/o Oleander Av.	Business Park	70.7	111	238	514
4	I-215 SB Fwy	n/o Harley Knox Bl.	Light Industrial	76.8	285	613	1321
5	I-215 SB Fwy	s/o Harley Knox Bl.	Light Industrial	76.5	272	585	1261
6	I-215 NB Fwy	n/o Harley Knox Bl.	Light Industrial	77.2	301	649	1399
7	I-215 NB Fwy	s/o Harley Knox Bl.	Light Industrial	75.7	239	516	1111
8	Harley Knox Bl.	e/o Harvill Av.	Business Park	71.5	125	269	580
9	Harley Knox Bl.	e/o I-215 SB Fwy Ramps	Light Industrial	70.6	109	235	507
10	Harley Knox Bl.	e/o I-215 NB Fwy Ramps	Light Industrial	70.8	114	245	528
11	Oleander Av.	e/o Driveway 6	Business Park	66.1	55	118	254
12	Oleander Av.	w/o Harvill Av.	Business Park	66.1	55	118	254

[1] Sources: County of Riverside General Plan, Mead Valley Area Plan Land Use Plan, Figure 3.
[2] The CNEL is calculated at the boundary of the right-of-way of each roadway and the property line of the nearest adjacent land use.
"RW" = Location of the respective noise contour falls within the right-of-way of the road.

7.2 EXISTING CONDITION PROJECT TRAFFIC NOISE LEVEL CONTRIBUTIONS

Table 7-1 presents the Existing without Project conditions CNEL noise levels. From this we can see that the exterior noise levels are expected to range from 44.1 to 74.3 dBA CNEL, without accounting for any noise attenuation features such as noise barriers or topography. Table 7-2 shows the Existing with Project conditions will range from 63.8 to 74.3 dBA CNEL. As shown on Table 7-7 the Project will generate *potentially significant* noise level increases of 13.0 to 19.7 dBA CNEL on two study area roadway segments: Oleander Avenue east of Driveway 6, and west of Harvill Avenue. However, it is important to note that Oleander Avenue is not fully constructed west of the future location of Driveway 6, which prevents existing through traffic along Oleander Avenue. The Existing without Project noise levels ranged from 44.1 to 51.0 dBA CNEL due to the low existing traffic volumes along these segments. Further, the Project-generated traffic represents a larger noise level increase since the roadway will be fully constructed under Existing with Project conditions. Moreover, the Project-related traffic noise level increases will not cause the Existing without Project noise levels to exceed the County of Riverside General Plan Noise Element *normally acceptable* 70 dBA CNEL *Land Use Compatibility for Community Noise Exposure* criteria for Business Park and Industrial land uses.

However, based on the significance criteria in Section 4, the *readily perceptible* Project-related increases of greater than 5 dBA at non-noise-sensitive land uses represent a *potentially significant* impact under Existing conditions.

TABLE 7-7: EXISTING CONDITION OFF-SITE PROJECT RELATED TRAFFIC NOISE IMPACTS

ID	Road	Segment	Adjacent Planned Land Use[1]	CNEL at Adjacent Land Use (dBA)[2]			Potential Significant Impact at Receivers?[3]	
				No Project	With Project	Project Addition	Noise-Sensitive	Non Noise-Sensitive
1	Harvill Av.	s/o Harley Knox Bl.	Business Park	65.9	68.5	2.6	No	No
2	Harvill Av.	n/o Oleander Av.	Business Park	65.6	68.4	2.8	No	No
3	Harvill Av.	s/o Oleander Av.	Business Park	65.5	65.7	0.2	No	No
4	I-215 SB Fwy	n/o Harley Knox Bl.	Light Industrial	74.3	74.3	0.0	No	No
5	I-215 SB Fwy	s/o Harley Knox Bl.	Light Industrial	73.8	74.0	0.2	No	No
6	I-215 NB Fwy	n/o Harley Knox Bl.	Light Industrial	73.6	74.2	0.6	No	No
7	I-215 NB Fwy	s/o Harley Knox Bl.	Light Industrial	72.9	72.9	0.0	No	No
8	Harley Knox Bl.	e/o Harvill Av.	Business Park	65.1	67.8	2.7	No	No
9	Harley Knox Bl.	e/o I-215 SB Fwy Ramps	Light Industrial	66.0	67.9	1.9	No	No
10	Harley Knox Bl.	e/o I-215 NB Fwy Ramps	Light Industrial	67.1	67.2	0.1	No	No
11	Oleander Av.	e/o Driveway 6	Business Park	44.1	63.8	19.7	No	Yes
12	Oleander Av.	w/o Harvill Av.	Business Park	51.0	64.0	13.0	No	Yes

[1] Sources: County of Riverside General Plan, Mead Valley Area Plan Land Use Plan, Figure 3.
[2] The CNEL is calculated at the boundary of the right-of-way of each roadway and the property line of the nearest adjacent land use.
[3] Significance Criteria (Section 4).

7.3 YEAR 2017 PROJECT TRAFFIC NOISE LEVEL CONTRIBUTIONS

Table 7-8 presents a comparison of the Year 2017 without and with Project conditions CNEL noise levels. Table 7-3 shows that the exterior noise levels without accounting for any noise attenuation features are expected to range from 44.1 to 75.5 dBA CNEL without the Project. Table 7-4 presents the Year 2017 with Project conditions noise level contours that are expected to range from 63.8 to 75.5 dBA CNEL. As shown on Table 7-8 the Project will generate *potentially significant* noise level increases of 13.0 to 19.7 dBA CNEL on two study area roadway segments: Oleander Avenue east of Driveway 6, and west of Harvill Avenue. However, it is important to note that Oleander Avenue is not fully constructed west of the future location of Driveway 6, which prevents through traffic along Oleander Avenue. The Year 2017 without Project noise levels range from 44.1 to 51.0 dBA CNEL due to the low traffic volumes along these segments. Further, the Project-generated traffic then represents a larger noise level increase since the roadway will be fully constructed under Year 2017 with Project conditions. Moreover, the Project-related traffic noise level increases will not cause the Year 2017 without Project noise levels to exceed the County of Riverside General Plan Noise Element *normally acceptable* 70 dBA CNEL *Land Use Compatibility for Community Noise Exposure* criteria for Business Park and Industrial land uses.

However, based on the significance criteria in Section 4, the *readily perceptible* Project-related increases of greater than 5 dBA at non-noise-sensitive land uses represents a *potentially significant* impact under Year 2017 conditions.

TABLE 7-8: YEAR 2017 OFF-SITE PROJECT RELATED TRAFFIC NOISE IMPACTS

ID	Road	Segment	Adjacent Planned Land Use[1]	CNEL at Adjacent Land Use (dBA)[2]			Potential Significant Impact at Receivers?[3]	
				No Project	With Project	Project Addition	Noise-Sensitive	Non Noise-Sensitive
1	Harvill Av.	s/o Harley Knox Bl.	Business Park	66.8	69.0	2.2	No	No
2	Harvill Av.	n/o Oleander Av.	Business Park	66.7	69.0	2.3	No	No
3	Harvill Av.	s/o Oleander Av.	Business Park	66.4	66.6	0.2	No	No
4	I-215 SB Fwy	n/o Harley Knox Bl.	Light Industrial	75.5	75.5	0.0	No	No
5	I-215 SB Fwy	s/o Harley Knox Bl.	Light Industrial	75.2	75.4	0.2	No	No
6	I-215 NB Fwy	n/o Harley Knox Bl.	Light Industrial	75.0	75.4	0.4	No	No
7	I-215 NB Fwy	s/o Harley Knox Bl.	Light Industrial	73.9	73.9	0.0	No	No
8	Harley Knox Bl.	e/o Harvill Av.	Business Park	66.1	68.4	2.3	No	No
9	Harley Knox Bl.	e/o I-215 SB Fwy Ramps	Light Industrial	68.6	69.7	1.1	No	No
10	Harley Knox Bl.	e/o I-215 NB Fwy Ramps	Light Industrial	70.1	70.2	0.1	No	No
11	Oleander Av.	e/o Driveway 6	Business Park	44.1	63.8	19.7	No	Yes
12	Oleander Av.	w/o Harvill Av.	Business Park	51.0	64.0	13.0	No	Yes

[1] Sources: County of Riverside General Plan, Mead Valley Area Plan Land Use Plan, Figure 3.
[2] The CNEL is calculated at the boundary of the right-of-way of each roadway and the property line of the nearest adjacent land use.
[3] Significance Criteria (Section 4).

7.4 YEAR 2035 PROJECT TRAFFIC NOISE LEVEL CONTRIBUTIONS

Table 7-9 presents a comparison of the Year 2035 without and with Project conditions CNEL noise levels. Table 7-5 shows that the exterior noise levels without accounting for any noise attenuation features are expected to range from 62.3 to 76.9 dBA CNEL without the Project. Table 7-6 presents the Year 2035 with Project conditions noise level contours that are expected to range from 66.1 to 77.2 dBA CNEL. As shown on Table 7-9 the Project will not generate any potentially significant noise level increases on the study area roadway segments. Based on the significance criteria in Section 4, the Project-related traffic noise level increases will be *less than significant* impacts under Year 2035 conditions.

TABLE 7-9: YEAR 2035 OFF-SITE PROJECT RELATED TRAFFIC NOISE IMPACTS

ID	Road	Segment	Adjacent Planned Land Use[1]	CNEL at Adjacent Land Use (dBA)[2]			Potential Significant Impact at Receivers?[3]	
				No Project	With Project	Project Addition	Noise-Sensitive	Non Noise-Sensitive
1	Harvill Av.	s/o Harley Knox Bl.	Business Park	69.7	71.0	1.3	No	No
2	Harvill Av.	n/o Oleander Av.	Business Park	69.7	71.0	1.3	No	No
3	Harvill Av.	s/o Oleander Av.	Business Park	70.6	70.7	0.1	No	No
4	I-215 SB Fwy	n/o Harley Knox Bl.	Light Industrial	76.8	76.8	0.0	No	No
5	I-215 SB Fwy	s/o Harley Knox Bl.	Light Industrial	76.4	76.5	0.1	No	No
6	I-215 NB Fwy	n/o Harley Knox Bl.	Light Industrial	76.9	77.2	0.3	No	No
7	I-215 NB Fwy	s/o Harley Knox Bl.	Light Industrial	75.7	75.7	0.0	No	No
8	Harley Knox Bl.	e/o Harvill Av.	Business Park	70.5	71.5	1.0	No	No
9	Harley Knox Bl.	e/o I-215 SB Fwy Ramps	Light Industrial	69.6	70.6	1.0	No	No
10	Harley Knox Bl.	e/o I-215 NB Fwy Ramps	Light Industrial	70.8	70.8	0.0	No	No
11	Oleander Av.	e/o Driveway 6	Business Park	62.3	66.1	3.8	No	No
12	Oleander Av.	w/o Harvill Av.	Business Park	62.3	66.1	3.8	No	No

[1] Sources: County of Riverside General Plan, Mead Valley Area Plan Land Use Plan, Figure 3.
[2] The CNEL is calculated at the boundary of the right-of-way of each roadway and the property line of the nearest adjacent land use.
[3] Significance Criteria (Section 4).

7.5 CUMULATIVE PROJECT TRAFFIC NOISE IMPACTS

According to the U.S. Environmental Protection Agency (EPA), cumulative impacts represent the combined incremental effects of human activities that accumulate over time. (19) While the incremental impacts may be insignificant by themselves, the combined effect may result in a significant impact. The level of significance attributed to a cumulative noise impact is based on a comparison of the Existing without Project noise levels with the future Year 2035 without Project noise levels. A significant impact occurs when the Existing noise levels at nearby Business Park/Industrial land uses are less than the County of Riverside General Plan Noise Element, Table N-1, *normally acceptable* 70 dBA and a *readily perceptible* 5 dBA or greater noise level increase occurs; or are greater than the *normally acceptable* 70 dBA and a *barely perceptible* 3 dBA or greater noise level increase occurs due to cumulative development.

Table 7-10 shows that the cumulative increase from Existing to Year 2035 without Project conditions will range from 2.5 to 18.2 dBA CNEL. Based on the significance criteria in Section 4, the cumulative increase represents a *significant* cumulative impact on the non-noise-sensitive land uses adjacent to the study area roadway segments. To determine if the Project-related contribution to the cumulative noise impact is potentially significant, the Year 2035 Project-related noise level increases were combined with the cumulative Year 2035 without Project noise level increases. As previously shown on Table 7-9, the Year 2035 with Project noise level increases will approach 3.8 dBA CNEL and represent a *less than significant* impact under Year 2035 conditions. However, to determine if the Project-related impact is cumulatively

considerable, the Project's contribution to the cumulative impact must be determined. As shown on Table 7-10, the combined Project plus cumulative noise level increases will range from 4.4 to 18.4 dBA CNEL. The Project contribution to the cumulative increase is then determined by subtracting the Year 2035 cumulative traffic noise level increase from the combined Project plus cumulative noise level increase. The Project's actual contribution to the cumulative noise level increases will range from 0.2 to 1.9 dBA CNEL, and will not exceed the significance thresholds for non-noise-sensitive land uses. Therefore, since the Project-related off-site traffic noise level increases represent a *less than significant* contribution to the cumulative noise impacts, the Project-related traffic noise level increases are *less than cumulatively considerable*.

TABLE 7-10: YEAR 2035 OFF-SITE CUMULATIVE TRAFFIC NOISE IMPACTS (DBA CNEL)

ID	Road	Segment	Adjacent Planned Land Use[1]	CNEL at Adjacent Land Use[2]		Cumulative		Noise Level Increases		Project-Related	
				Existing Without Project (Table 7-1)	Year 2035 Without Project (Table 7-5)	Increase From Existing[3]	Potential Impact?[4]	Year 2035 Project-Related (Table 7-9)	Project Plus Cumulative[5]	Cumulative Contribution[6]	Cumulatively Considerable Impact?[7]
1	Harvill Av.	s/o Harley Knox Bl.	Business Park	65.9	69.7	3.8	No	1.3	5.7	1.9	No
2	Harvill Av.	n/o Oleander Av.	Business Park	65.6	69.7	4.1	No	1.3	5.9	1.8	No
3	Harvill Av.	s/o Oleander Av.	Business Park	65.5	70.6	5.1	Yes	0.1	6.3	1.2	No
4	I-215 SB Fwy	n/o Harley Knox Bl.	Light Industrial	74.3	76.8	2.5	No	0.0	4.4	1.9	No
5	I-215 SB Fwy	s/o Harley Knox Bl.	Light Industrial	73.8	76.4	2.6	No	0.1	4.5	1.9	No
6	I-215 NB Fwy	n/o Harley Knox Bl.	Light Industrial	73.6	76.9	3.3	Yes	0.3	5.1	1.8	No
7	I-215 NB Fwy	s/o Harley Knox Bl.	Light Industrial	72.9	75.7	2.8	No	0.0	4.6	1.8	No
8	Harley Knox Bl.	e/o Harvill Av.	Business Park	65.1	70.5	5.4	Yes	1.0	6.7	1.3	No
9	Harley Knox Bl.	e/o I-215 SB Fwy Ramps	Light Industrial	66.0	69.6	3.6	No	1.0	5.5	1.9	No
10	Harley Knox Bl.	e/o I-215 NB Fwy Ramps	Light Industrial	67.1	70.8	3.7	No	0.0	5.2	1.5	No
11	Oleander Av.	e/o Driveway 6	Business Park	44.1	62.3	18.2	Yes	3.8	18.4	0.2	No
12	Oleander Av.	w/o Harvill Av.	Business Park	51.0	62.3	11.3	Yes	3.8	12.0	0.7	No

[1] Sources: County of Riverside General Plan, Mead Valley Area Plan Land Use Plan, Figure 3.
[2] The CNEL is calculated at the boundary of the right-of-way of each roadway and the property line of the nearest adjacent land use.
[3] Increase from Existing without Project to Year 2035 without Project conditions.
[4] Does the cumulative increase without the Project exceed the 3 dBA significance criteria for non-noise-sensitive land uses?
[5] Combined cumulative and Project Year 2035 noise level increases.
[6] Total Project contribution to the cumulative noise level increase.
[7] Does the Project-related contribution to the cumulative noise level increase exceed the 3 dBA significance criteria for non-noise-sensitive land uses?

8 RECEIVER LOCATIONS

To assess the potential for long-term operational and short-term construction noise impacts, the following eight receiver locations, as shown on Exhibit 8-A, were identified as representative locations for analysis. Sensitive receivers are generally defined as locations where people reside or where the presence of unwanted sound could otherwise adversely affect the use of the land. Noise-sensitive land uses are generally considered to include: schools, hospitals, single-family dwellings, mobile home parks, churches, libraries, and recreation areas. Moderately noise-sensitive land uses typically include: multi-family dwellings, hotels, motels, dormitories, out-patient clinics, cemeteries, golf courses, country clubs, athletic/tennis clubs, and equestrian clubs. Land uses that are considered relatively insensitive to noise include business, commercial, and professional developments. Land uses that are typically not affected by noise include: industrial, manufacturing, utilities, agriculture, natural open space, undeveloped land, parking lots, warehousing, liquid and solid waste facilities, salvage yards, and transit terminals.

Representative sensitive receivers near the Project site include the single-family residential homes at locations R1 to R8. The closest noise-sensitive receiver is represented by location R6 where an existing residential home is located approximately 191 feet from the Project site boundary.

R1: Located approximately 1,992 feet northwest of the Project site along Corson Avenue, R1 represents existing single-family residential homes. A long-term noise measurement was taken near this location, L1, to describe the existing ambient noise environment.

R2: Location R2 represents the existing residential homes located roughly 1,141 feet west of the Project site and east of Day Street. A long-term noise measurement was taken near this location, L2, to describe the existing ambient noise environment.

R3: Location R3 represents the existing residential homes situated southwest of the Project site at approximately 1,044 feet along Nance Street. A long-term noise measurement was taken at this location, L3, to describe the existing ambient noise environment.

R4: Location R4 represents the existing residential homes situated approximately 631 feet southwest of the Project site.

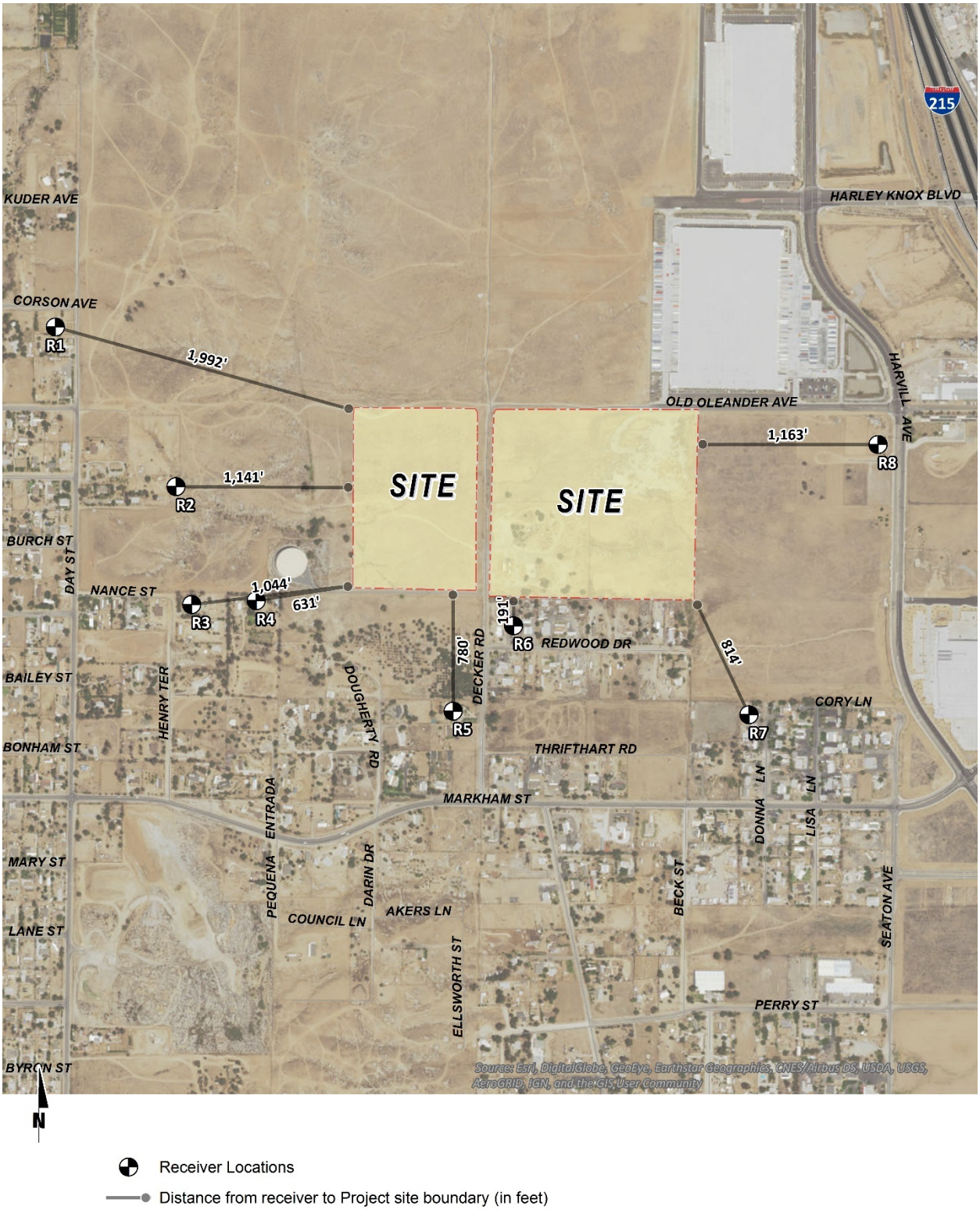
R5: At approximately 780 feet, location R5 represents a single-family residential home situated along Decker Road south of the Project site. A long-term noise measurement was taken near this location, L6, to describe the existing ambient noise environment.

R6: At 191 feet south of the Project site, R6 describes the residential homes located along Redwood Drive. A long-term noise measurement was taken near this location, L4, to describe the existing ambient noise environment.

R7: Location R7 represents the existing residential home located approximately 814 feet southeast of the Project site along Donna Lane.

R8: At approximately 1,163 feet, location R8 represents a single-family residential home situated along Harvill Avenue, east of the Project site. A long-term noise measurement was taken near this location, L5, to describe the existing ambient noise environment.

EXHIBIT 8-A: RECEIVER LOCATIONS



9 OPERATIONAL NOISE IMPACTS

This section analyzes the potential stationary-source operational noise impacts at nearby receiver locations resulting from operation of the proposed Knox Business Park. Exhibit 9-A identifies the representative receiver locations and noise source locations used to assess the operational noise levels.

9.1 OPERATIONAL NOISE STANDARDS

The County of Riverside has set exterior noise limits to control idling trucks, delivery truck activities, parking, backup alarms, as well as loading and unloading of dry goods associated with projects like the proposed Knox Business Park. The County considers noise generated by the use of motor vehicles to be a stationary noise source when operated on private property such as at a truck terminal or warehousing facility. These facility-related noises, as projected to any portion of any surrounding property containing a *habitable dwelling, hospital, school, library or nursing home*, must not exceed the following worst-case noise levels.

Policy N 4.1 of the Noise Element sets an exterior noise limit not to be exceeded for a cumulative period of more than ten minutes in any hour of 65 dBA Leq for daytime hours of 7:00 a.m. to 10:00 p.m., and 45 dBA Leq during the noise-sensitive nighttime hours of 10:00 p.m. to 7:00 a.m. Policy N 4.8 of the Noise Element requires that loading docks of industrial land uses minimize the potential noise impacts of vehicles on the site, as well on the adjacent land uses. (12) The County of Riverside operational noise standards used in this analysis are shown on Table 3-1.

9.2 OPERATIONAL NOISE SOURCES

At the time this noise analysis was prepared, the future tenants of the proposed Project were unknown. Furthermore, this analysis assumes the Project would be operational 24 hours per day, seven days per week. This analysis does not account for the noise associated with tenants that require cold storage (refrigeration). Business operations would primarily be conducted within the enclosed buildings, except for traffic movement, parking, and the loading and unloading of trucks at designated loading bays. The on-site Project related noise sources are expected to include: idling trucks, delivery truck activities, parking, backup alarms, as well as loading and unloading of dry goods.

This analysis does not account for any special noise generators that may be needed to accommodate the needs of specific Knox Business Park building tenants. Special noise generators may consist of outdoor compressors, air scrubbers, heavy materials handlings, HVAC units, emergency generators, etc. This noise analysis is intended to describe noise level impacts associated with the expected typical warehouse and distribution storage activities at the Project site.

9.3 REFERENCE NOISE LEVELS

Since the future tenants of the proposed Project are unknown, the Project's operational noise levels were estimated based on reference noise level measurements of similar logistics warehouse buildings. The reference noise levels are intended to describe the expected operational noise sources that may include idling trucks, delivery truck activities, parking, backup alarms, as well as loading and unloading of dry goods. To estimate the Project off-site operational noise impacts associated with the Knox Business Park, the following reference noise level measurements were collected at an existing logistics warehouse containing similar operational noise sources, as shown on Table 9-1. Appendix 9.1 includes reference noise source photos for each location.

9.3.1 MOTIVATIONAL FULFILLMENT & LOGISTICS SERVICES DISTRIBUTION FACILITY (DRY GOODS)

Short-term reference noise level measurements were collected on Wednesday, January 7th, 2015, by Urban Crossroads, Inc. at the Motivational Fulfillment & Logistics Services distribution facility located at 6810 Bickmore Avenue in the City of Chino. The noise level measurements represent the typical weekday dry goods logistics warehouse operation in a single building with a loading dock area along the western side of the building façade. Two reference noise level measurements were taken at this location, including entry gate activity and unloading/docking activity noise sources. Up to ten trucks were observed in the loading dock area including a combination of track trailer semi-trucks, two-axle delivery trucks, and background forklift operations.

ENTRY GATE ACTIVITY

The entry gate activity noise level measurement was taken at the southern entry gate over a 15-minute period and represents multiple noise sources producing a reference noise level of 64.0 dBA Leq. The noise sources included at this measurement location account for the rattling and squeaking during normal opening and closing operations, the gate closure equipment, truck engines idling outside the entry gate, and background forklift backup alarm noise.

UNLOADING/DOCKING ACTIVITY

The unloading/docking activity noise level measurement was taken over a 15-minute period and represents multiple noise sources taken from the center of loading dock activities generating a reference noise level of 67.2 dBA Leq. At this measurement location, the noise sources associated with employees unloading a docked truck container included the squeaking of the truck's shocks when weight was removed from the truck, employees playing music over a radio, as well as a forklift horn and backup alarm. In addition, during the noise level measurement a truck entered the loading dock area and proceeded to reverse and dock in a nearby loading bay, adding truck engine and air brakes noise.

9.3.2 WORST-CASE REFERENCE NOISE LEVELS

To describe the worst-case Project-only operational noise levels associated with the Knox Business Park, this analysis relies on a reference noise level of 67.2 dBA Leq representing unloading/docking activity taken at the Motivational Fulfillment & Logistics Services Distribution Facility (dry storage).

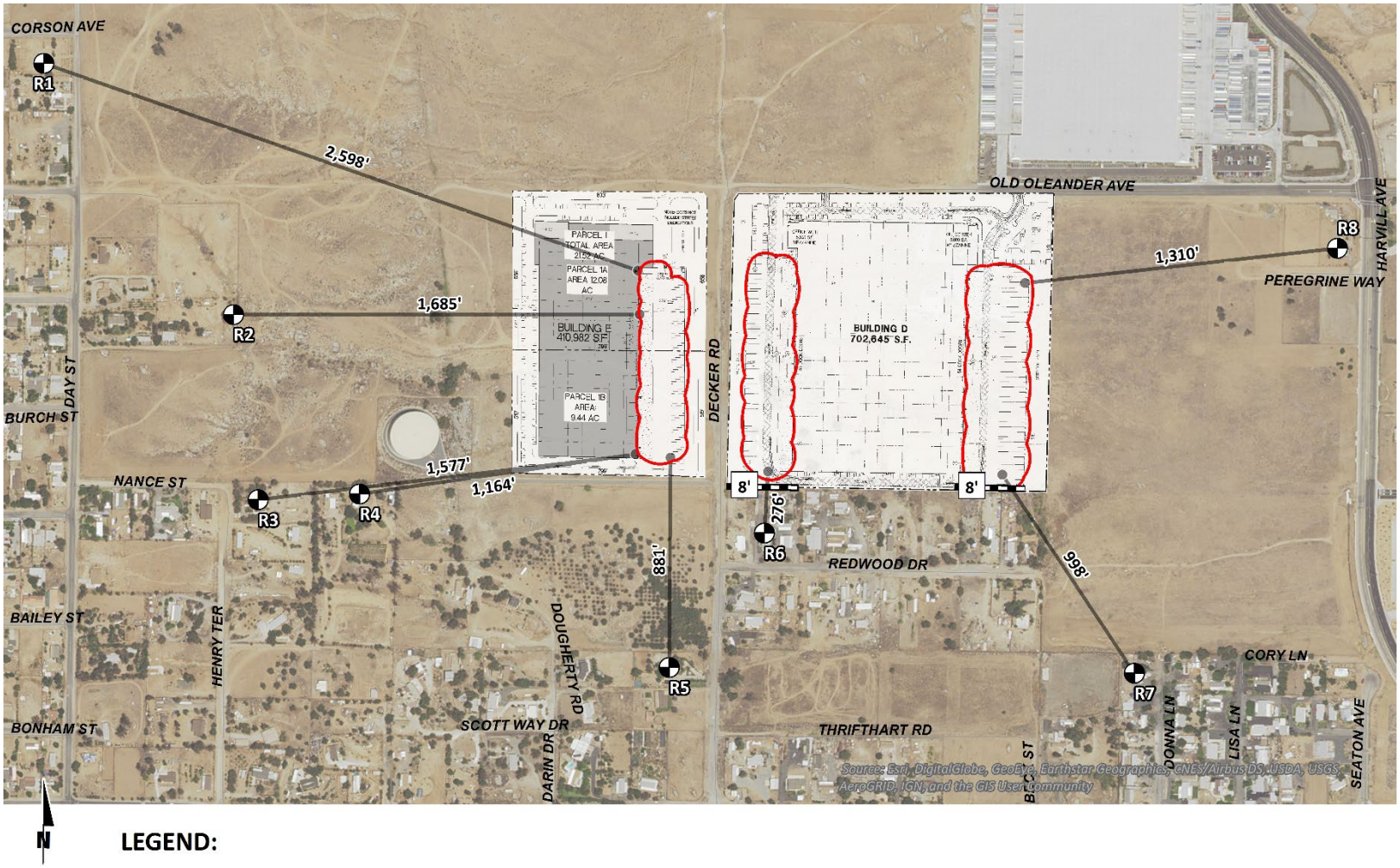
As shown on Table 9-1, the reference noise level of 67.2 dBA was measured at a distance of 30 feet and at a height of 8 feet. While the specific noise levels at the Project site will depend on the actual tenant, the intensity and the daytime / nighttime hours of operation, a reference noise level of 67.2 dBA Leq is used to describe the peak Project operational noise activity since it represents similar operational characteristics. The reference noise levels are intended to describe noise level impacts associated with the expected typical warehouse and distribution storage operations at the Project site and do not account for any special noise generators.

TABLE 9-1: REFERENCE NOISE LEVEL MEASUREMENTS

Noise Source	Duration (hh:mm:ss)	Distance From Source (Feet)	Noise Source Height (Feet)	Hourly Activity (Minutes)[2]	Hourly (dBA Leq)
Entry Gate Activity[1]	0:15:00	20'	8'	60	64.0
Unloading/Docking Activity[1]	0:15:00	30'	8'	60	67.2

[1] Reference noise level measurements were collected from the existing operations of the Motivational Fulfillment & Logistics Services distribution facility located at 6810 Bickmore Avenue in the City of Chino. The reference noise level measurements were collected on Wednesday, January 7, 2015.
[2] Duration (minutes within the hour) of noise activity during peak hourly conditions.

EXHIBIT 9-A: OPERATIONAL NOISE SOURCE LOCATIONS



9.4 PROJECT OPERATIONAL NOISE LEVELS

Using the 67.2 dBA Leq reference noise level to represent the proposed logistics warehouse operations that include idling trucks, delivery truck activities, parking, backup alarms, as well as loading and unloading of dry goods, it is possible to estimate the operational source noise levels generated at the Project site and the Project-related noise level increases that would be experienced at each of the sensitive receiver locations. The operational noise level calculations shown on Table 9-2 account for the distance attenuation provided due to geometric spreading, when sound from a localized stationary source (i.e., a point source) propagates uniformly outward in a spherical pattern. With geometric spreading, sound levels attenuate (or decrease) at a rate of 6 dB for each doubling of distance from a point source (idling trucks, delivery truck activities, parking, backup alarms, as well as loading and unloading of dry goods). In addition, the operational noise analysis accounts for the additional noise attenuation associated with the topographic relationship between the noise source, barrier and receiver locations based on the Project grading plans prepared by HPA Architecture. The elevations used for this analysis are included in the operational noise level calculation sheets in Appendix 9.2.

Table 9-2 presents the exterior noise levels including the barrier attenuation provided by the recommended 8-foot high noise barriers along the southern Project site boundary, as shown on Exhibit 9-A. Both the 8-foot high noise barriers were located at the top of slope elevation along the property line of the Project site to provide greater noise attenuation to nearby sensitive receivers. Table 9-2 indicates that the hourly noise levels associated with the Knox Business Park are expected to range from 28.4 to 37.8 dBA Leq at the sensitive receiver locations. The operational noise level calculations are included in Appendix 9.2.

9.5 PROJECT OPERATIONAL NOISE LEVEL COMPLIANCE

The operational noise levels associated with the idling trucks, delivery truck activities, parking, backup alarms, as well as loading and unloading of dry goods at the Knox Business Park will not exceed the County of Riverside General Plan Noise Element daytime (7:00 a.m. to 10:00 p.m.) noise level standard of 65 dBA Leq or the nighttime (10:00 p.m. to 7:00 a.m.) noise level standard of 45 dBA Leq at the sensitive residential receiver locations, as shown on Table 9-3. The Project-only noise levels shown on Table 9-3 include the attenuation provided by the recommended 8-foot high noise barriers along the southern Project site boundary. Without the recommended noise barriers at receiver location R6, which represents the closest residential homes along Redwood Drive to the Project site, the Project-only operational noise levels would not satisfy the County of Riverside General Plan Noise Element standards.

TABLE 9-2: OPERATIONAL NOISE LEVEL PROJECTIONS (DBA LEQ)

Receiver Location[1]	Project Noise (dBA Leq)[2]	Distance From Source To Receiver (Feet)[3]	Attenuation (dBA Leq)		Noise Level At Receiver Locations (dBA Leq)[6]
			Distance[4]	Recommended Noise Barriers[5]	
R1	67.2	2,598'	-38.8	0.0	28.4
R2	67.2	1,685'	-35.0	0.0	32.2
R3	67.2	1,577'	-34.4	0.0	32.8
R4	67.2	1,164'	-31.8	0.0	35.4
R5	67.2	881'	-29.4	0.0	37.8
R6	67.2	276'	-19.3	-11.0	36.9
R7	67.2	998'	-30.4	0.0	36.8
R8	67.2	1,310'	-32.8	0.0	34.4

[1] See Exhibit 9-A for the noise receiver and noise source locations.
[2] Worst-case Project-only reference noise level from Table 9-1.
[3] Estimated distances to nearest loading dock activities.
[4] Noise levels diminish at a rate 6 dBA per doubling of distance and a reference distance of 30 feet.
[5] Calculated noise attenuation provided by the recommended barriers, as shown on Exhibit 9-A.
[6] Estimated Project stationary source noise levels.

TABLE 9-3: OPERATIONAL NOISE LEVEL COMPLIANCE (DBA LEQ)

Receiver Location[1]	Noise Level At Receiver Locations (dBA Leq)[2]	Noise Level Standard (dBA Leq)[3]		Compliance[4]	
		Daytime	Nighttime	Daytime	Nighttime
R1	28.4	65	45	Yes	Yes
R2	32.2	65	45	Yes	Yes
R3	32.8	65	45	Yes	Yes
R4	35.4	65	45	Yes	Yes
R5	37.8	65	45	Yes	Yes
R6	36.9	65	45	Yes	Yes
R7	36.8	65	45	Yes	Yes
R8	34.4	65	45	Yes	Yes

[1] See Exhibit 9-A for the noise receiver and noise source locations.
[2] Estimated Project stationary source noise levels as shown on Table 9-2.
[3] Noise standards as shown on Table 3-1.
[4] Do the estimated Project stationary source noise levels meet the noise standards on the affected land uses? "Daytime" = 7:00 a.m. to 10:00 p.m.; "Nighttime" = 10:00 p.m. to 7:00 a.m.

9.6 CUMULATIVE OPERATIONAL NOISE IMPACTS

To account for potential cumulative stationary-source noise impacts, cumulative developments in the Project study area were identified. The cumulative developments used in this analysis were obtained from the *Knox Business Park Traffic Impact Analysis*, and are described on Table 9-4. The cumulative development locations, shown on Exhibit 9-B, represent those off-site cumulative development projects with potential to generate off-site operational noise sources and do not account for any planned residential land uses. In addition, planned development projects east of the I-215 Freeway were not included in the cumulative noise analysis due to their increased distance to the sensitive receiver locations. Further, the traffic noise levels from the I-215 Freeway are expected to largely overshadow and effectively mask potential stationary-source noise levels at planned developments east of the freeway, and, therefore, they do not represent considerable contributions to the existing noise environment at each of the receiver locations.

9.6.1 CUMULATIVE DEVELOPMENT OPERATIONAL NOISE LEVELS

Exhibit 9-B shows the location of each cumulative development in relation to the Project site and the noise-sensitive receiver locations. By identifying each development near the Project, the potential effects at each receiver location, such as a potential land use change or future development which would block the noise contributions from the Project site to the receiver, can be determined. Further, each development's potential stationary noise sources were estimated based on their planned land use designation. The stationary-source noise levels are determined using reference noise level measurements of similar land uses taken by Urban Crossroads, Inc. The cumulative developments and potential stationary noise sources are shown on Table 9-4.

Table 9-5 shows the estimated cumulative development noise levels at each receiver location from the operation of the projects identified on Table 9-4, based on the distance to each sensitive receiver location. The analysis shows that the noise levels due to the cumulative development activities are expected to range from 35.0 to 60.2 dBA Leq. The stationary-source cumulative noise level calculations are provided in Appendix 9.3.

EXHIBIT 9-B: CUMULATIVE DEVELOPMENT LOCATION MAP

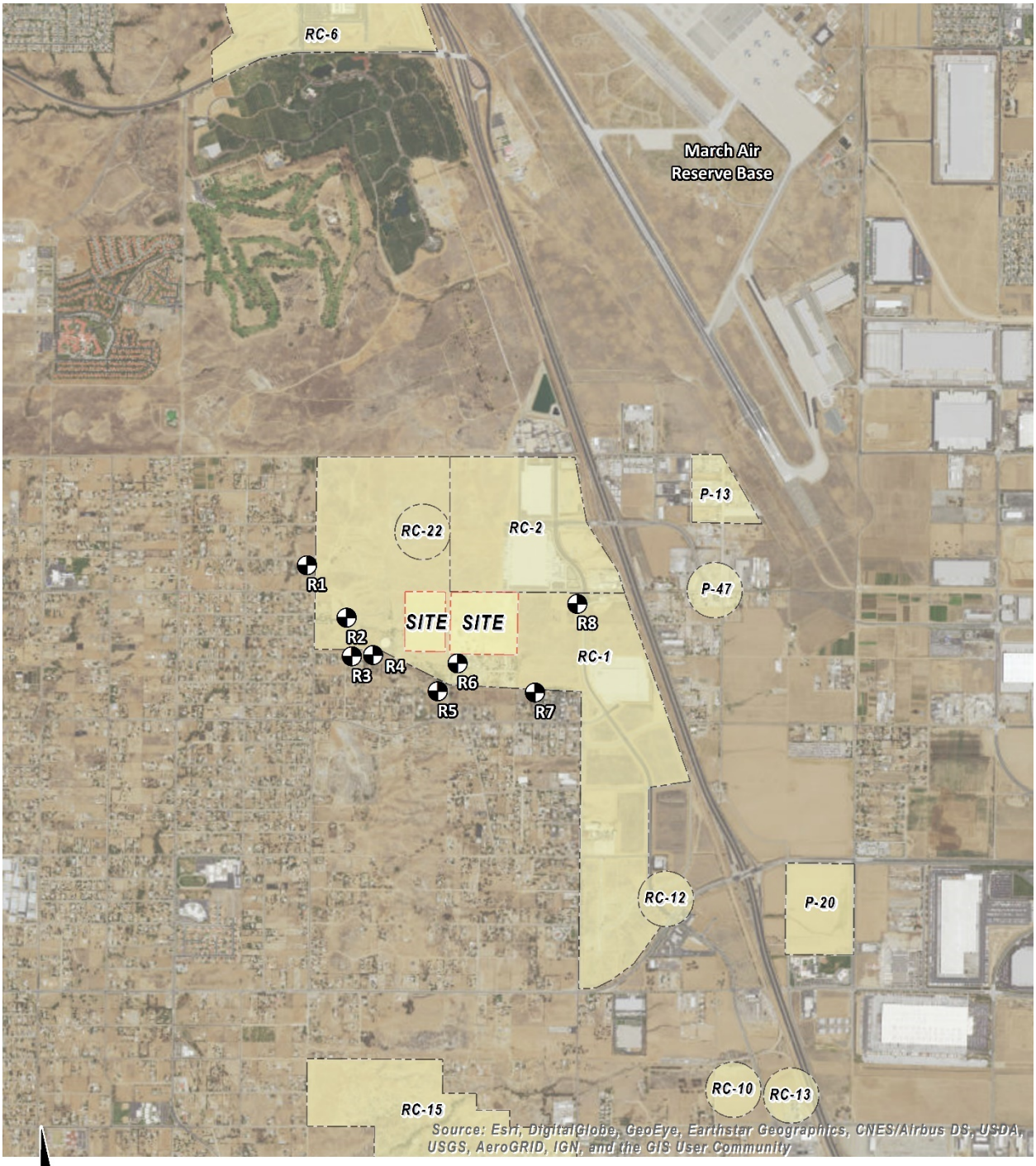


TABLE 9-4: CUMULATIVE DEVELOPMENTS AND STATIONARY NOISE SOURCES

Cumulative Development Number[1]	Development Name	Land Use(s)	Estimated Stationary Noise Source(s)[2]
P-13	P 06-0411 (Concrete Batch Plant)	Manufacturing	Unloading/Docking Activity[3]
P-20	Starcrest, P011-0005; 08-11-0006	General Light Industrial	Unloading/Docking Activity[3]
P-47	PM 34199, DPR 05-0387, DPR 05-0452, TPM 34697, DPR 06-0396	General Light Industrial Warehousing	Unloading/Docking Activity[3]
RC-1	Majestic Freeway Business Center	High-Cube Warehouse	Unloading/Docking Activity[3]
RC-2	PP 20699 (Oleander Business Park)	Warehousing	Unloading/Docking Activity[3]
RC-6	Meridian Business Park North	Industrial Park	Unloading/Docking Activity[3]
RC-10	PP 21144	Industrial Park	Unloading/Docking Activity[3]
RC-12	CUP03315	Gas Station with Market Fast Food without Drive Thru High-Turnover Restaurant	Parking Lot Vehicle Movements[4]
RC-13	PP23342	Industrial Park	Unloading/Docking Activity[3]
RC-15	Rider Street Quarry	Quarry	Unloading/Docking Activity[3]
RC-22	Blanding Assemblage	High-Cube Warehouse	Unloading/Docking Activity[3]

[1] Source: Knox Business Park Traffic Impact Analysis, Urban Crossroads, Inc. See Exhibit 9-B for the development locations.
[2] Estimated based on the land use(s) of each development using reference noise level measurements taken by Urban Crossroads, Inc.
[3] Reference noise level measurements were collected from the existing operations of the Motivational Fulfillment & Logistics Services distribution facility located at 6810 Bickmore Avenue in the City of Chino. The reference noise level measurements were collected on Wednesday, January 7, 2015.
[4] As measured by Urban Crossroads, Inc. on 5/30/2012 at the Laguna Niguel Walmart located at 27470 Alicia Parkway.

TABLE 9-5: CUMULATIVE DEVELOPMENT OPERATIONAL NOISE LEVEL PROJECTIONS (DBA LEQ)

Cumulative Development Number	Noise Levels at Receiver Locations (dBA Leq)[1]							
	R1	R2	R3	R4	R5	R6	R7	R8
P-13	19.1	19.8	19.6	20.1	21.2	22.1	23.8	27.9
P-20	16.8	16.8	17.2	17.6	19.1	19.2	21.2	20.4
P-47	19.3	20.2	20.2	20.8	22.3	23.3	25.8	30.1
RC-1	52.2	-[2]	54.3	56.5	49.8	-[2]	60.2	-[2]
RC-2	27.8	30.3	29.5	30.9	30.8	33.9	30.9	50.0
RC-6	17.1	16.1	15.5	15.4	14.8	15.2	14.7	15.8
RC-10	14.7	15.6	16.1	16.3	17.5	17.3	18.5	17.2
RC-12	11.2	12.2	12.7	13.0	14.5	14.3	16.1	14.5
RC-13	14.1	15.0	15.4	15.6	16.8	16.6	17.8	16.8
RC-15	17.0	18.0	18.8	18.8	19.6	18.9	19.3	17.3
RC-22	31.8	32.1	29.7	30.5	28.5	30.2	26.4	27.8
Combined Noise Levels	**52.3**	**35.0**	**54.3**	**56.5**	**49.9**	**36.2**	**60.2**	**50.1**

[1] See Exhibit 9-B for the noise receiver and cumulative development locations and Appendix 9.3 for the stationary source noise analysis worksheets.
[2] The noise receiver is located within the cumulative development boundaries.

9.6.2 OPERATIONAL NOISE LEVEL CONTRIBUTIONS

The ambient noise level measurements, previously shown on Table 5-1, were used in this analysis to determine the existing ambient noise environment at each receiver location. Once the noise level contributions created by the cumulative developments and Project are determined, the Project's overall contribution to the cumulative noise level increases can then be evaluated.

To assess the noise level contributions from cumulative development in the Project study area, the cumulative development activity noise levels, shown on Table 9-5, were combined with the existing noise levels at each receiver location. The existing noise levels were then subtracted from the combined cumulative plus existing noise levels to determine the magnitude of the noise level increases due to the cumulative developments. Table 9-6 shows the cumulative daytime noise level increases on existing conditions will approach 3.2 dBA Leq at the receiver locations. Based on the significance criteria in Section 4, the cumulative development impacts during the daytime hours represent a *less than significant* impact on the existing ambient noise environment.

Table 9-7 shows the cumulative development nighttime noise level increases will range from 0.1 to 13.8 dBA Leq. Based on the significance criteria in Section 4, the cumulative noise level increases represent a *significant* cumulative noise level contribution at receiver locations R1, and R3 to R5 during the nighttime hours.

The Project-only noise level projections, previously shown on Table 9-2, are then combined with the existing ambient noise level measurements at each receiver location to identify the combined Project plus existing ambient noise levels. The combined noise levels can then be used to calculate the Project contribution to the ambient noise conditions. Tables 9-6 and 9-7 show the Project daytime and nighttime noise level contributions, respectively. The Project-related operational noise level increases at the noise-sensitive receivers will approach 0.1 dBA Leq during the daytime hours, and 0.8 dBA Leq during the nighttime hours. Based on the significance criteria in Section 4, the Project-related operational noise level increases are *less than significant* at the noise-sensitive receiver locations during the daytime and nighttime hours.

Since the combined cumulative plus existing noise levels generate a *significant* noise level contribution on the existing ambient conditions during the nighttime hours, it is necessary to determine if the nighttime Project-related noise contribution on the *significant* cumulative noise level increase is cumulatively considerable. By combining the cumulative development activity, Project-only, and existing ambient noise levels, the cumulative plus Project plus existing noise level contribution on the existing ambient conditions can be determined. The noise level increases due to the combined cumulative plus Project noise levels will range from 0.1 to 13.8 dBA Leq at the receiver locations. To determine the Project's contributions to the cumulative noise level increases, the cumulative plus existing increases ranging from 0.1 to 13.8 dBA Leq are subtracted from the combined cumulative plus Project-related noise level contributions. The results of this analysis indicate that the Project's noise level contribution will ranging from 0.0 to 0.6 dBA Leq on the overall cumulative development noise level increase during the nighttime hours. When compared with the significance criteria described in Section 4, the Project-related noise level contribution to the cumulative noise level environment will be *less than significant*, and therefore, is *less than cumulatively considerable*.

It is important to note that the cumulative development analysis represents the worst-case cumulative noise conditions with all potential stationary noise sources operating simultaneously, 24-hours and seven days per week. Further, this analysis assumes the noise source within each development is operating at the site boundary, which may not represent actual conditions once each development is fully constructed. The cumulative development noise analysis does not account for future noise barriers or topographic changes within each development which may provide further attenuation to the noise levels estimated at the receiver locations in the Project study area.

TABLE 9-6: CUMULATIVE DAYTIME NOISE LEVEL CONTRIBUTIONS (DBA LEQ)

Receiver Location[1]	Existing Ambient Measurements (dBA Leq)[2]		Cumulative Dev. Only Noise Level[3]	Cumulative Plus Existing Noise Levels (dBA Leq)[4]		Potentially Significant Impact?[5]	Project Only Operational Noise Level[6]	Combined Existing Plus Project Noise Levels (dBA Leq)[7]		Potentially Significant Impact?[5]	Cumulative Plus Project Plus Existing Noise Levels (dBA Leq)[8]			Potentially Significant Impact?[5]
	Meas. Location	Noise Level		Logarithmic Sum	Increase Over Existing			Logarithmic Sum	Increase Over Existing		Logarithmic Sum	Increase Over Existing	Project Contribution	
R1	L1	56.4	52.3	57.8	1.4	No	28.4	56.4	0.0	No	57.8	1.4	0.0	No
R2	L2	58.2	35.0	58.2	0.0	No	32.2	58.2	0.0	No	58.2	0.0	0.0	No
R3	L3	56.1	54.3	58.3	2.2	No	32.8	56.1	0.0	No	58.3	2.2	0.0	No
R4	L3	56.1	56.5	59.3	3.2	No	35.4	56.1	0.0	No	59.3	3.2	0.0	No
R5	L4	55.9	49.9	56.9	1.0	No	37.8	56.0	0.1	No	56.9	1.0	0.1	No
R6	L4	55.9	36.2	55.9	0.0	No	36.9	56.0	0.1	No	56.0	0.1	0.1	No
R7	L7	69.5	60.2	70.0	0.5	No	36.8	69.5	0.0	No	70.0	0.5	0.0	No
R8	L5	63.0	50.1	63.2	0.2	No	34.4	63.0	0.0	No	63.2	0.2	0.0	No

[1] See Exhibit 9-B for the noise receiver locations.
[2] Existing noise level measurement locations are shown on Exhibit 5-A, and the noise levels are shown on Table 5-1.
[3] Cumulative development operational noise levels at each receiver location as shown on Table 9-5.
[4] Represents the combined exiting ambient conditions plus the cumulative development activities.
[5] Does the noise level increase exceed the significance criteria described in Section 4 (Table 4-2)?
[6] Total Project operational noise levels as shown on Table 9-2.
[7] Represents the combined existing ambient conditions plus the Project activities, and the noise level increase expected with the addition of the proposed Project activities.
[8] Represents the combined ambient conditions plus the Project activities plus the cumulative development activities.

TABLE 9-7: CUMULATIVE NIGHTTIME NOISE LEVEL CONTRIBUTIONS (DBA LEQ)

Receiver Location[1]	Existing Ambient Measurements (dBA Leq)[2]		Cumulative Dev. Only Noise Level[3]	Cumulative Plus Existing Noise Levels (dBA Leq)[4]		Potentially Significant Impact?[5]	Project Only Operational Noise Level[6]	Combined Existing Plus Project Noise Levels (dBA Leq)[7]		Potentially Significant Impact?[5]	Cumulative Plus Project Plus Existing Noise Levels (dBA Leq)[8]			Potentially Significant Impact?[5]
	Meas. Location	Noise Level		Logarithmic Sum	Increase Over Existing			Logarithmic Sum	Increase Over Existing		Logarithmic Sum	Increase Over Existing	Project Contribution	
R1	L1	45.2	52.3	53.0	7.8	Yes	28.4	45.3	0.1	No	53.1	7.9	0.0	No
R2	L2	51.7	35.0	51.8	0.1	No	32.2	51.7	0.0	No	51.8	0.1	0.0	No
R3	L3	42.9	54.3	54.6	11.7	Yes	32.8	43.3	0.4	No	54.7	11.8	0.0	No
R4	L3	42.9	56.5	56.7	13.8	Yes	35.4	43.6	0.7	No	56.7	13.8	0.0	No
R5	L4	44.6	49.9	51.0	6.4	Yes	37.8	45.4	0.8	No	51.2	6.6	0.2	No
R6	L4	44.6	36.2	45.2	0.6	No	36.9	45.3	0.7	No	45.8	1.2	0.6	No
R7	L7	66.3	60.2	67.3	1.0	No	36.8	66.3	0.0	No	67.3	1.0	0.0	No
R8	L5	58.2	50.1	58.8	0.6	No	34.4	58.2	0.0	No	58.8	0.6	0.0	No

[1] See Exhibit 9-B for the noise receiver locations.
[2] Existing noise level measurement locations are shown on Exhibit 5-A, and the noise levels are shown on Table 5-1.
[3] Cumulative development operational noise levels at each receiver location as shown on Table 9-5.
[4] Represents the combined exiting ambient conditions plus the cumulative development activities.
[5] Does the noise level increase exceed the significance criteria described in Section 4 (Table 4-2)?
[6] Total Project operational noise levels as shown on Table 9-2.
[7] Represents the combined existing ambient conditions plus the Project activities, and the noise level increase expected with the addition of the proposed Project activities.
[8] Represents the combined ambient conditions plus the Project activities plus the cumulative development activities.

9.7 OPERATIONAL NOISE MITIGATION MEASURES

With the noise mitigation measures (MM) recommended below, the normal operation of the Project will not exceed the County of Riverside standards for stationary-source noise impacts. As previously shown on Table 9-2, the recommended 8-foot high noise barriers will reduce the noise levels at receiver location R6 by 11 dBA to satisfy the County of Riverside General Plan Noise Element 45 dBA Leq nighttime noise level standards. It is recommended that the Lead Agency require the following as Project Conditions of Approval:

MM Noise-1:

- Construct 8-foot high noise barriers at the southern property line of the Building D site at the top-of-slope elevation, as shown on Exhibit 9-A.
- All on-site operating equipment under the control of the building user that is used in outdoor areas (including but not limited to trucks, tractors, forklifts, and hostlers), shall be operated with properly functioning and well-maintained mufflers.
- Maintain quality pavement conditions on the property that are free of vertical deflection (i.e. speed bumps) to minimize truck noise.
- Should any of the buildings within the Project include special noise generators, such as outdoor compressors, air scrubbers, heavy materials handlings, HVAC units, emergency generators, or outdoor amplification (speakers), the following shall be required as conditions of the occupancy permit:
    - An acoustical study shall be required to determine the noise impacts, if any, to nearby sensitive receivers due to special noise generators and recommend any necessary noise mitigation measures.
        - The study shall analyze the noise levels received at adjacent sensitive land uses to satisfy the appropriate jurisdiction's noise level standards; and
        - The study shall determine the significance of noise level contributions from the operation of special noise generators based on the significance criteria below when the ambient noise levels at nearby sensitive receivers:
            - are less than 60 dBA and the project creates a *readily perceptible* 5 dBA or greater project related noise level increase; or
            - range from 60 to 65 dBA and the project creates a *barely perceptible* 3 dBA or greater project noise level increase; or
            - already exceed 65 dBA, and the project creates a community noise level impact of greater than 1.5 dBA.
        - The study shall identify the noise attenuation measures needed to meet the above performance standards, and Riverside County shall require the implementation of such measures.
- The truck access gates and loading docks within the truck court on the Project site shall be posted with signs which state:
    - Truck drivers shall turn off engines when not in use;
    - Diesel trucks servicing the Project shall not idle for more than five (5) minutes; and

- Post telephone numbers of the building facilities manager to report violations.

9.8 OPERATIONAL VIBRATION IMPACTS

Although the human threshold of perception for vibration is around 65 VdB, human response to vibration is not usually significant unless the vibration exceeds 70 VdB. Truck vibration levels are dependent on vehicle characteristics, load, speed, and pavement condition. Typical vibration levels for heavy trucks at normal traffic speeds do not exceed 65 VdB. Truck deliveries transiting on site will be travelling at very low speeds so it is expected that delivery truck vibration impacts nearby homes will be less than significant.

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10 CONSTRUCTION IMPACTS

This section analyzes potential impacts resulting from the short-term construction activities associated with the development of the Project.

10.1 CONSTRUCTION NOISE STANDARDS

To control noise impacts associated with the construction of the proposed Project, the County has established limits to the hours of operation. Section 9.52.020 of the County's Noise Regulation ordinance, provided in Appendix 3.1, indicates that noise associated with any private construction activity located within one-quarter of a mile from an inhabited dwelling is considered exempt between the hours of 6:00 a.m. and 6:00 p.m., during the months of June through September, and 7:00 a.m. and 6:00 p.m., during the months of October through May. (13) Neither the County's General Plan nor Municipal Code establish numeric maximum acceptable construction source noise levels at potentially affected receivers, which would allow for a quantified determination of what CEQA constitutes a *substantial temporary or periodic noise increase*.

To allow for a quantified determination of what the Noise Control Ordinance constitutes as noise that *may jeopardize the health, safety or general welfare of Riverside County residents and degrade their quality of life* due to Project construction activity, relevant quantified stationary source noise standards established in the General Plan, Policy N 4.1, are used in this analysis to assess the Project construction noise levels at nearby sensitive receivers. Therefore, the daytime noise level standard of 65 dBA Leq is used to evaluate the potential Project-related construction noise impacts. (12)

10.2 CONSTRUCTION NOISE LEVELS

Noise generated by the Project construction equipment will include a combination of trucks, power tools, concrete mixers, and portable generators that when combined can reach high levels. The number and mix of construction equipment is expected to occur in the following seven stages:

- Demolition
- Grading
- Underground Utilities
- Building Construction
- Landscaping
- Paving & Site Finishes
- Architectural Finishes

This construction noise analysis was prepared using reference noise level measurements taken by Urban Crossroads, Inc. to describe the typical construction activity noise levels for each stage of Project construction. The construction reference noise level measurements, provided in Appendix 10.1, represent a list of typical construction activity noise levels. Noise levels generated by heavy construction equipment can range from approximately 68 dBA to in excess of 80 dBA

when measured at 50 feet. However, these noise levels diminish with distance from the construction site at a rate of 6 dBA per doubling of distance. For example, a noise level of 80 dBA measured at 50 feet from the noise source to the receiver would be reduced to 74 dBA at 100 feet from the source to the receiver, and would be further reduced to 68 dBA at 200 feet from the source to the receiver. The construction stages used in this analysis are consistent with the data used to support the construction emissions in the *Knox Business Park Air Quality Impact Analysis* prepared by Urban Crossroads Inc. (20)

10.3 CONSTRUCTION REFERENCE NOISE LEVELS

To describe the Project construction noise levels, measurements were collected for similar activities at several construction sites. Table 10-1 provides a summary of the 16-construction reference noise level measurements. Since the reference noise levels were collected at varying distances, all construction noise level measurements presented on Table 10-1 have been adjusted to describe a common reference distance of 50 feet. Appendix 10.1 includes a detailed construction reference noise level memo and reference noise source photos for each type of construction activity.

OFF-SITE CONSTRUCTION ACTIVITIES

In addition to the Project construction phases, off-site improvements may occur in relation to the construction of the Project. At the time of this analysis, the nature of the off-site improvements was unknown, however, as with the on-site construction phases, the hours will be limited by the Municipal Code and enforced by the County of Riverside. Also, implementation of the construction noise mitigation measures, described in Section 10.6, will ensure that further noise level increases associated with any off-site construction activities are reduced. The noise levels associated with off-site construction activities at the nearby sensitive land uses are not expected to exceed those already calculated to occur for other construction-related activities when equipment is operating along the Project site perimeter.

TABLE 10-1: CONSTRUCTION REFERERNCE NOISE LEVELS

ID	Noise Source	Reference Distance From Source (Feet)	Reference Noise Levels @ Reference Distance		Reference Noise Levels @ 50 Feet[6]	
			dBA Leq	dBA Lmax	dBA Leq	dBA Lmax
1	Truck Pass-Bys & Dozer Activity[1]	30'	63.6	68.1	59.2	63.7
2	Dozer Activity[1]	30'	68.6	76.4	64.2	72.0
3	Construction Vehicle Maintenance Activities[2]	30'	71.9	74.8	67.5	70.4
4	Foundation Trenching[2]	30'	72.6	74.9	68.2	70.5
5	Rough Grading Activities[2]	30'	77.9	84.8	73.5	80.4
6	Residential Framing[3]	30'	66.7	76.7	62.3	72.3
7	Water Truck Pass-By & Backup Alarm[4]	30'	76.3	82.3	71.9	77.9
8	Dozer Pass-By[4]	30'	84.0	89.9	79.6	85.5
9	Two Scrapers & Water Truck Pass-By[4]	30'	83.4	89.0	79.0	84.6
10	Two Scrapers Pass-By[4]	30'	83.7	86.9	79.3	82.5
11	Scraper, Water Truck, & Dozer Activity[4]	30'	79.7	87.7	75.3	83.3
12	Concrete Mixer Truck Movements[5]	50'	71.2	73.1	71.2	73.1
13	Concrete Paver Activities[5]	30'	70.0	75.7	65.6	71.3
14	Concrete Mixer Pour & Paving Activities[5]	30'	70.3	76.3	65.9	71.9
15	Concrete Mixer Backup Alarms & Air Brakes[5]	50'	71.6	78.8	71.6	78.8
16	Concrete Mixer Pour Activities[5]	50'	67.7	79.2	67.7	79.2

[1] As measured by Urban Crossroads, Inc. on 10/14/15 at a business park construction site located at the northwest corner of Barranca Parkway and Alton Parkway in the City of Irvine.
[2] As measured by Urban Crossroads, Inc. on 10/20/15 at a construction site located in Rancho Mission Viejo.
[3] As measured by Urban Crossroads, Inc. on 10/20/15 at a residential construction site located in Rancho Mission Viejo.
[4] As measured by Urban Crossroads, Inc. on 10/30/15 during grading operations within an industrial construction site located in the City of Ontario.
[5] Reference noise level measurements were collected from a nighttime concrete pour at an industrial construction site, located at 27334 San Bernardino Avenue in the City of Redlands, between 1:00 a.m. to 2:00 a.m. on 7/1/15.
[6] Reference noise levels are calculated at 50 feet using a drop off rate of 6 dBA per doubling of distance (point source).

10.4 CONSTRUCTION NOISE ANALYSIS

Tables 10-2 to 10-8 show the Project construction stages and the reference construction noise levels used for each stage. Table 10-9 provides a summary of the noise levels from each stage of construction at each of the sensitive receiver locations. Based on the reference construction noise levels, the Project-related construction noise levels when the peak reference noise level is operating at a single point nearest the sensitive receiver location will range from 47.6 to 67.9 dBA Leq.

TABLE 10-2: DEMOLITION EQUIPMENT NOISE LEVELS

Reference Construction Activity[1]	Reference Noise Level @ 50 Feet (dBA Leq)
Truck Pass-Bys & Dozer Activity	59.2
Dozer Activity	64.2
Dozer Pass-By	79.6
Peak Reference Noise Level at 50 Feet (dBA Leq):	79.6

Receiver Location	Distance To Construction Activity (Feet)[2]	Distance Attenuation (dBA Leq)[3]	Estimated Noise Barrier Attenuation (dBA Leq)[4]	Construction Noise Level (dBA Leq)
R1	1,992'	-32.0	0.0	47.6
R2	1,141'	-27.2	0.0	52.4
R3	1,044'	-26.4	0.0	53.2
R4	631'	-22.0	0.0	57.5
R5	780'	-23.9	0.0	55.7
R6	191'	-11.6	0.0	67.9
R7	814'	-24.2	0.0	55.3
R8	1,163'	-27.3	0.0	52.2

[1] Reference construction noise level measurements taken by Urban Crossroads, Inc. (Appendix 10.1).
[2] Distance from the nearest point of construction activity to the nearest receiver.
[3] Point (stationary) source drop off rate of 6.0 dBA per doubling of distance.
[4] Estimated barrier attenuation from existing barriers in the Project study area.

TABLE 10-3: GRADING EQUIPMENT NOISE LEVELS

Reference Construction Activity[1]	Reference Noise Level @ 50 Feet (dBA Leq)
Truck Pass-Bys & Dozer Activity	59.2
Dozer Activity	64.2
Rough Grading Activities	73.5
Dozer Pass-By	79.6
Scraper, Water Truck, & Dozer Activity	75.3
Peak Reference Noise Level at 50 Feet (dBA Leq):	79.6

Receiver Location	Distance To Construction Activity (Feet)[2]	Distance Attenuation (dBA Leq)[3]	Estimated Noise Barrier Attenuation (dBA Leq)[4]	Construction Noise Level (dBA Leq)
R1	1,992'	-32.0	0.0	47.6
R2	1,141'	-27.2	0.0	52.4
R3	1,044'	-26.4	0.0	53.2
R4	631'	-22.0	0.0	57.5
R5	780'	-23.9	0.0	55.7
R6	191'	-11.6	0.0	67.9
R7	814'	-24.2	0.0	55.3
R8	1,163'	-27.3	0.0	52.2

[1] Reference construction noise level measurements taken by Urban Crossroads, Inc. (Appendix 10.1).
[2] Distance from the nearest point of construction activity to the nearest receiver.
[3] Point (stationary) source drop off rate of 6.0 dBA per doubling of distance.
[4] Estimated barrier attenuation from existing barriers in the Project study area.

TABLE 10-4: UNDERGROUND UTILITIES EQUIPMENT NOISE LEVELS

Reference Construction Activity[1]	Reference Noise Level @ 50 Feet (dBA Leq)
Truck Pass-Bys & Dozer Activity	59.2
Dozer Activity	64.2
Foundation Trenching	68.2
Dozer Pass-By	79.6
Peak Reference Noise Level at 50 Feet (dBA Leq):	79.6

Receiver Location	Distance To Construction Activity (Feet)[2]	Distance Attenuation (dBA Leq)[3]	Estimated Noise Barrier Attenuation (dBA Leq)[4]	Construction Noise Level (dBA Leq)
R1	1,992'	-32.0	0.0	47.6
R2	1,141'	-27.2	0.0	52.4
R3	1,044'	-26.4	0.0	53.2
R4	631'	-22.0	0.0	57.5
R5	780'	-23.9	0.0	55.7
R6	191'	-11.6	0.0	67.9
R7	814'	-24.2	0.0	55.3
R8	1,163'	-27.3	0.0	52.2

[1] Reference construction noise level measurements taken by Urban Crossroads, Inc. (Appendix 10.1).
[2] Distance from the nearest point of construction activity to the nearest receiver.
[3] Point (stationary) source drop off rate of 6.0 dBA per doubling of distance.
[4] Estimated barrier attenuation from existing barriers in the Project study area.

TABLE 10-5: BUILDING CONSTRUCTION EQUIPMENT NOISE LEVELS

Reference Construction Activity[1]	Reference Noise Level @ 50 Feet (dBA Leq)
Truck Pass-Bys & Dozer Activity	59.2
Dozer Activity	64.2
Foundation Trenching	68.2
Water Truck Pass-By & Backup Alarm	71.9
Dozer Pass-By	79.6
Peak Reference Noise Level at 50 Feet (dBA Leq):	79.6

Receiver Location	Distance To Construction Activity (Feet)[2]	Distance Attenuation (dBA Leq)[3]	Estimated Noise Barrier Attenuation (dBA Leq)[4]	Construction Noise Level (dBA Leq)
R1	1,992'	-32.0	0.0	47.6
R2	1,141'	-27.2	0.0	52.4
R3	1,044'	-26.4	0.0	53.2
R4	631'	-22.0	0.0	57.5
R5	780'	-23.9	0.0	55.7
R6	191'	-11.6	0.0	67.9
R7	814'	-24.2	0.0	55.3
R8	1,163'	-27.3	0.0	52.2

[1] Reference construction noise level measurements taken by Urban Crossroads, Inc. (Appendix 10.1).
[2] Distance from the nearest point of construction activity to the nearest receiver.
[3] Point (stationary) source drop off rate of 6.0 dBA per doubling of distance.
[4] Estimated barrier attenuation from existing barriers in the Project study area.

TABLE 10-6: LANDSCAPING EQUIPMENT NOISE LEVELS

Reference Construction Activity[1]	Reference Noise Level @ 50 Feet (dBA Leq)
Dozer Pass-By	79.6
Two Scrapers & Water Truck Pass-By	79.0
Two Scrapers Pass-By	79.3
Peak Reference Noise Level at 50 Feet (dBA Leq):	79.6

Receiver Location	Distance To Construction Activity (Feet)[2]	Distance Attenuation (dBA Leq)[3]	Estimated Noise Barrier Attenuation (dBA Leq)[4]	Construction Noise Level (dBA Leq)
R1	1,992'	-32.0	0.0	47.6
R2	1,141'	-27.2	0.0	52.4
R3	1,044'	-26.4	0.0	53.2
R4	631'	-22.0	0.0	57.5
R5	780'	-23.9	0.0	55.7
R6	191'	-11.6	0.0	67.9
R7	814'	-24.2	0.0	55.3
R8	1,163'	-27.3	0.0	52.2

[1] Reference construction noise level measurements taken by Urban Crossroads, Inc. (Appendix 10.1).
[2] Distance from the nearest point of construction activity to the nearest receiver.
[3] Point (stationary) source drop off rate of 6.0 dBA per doubling of distance.
[4] Estimated barrier attenuation from existing barriers in the Project study area.

TABLE 10-7: PAVING & SITE FINISHES EQUIPMENT NOISE LEVELS

Reference Construction Activity[1]	Reference Noise Level @ 50 Feet (dBA Leq)
Concrete Mixer Truck Movements	71.2
Concrete Paver Activities	65.6
Concrete Mixer Pour & Paving Activities	65.9
Concrete Mixer Backup Alarms & Air Brakes	71.6
Concrete Mixer Pour Activities	67.7
Peak Reference Noise Level at 50 Feet (dBA Leq):	71.6

Receiver Location	Distance To Construction Activity (Feet)[2]	Distance Attenuation (dBA Leq)[3]	Estimated Noise Barrier Attenuation (dBA Leq)[4]	Construction Noise Level (dBA Leq)
R1	1,992'	-32.0	0.0	39.6
R2	1,141'	-27.2	0.0	44.4
R3	1,044'	-26.4	0.0	45.2
R4	631'	-22.0	0.0	49.6
R5	780'	-23.9	0.0	47.7
R6	191'	-11.6	0.0	60.0
R7	814'	-24.2	0.0	47.4
R8	1,163'	-27.3	0.0	44.3

[1] Reference construction noise level measurements taken by Urban Crossroads, Inc. (Appendix 10.1).
[2] Distance from the nearest point of construction activity to the nearest receiver.
[3] Point (stationary) source drop off rate of 6.0 dBA per doubling of distance.
[4] Estimated barrier attenuation from existing barriers in the Project study area.

TABLE 10-8: ARCHITECTURAL COATING EQUIPMENT NOISE LEVELS

Reference Construction Activity[1]	Reference Noise Level @ 50 Feet (dBA Leq)
Construction Vehicle Maintenance Activities	67.5
Foundation Trenching	68.2
Peak Reference Noise Level at 50 Feet (dBA Leq):	68.2

Receiver Location	Distance To Construction Activity (Feet)[2]	Distance Attenuation (dBA Leq)[3]	Estimated Noise Barrier Attenuation (dBA Leq)[4]	Construction Noise Level (dBA Leq)
R1	1,992'	-32.0	0.0	36.2
R2	1,141'	-27.2	0.0	41.0
R3	1,044'	-26.4	0.0	41.8
R4	631'	-22.0	0.0	46.1
R5	780'	-23.9	0.0	44.3
R6	191'	-11.6	0.0	56.5
R7	814'	-24.2	0.0	43.9
R8	1,163'	-27.3	0.0	40.8

[1] Reference construction noise level measurements taken by Urban Crossroads, Inc. (Appendix 10.1).
[2] Distance from the nearest point of construction activity to the nearest receiver.
[3] Point (stationary) source drop off rate of 6.0 dBA per doubling of distance.
[4] Estimated barrier attenuation from existing barriers in the Project study area.

10.5 CONSTRUCTION NOISE THRESHOLDS OF SIGNIFICANCE

The construction noise analysis shows that the highest construction noise levels will occur when mobile equipment is operating along the perimeter of the Project site. As shown on Table 10-9, the unmitigated peak construction noise levels are expected to range from 47.6 to 67.9 dBA Leq. Construction activities are estimated to occur during the permitted hours of 6:00 a.m. and 6:00 p.m., during the months of June through September, and 7:00 a.m. and 6:00 p.m., during the months of October through May, based on the County of Riverside Municipal Code noise standards.

TABLE 10-9: UNMITIGATED CONSTRUCTION EQUIPMENT NOISE LEVEL SUMMARY

Noise Receiver[1]	Distance to Const. Activity (Feet)	Construction Phase Hourly Noise Level (dBA Leq)							
		Demo.	Grading	Utilities	Building Const.	Landscape	Paving	Arch.	Peak[2]
R1	1,992'	47.6	47.6	47.6	47.6	47.6	39.6	36.2	47.6
R2	1,141'	52.4	52.4	52.4	52.4	52.4	44.4	41.0	52.4
R3	1,044'	53.2	53.2	53.2	53.2	53.2	45.2	41.8	53.2
R4	631'	57.5	57.5	57.5	57.5	57.5	49.6	46.1	57.5
R5	780'	55.7	55.7	55.7	55.7	55.7	47.7	44.3	55.7
R6	191'	67.9	67.9	67.9	67.9	67.9	60.0	56.5	67.9
R7	814'	55.3	55.3	55.3	55.3	55.3	47.4	43.9	55.3
R8	1,163'	52.2	52.2	52.2	52.2	52.2	44.3	40.8	52.2

[1] Noise receiver locations are shown on Exhibit 8-A.
[2] Estimated construction noise levels during peak operating conditions.

Based on the construction noise standards described in Section 3.4, the potential short-term unmitigated construction noise level impacts are expected to exceed the acceptable construction noise level threshold of 65 dBA Leq at one of the sensitive receiver locations, R6, during the permitted hours of construction activity near the property line. Therefore, a 6-foot high temporary construction noise barrier is required at the southern construction boundaries near receiver location R6 where Project construction noise levels could potentially exceed the noise level thresholds, as shown on Exhibit 10-A. With the installation of temporary exterior noise control barriers with a minimum height of 6-feet, construction noise levels at the nearby residential receivers would be reduced.

This analysis does not evaluate the feasibility of temporary noise barrier installation. If it is not feasible to install temporary barriers, construction noise levels would not be reduced, because no other measures exist to reasonably reduce construction noise levels. The noise attenuation provided through temporary noise barriers depends on many factors including cost, wind loading, the location of the receiver, and the ability to place barriers such that the line-of-sight of the receiver is blocked to the noise source, among others. This analysis assumes a temporary noise barrier constructed using frame-mounted materials such as vinyl acoustic curtains or quilted blankets.

EXHIBIT 10-A: TEMPORARY CONSTRUCTION NOISE BARRIER LOCATION

Table 10-10 shows the peak construction noise levels are expected to range from 47.6 to 61.2 dBA Leq with the attenuation provided by the temporary construction noise barrier. With the minimum 6-foot high temporary noise control barrier, the construction noise levels will satisfy the 65 dBA Leq construction noise level threshold at the closest receiver location, R6. Therefore, the construction of the Project will result in a *less than significant* impact after mitigation at the nearby sensitive receiver locations during peak construction activity.

TABLE 10-10: MITIGATED CONSTRUCTION EQUIPMENT NOISE LEVEL SUMMARY

Receiver Location[1]	Const. Noise Levels (dBA Leq)			With Temporary Noise Barriers		
	Peak Activity (dBA Leq)[2]	Threshold (dBA Leq)[3]	Threshold Exceeded?[4]	Attenuation (dBA Leq)	Construction Noise Levels (dBA Leq)[5]	Threshold Exceeded?[4]
R1	47.6	65	No	0	47.6	No
R2	52.4	65	No	0	52.4	No
R3	53.2	65	No	0	53.2	No
R4	57.5	65	No	0	57.5	No
R5	55.7	65	No	0	55.7	No
R6	67.9	65	Yes	-6.7	61.2	No
R7	55.3	65	No	0	55.3	No
R8	52.2	65	No	0	52.2	No

[1] Noise receiver locations are shown on Exhibit 8-A.
[2] Estimated construction noise levels during peak operating conditions, as shown on Table 10-9.
[3] Construction noise standards as shown on Table 3-2.
[4] Do the estimated Project construction noise levels meet the construction noise level thresholds?
[5] Peak construction noise levels with the minimum 6-foot high temporary construction noise barrier as shown on Exhibit 10-A. Temporary barrier attenuation calculations are provided in Appendix 10.2.

10.6 CONSTRUCTION NOISE MITIGATION MEASURES

Though construction noise is temporary, intermittent and of short duration, and will not present any long-term impacts, the following practices would reduce any noise level increases produced by the construction equipment to the nearby noise-sensitive residential land uses:

MM Noise-2:

- Prior to approval of grading plans and/or issuance of building permits, plans shall include a note indicating that noise-generating Project construction activities that would create noise levels of greater than 45 dBA Leq at sensitive receivers shall only occur between the hours of 6:00 a.m. and 6:00 p.m., during the months of June through September, and 7:00 a.m. and 6:00 p.m., during the months of October through May. The Project construction supervisor shall ensure compliance with the note and the County shall conduct periodic inspection at its discretion.
- Install a minimum 6-foot high temporary noise control barrier, as shown on Exhibit 10-A, at the southern Project site boundaries near receiver location R6. The noise control barrier must present a solid face from top to bottom. The noise control barrier must be a minimum height of 6-feet.

  - The noise barrier may be constructed using an acoustical blanket (e.g. vinyl acoustic curtains or quilted blankets) attached to the construction site perimeter fence or equivalent temporary fence posts.
  - The noise barriers must be maintained and any damage promptly repaired. Gaps, holes, or weaknesses in the barrier or openings between the barrier and the ground shall be promptly repaired.
  - The noise control barriers and associated elements shall be completely removed and the site appropriately restored upon the conclusion of the construction activity.
- During all Project site construction, the construction contractors shall equip all construction equipment, fixed or mobile, with properly operating and maintained mufflers, consistent with manufacturers' standards. The construction contractor shall place all stationary construction equipment so that emitted noise is directed away from the noise sensitive receptors nearest the Project site.
- The construction contractor shall locate equipment staging in areas that will create the greatest distance between construction-related noise sources and noise-sensitive receivers nearest the Project site (i.e., to the center) during all Project construction.
- The construction contractor shall limit haul truck deliveries to the same hours specified for construction equipment (between the hours of 6:00 a.m. and 6:00 p.m., during the months of June through September, and 7:00 a.m. and 6:00 p.m., during the months of October through May). The contractor shall prepare a haul route exhibit and shall design delivery routes to minimize the exposure of sensitive land uses or residential dwellings to delivery truck-related noise.
- The following blasting noise and vibration monitoring and abatement plan shall be adopted and submitted to the County prior to commencement of blasting activities:
  - Pre-blasting inspections shall be offered to property owners within 200 feet of the blast site.
  - Existing damage of each structure shall be documented.
  - Post-blasting inspections shall be offered to assess new or additional damage to each structure once blasting activities have ceased for those property owners who accepted pre-blast inspections.
  - Property owners within at least 200 feet of the blast site shall be notified via postings on the construction site at least 24 hours before the occurrence of major construction-related noise and vibration impacts (such as grading and rock blasting) which may affect them.
  - The County may impose conditions and procedures on the blasting operations as necessary. The construction contractor shall comply with these measures for the duration of the blasting permit. The County may inspect the blast site and materials at any reasonable time (County of Riverside Ordinance No. 787).

10.7 CONSTRUCTION VIBRATION IMPACTS

Construction activity can result in varying degrees of ground vibration, depending on the equipment and methods used, distance to the affected structures and soil type. It is expected that ground-borne vibration from Project construction activities would cause only intermittent,

localized intrusion. The proposed Project's construction activities most likely to cause vibration impacts are:

- Heavy Construction Equipment: Although all heavy mobile construction equipment has the potential of causing at least some perceptible vibration while operating close to buildings, the vibration is usually short-term and is not of sufficient magnitude to cause building damage. It is not expected that heavy equipment such as large bulldozers would operate close enough to any residences or buildings to cause a vibration impact.
- Trucks: Trucks hauling building materials to construction sites can be sources of vibration intrusion if the haul routes pass through residential neighborhoods on streets with bumps or potholes. Repairing the bumps and potholes generally eliminates the problem.

Ground-borne vibration levels resulting from construction activities occurring within the Project site were estimated by data published by the Federal Transit Administration. Construction activities that would have the potential to generate low levels of ground-borne vibration within the Project site include grading and paving. Using the vibration source level of construction equipment provided on Table 6-7 and the construction vibration assessment methodology published by the FTA, it is possible to estimate the Project vibration impacts. Table 10-11 presents the expected Project related vibration levels at the eight receiver locations.

TABLE 10-11: CONSTRUCTION EQUIPMENT VIBRATION LEVELS

Noise Receiver[1]	Distance to Construction (Feet)	Receiver PPV Levels (in/sec)[2]					RMS Velocity Levels (in/sec)[3]	Potential Significant Impact?[4]
		Small Bulldozer	Jack-hammer	Loaded Trucks	Large Bulldozer	Peak Vibration		
R1	1,485'	0.0000	0.0001	0.0002	0.0002	0.000	0.000	No
R2	537'	0.0000	0.0004	0.0008	0.0009	0.001	0.001	No
R3	612'	0.0000	0.0003	0.0006	0.0007	0.001	0.001	No
R4	418'	0.0000	0.0005	0.0011	0.0013	0.001	0.001	No
R5	780'	0.0000	0.0002	0.0004	0.0005	0.001	0.000	No
R6	191'	0.0001	0.0017	0.0036	0.0042	0.004	0.003	No
R7	814'	0.0000	0.0002	0.0004	0.0005	0.000	0.000	No
R8	1,163'	0.0000	0.0001	0.0002	0.0003	0.000	0.000	No

[1] Receiver locations are shown on Exhibit 8-A.
[2] Based on the Vibration Source Levels of Construction Equipment included on Table 6-7.
[3] Vibration levels in PPV are converted to RMS velocity using a 0.71 conversion factor identified in the Caltrans Transportation and Construction Vibration Guidance Manual, September 2013.
[4] Does the peak vibration exceed the County of Riverside maximum acceptable vibration standard of 0.01 in/sec?

Based on the reference vibration levels provided by the FTA, a large bulldozer represents the peak source of vibration with a reference velocity of 0.089 in/sec (PPV) at 25 feet. At distances ranging from 191 to 1,485 feet from the Project site, construction vibration velocity levels are expected to approach 0.004 in/sec (PPV), as shown on Table 10-11. To assess the human perception of vibration levels in PPV, as previously discussed in Section 3.5.1, the velocities are converted to RMS vibration levels based on the Caltrans *Transportation and Construction*

Vibration Guidance Manual conversion factor of 0.71. Table 10-11 shows the construction vibration levels in RMS are expected to approach 0.003 in/sec (RMS) at the eight receiver locations. Based on the County of Riverside vibration standards, the proposed Project construction activities will not include or require equipment, facilities, or activities that would result in a *barely perceptible* human response (annoyance), and therefore, the construction-related vibration impacts are considered *less than significant.*

Further, vibration levels at the site of the closest sensitive receiver are unlikely to be sustained during the entire construction period, but will occur rather only during the times that heavy construction equipment is operating along the Project site perimeter. Moreover, construction at the Project site will be restricted to daytime hours consistent with County of Riverside requirements thereby eliminating potential vibration impacts during the sensitive nighttime hours.

10.8 BLASTING NOISE AND VIBRATION ANALYSIS

The construction of the proposed Project will include blasting of hard rock areas, which is a major source of potential noise impacts to nearby residential receivers. The intensity of the noise and vibration impacts associated with rock blasting depends on location, size, material, shape of the rock, and the methods used to crack it. While a blasting contractor can design the blasts to stay below a given vibration level that could cause damage to nearby sensitive structures, it is difficult to design blasts that produce noise levels which are not perceptible to receivers in the vicinity of the blast site. (3) The noise produced by blasting activities is referred to as an airblast, or a pressure wave that is generated when explosive energy in the form of gases escape from the detonating blast holes. Much like a point source, airblasts radiate outward in a spherical pattern and attenuate with each doubling of distance from the blast location. (21)

Blasting activities generally include: the pre-drilling of holes in the hard rock area; preparation and placement of the charges in the drilled holes; a pre-blast horn signal; additional pre-blast horn signals immediately prior to the blast; and the blast itself. An additional horn signal is sounded to indicate the "all clear" after the blast and the blasting contractor has inspected the blasting area. During the blast, which occurs over a few seconds, the noise from the blast itself starts with a cracking sound from the detonator, located at a distance from the charges, and ends with the low crackling sound from each charge as they are subsequently set off. It is important to note that no other construction equipment will be operating during the blast in the immediate area, and will commence once the blasting contractor indicates it is safe to do so.

The worst-case blasting activities associated with Project construction are expected to include 15 sections of approximately 400 holes per blast over a two-month period. This equates to roughly 15 separate blasting events. Using conventional blasting methods, there will be one blast near the edge of the southern property line using holes as deep as 15 to 20 feet. The explosive charges are placed in each hole to fragment the rocks into smaller, crushable pieces. The charges will be made up of ammonium nitrate/fuel oil (ANFO) which consists of 94 percent ammonium nitrate and 6 percent diesel fuel. Further, the blasts will be single-event noise sources which occur over a few seconds, with multiple small blasts in each hole occurring milliseconds apart from each other. Once the blast is completed, normal construction grading activities will resume. An

electric rock crusher will later break down the fragmented rocks at the Project site and will be powered by a 300-horsepower diesel generator. The noise and vibration levels expected due to blasting activities during Project construction are discussed below.

10.8.1 BLASTING NOISE LEVELS

To evaluate the potential noise levels from blasting activities during Project construction, Urban Crossroads, Inc. collected a reference noise level measurement of a single blast performed by the same contractor for the Project, California Blasting and Drilling, on March 15th, 2016 at a residential construction site in Chatsworth. At a reference distance of 370 feet, the blasting noise levels reached 81.5 dBA Lmax for one second over a total duration of 7 seconds for all blasts included in the event. The reference blast measurement represents a larger blasting area and greater amount of ANFO explosive material than what is planned at the Project site. In addition, due to the distance of roughly 400 feet to nearby residential homes of the reference blast site, some debris was allowed to be cast into the air and the additional noise associated with this debris is included in the reference noise level. Debris due to blasting at the Project site is not anticipated to be cast into the air per conversations with the blasting contractor, and therefore, the reference noise level measurement may conservatively overstate the noise levels of the Project site blasting activities. Table 10-12 shows the blasting noise level at the closest receiver location, R6, using the reference noise level measurement taken by Urban Crossroads, Inc. The additional attenuation provided by the recommended temporary noise barrier is included in the blasting noise levels at receiver location R6.

TABLE 10-12: BLASTING NOISE LEVELS

Reference Construction Activity[1]	Reference Noise Level @ 370 Feet (dBA Lmax)
Blasting	81.5
Peak Reference Noise Level at 370 Feet:	81.5

Receiver Location	Distance To Property Line Activity (Feet)[2]	Distance Attenuation (dBA)[3]	Calculated Noise Barrier Attenuation (dBA)[4]	Blasting Noise Level (dBA Lmax)
R6	191'	5.7	-6.7	80.5

[1] As measured by Urban Crossroads, Inc. on 3/15/2016 at a construction site in Chatsworth.
[2] Distance from the nearest point of construction activity to the nearest receiver.
[3] Point (stationary) source drop off rate of 6.0 dBA per doubling of distance.
[4] Calculated barrier attenuation from existing barriers in the Project study area (Appendix 10.2).

The County of Riverside General Plan and Municipal Code do not identify specific construction noise level limits for blasting activities. Therefore, the OSMRE and CFR lowest maximum *Airblast Limit* (30 CFR 816.67(b)) of 129 dBA Lmax at nearby sensitive uses is used in this analysis as an acceptable threshold for noise levels due to blasting activity at the Project site, as previously

discussed in Section 3.6. (2) Based on the reference blasting noise level, the closest residential receiver will experience noise levels approaching 80.5 dBA Lmax over the course of the blast, which will likely occur for only a few seconds. While some blasting noise may be noticeable by nearby residents, the single-event, temporary noise levels generated by the blast will not exceed the OSMRE and the CFR standards for airblasts, and therefore, will result in a *less than significant* noise impact.

10.8.2 BLASTING VIBRATION LEVELS

Based on the California Department of Transportation's *Transportation and Construction Vibration Guidance Manual*, it is unusual for damage to be caused to residential structures from the vibrations due to blasting activities as other agencies' (U.S. Bureau of Mines and the Office of Surface Mining and Reclamation Enforcement) maximum vibration level limits have been shown to fail to cause any damage to existing homes. Often existing damage is perceived to have been due to nearby blasting operations as the detonation of the blast causes closer examination by homeowners of the structural integrity of their home. (3)

The *Transportation and Construction Vibration Guidance Manual* provides the human perception thresholds for vibration from continuous events at a peak particle velocity (PPV) level of 0.02 in/sec, and provides vibration velocity levels for various building materials susceptibility to damage. For residential structures, the threshold of damage for vibration is approximately 3.0 in/sec (PPV) for cosmetic cracking and damage. (3) While determining the vibration levels from the blasting operations at the Project site is difficult due to the variability of conditions at the site, it is possible to monitor and prevent vibration levels to the extent feasible with a monitoring and abatement plan. To prevent damage to nearby residential structures, the following steps are recommended, consistent with the *Transportation and Construction Vibration Guidance Manual Procedures for Mitigating Blast Vibration and Air Overpressure from Construction Blasting:* (3)

- *Identify potential problem areas surrounding the Project site.*
- *Determine the conditions that exist prior to commencement of construction.*
- *Inform the public about the Project and potential blasting-related consequences.*
- *Schedule the work to reduce adverse effects.*
- *Design the blast to reduce vibration and air over pressure.*
- *Use blast signals to notify nearby residents that blasting is imminent.*
- *Monitor and record the vibration and air overpressure effects of the blast.*
- *Respond to and investigate complaints.*

By incorporating the above steps, the vibration levels at nearby residential receivers will be reduced. A pre and post-blast survey radius of approximately 200 feet is recommended to assess the potential vibration level radius due to blasting activities and shall include the inspection of the closest residential structures. Existing defects or damage should be noted and documented to determine the conditions of the closest residential homes, and surveys should be offered to homeowners to assess such damage. Neighborhood meetings, notifications, or posting of signs

are all recommended to notify nearby homeowners of the blasting activities. To reduce adverse effects, rock blasting activities will be limited during the permitted hours for construction activity between 6:00 a.m. and 6:00 p.m., during the months of June through September, and 7:00 a.m. and 6:00 p.m., during the months of October through May, as required by the County of Riverside Municipal Code. (13) Further, the blasting contractor shall design the blasts when located within 200 feet of existing residential structures to reduce vibration velocity levels from each blast below the damage threshold of 3.0 in/sec. A blast signal shall be used to notify nearby residents that blasting is about to occur. Lastly, all complaints must be responded to and investigated as they occur. The major source of vibration due to rock blasting is expected to be from the charges placed in each drill hole within the Project site. Due to the ability of the blasting contractor to limit the ground-borne vibration levels, the vibration velocity levels at 191 feet to the nearest sensitive receiver are expected to be *less than significant*.

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11 REFERENCES

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4. **California Department of Transportation Environmental Program.** *Technical Noise Supplement - A Technical Supplement to the Traffic Noise Analysis Protocol.* Sacramento, CA : s.n., September 2013.
5. **Environmental Protection Agency Office of Noise Abatement and Control.** *Information on Levels of Environmental Noise Requsite to Protect Public Health and Welfare with an Adequate Margin of Safety.* March, 1974. EPA/ONAC 550/9/74-004.
6. **U.S. Department of Transportation, Federal Highway Administration, Office of Environment and Planning, Noise and Air Quality Branch.** *Highway Traffic Noise Analysis and Abatement Policy and Guidance.* June, 1995.
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8. **U.S. Environmental Protection Agency Office of Noise Abatement and Control.** *Noise Effects Handbook-A Desk Reference to Health and Welfare Effects of Noise.* October 1979 (revised July 1981). EPA 550/9/82/106.
9. **U.S. Department of Transportation, Federal Transit Administration.** *Transit noise and Vibration Impact Assessment.* May 2006. FTA-VA-90-1003-06.
10. **Office of Planning and Research.** *State of California General Plan Guidlines 2003.* October 2003.
11. **State of California.** *2013 California Green Building Standards Code.* January 2014.
12. **County of Riverside.** *General Plan Noise Element.* December 2014.
13. —. *Code of Ordinances, Title 9 - Public, Peace, Morals and Welfare, Chapter 9.52 - Noise Regulation.*
14. **California Court of Appeal.** *Gray v. County of Madera, F053661.* 167 Cal.App.4th 1099; - Cal.Rptr.3d, October 2008.
15. **Federal Interagency Committee on Noise.** *Federal Agency Review of Selected Airport Noise Analysis Issues.* August 1992.
16. **American National Standards Institute (ANSI).** *Specification for Sound Level Meters ANSI S1.4-2014/IEC 61672-1:2013.*
17. **U.S. Department of Transportation, Federal Highway Administration.** *FHWA Highway Traffic Noise Prediction Model.* December 1978. FHWA-RD-77-108.
18. **California Department of Transportation Environmental Program, Office of Environmental Engineering.** *Use of California Vehicle Noise Reference Energy Mean Emission Levels (Calveno REMELs) in FHWA Highway Traffic Noise Prediction.* September 1995. TAN 95-03.
19. **U.S. Environmental Protection Agency, Office of Federal Activities.** *Consideration of Cumultive Impacts.* May 1999. EPA 315-R-99-002.
20. **Urban Crossroads, Inc.** *Knox Business Park Air Quality Impact Analysis.* June 2015.
21. **Office of Surface Mining Reclamation and Enforcement.** *Controlling the Adverse Effects of Blasting.*

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12 CERTIFICATION

The contents of this noise study report represent an accurate depiction of the noise environment and impacts associated with the proposed Knox Business Park Project. The information contained in this noise study report is based on the best available data at the time of preparation. If you have any questions, please contact me directly at (949) 336-5979.

BILL LAWSON, P.E., INCE

Principal
URBAN CROSSROADS, INC.
260 E. Baker Street, Suite 200
Costa Mesa, CA 92626
(949) 336-5979
blawson@urbanxroads.com

STATEMENT OF QUALIFICATIONS

Bill Lawson is a Registered Professional Traffic Engineer and a Certified Acoustical Consultant. His educational background includes a Master's Degree in Civic and Environmental Engineering and a Bachelor's Degree in City and Regional Planning from Cal Poly San Luis Obispo. Mr. Lawson maintains a wide range of technical expertise that includes transportation planning, traffic engineering, neighborhood traffic control, and noise impact analysis.

EDUCATION

Master of Science in Civil and Environmental Engineering
California Polytechnic State University, San Luis Obispo • December, 1993

Bachelor of Science in City and Regional Planning
California Polytechnic State University, San Luis Obispo • June, 1992

PROFESSIONAL REGISTRATIONS

PE – Registered Professional Traffic Engineer – TR 2537 • January, 2009
AICP – American Institute of Certified Planners – 013011 • June, 1997–January 1, 2012
PTP – Professional Transportation Planner • May, 2007 – May, 2013
INCE – Institute of Noise Control Engineering • March, 2004

PROFESSIONAL AFFILIATIONS

ASA – Acoustical Society of America
ITE – Institute of Transportation Engineers

PROFESSIONAL CERTIFICATIONS

Certified Acoustical Consultant – County of Orange • February, 2011
FHWA-NHI-142051 Highway Traffic Noise Certificate of Training • February, 2013

ALEX WOLFE

Assistant Analyst
URBAN CROSSROADS, INC.
260 E. Baker Street, Suite 200
Costa Mesa, CA 92626
(949) 336-5977
awolfe@urbanxroads.com

STATEMENT OF QUALIFICATIONS

Alex Wolfe has worked on a variety of noise projects for Urban Crossroads as an analyst. He has been involved in the analysis and reporting of noise impacts to and from development projects using the Federal Highway Administration (FHWA) Traffic Noise Model (TNM), and Geographic Information Systems (GIS) to graphically represent existing and future noise environments. He received his Bachelor's Degree in Urban Studies from the University of California, Irvine in 2012.

EDUCATION

Bachelor of the Arts in Urban Studies
University of California, Irvine • June, 2012

APPENDIX 3.1:

COUNTY OF RIVERSIDE MUNICIPAL CODE

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Chapter 9.52 - NOISE REGULATION

Sections:

9.52.010 - Intent.

At certain levels, sound becomes noise and may jeopardize the health, safety or general welfare of Riverside County residents and degrade their quality of life. Pursuant to its police power, the board of supervisors declares that noise shall be regulated in the manner described in this chapter. This chapter is intended to establish county-wide standards regulating noise. This chapter is not intended to establish thresholds of significance for the purpose of any analysis required by the California Environmental Quality Act and no such thresholds are established.

(Ord. 847 § 1, 2006)

9.52.020 - Exemptions.

Sound emanating from the following sources is exempt from the provisions of this chapter:

A. Facilities owned or operated by or for a governmental agency;
B. Capital improvement projects of a governmental agency;
C. The maintenance or repair of public properties;
D. Public safety personnel in the course of executing their official duties, including, but not limited to, sworn peace officers, emergency personnel and public utility personnel. This exemption includes, without limitation, sound emanating from all equipment used by such personnel, whether stationary or mobile;
E. Public or private schools and school-sponsored activities;
F. Agricultural operations on land designated "Agriculture" in the Riverside County general plan, or land zoned A-l (light agriculture), A-P (light agriculture with poultry), A-2 (heavy agriculture), A-D (agriculture-dairy) or C/V (citrus/vineyard), provided such operations are carried out in a manner consistent with accepted industry standards. This exemption includes, without limitation, sound emanating from all equipment used during such operations, whether stationary or mobile;
G. Wind energy conversion systems (WECS), provided such systems comply with the WECS noise provisions of Riverside County Ordinance No. 348;
H. Private construction projects located one-quarter of a mile or more from an inhabited dwelling;
I. Private construction projects located within one-quarter of a mile from an inhabited dwelling, provided that:
    1. Construction does not occur between the hours of six p.m. and six a.m. during the months of June through September, and
    2. Construction does not occur between the hours of six p.m. and seven a.m. during the months of October through May;
J. Property maintenance, including, but not limited to, the operation of lawnmowers, leaf blowers, etc., provided such maintenance occurs between the hours of seven a.m. and eight p.m.;
K.

Motor vehicles, other than off-highway vehicles. This exemption does not include sound emanating from motor vehicle sound systems;

L. Heating and air conditioning equipment;

M. Safety, warning and alarm devices, including, but not limited to, house and car alarms, and other warning devices that are designed to protect the public health, safety, and welfare;

N. The discharge of firearms consistent with all state laws.

(Ord. 847 § 2, 2006)

9.52.030 - Definitions.

As used in this chapter, the following terms shall have the following meanings:

"Audio equipment" means a television, stereo, radio, tape player, compact disc player, mp3 player, I-POD or other similar device.

"Decibel (dB)" means a unit for measuring the relative amplitude of a sound equal approximately to the smallest difference normally detectable by the human ear, the range of which includes approximately one hundred thirty (130) decibels on a scale beginning with zero decibels for the faintest detectable sound. Decibels are measured with a sound level meter using different methodologies as defined below:

1. "A-weighting (dBA)" means the standard A-weighted frequency response of a sound level meter, which de-emphasizes low and high frequencies of sound in a manner similar to the human ear for moderate sounds.
2. "Maximum sound level (L_{max})" means the maximum sound level measured on a sound level meter.

"Governmental agency" means the United States, the state of California, Riverside County, any city within Riverside County, any special district within Riverside County or any combination of these agencies.

"Land use permit" means a discretionary permit issued by Riverside County pursuant to Riverside County Ordinance No. 348.

"Motor vehicle" means a vehicle that is self-propelled.

"Motor vehicle sound system" means a stereo, radio, tape player, compact disc player, mp3 player, I-POD or other similar device.

"Noise" means any loud, discordant or disagreeable sound.

"Occupied property" means property upon which is located a residence, business or industrial or manufacturing use.

"Off-highway vehicle" means a motor vehicle designed to travel over any terrain.

"Public or private school" means an institution conducting academic instruction at the preschool, elementary school, junior high school, high school, or college level.

"Public property" means property owned by a governmental agency or held open to the public, including, but not limited to, parks, streets, sidewalks, and alleys.

APPENDIX 5.1:

STUDY AREA PHOTOS

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L1
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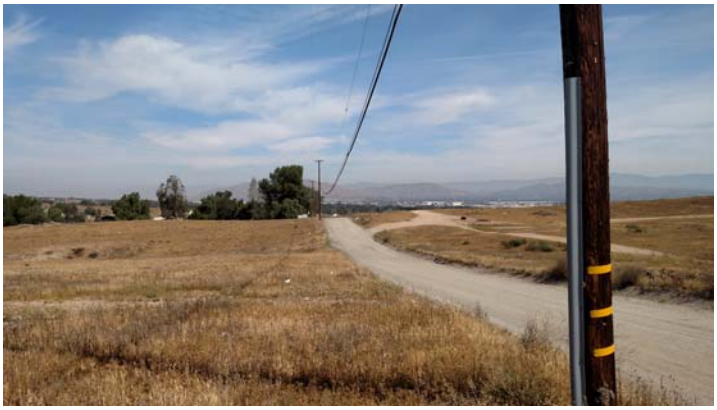

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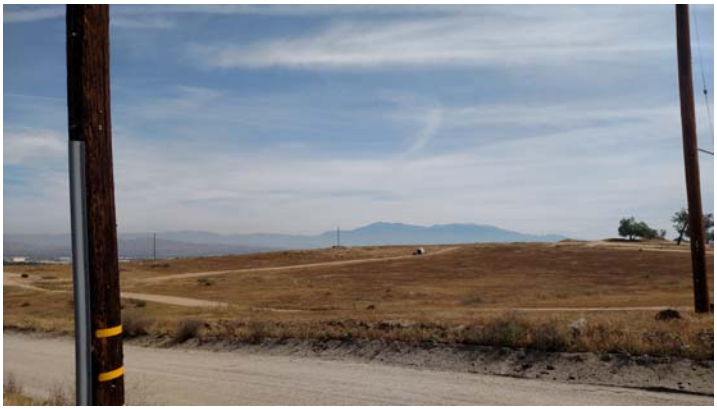

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L1_SE
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L1_W
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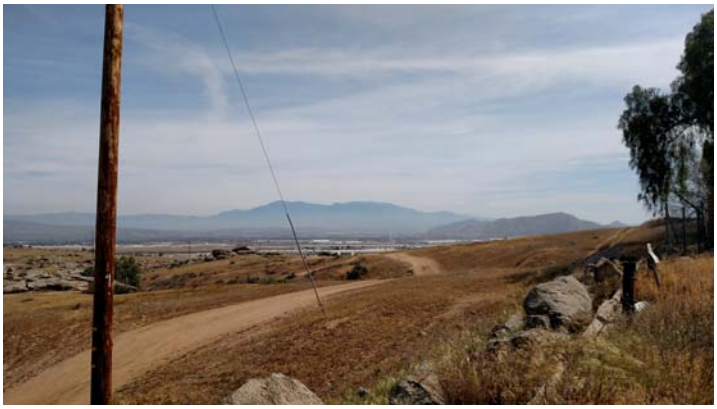

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APPENDIX 5.2:

NOISE LEVEL MEASUREMENT WORKSHEETS

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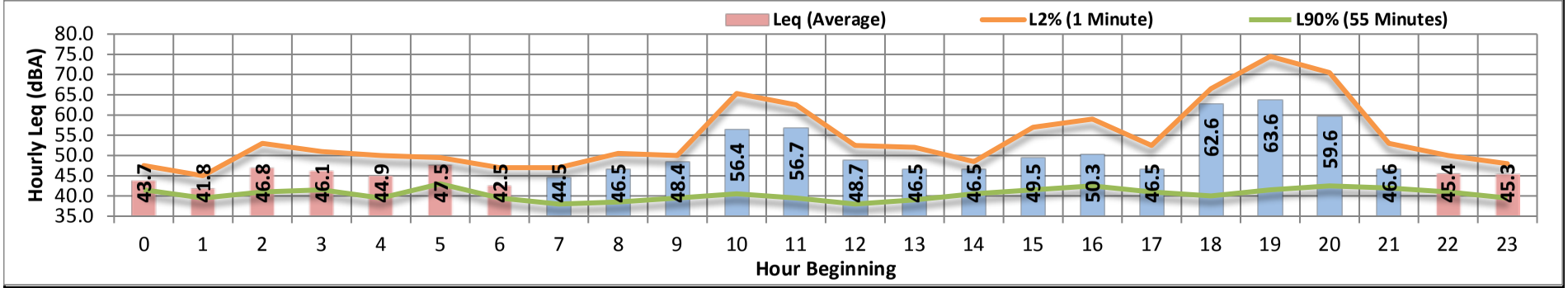
24-Hour Noise Level Measurement Summary

				Energy Average Leq		24-Hour
Project Name:	Knox Business Park	*JN:*	9349	*Day*	*Night*	*CNEL*
Location:	L1 - Located at the northwest corner of Corson Avenue and Day Street near existing residential homes.	*Analyst:*	A. Wolfe	56.4	45.2	58.4
		Date:	3/31-4/1/2015			

Hourly Leq dBA Readings (unadjusted)



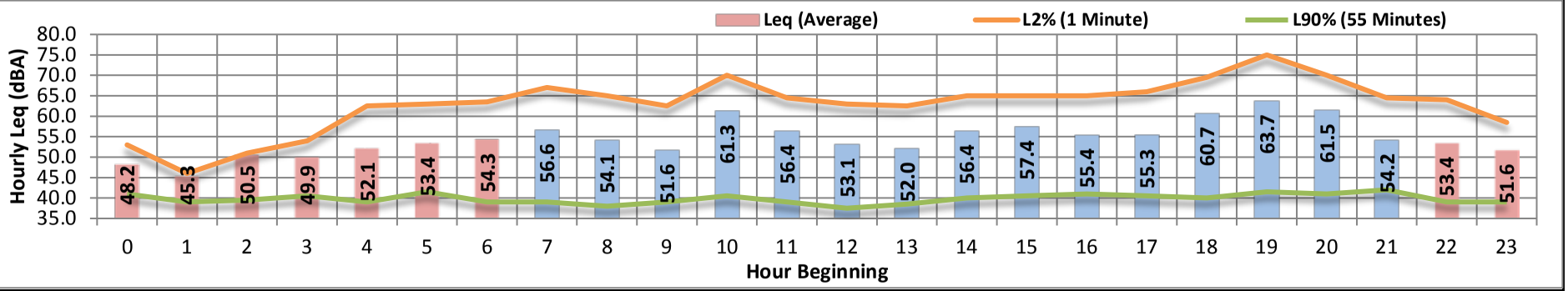
Time Period	*Hour*	*Leq*	*Lmax*	*Lmin*	*L1%*	*L2%*	*L5%*	*L8%*	*L25%*	*L50%*	*L90%*	*L95%*	*L99%*
Day	Min	44.5	69.5	36.8	49.5	47.0	44.5	42.5	40.5	39.5	38.0	38.0	37.5
	Max	63.6	91.3	40.8	77.5	74.5	67.0	61.5	53.0	46.0	42.5	42.0	41.0
Energy Average		56.4	81.6	38.8	68.7	65.4	57.8	52.5	46.3	43.0	40.6	40.1	39.4
Night	Min	41.8	50.3	37.9	46.0	45.0	44.0	43.0	42.0	41.0	39.5	39.0	38.0
	Max	47.5	74.7	41.2	56.0	53.0	50.0	48.0	45.0	44.0	43.0	42.5	42.0
Energy Average		45.2	69.6	39.5	52.4	49.6	47.2	45.8	43.9	42.6	40.8	40.6	39.9
Hourly Summary													
Night	0	43.7	52.9	40.5	48.0	47.5	46.0	45.0	44.0	43.0	41.5	41.5	41.0
	1	41.8	50.3	39.1	46.0	45.0	44.0	43.0	42.0	41.0	39.5	39.5	39.5
	2	46.8	72.5	39.5	55.0	53.0	50.0	47.5	44.5	43.0	41.0	41.0	39.5
	3	46.1	70.6	40.7	53.0	51.0	49.5	48.0	45.0	43.0	41.5	41.0	41.0
	4	44.9	64.6	37.9	56.0	50.0	45.5	44.5	43.0	41.5	39.5	39.5	38.0
	5	47.5	74.7	41.2	53.5	49.5	47.0	46.0	45.0	44.0	43.0	42.5	42.0
	6	42.5	52.5	37.9	48.0	47.0	45.5	44.5	43.0	41.5	39.5	39.0	38.0
Day	7	44.5	74.4	37.7	49.5	47.0	44.5	42.5	40.5	39.5	38.0	38.0	37.5
	8	46.5	75.7	37.8	55.5	50.5	46.0	43.5	41.5	40.0	38.5	38.0	38.0
	9	48.4	76.1	37.9	55.0	50.0	46.0	44.5	43.0	41.5	39.5	38.5	38.0
	10	56.4	81.6	38.8	68.7	65.4	57.8	52.5	46.3	43.0	40.6	40.1	39.4
	11	56.7	79.8	38.5	69.0	62.5	53.0	47.5	43.0	41.5	39.5	39.5	39.5
	12	48.7	73.0	36.8	57.0	52.5	46.5	44.5	42.0	40.0	38.0	38.0	37.5
	13	46.5	71.3	37.9	56.5	52.0	47.5	44.5	42.0	41.0	39.0	38.5	38.0
	14	46.5	76.2	38.7	50.0	48.5	47.5	46.5	44.5	42.5	40.5	40.0	39.5
	15	49.5	72.3	39.6	61.5	57.0	52.5	49.5	46.5	44.0	41.5	41.0	40.0
	16	50.3	71.9	39.7	61.5	59.0	53.5	50.5	47.5	45.0	42.5	42.0	41.0
	17	46.5	71.0	39.3	56.0	52.5	49.0	47.5	45.0	43.0	41.0	40.5	39.5
	18	62.6	91.3	37.9	70.0	66.5	57.5	51.5	45.0	42.5	40.0	39.5	39.5
	19	63.6	83.9	38.7	77.5	74.5	67.0	61.5	53.0	46.0	41.5	41.0	39.5
	20	59.6	80.4	40.8	74.0	70.5	62.5	55.5	49.0	45.0	42.5	42.0	41.0
	21	46.6	69.5	40.5	53.5	53.0	50.5	48.5	45.5	44.0	42.0	41.5	41.0
Night	22	45.4	67.5	39.6	52.5	50.0	48.5	46.6	44.5	43.0	41.0	40.5	39.5
	23	45.3	71.6	37.9	50.0	48.0	45.0	44.5	43.5	42.5	39.5	39.5	38.5

URBAN CROSSROADS

24-Hour Noise Level Measurement Summary

				Energy Average Leq		24-Hour
Project Name:	Knox Business Park	*JN:*	9349	*Day*	*Night*	*CNEL*
Location:	L2 - Located along Day Street south of Burch Street near existing residential homes.	*Analyst:*	A. Wolfe	58.2	51.7	61.2
		Date:	3/31-4/1/2015			

Hourly Leq dBA Readings (unadjusted)



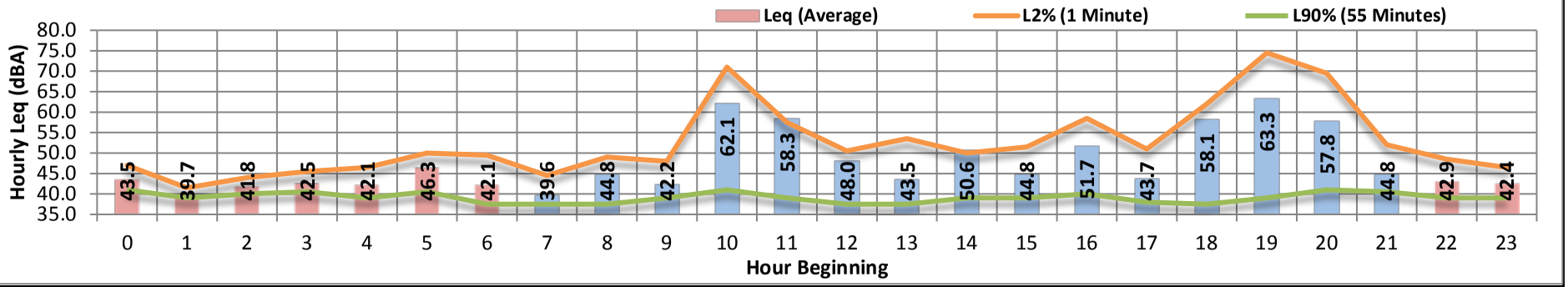
Time Period	*Hour*	*Leq*	*Lmax*	*Lmin*	*L1%*	*L2%*	*L5%*	*L8%*	*L25%*	*L50%*	*L90%*	*L95%*	*L99%*
Day	Min	51.6	73.7	37.6	65.0	62.5	55.0	47.0	42.5	40.0	37.5	37.5	37.5
	Max	63.7	87.6	39.5	77.5	75.0	69.0	63.5	55.8	47.0	42.0	41.5	41.0
Energy Average		58.2	81.5	38.7	70.9	67.9	62.8	57.4	48.8	43.5	40.0	39.6	39.1
Night	Min	45.3	70.0	37.5	53.0	46.0	44.0	43.0	41.5	40.0	39.0	38.0	37.5
	Max	54.3	79.9	39.9	67.5	64.0	57.0	49.5	44.5	42.5	41.5	40.5	40.5
Energy Average		51.7	77.3	38.8	64.5	60.4	52.9	46.6	43.1	41.5	39.8	39.4	39.0
Hourly Summary													
Night	0	48.2	70.0	39.9	60.0	53.0	48.0	46.0	44.0	42.5	41.0	40.5	40.5
	1	45.3	71.8	39.2	53.0	46.0	44.0	43.0	41.5	40.5	39.0	39.0	39.0
	2	50.5	79.4	39.1	59.0	51.0	44.0	43.0	42.0	41.0	39.5	39.5	39.0
	3	49.9	77.1	39.3	61.5	54.0	46.5	44.0	43.0	42.0	40.5	40.5	40.0
	4	52.1	75.1	37.6	66.5	62.5	53.5	46.0	41.5	40.0	39.0	38.0	37.5
	5	53.4	79.9	39.3	66.5	63.0	57.0	49.0	44.5	42.5	41.5	40.5	40.0
	6	54.3	79.3	38.7	67.5	63.5	55.0	48.0	43.5	41.0	39.0	39.0	39.0
Day	7	56.6	79.6	37.6	69.5	67.0	62.0	55.5	45.0	41.0	39.0	39.0	38.0
	8	54.1	77.1	37.6	67.5	65.0	59.0	52.0	43.5	40.0	38.0	37.5	37.5
	9	51.6	74.4	37.6	65.5	62.5	55.0	47.0	42.5	41.5	39.0	39.0	37.5
	10	61.3	84.1	39.4	74.5	70.0	63.5	57.0	47.0	42.5	40.5	40.5	40.5
	11	56.4	78.7	38.5	68.5	64.5	59.0	52.5	43.5	40.5	39.0	39.0	39.0
	12	53.1	73.7	37.6	66.5	63.0	58.5	52.0	43.5	40.5	37.5	37.5	37.5
	13	52.0	75.3	37.6	65.0	62.5	57.0	50.1	42.5	40.0	38.5	37.5	37.5
	14	56.4	81.0	39.0	68.0	65.0	60.0	53.5	45.0	42.0	40.0	39.5	39.0
	15	57.4	83.5	39.3	67.5	65.0	61.0	56.0	48.5	44.0	40.5	40.5	39.5
	16	55.4	79.8	39.3	67.5	65.0	61.5	57.0	48.0	44.0	41.0	40.5	39.5
	17	55.3	74.1	39.2	68.0	66.0	62.5	57.5	48.5	44.0	40.5	40.0	39.0
	18	60.7	84.4	38.6	73.0	69.5	66.0	61.5	51.0	44.5	40.0	39.0	39.0
	19	63.7	82.6	38.8	77.5	75.0	69.0	63.5	55.8	47.0	41.5	40.5	39.5
	20	61.5	87.6	39.3	73.0	70.0	66.0	61.0	51.5	45.0	41.0	40.5	40.0
	21	54.2	77.0	39.5	67.5	64.5	57.0	50.5	48.0	46.5	42.0	41.5	41.0
Night	22	53.4	76.7	37.6	67.5	64.0	56.5	49.5	44.5	42.5	39.0	39.0	37.5
	23	51.6	77.7	37.5	63.0	58.5	49.5	45.5	42.5	41.0	39.0	38.0	37.5

URBAN CROSSROADS

24-Hour Noise Level Measurement Summary

				Energy Average Leq		24-Hour
Project Name:	Knox Business Park	*JN:*	9349	*Day*	*Night*	*CNEL*
Location:	L3 - Located southwest of the Project site along Nance Street adjacent to existing residential homes.	*Analyst:*	A. Wolfe	56.1	42.9	57.6
		Date:	3/31-4/1/2015			

Hourly Leq dBA Readings (unadjusted)



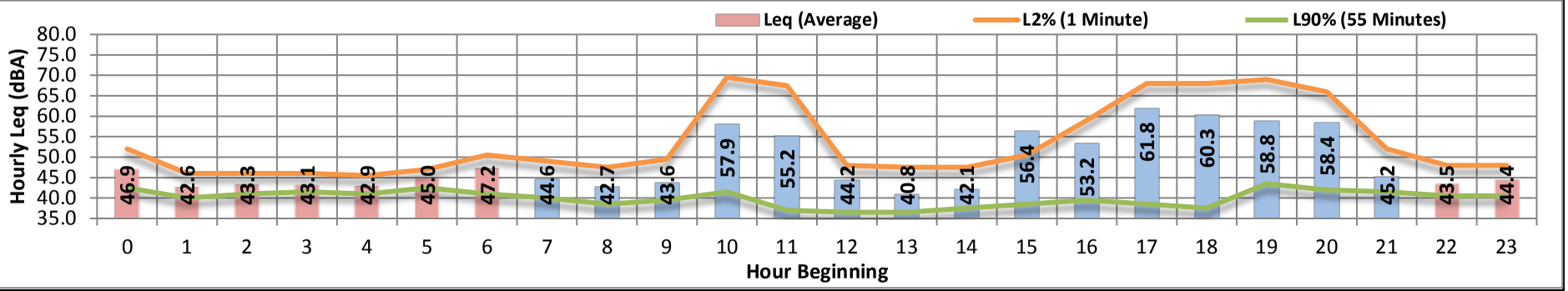
Time Period	*Hour*	*Leq*	*Lmax*	*Lmin*	*L1%*	*L2%*	*L5%*	*L8%*	*L25%*	*L50%*	*L90%*	*L95%*	*L99%*
Day	Min	39.6	56.3	35.5	47.0	44.5	42.0	40.5	39.0	37.5	37.5	37.0	37.0
	Max	63.3	84.6	39.9	77.5	74.5	65.0	58.0	50.0	43.5	41.0	40.5	40.5
Energy Average		56.1	78.8	37.7	69.5	65.5	57.2	50.3	44.3	41.2	39.1	38.7	38.3
Night	Min	39.7	44.0	37.3	42.0	41.5	41.0	40.5	40.0	39.0	37.5	37.5	37.0
	Max	46.3	60.7	39.2	53.0	50.0	49.0	48.0	47.0	45.5	41.0	40.5	40.0
Energy Average		42.9	56.8	38.2	49.1	47.2	45.4	44.2	43.1	42.0	39.6	39.2	38.5
Hourly Summary													
Night	0	43.5	59.6	39.0	49.0	47.0	45.0	44.5	43.5	42.5	41.0	40.0	39.0
	1	39.7	44.0	37.4	42.0	41.5	41.0	40.5	40.0	39.0	39.0	38.0	37.5
	2	41.8	52.1	39.1	44.5	44.0	43.5	43.0	42.0	41.5	40.0	39.5	39.0
	3	42.5	56.8	39.2	46.5	45.5	44.5	43.5	42.5	42.0	40.5	40.5	40.0
	4	42.1	52.7	37.4	47.0	46.5	45.5	44.0	42.5	41.0	39.0	39.0	38.0
	5	46.3	60.2	39.1	52.0	50.0	49.0	48.0	47.0	45.5	40.5	39.5	39.0
	6	42.1	60.7	37.3	53.0	49.5	44.5	42.0	40.5	39.5	37.5	37.5	37.0
Day	7	39.6	62.9	35.5	47.0	44.5	42.0	40.5	39.0	37.5	37.5	37.0	37.0
	8	44.8	68.5	37.1	55.0	49.0	45.0	42.5	40.5	38.5	37.5	37.5	37.0
	9	42.2	58.6	37.4	49.0	48.0	45.5	44.0	42.0	40.5	39.0	39.0	38.0
	10	62.1	84.6	39.9	76.5	71.0	62.5	53.5	45.0	42.5	41.0	40.5	40.5
	11	58.3	82.2	37.4	69.5	57.5	50.0	45.0	41.5	40.5	39.0	39.0	39.0
	12	48.0	71.8	36.6	57.0	50.5	45.0	42.5	40.0	38.5	37.5	37.0	37.0
	13	43.5	58.3	37.2	55.0	53.5	49.5	45.5	41.0	39.0	37.5	37.5	37.0
	14	50.6	76.9	37.4	57.0	50.0	47.5	46.0	43.5	41.5	39.0	39.0	37.5
	15	44.8	59.7	37.4	52.5	51.5	49.5	47.5	45.0	42.5	39.0	39.0	38.5
	16	51.7	77.1	37.4	64.0	58.5	51.5	48.0	44.5	42.5	40.0	39.0	39.0
	17	43.7	56.3	37.3	52.5	51.0	48.5	46.5	43.5	41.0	38.0	37.5	37.5
	18	58.1	83.7	37.0	67.0	62.0	55.0	48.5	42.5	39.5	37.5	37.5	37.0
	19	63.3	84.3	37.2	77.5	74.5	65.0	58.0	50.0	43.0	39.0	37.5	37.5
	20	57.8	76.9	39.7	71.5	69.5	62.5	54.5	47.5	43.5	41.0	40.5	40.0
	21	44.8	59.9	39.1	53.0	52.0	49.5	47.0	44.0	42.5	40.5	40.5	39.0
Night	22	42.9	53.9	37.5	50.0	48.5	46.0	44.5	43.0	41.5	39.0	39.0	38.5
	23	42.4	49.8	37.4	47.0	46.5	45.5	44.0	43.0	42.0	39.0	39.0	37.5

URBAN CROSSROADS

24-Hour Noise Level Measurement Summary

				Energy Average Leq		24-Hour
Project Name:	Knox Business Park	*JN:*	9349	*Day*	*Night*	*CNEL*
Location:	L4 - Located at the future southwest property line of Building D, adjacent to existing residential homes on Redwood Drive.	*Analyst:*	A. Wolfe	55.9	44.6	56.8
		Date:	3/31-4/1/2015			

Hourly Leq dBA Readings (unadjusted)



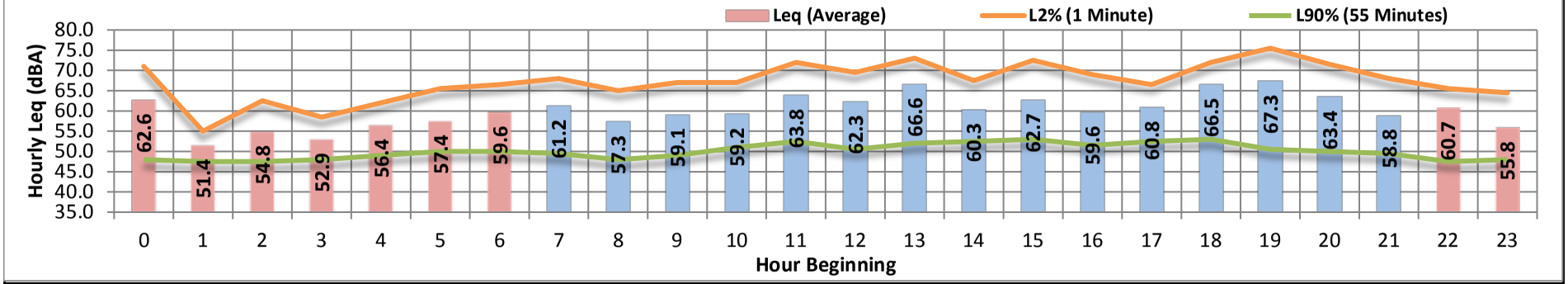
Time Period	*Hour*	*Leq*	*Lmax*	*Lmin*	*L1%*	*L2%*	*L5%*	*L8%*	*L25%*	*L50%*	*L90%*	*L95%*	*L99%*
Day	Min	40.8	55.2	35.8	48.5	47.5	44.0	42.0	40.0	38.0	36.5	36.5	35.5
	Max	61.8	89.3	40.4	73.5	69.5	63.5	57.5	51.0	46.5	43.5	43.0	41.0
Energy Average		55.9	82.3	37.7	67.9	64.3	58.2	51.1	45.2	42.1	39.7	39.2	38.4
Night	Min	42.6	50.3	39.0	46.0	45.5	45.0	44.0	43.0	42.0	40.0	39.5	39.5
	Max	47.2	75.1	41.1	57.0	52.0	49.0	47.5	46.0	44.5	42.5	42.5	42.0
Energy Average		44.6	67.1	39.8	51.6	48.3	46.5	45.4	44.2	43.0	41.2	40.9	40.4
Hourly Summary													
Night	0	46.9	68.4	41.1	57.0	52.0	49.0	47.5	46.0	44.5	42.5	42.5	42.0
	1	42.6	50.3	39.0	46.0	46.0	45.0	44.0	43.0	42.0	40.0	39.5	39.5
	2	43.3	57.7	39.8	46.0	46.0	45.5	44.5	43.5	42.5	41.0	41.0	40.5
	3	43.1	50.7	40.1	46.5	46.0	45.0	44.5	43.5	42.5	41.5	41.0	40.5
	4	42.9	56.7	39.4	46.5	45.5	45.0	44.0	43.0	42.0	41.0	40.5	39.5
	5	45.0	66.6	40.8	47.5	47.0	46.5	46.0	45.0	44.0	42.5	42.0	41.5
	6	47.2	75.1	39.0	56.0	50.5	47.0	45.5	44.0	42.5	41.0	40.5	39.5
Day	7	44.6	70.9	38.6	50.5	49.0	46.5	45.0	43.5	41.5	40.0	39.5	39.0
	8	42.7	66.3	37.5	50.0	47.5	44.5	43.0	41.0	40.0	38.5	38.0	38.0
	9	43.6	65.6	38.0	52.5	49.5	46.5	45.0	43.0	41.5	39.5	39.0	38.5
	10	57.9	76.9	40.4	72.0	69.5	63.0	54.5	46.5	43.5	41.5	41.0	41.0
	11	55.2	73.4	35.9	69.5	67.5	62.0	51.5	45.0	40.0	37.0	36.5	36.0
	12	44.2	67.9	35.8	56.5	48.0	44.0	42.0	40.0	38.0	36.5	36.5	35.5
	13	40.8	59.8	35.8	48.5	47.5	45.0	43.0	40.0	38.5	36.5	36.5	36.0
	14	42.1	61.3	36.1	48.5	47.5	45.5	44.0	42.0	40.0	37.5	37.0	36.5
	15	56.4	86.6	37.1	55.5	50.5	48.5	46.5	43.5	41.0	38.5	38.0	37.5
	16	53.2	76.4	37.6	66.0	59.0	52.0	47.5	44.5	42.0	39.5	39.0	38.5
	17	61.8	89.3	36.9	73.5	68.0	57.5	49.5	44.0	41.0	38.5	38.0	37.5
	18	60.3	89.3	35.9	71.0	68.0	62.5	54.5	45.0	40.5	37.5	37.0	36.5
	19	58.8	80.7	37.5	72.0	69.0	63.5	57.5	51.0	46.5	43.5	43.0	40.0
	20	58.4	81.2	39.4	70.5	66.0	60.5	54.5	48.5	45.0	42.0	41.0	40.0
	21	45.2	55.2	39.6	53.0	52.0	50.0	47.5	44.5	43.5	41.5	41.0	40.5
Night	22	43.5	55.3	39.6	49.5	48.0	46.0	45.0	44.0	42.5	40.5	40.0	40.0
	23	44.4	53.7	39.1	49.0	48.0	47.5	46.5	45.0	43.5	40.5	40.5	40.0

URBAN CROSSROADS

24-Hour Noise Level Measurement Summary

				Energy Average Leq		24-Hour
Project Name:	Knox Business Park	*JN:*	9349	*Day*	*Night*	*CNEL*
Location:	L5 - Located on Old Oleander Avenue, northeast of the Project site near an existing cell tower with electrical generators and residential home.	*Analyst:*	A. Wolfe	63.0	58.2	66.5
		Date:	3/31-4/1/2015			

Hourly Leq dBA Readings (unadjusted)



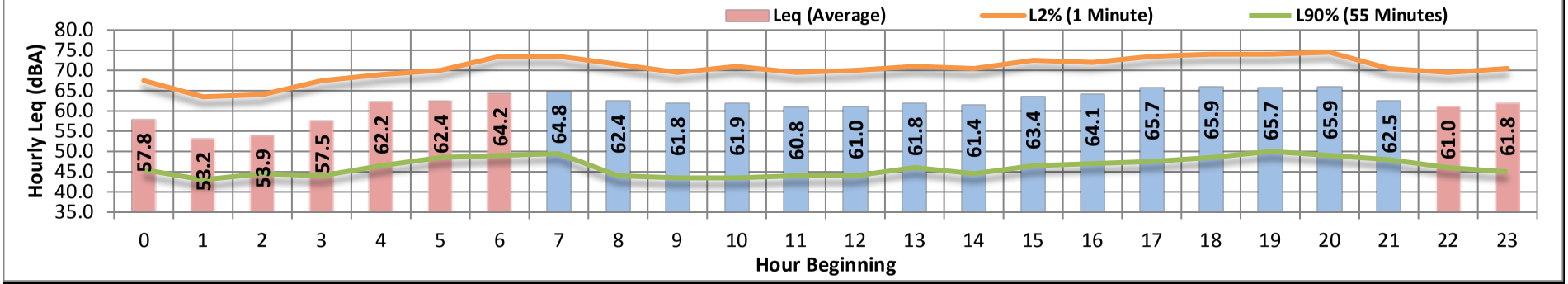
Time Period	*Hour*	*Leq*	*Lmax*	*Lmin*	*L1%*	*L2%*	*L5%*	*L8%*	*L25%*	*L50%*	*L90%*	*L95%*	*L99%*
Day	Min	57.3	77.8	46.2	68.5	65.0	60.0	57.0	53.0	51.0	48.0	47.5	47.0
	Max	67.3	95.9	50.8	75.5	75.5	75.5	75.5	62.0	58.5	53.0	52.0	51.5
Energy Average		63.0	88.3	49.0	72.9	70.6	68.5	67.2	58.1	54.7	51.3	50.6	49.7
Night	Min	51.4	73.4	45.5	58.0	55.0	52.5	51.0	50.0	49.0	47.5	47.0	46.5
	Max	62.6	88.7	47.7	72.5	71.0	70.5	68.0	55.5	53.0	50.0	49.5	48.5
Energy Average		58.2	83.5	46.9	68.5	65.4	62.8	60.3	52.6	50.7	48.5	48.2	47.6
Hourly Summary													
Night	0	62.6	85.1	47.2	72.5	71.0	70.5	68.0	52.5	50.5	48.0	48.0	47.5
	1	51.4	73.4	46.5	58.0	55.0	52.5	51.0	50.0	49.0	47.5	47.5	47.0
	2	54.8	75.5	46.5	66.5	62.5	57.0	55.5	51.5	49.5	47.5	47.5	47.0
	3	52.9	78.5	46.8	60.0	58.5	54.5	52.5	51.5	49.5	48.0	48.0	47.5
	4	56.4	77.7	47.5	67.0	62.0	58.5	55.5	52.0	50.5	49.0	48.5	48.0
	5	57.4	80.9	47.7	68.0	65.5	61.5	58.0	54.5	52.5	50.0	49.5	48.5
	6	59.6	88.7	47.5	70.5	66.5	61.5	60.0	55.5	53.0	50.0	49.5	48.5
Day	7	61.2	85.4	47.1	73.0	68.0	62.0	59.5	58.5	53.0	49.5	49.0	48.0
	8	57.3	79.7	46.2	69.0	65.0	60.0	57.0	53.0	51.0	48.0	47.5	47.0
	9	59.1	85.9	46.7	70.0	67.0	62.0	60.0	56.0	52.5	49.0	48.5	48.0
	10	59.2	77.8	47.7	68.5	67.0	64.0	62.0	58.5	55.5	51.0	50.0	48.5
	11	63.8	83.7	48.9	75.5	72.0	69.0	67.0	60.5	58.5	52.5	51.5	50.5
	12	62.3	85.9	48.1	73.5	69.5	63.5	60.0	55.5	53.0	50.5	49.5	48.5
	13	66.6	95.9	49.4	75.0	73.0	72.0	68.0	58.5	55.0	52.0	51.0	50.5
	14	60.3	82.6	49.5	71.5	67.5	62.5	59.5	56.5	54.5	52.5	52.0	51.0
	15	62.7	84.2	50.6	74.5	72.5	67.5	63.0	58.5	55.5	53.0	52.0	51.0
	16	59.6	82.7	50.3	70.5	69.0	64.5	61.5	56.5	54.0	51.5	51.5	50.5
	17	60.8	83.4	50.5	72.0	66.5	62.5	59.5	57.0	54.5	52.5	52.0	51.0
	18	66.5	94.7	50.8	72.5	72.0	72.0	72.0	62.0	57.0	53.0	52.0	51.5
	19	67.3	79.1	49.0	75.5	75.5	75.5	75.5	59.5	55.0	50.5	50.0	49.5
	20	63.4	88.4	48.4	73.5	71.5	69.0	67.5	57.5	53.0	50.0	49.5	49.0
	21	58.8	79.2	47.8	71.0	68.0	63.5	59.5	55.5	53.0	49.5	49.0	48.0
Night	22	60.7	87.8	45.5	70.0	65.5	59.5	55.5	52.0	50.0	47.5	47.0	46.5
	23	55.8	76.3	46.4	69.0	64.5	57.5	54.5	51.5	50.0	48.0	47.5	47.0

URBAN CROSSROADS

24-Hour Noise Level Measurement Summary

				Energy Average Leq		24-Hour
Project Name:	Knox Business Park	*JN:*	9349	*Day*	*Night*	*CNEL*
Location:	L6 - Located at the northwest corner of Markham Street and Decker Road near existing residential homes.	*Analyst:*	A. Wolfe	63.7	60.6	68.2
		Date:	3/31-4/1/2015			

Hourly Leq dBA Readings (unadjusted)



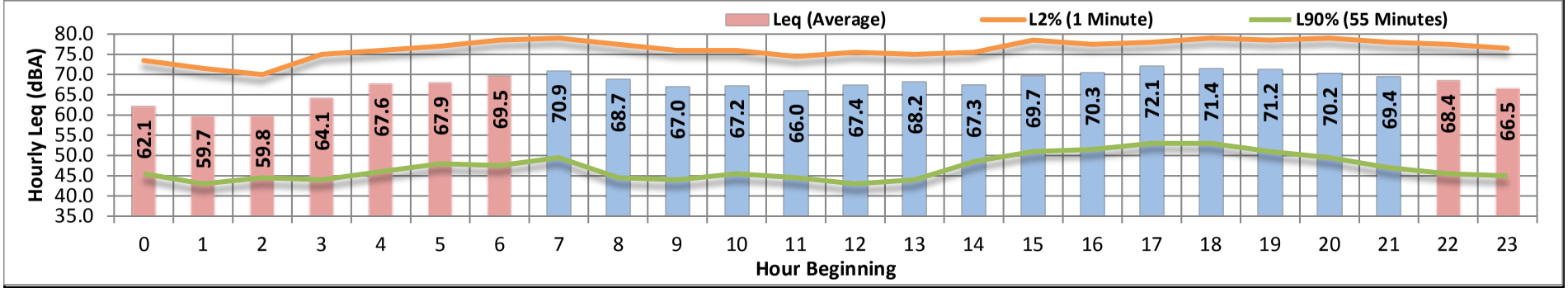
Time Period	*Hour*	*Leq*	*Lmax*	*Lmin*	*L1%*	*L2%*	*L5%*	*L8%*	*L25%*	*L50%*	*L90%*	*L95%*	*L99%*
Day	Min	60.8	81.0	38.2	72.0	69.5	66.0	63.5	59.0	52.0	43.5	42.0	38.5
	Max	65.9	90.4	45.9	77.5	74.5	71.0	68.0	64.5	59.5	50.0	49.0	47.5
Energy Average		63.7	85.9	42.8	74.8	72.2	68.6	66.1	62.0	55.9	46.9	45.6	43.9
Night	Min	53.2	72.8	41.2	66.0	63.5	56.5	51.0	48.5	46.5	43.0	42.5	41.5
	Max	64.2	88.6	45.9	75.5	73.5	69.5	67.0	63.0	55.0	49.0	48.0	47.0
Energy Average		60.6	83.3	43.6	71.9	69.3	65.8	63.1	58.2	51.3	46.2	45.4	44.5
Hourly Summary													
Night	0	57.8	81.5	43.3	70.0	67.5	62.0	57.0	51.0	48.5	45.5	45.0	44.5
	1	53.2	72.8	41.2	66.0	63.5	58.0	52.0	49.0	46.5	43.0	42.5	41.5
	2	53.9	77.2	42.2	67.0	64.0	56.5	51.0	48.5	47.0	44.5	43.5	43.0
	3	57.5	79.3	42.5	69.5	67.5	64.0	60.0	50.5	46.5	44.0	43.5	43.0
	4	62.2	88.6	44.5	71.0	69.0	67.0	64.5	58.5	50.5	46.5	46.0	45.5
	5	62.4	82.0	45.9	72.0	70.0	68.0	66.0	63.0	55.0	48.5	47.5	47.0
	6	64.2	83.9	44.6	75.5	73.5	69.5	67.0	62.5	55.0	49.0	48.0	46.0
Day	7	64.8	85.0	45.7	75.5	73.5	70.5	68.0	64.0	57.0	49.5	48.5	47.0
	8	62.4	81.0	38.2	73.0	71.5	68.0	66.0	61.5	53.5	44.0	42.0	38.5
	9	61.8	84.8	38.6	72.5	69.5	67.0	64.0	59.5	52.0	43.5	42.0	40.0
	10	61.9	83.7	40.8	73.5	71.0	67.0	64.5	59.5	53.0	43.5	42.5	41.5
	11	60.8	81.3	40.6	72.0	69.5	66.0	63.5	59.0	53.0	44.0	42.5	41.5
	12	61.0	83.7	40.8	72.0	70.0	66.5	64.0	59.5	52.5	44.0	43.0	42.0
	13	61.8	81.2	42.3	73.5	71.0	67.0	64.0	60.5	54.5	46.0	45.0	43.5
	14	61.4	81.5	41.5	73.0	70.5	66.5	64.0	59.5	53.0	44.5	44.0	42.5
	15	63.4	82.1	43.2	75.5	72.5	68.5	65.5	61.5	55.0	46.5	45.5	44.0
	16	64.1	87.4	44.4	74.5	72.0	68.5	66.5	62.5	56.5	47.0	46.0	45.0
	17	65.7	89.6	42.8	77.0	73.5	70.0	67.5	63.5	58.0	47.5	45.5	43.5
	18	65.9	86.7	42.3	76.5	74.0	71.0	68.0	64.5	59.5	48.5	46.0	43.5
	19	65.7	86.5	45.9	77.0	74.0	70.5	68.0	64.5	59.0	50.0	49.0	47.5
	20	65.9	90.4	44.5	77.5	74.5	70.0	67.5	63.0	57.0	49.0	47.5	46.0
	21	62.5	87.2	42.8	73.0	70.5	67.5	65.5	61.0	55.0	48.0	46.0	43.5
Night	22	61.0	84.6	44.0	72.0	69.5	67.0	64.5	58.5	52.0	46.0	45.5	44.5
	23	61.8	82.9	41.6	75.0	70.5	66.0	62.5	56.0	50.0	45.0	43.5	42.5

URBAN CROSSROADS

24-Hour Noise Level Measurement Summary

				Energy Average Leq		24-Hour
Project Name:	Knox Business Park	*JN:*	9349	*Day*	*Night*	*CNEL*
Location:	L7 - Located along Markham Street near existing residential homes, south of the Project site.	*Analyst:*	A. Wolfe	69.5	66.3	73.9
		Date:	3/31-4/1/2015			

Hourly Leq dBA Readings (unadjusted)



Time Period	*Hour*	*Leq*	*Lmax*	*Lmin*	*L1%*	*L2%*	*L5%*	*L8%*	*L25%*	*L50%*	*L90%*	*L95%*	*L99%*
Day	Min	66.0	86.6	40.1	76.5	74.5	72.0	70.0	65.0	54.5	43.0	42.0	41.0
	Max	72.1	98.5	46.7	80.5	79.0	77.0	75.5	72.0	66.5	53.0	50.5	48.0
Energy Average		69.5	92.4	43.1	79.2	77.4	75.1	73.1	68.8	61.7	49.2	47.3	44.7
Night	Min	59.7	80.4	41.0	74.0	70.0	61.0	53.0	47.5	45.5	43.0	42.5	41.5
	Max	69.5	93.9	45.8	80.0	78.5	76.0	74.0	68.0	58.5	48.0	47.0	46.0
Energy Average		66.3	88.1	43.2	77.5	75.8	72.7	69.9	62.7	53.4	45.7	44.9	43.8
Hourly Summary													
Night	0	62.1	84.0	43.5	76.0	73.5	67.0	59.0	50.5	48.0	45.5	45.0	44.0
	1	59.7	80.4	41.0	74.0	71.5	64.0	56.5	48.5	45.5	43.0	42.5	41.5
	2	59.8	83.8	42.4	74.0	70.0	61.0	53.0	47.5	46.0	44.5	44.0	43.0
	3	64.1	84.0	42.5	77.0	75.0	71.0	66.0	54.5	47.0	44.0	43.5	43.0
	4	67.6	93.9	44.2	77.0	76.0	74.0	71.0	62.5	52.5	46.0	45.5	45.0
	5	67.9	86.1	45.8	78.5	77.0	74.5	72.5	66.5	56.5	48.0	47.0	46.0
	6	69.5	87.0	43.0	80.0	78.5	76.0	74.0	68.0	58.5	47.5	46.5	44.0
Day	7	70.9	92.9	43.1	80.5	79.0	77.0	75.0	70.5	62.0	49.5	48.0	46.0
	8	68.7	87.1	40.1	79.0	77.5	75.5	73.5	68.0	57.5	44.5	43.0	41.0
	9	67.0	89.8	40.9	77.5	76.0	73.5	71.0	65.0	54.5	44.0	43.0	41.5
	10	67.2	86.6	42.7	77.0	76.0	73.5	71.5	67.0	58.0	45.5	44.5	43.0
	11	66.0	86.8	41.0	76.5	74.5	72.0	70.0	65.0	54.5	44.5	43.0	41.5
	12	67.4	89.2	40.5	78.5	75.5	72.5	70.5	65.0	55.5	43.0	42.0	41.0
	13	68.2	96.4	41.0	77.0	75.0	73.0	70.5	65.5	56.5	44.0	43.0	42.0
	14	67.3	87.5	42.7	77.5	75.5	73.0	71.0	66.5	59.0	48.5	46.5	44.5
	15	69.7	88.9	43.5	80.5	78.5	75.0	72.5	69.0	63.0	51.0	49.0	45.0
	16	70.3	93.2	42.8	80.0	77.5	75.0	73.5	70.0	64.0	51.5	49.5	46.5
	17	72.1	98.5	44.7	80.0	78.0	76.0	74.1	71.0	65.5	53.0	50.5	46.5
	18	71.4	87.9	43.0	80.5	79.0	77.0	75.5	72.0	66.5	53.0	50.5	45.5
	19	71.2	95.8	46.7	80.0	78.5	76.5	74.5	70.5	63.5	51.0	49.5	48.0
	20	70.2	88.3	45.5	80.5	79.0	76.5	74.5	69.5	62.0	49.5	48.0	46.5
	21	69.4	88.1	42.5	79.5	78.0	76.0	73.5	68.0	59.5	47.0	44.5	43.0
Night	22	68.4	90.4	42.5	79.0	77.5	75.0	72.5	64.5	55.0	45.5	44.5	43.5
	23	66.5	86.5	41.8	78.5	76.5	73.5	69.5	59.5	50.5	45.0	44.0	42.5

URBAN CROSSROADS

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APPENDIX 7.1:

OFF-SITE TRAFFIC NOISE CONTOURS

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing
Road Name: Harvill Av.
Road Segment: s/o Harley Knox Bl.
Project Name: Knox Business Park
Job Number: 9349

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	9,700	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	970	vehicles
Vehicle Speed:	50	mph
Near/Far Lane Distance:	48	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	100.0	feet
Centerline Dist. to Observer:	100.0	feet
Barrier Distance to Observer:	0.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	0.0	feet
Road Elevation:	0.0	feet
Road Grade:	0.0%	
Left View:	-90.0	degrees
Right View:	90.0	degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	93.82%
Medium Trucks:	84.8%	4.9%	10.3%	1.09%
Heavy Trucks:	86.5%	2.7%	10.8%	5.09%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	97.206
Medium Trucks:	97.115
Heavy Trucks:	97.124

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	-2.70	-4.43	-1.20	-4.77	0.000	0.000
Medium Trucks:	81.00	-22.07	-4.43	-1.20	-4.88	0.000	0.000
Heavy Trucks:	85.38	-15.36	-4.43	-1.20	-5.16	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	61.9	60.0	58.2	52.1	60.8	61.4
Medium Trucks:	53.3	51.8	45.4	43.9	52.3	52.6
Heavy Trucks:	64.4	63.0	53.9	55.2	63.5	63.7
Vehicle Noise:	66.5	64.9	59.7	57.1	65.6	65.9

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	51	109	236	508
CNEL:	53	115	247	532

Monday, June 08, 2015

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing
Road Name: Harvill Av.
Road Segment: n/o Oleander Av.
Project Name: Knox Business Park
Job Number: 9349

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	9,100	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	910	vehicles
Vehicle Speed:	50	mph
Near/Far Lane Distance:	48	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	100.0	feet
Centerline Dist. to Observer:	100.0	feet
Barrier Distance to Observer:	0.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	0.0	feet
Road Elevation:	0.0	feet
Road Grade:	0.0%	
Left View:	-90.0	degrees
Right View:	90.0	degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	93.82%
Medium Trucks:	84.8%	4.9%	10.3%	1.09%
Heavy Trucks:	86.5%	2.7%	10.8%	5.09%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	97.206
Medium Trucks:	97.115
Heavy Trucks:	97.124

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	-2.98	-4.43	-1.20	-4.77	0.000	0.000
Medium Trucks:	81.00	-22.35	-4.43	-1.20	-4.88	0.000	0.000
Heavy Trucks:	85.38	-15.64	-4.43	-1.20	-5.16	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	61.6	59.7	57.9	51.9	60.5	61.1
Medium Trucks:	53.0	51.5	45.2	43.6	52.1	52.3
Heavy Trucks:	64.1	62.7	53.7	54.9	63.3	63.4
Vehicle Noise:	66.3	64.7	59.5	56.9	65.3	65.6

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	49	105	226	487
CNEL:	51	110	237	510

Monday, June 08, 2015

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing
Road Name: Harvill Av.
Road Segment: s/o Oleander Av.
Project Name: Knox Business Park
Job Number: 9349

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	8,800	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	880	vehicles
Vehicle Speed:	50	mph
Near/Far Lane Distance:	48	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	100.0	feet
Centerline Dist. to Observer:	100.0	feet
Barrier Distance to Observer:	0.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	0.0	feet
Road Elevation:	0.0	feet
Road Grade:	0.0%	
Left View:	-90.0	degrees
Right View:	90.0	degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	93.82%
Medium Trucks:	84.8%	4.9%	10.3%	1.09%
Heavy Trucks:	86.5%	2.7%	10.8%	5.09%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	97.206
Medium Trucks:	97.115
Heavy Trucks:	97.124

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	-3.13	-4.43	-1.20	-4.77	0.000	0.000
Medium Trucks:	81.00	-22.50	-4.43	-1.20	-4.88	0.000	0.000
Heavy Trucks:	85.38	-15.78	-4.43	-1.20	-5.16	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	61.4	59.5	57.8	51.7	60.3	61.0
Medium Trucks:	52.9	51.4	45.0	43.5	51.9	52.2
Heavy Trucks:	64.0	62.5	53.5	54.8	63.1	63.2
Vehicle Noise:	66.1	64.5	59.3	56.7	65.2	65.5

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	48	103	221	476
CNEL:	50	107	231	498

Monday, June 08, 2015

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing
Road Name: I-215 SB Fwy
Road Segment: n/o Harley Knox Bl.
Project Name: Knox Business Park
Job Number: 9349

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	38,600	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	3,860	vehicles
Vehicle Speed:	65	mph
Near/Far Lane Distance:	60	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	100.0	feet
Centerline Dist. to Observer:	100.0	feet
Barrier Distance to Observer:	0.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	0.0	feet
Road Elevation:	0.0	feet
Road Grade:	0.0%	
Left View:	-90.0	degrees
Right View:	90.0	degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	93.82%
Medium Trucks:	84.8%	4.9%	10.3%	1.09%
Heavy Trucks:	86.5%	2.7%	10.8%	5.09%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	95.525
Medium Trucks:	95.432
Heavy Trucks:	95.441

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	74.55	2.15	-4.32	-1.20	-4.77	0.000	0.000
Medium Trucks:	84.86	-17.21	-4.31	-1.20	-4.88	0.000	0.000
Heavy Trucks:	88.18	-10.50	-4.31	-1.20	-5.16	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	71.2	69.3	67.5	61.5	70.1	70.7
Medium Trucks:	62.1	60.6	54.3	52.7	61.2	61.4
Heavy Trucks:	72.2	70.7	61.7	63.0	71.3	71.4
Vehicle Noise:	74.9	73.3	68.7	65.5	74.0	74.3

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	184	397	856	1,844
CNEL:	194	418	901	1,940

Monday, June 08, 2015

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing
Road Name: I-215 SB Fwy
Road Segment: s/o Harley Knox Bl.
Project Name: Knox Business Park
Job Number: 9349

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	34,500	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	3,450	vehicles
Vehicle Speed:	65	mph
Near/Far Lane Distance:	60	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	100.0	feet
Centerline Dist. to Observer:	100.0	feet
Barrier Distance to Observer:	0.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	0.0	feet
Road Elevation:	0.0	feet
Road Grade:	0.0%	
Left View:	-90.0	degrees
Right View:	90.0	degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	93.82%
Medium Trucks:	84.8%	4.9%	10.3%	1.09%
Heavy Trucks:	86.5%	2.7%	10.8%	5.09%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	95.525
Medium Trucks:	95.432
Heavy Trucks:	95.441

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	74.55	1.67	-4.32	-1.20	-4.77	0.000	0.000
Medium Trucks:	84.86	-17.70	-4.31	-1.20	-4.88	0.000	0.000
Heavy Trucks:	88.18	-10.99	-4.31	-1.20	-5.16	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	70.7	68.8	67.0	61.0	69.6	70.2
Medium Trucks:	61.6	60.1	53.8	52.2	60.7	60.9
Heavy Trucks:	71.7	70.3	61.2	62.5	70.8	71.0
Vehicle Noise:	74.5	72.8	68.2	65.0	73.5	73.8

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	171	369	794	1,711
CNEL:	180	388	836	1,801

Monday, June 08, 2015

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing
Road Name: I-215 NB Fwy
Road Segment: n/o Harley Knox Bl.
Project Name: Knox Business Park
Job Number: 9349

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	32,500	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	3,250	vehicles
Vehicle Speed:	65	mph
Near/Far Lane Distance:	60	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	100.0	feet
Centerline Dist. to Observer:	100.0	feet
Barrier Distance to Observer:	0.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	0.0	feet
Road Elevation:	0.0	feet
Road Grade:	0.0%	
Left View:	-90.0	degrees
Right View:	90.0	degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	93.82%
Medium Trucks:	84.8%	4.9%	10.3%	1.09%
Heavy Trucks:	86.5%	2.7%	10.8%	5.09%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	95.525
Medium Trucks:	95.432
Heavy Trucks:	95.441

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	74.55	1.41	-4.32	-1.20	-4.77	0.000	0.000
Medium Trucks:	84.86	-17.96	-4.31	-1.20	-4.88	0.000	0.000
Heavy Trucks:	88.18	-11.25	-4.31	-1.20	-5.16	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	70.4	68.5	66.8	60.7	69.3	69.9
Medium Trucks:	61.4	59.9	53.5	52.0	60.4	60.7
Heavy Trucks:	71.4	70.0	61.0	62.2	70.6	70.7
Vehicle Noise:	74.2	72.6	67.9	64.8	73.2	73.6

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	164	354	763	1,644
CNEL:	173	373	803	1,730

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing
Road Name: I-215 NB Fwy
Road Segment: s/o Harley Knox Bl.
Project Name: Knox Business Park
Job Number: 9349

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	27,800	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	2,780	vehicles
Vehicle Speed:	65	mph
Near/Far Lane Distance:	60	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	100.0	feet
Centerline Dist. to Observer:	100.0	feet
Barrier Distance to Observer:	0.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	0.0	feet
Road Elevation:	0.0	feet
Road Grade:	0.0%	
Left View:	-90.0	degrees
Right View:	90.0	degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	93.82%
Medium Trucks:	84.8%	4.9%	10.3%	1.09%
Heavy Trucks:	86.5%	2.7%	10.8%	5.09%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	95.525
Medium Trucks:	95.432
Heavy Trucks:	95.441

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	74.55	0.73	-4.32	-1.20	-4.77	0.000	0.000
Medium Trucks:	84.86	-18.64	-4.31	-1.20	-4.88	0.000	0.000
Heavy Trucks:	88.18	-11.93	-4.31	-1.20	-5.16	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	69.8	67.9	66.1	60.0	68.7	69.3
Medium Trucks:	60.7	59.2	52.8	51.3	59.8	60.0
Heavy Trucks:	70.7	69.3	60.3	61.5	69.9	70.0
Vehicle Noise:	73.5	71.9	67.3	64.1	72.6	72.9

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	148	319	688	1,481
CNEL:	156	336	724	1,559

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing
Road Name: Harley Knox Bl.
Road Segment: e/o Harvill Av.
Project Name: Knox Business Park
Job Number: 9349

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	9,900	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	990	vehicles
Vehicle Speed:	45	mph
Near/Far Lane Distance:	54	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	100.0	feet
Centerline Dist. to Observer:	100.0	feet
Barrier Distance to Observer:	0.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	0.0	feet
Road Elevation:	0.0	feet
Road Grade:	0.0%	
Left View:	-90.0	degrees
Right View:	90.0	degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	93.82%
Medium Trucks:	84.8%	4.9%	10.3%	1.09%
Heavy Trucks:	86.5%	2.7%	10.8%	5.09%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	96.416
Medium Trucks:	96.324
Heavy Trucks:	96.333

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	-2.16	-4.38	-1.20	-4.77	0.000	0.000
Medium Trucks:	79.45	-21.53	-4.37	-1.20	-4.88	0.000	0.000
Heavy Trucks:	84.25	-14.81	-4.38	-1.20	-5.16	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	60.7	58.8	57.1	51.0	59.6	60.2
Medium Trucks:	52.3	50.8	44.5	42.9	51.4	51.6
Heavy Trucks:	63.9	62.4	53.4	54.7	63.0	63.1
Vehicle Noise:	65.8	64.2	58.8	56.4	64.9	65.1

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	45	98	211	454
CNEL:	47	102	220	474

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing
Road Name: Harley Knox Bl.
Road Segment: e/o I-215 SB Fwy Ramps
Project Name: Knox Business Park
Job Number: 9349

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	12,200 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	1,220 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	54 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	100.0 feet
Centerline Dist. to Observer:	100.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	93.82%
Medium Trucks:	84.8%	4.9%	10.3%	1.09%
Heavy Trucks:	86.5%	2.7%	10.8%	5.09%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	96.416
Medium Trucks:	96.324
Heavy Trucks:	96.333

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	-1.25	-4.38	-1.20	-4.77	0.000	0.000
Medium Trucks:	79.45	-20.62	-4.37	-1.20	-4.88	0.000	0.000
Heavy Trucks:	84.25	-13.91	-4.38	-1.20	-5.16	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	61.6	59.7	58.0	51.9	60.5	61.1
Medium Trucks:	53.3	51.7	45.4	43.8	52.3	52.5
Heavy Trucks:	64.8	63.4	54.3	55.6	63.9	64.0
Vehicle Noise:	66.7	65.1	59.7	57.3	65.8	66.0

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	52	112	242	521
CNEL:	54	117	253	544

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing
Road Name: Harley Knox Bl.
Road Segment: e/o I-215 NB Fwy Ramps
Project Name: Knox Business Park
Job Number: 9349

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	15,600 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	1,560 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	54 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	100.0 feet
Centerline Dist. to Observer:	100.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	93.82%
Medium Trucks:	84.8%	4.9%	10.3%	1.09%
Heavy Trucks:	86.5%	2.7%	10.8%	5.09%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	96.416
Medium Trucks:	96.324
Heavy Trucks:	96.333

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	-0.18	-4.38	-1.20	-4.77	0.000	0.000
Medium Trucks:	79.45	-19.55	-4.37	-1.20	-4.88	0.000	0.000
Heavy Trucks:	84.25	-12.84	-4.38	-1.20	-5.16	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	62.7	60.8	59.0	53.0	61.6	62.2
Medium Trucks:	54.3	52.8	46.5	44.9	53.4	53.6
Heavy Trucks:	65.8	64.4	55.4	56.6	65.0	65.1
Vehicle Noise:	67.8	66.2	60.8	58.4	66.8	67.1

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	61	132	285	614
CNEL:	64	138	298	641

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing
Road Name: Oleander Av.
Road Segment: e/o Driveway 6
Project Name: Knox Business Park
Job Number: 9349

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	100 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	10 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	36 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	100.0 feet
Centerline Dist. to Observer:	100.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	93.82%
Medium Trucks:	84.8%	4.9%	10.3%	1.09%
Heavy Trucks:	86.5%	2.7%	10.8%	5.09%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	98.494
Medium Trucks:	98.404
Heavy Trucks:	98.413

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	66.51	-21.60	-4.52	-1.20	-4.77	0.000	0.000
Medium Trucks:	77.72	-40.97	-4.51	-1.20	-4.88	0.000	0.000
Heavy Trucks:	82.99	-34.26	-4.51	-1.20	-5.16	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	39.2	37.3	35.5	29.5	38.1	38.7
Medium Trucks:	31.0	29.5	23.2	21.6	30.1	30.3
Heavy Trucks:	43.0	41.6	32.6	33.8	42.2	42.3
Vehicle Noise:	44.7	43.2	37.5	35.4	43.8	44.1

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	2	4	8	18
CNEL:	2	4	9	19

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing
Road Name: Oleander Av.
Road Segment: w/o Harvill Av.
Project Name: Knox Business Park
Job Number: 9349

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	500 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	50 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	36 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	100.0 feet
Centerline Dist. to Observer:	100.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	93.82%
Medium Trucks:	84.8%	4.9%	10.3%	1.09%
Heavy Trucks:	86.5%	2.7%	10.8%	5.09%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	98.494
Medium Trucks:	98.404
Heavy Trucks:	98.413

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	66.51	-14.61	-4.52	-1.20	-4.77	0.000	0.000
Medium Trucks:	77.72	-33.98	-4.51	-1.20	-4.88	0.000	0.000
Heavy Trucks:	82.99	-27.27	-4.51	-1.20	-5.16	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	46.2	44.3	42.5	36.5	45.1	45.7
Medium Trucks:	38.0	36.5	30.2	28.6	37.1	37.3
Heavy Trucks:	50.0	48.6	39.6	40.8	49.2	49.3
Vehicle Noise:	51.7	50.2	44.5	42.4	50.8	51.0

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	5	11	24	52
CNEL:	5	12	25	55

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing Plus Project | Project Name: Knox Business Park
Road Name: Harvill Av. | Job Number: 9349
Road Segment: s/o Harley Knox Bl.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	11,513 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	1,151 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	48 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	100.0 feet
Centerline Dist. to Observer:	100.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	88.14%
Medium Trucks:	84.8%	4.9%	10.3%	2.37%
Heavy Trucks:	86.5%	2.7%	10.8%	9.48%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	97.206
Medium Trucks:	97.115
Heavy Trucks:	97.124

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	-2.23	-4.43	-1.20	-4.77	0.000	0.000
Medium Trucks:	81.00	-17.93	-4.43	-1.20	-4.88	0.000	0.000
Heavy Trucks:	85.38	-11.92	-4.43	-1.20	-5.16	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	62.3	60.4	58.7	52.6	61.2	61.8
Medium Trucks:	57.4	55.9	49.6	48.0	56.5	56.7
Heavy Trucks:	67.8	66.4	57.4	58.6	67.0	67.1
Vehicle Noise:	69.2	67.7	61.4	59.9	68.3	68.5

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	77	166	358	771
CNEL:	80	172	371	799

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing Plus Project | Project Name: Knox Business Park
Road Name: Harvill Av. | Job Number: 9349
Road Segment: n/o Oleander Av.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	10,913 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	1,091 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	48 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	100.0 feet
Centerline Dist. to Observer:	100.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	87.83%
Medium Trucks:	84.8%	4.9%	10.3%	2.45%
Heavy Trucks:	86.5%	2.7%	10.8%	9.72%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	97.206
Medium Trucks:	97.115
Heavy Trucks:	97.124

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	-2.48	-4.43	-1.20	-4.77	0.000	0.000
Medium Trucks:	81.00	-18.03	-4.43	-1.20	-4.88	0.000	0.000
Heavy Trucks:	85.38	-12.04	-4.43	-1.20	-5.16	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	62.1	60.2	58.4	52.4	61.0	61.6
Medium Trucks:	57.3	55.8	49.5	47.9	56.4	56.6
Heavy Trucks:	67.7	66.3	57.3	58.5	66.9	67.0
Vehicle Noise:	69.1	67.5	61.2	59.7	68.2	68.4

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	75	162	350	754
CNEL:	78	168	362	781

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing Plus Project | Project Name: Knox Business Park
Road Name: Harvill Av. | Job Number: 9349
Road Segment: s/o Oleander Av.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	9,102 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	910 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	48 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	100.0 feet
Centerline Dist. to Observer:	100.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	93.59%
Medium Trucks:	84.8%	4.9%	10.3%	1.15%
Heavy Trucks:	86.5%	2.7%	10.8%	5.27%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	97.206
Medium Trucks:	97.115
Heavy Trucks:	97.124

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	-2.99	-4.43	-1.20	-4.77	0.000	0.000
Medium Trucks:	81.00	-22.11	-4.43	-1.20	-4.88	0.000	0.000
Heavy Trucks:	85.38	-15.49	-4.43	-1.20	-5.16	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	61.6	59.7	57.9	51.9	60.5	61.1
Medium Trucks:	53.3	51.8	45.4	43.8	52.3	52.5
Heavy Trucks:	64.3	62.8	53.8	55.1	63.4	63.5
Vehicle Noise:	66.4	64.8	59.5	57.0	65.4	65.7

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	49	107	230	495
CNEL:	52	111	240	517

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing Plus Project | Project Name: Knox Business Park
Road Name: I-215 SB Fwy | Job Number: 9349
Road Segment: n/o Harley Knox Bl.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	38,600 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	3,860 vehicles
Vehicle Speed:	65 mph
Near/Far Lane Distance:	60 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	100.0 feet
Centerline Dist. to Observer:	100.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	93.82%
Medium Trucks:	84.8%	4.9%	10.3%	1.09%
Heavy Trucks:	86.5%	2.7%	10.8%	5.09%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	95.525
Medium Trucks:	95.432
Heavy Trucks:	95.441

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	74.55	2.15	-4.32	-1.20	-4.77	0.000	0.000
Medium Trucks:	84.86	-17.21	-4.31	-1.20	-4.88	0.000	0.000
Heavy Trucks:	88.18	-10.50	-4.31	-1.20	-5.16	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	71.2	69.3	67.5	61.5	70.1	70.7
Medium Trucks:	62.1	60.6	54.3	52.7	61.2	61.4
Heavy Trucks:	72.2	70.7	61.7	63.0	71.3	71.4
Vehicle Noise:	74.9	73.3	68.7	65.5	74.0	74.3

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	184	397	856	1,844
CNEL:	194	418	901	1,940

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing Plus Project
Road Name: I-215 SB Fwy
Road Segment: s/o Harley Knox Bl.
Project Name: Knox Business Park
Job Number: 9349

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	34,923	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	3,492	vehicles
Vehicle Speed:	65	mph
Near/Far Lane Distance:	60	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	100.0	feet
Centerline Dist. to Observer:	100.0	feet
Barrier Distance to Observer:	0.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	0.0	feet
Road Elevation:	0.0	feet
Road Grade:	0.0%	
Left View:	-90.0	degrees
Right View:	90.0	degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	93.44%
Medium Trucks:	84.8%	4.9%	10.3%	1.17%
Heavy Trucks:	86.5%	2.7%	10.8%	5.39%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	95.525
Medium Trucks:	95.432
Heavy Trucks:	95.441

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	74.55	1.70	-4.32	-1.20	-4.77	0.000	0.000
Medium Trucks:	84.86	-17.31	-4.31	-1.20	-4.88	0.000	0.000
Heavy Trucks:	88.18	-10.69	-4.31	-1.20	-5.16	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	70.7	68.8	67.1	61.0	69.6	70.2
Medium Trucks:	62.0	60.5	54.2	52.6	61.1	61.3
Heavy Trucks:	72.0	70.6	61.5	62.8	71.1	71.3
Vehicle Noise:	74.7	73.0	68.3	65.2	73.7	74.0

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	176	380	819	1,764
CNEL:	185	400	861	1,854

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing Plus Project
Road Name: I-215 NB Fwy
Road Segment: n/o Harley Knox Bl.
Project Name: Knox Business Park
Job Number: 9349

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	33,653	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	3,365	vehicles
Vehicle Speed:	65	mph
Near/Far Lane Distance:	60	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	100.0	feet
Centerline Dist. to Observer:	100.0	feet
Barrier Distance to Observer:	0.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	0.0	feet
Road Elevation:	0.0	feet
Road Grade:	0.0%	
Left View:	-90.0	degrees
Right View:	90.0	degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	92.36%
Medium Trucks:	84.8%	4.9%	10.3%	1.42%
Heavy Trucks:	86.5%	2.7%	10.8%	6.23%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	95.525
Medium Trucks:	95.432
Heavy Trucks:	95.441

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	74.55	1.49	-4.32	-1.20	-4.77	0.000	0.000
Medium Trucks:	84.86	-16.65	-4.31	-1.20	-4.88	0.000	0.000
Heavy Trucks:	88.18	-10.22	-4.31	-1.20	-5.16	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	70.5	68.6	66.8	60.8	69.4	70.0
Medium Trucks:	62.7	61.2	54.8	53.3	61.7	62.0
Heavy Trucks:	72.4	71.0	62.0	63.2	71.6	71.7
Vehicle Noise:	74.9	73.3	68.3	65.5	73.9	74.2

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	183	393	847	1,825
CNEL:	191	412	888	1,914

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing Plus Project
Road Name: I-215 NB Fwy
Road Segment: s/o Harley Knox Bl.
Project Name: Knox Business Park
Job Number: 9349

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	27,800	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	2,780	vehicles
Vehicle Speed:	65	mph
Near/Far Lane Distance:	60	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	100.0	feet
Centerline Dist. to Observer:	100.0	feet
Barrier Distance to Observer:	0.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	0.0	feet
Road Elevation:	0.0	feet
Road Grade:	0.0%	
Left View:	-90.0	degrees
Right View:	90.0	degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	93.82%
Medium Trucks:	84.8%	4.9%	10.3%	1.09%
Heavy Trucks:	86.5%	2.7%	10.8%	5.09%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	95.525
Medium Trucks:	95.432
Heavy Trucks:	95.441

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	74.55	0.73	-4.32	-1.20	-4.77	0.000	0.000
Medium Trucks:	84.86	-18.64	-4.31	-1.20	-4.88	0.000	0.000
Heavy Trucks:	88.18	-11.93	-4.31	-1.20	-5.16	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	69.8	67.9	66.1	60.0	68.7	69.3
Medium Trucks:	60.7	59.2	52.8	51.3	59.8	60.0
Heavy Trucks:	70.7	69.3	60.3	61.5	69.9	70.0
Vehicle Noise:	73.5	71.9	67.3	64.1	72.6	72.9

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	148	319	688	1,481
CNEL:	156	336	724	1,559

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing Plus Project
Road Name: Harley Knox Bl.
Road Segment: e/o Harvill Av.
Project Name: Knox Business Park
Job Number: 9349

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	11,713	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	1,171	vehicles
Vehicle Speed:	45	mph
Near/Far Lane Distance:	54	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	100.0	feet
Centerline Dist. to Observer:	100.0	feet
Barrier Distance to Observer:	0.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	0.0	feet
Road Elevation:	0.0	feet
Road Grade:	0.0%	
Left View:	-90.0	degrees
Right View:	90.0	degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	88.24%
Medium Trucks:	84.8%	4.9%	10.3%	2.35%
Heavy Trucks:	86.5%	2.7%	10.8%	9.41%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	96.416
Medium Trucks:	96.324
Heavy Trucks:	96.333

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	-1.69	-4.38	-1.20	-4.77	0.000	0.000
Medium Trucks:	79.45	-17.44	-4.37	-1.20	-4.88	0.000	0.000
Heavy Trucks:	84.25	-11.42	-4.38	-1.20	-5.16	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	61.2	59.3	57.5	51.5	60.1	60.7
Medium Trucks:	56.4	54.9	48.6	47.0	55.5	55.7
Heavy Trucks:	67.3	65.8	56.8	58.1	66.4	66.5
Vehicle Noise:	68.5	67.0	60.5	59.2	67.6	67.8

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	69	149	321	691
CNEL:	72	154	332	715

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing Plus Project | Project Name: Knox Business Park
Road Name: Harley Knox Bl. | Job Number: 9349
Road Segment: e/o I-215 SB Fwy Ramps

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	13,590	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	1,359	vehicles
Vehicle Speed:	45	mph
Near/Far Lane Distance:	54	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	100.0	feet
Centerline Dist. to Observer:	100.0	feet
Barrier Distance to Observer:	0.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	0.0	feet
Road Elevation:	0.0	feet
Road Grade:	0.0%	
Left View:	-90.0	degrees
Right View:	90.0	degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	90.01%
Medium Trucks:	84.8%	4.9%	10.3%	1.95%
Heavy Trucks:	86.5%	2.7%	10.8%	8.04%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	96.416
Medium Trucks:	96.324
Heavy Trucks:	96.333

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	-0.96	-4.38	-1.20	-4.77	0.000	0.000
Medium Trucks:	79.45	-17.60	-4.37	-1.20	-4.88	0.000	0.000
Heavy Trucks:	84.25	-11.45	-4.38	-1.20	-5.16	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	61.9	60.0	58.3	52.2	60.8	61.4
Medium Trucks:	56.3	54.8	48.4	46.9	55.3	55.6
Heavy Trucks:	67.2	65.8	56.8	58.0	66.4	66.5
Vehicle Noise:	68.6	67.1	60.8	59.3	67.7	67.9

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	70	151	326	702
CNEL:	73	157	338	728

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing Plus Project | Project Name: Knox Business Park
Road Name: Harley Knox Bl. | Job Number: 9349
Road Segment: e/o I-215 NB Fwy Ramps

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	15,837	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	1,584	vehicles
Vehicle Speed:	45	mph
Near/Far Lane Distance:	54	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	100.0	feet
Centerline Dist. to Observer:	100.0	feet
Barrier Distance to Observer:	0.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	0.0	feet
Road Elevation:	0.0	feet
Road Grade:	0.0%	
Left View:	-90.0	degrees
Right View:	90.0	degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	93.66%
Medium Trucks:	84.8%	4.9%	10.3%	1.12%
Heavy Trucks:	86.5%	2.7%	10.8%	5.21%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	96.416
Medium Trucks:	96.324
Heavy Trucks:	96.333

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	-0.13	-4.38	-1.20	-4.77	0.000	0.000
Medium Trucks:	79.45	-19.33	-4.37	-1.20	-4.88	0.000	0.000
Heavy Trucks:	84.25	-12.67	-4.38	-1.20	-5.16	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	62.8	60.9	59.1	53.0	61.7	62.3
Medium Trucks:	54.5	53.0	46.7	45.1	53.6	53.8
Heavy Trucks:	66.0	64.6	55.6	56.8	65.2	65.3
Vehicle Noise:	67.9	66.3	60.9	58.5	67.0	67.2

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	63	135	291	627
CNEL:	65	141	304	655

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing Plus Project | Project Name: Knox Business Park
Road Name: Oleander Av. | Job Number: 9349
Road Segment: e/o Driveway 6

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	2,215	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	222	vehicles
Vehicle Speed:	40	mph
Near/Far Lane Distance:	36	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	100.0	feet
Centerline Dist. to Observer:	100.0	feet
Barrier Distance to Observer:	0.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	0.0	feet
Road Elevation:	0.0	feet
Road Grade:	0.0%	
Left View:	-90.0	degrees
Right View:	90.0	degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	63.33%
Medium Trucks:	84.8%	4.9%	10.3%	8.04%
Heavy Trucks:	86.5%	2.7%	10.8%	28.63%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	98.494
Medium Trucks:	98.404
Heavy Trucks:	98.413

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	66.51	-9.86	-4.52	-1.20	-4.77	0.000	0.000
Medium Trucks:	77.72	-18.82	-4.51	-1.20	-4.88	0.000	0.000
Heavy Trucks:	82.99	-13.30	-4.51	-1.20	-5.16	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	50.9	49.0	47.3	41.2	49.8	50.4
Medium Trucks:	53.2	51.7	45.3	43.8	52.2	52.5
Heavy Trucks:	64.0	62.6	53.5	54.8	63.1	63.2
Vehicle Noise:	64.5	63.1	54.9	55.3	63.6	63.8

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	38	81	175	377
CNEL:	39	83	179	386

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing Plus Project | Project Name: Knox Business Park
Road Name: Oleander Av. | Job Number: 9349
Road Segment: w/o Harvill Av.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	2,615	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	262	vehicles
Vehicle Speed:	40	mph
Near/Far Lane Distance:	36	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	100.0	feet
Centerline Dist. to Observer:	100.0	feet
Barrier Distance to Observer:	0.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	0.0	feet
Road Elevation:	0.0	feet
Road Grade:	0.0%	
Left View:	-90.0	degrees
Right View:	90.0	degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	68.00%
Medium Trucks:	84.8%	4.9%	10.3%	6.98%
Heavy Trucks:	86.5%	2.7%	10.8%	25.03%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	98.494
Medium Trucks:	98.404
Heavy Trucks:	98.413

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	66.51	-8.83	-4.52	-1.20	-4.77	0.000	0.000
Medium Trucks:	77.72	-18.72	-4.51	-1.20	-4.88	0.000	0.000
Heavy Trucks:	82.99	-13.17	-4.51	-1.20	-5.16	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	52.0	50.1	48.3	42.2	50.9	51.5
Medium Trucks:	53.3	51.8	45.4	43.9	52.3	52.6
Heavy Trucks:	64.1	62.7	53.7	54.9	63.3	63.4
Vehicle Noise:	64.7	63.2	55.2	55.4	63.8	64.0

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	39	83	180	387
CNEL:	40	86	184	397

Monday, June 08, 2015

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Year 2017 Without Project
Road Name: Harvill Av.
Road Segment: s/o Harley Knox Bl.
Project Name: Knox Business Park
Job Number: 9349

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	11,900	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	1,190	vehicles
Vehicle Speed:	50	mph
Near/Far Lane Distance:	48	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	100.0	feet
Centerline Dist. to Observer:	100.0	feet
Barrier Distance to Observer:	0.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	0.0	feet
Road Elevation:	0.0	feet
Road Grade:	0.0%	
Left View:	-90.0	degrees
Right View:	90.0	degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	93.82%
Medium Trucks:	84.8%	4.9%	10.3%	1.09%
Heavy Trucks:	86.5%	2.7%	10.8%	5.09%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	97.206
Medium Trucks:	97.115
Heavy Trucks:	97.124

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	-1.82	-4.43	-1.20	-4.77	0.000	0.000
Medium Trucks:	81.00	-21.18	-4.43	-1.20	-4.88	0.000	0.000
Heavy Trucks:	85.38	-14.47	-4.43	-1.20	-5.16	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	62.8	60.9	59.1	53.0	61.7	62.3
Medium Trucks:	54.2	52.7	46.3	44.8	53.2	53.5
Heavy Trucks:	65.3	63.9	54.8	56.1	64.4	64.6
Vehicle Noise:	67.4	65.8	60.6	58.0	66.5	66.8

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	58	125	270	582
CNEL:	61	131	283	609

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Year 2017 Without Project
Road Name: Harvill Av.
Road Segment: n/o Oleander Av.
Project Name: Knox Business Park
Job Number: 9349

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	11,700	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	1,170	vehicles
Vehicle Speed:	50	mph
Near/Far Lane Distance:	48	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	100.0	feet
Centerline Dist. to Observer:	100.0	feet
Barrier Distance to Observer:	0.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	0.0	feet
Road Elevation:	0.0	feet
Road Grade:	0.0%	
Left View:	-90.0	degrees
Right View:	90.0	degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	93.82%
Medium Trucks:	84.8%	4.9%	10.3%	1.09%
Heavy Trucks:	86.5%	2.7%	10.8%	5.09%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	97.206
Medium Trucks:	97.115
Heavy Trucks:	97.124

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	-1.89	-4.43	-1.20	-4.77	0.000	0.000
Medium Trucks:	81.00	-21.26	-4.43	-1.20	-4.88	0.000	0.000
Heavy Trucks:	85.38	-14.54	-4.43	-1.20	-5.16	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	62.7	60.8	59.0	53.0	61.6	62.2
Medium Trucks:	54.1	52.6	46.2	44.7	53.2	53.4
Heavy Trucks:	65.2	63.8	54.7	56.0	64.4	64.5
Vehicle Noise:	67.3	65.8	60.6	58.0	66.4	66.7

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	58	124	267	576
CNEL:	60	130	280	603

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Year 2017 Without Project
Road Name: Harvill Av.
Road Segment: s/o Oleander Av.
Project Name: Knox Business Park
Job Number: 9349

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	10,900	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	1,090	vehicles
Vehicle Speed:	50	mph
Near/Far Lane Distance:	48	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	100.0	feet
Centerline Dist. to Observer:	100.0	feet
Barrier Distance to Observer:	0.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	0.0	feet
Road Elevation:	0.0	feet
Road Grade:	0.0%	
Left View:	-90.0	degrees
Right View:	90.0	degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	93.82%
Medium Trucks:	84.8%	4.9%	10.3%	1.09%
Heavy Trucks:	86.5%	2.7%	10.8%	5.09%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	97.206
Medium Trucks:	97.115
Heavy Trucks:	97.124

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	-2.20	-4.43	-1.20	-4.77	0.000	0.000
Medium Trucks:	81.00	-21.57	-4.43	-1.20	-4.88	0.000	0.000
Heavy Trucks:	85.38	-14.85	-4.43	-1.20	-5.16	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	62.4	60.5	58.7	52.7	61.3	61.9
Medium Trucks:	53.8	52.3	45.9	44.4	52.9	53.1
Heavy Trucks:	64.9	63.5	54.4	55.7	64.0	64.2
Vehicle Noise:	67.0	65.5	60.3	57.7	66.1	66.4

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	55	118	255	549
CNEL:	57	124	267	575

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Year 2017 Without Project
Road Name: I-215 SB Fwy
Road Segment: n/o Harley Knox Bl.
Project Name: Knox Business Park
Job Number: 9349

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	51,000	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	5,100	vehicles
Vehicle Speed:	65	mph
Near/Far Lane Distance:	60	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	100.0	feet
Centerline Dist. to Observer:	100.0	feet
Barrier Distance to Observer:	0.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	0.0	feet
Road Elevation:	0.0	feet
Road Grade:	0.0%	
Left View:	-90.0	degrees
Right View:	90.0	degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	93.82%
Medium Trucks:	84.8%	4.9%	10.3%	1.09%
Heavy Trucks:	86.5%	2.7%	10.8%	5.09%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	95.525
Medium Trucks:	95.432
Heavy Trucks:	95.441

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	74.55	3.36	-4.32	-1.20	-4.77	0.000	0.000
Medium Trucks:	84.86	-16.00	-4.31	-1.20	-4.88	0.000	0.000
Heavy Trucks:	88.18	-9.29	-4.31	-1.20	-5.16	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	72.4	70.5	68.7	62.7	71.3	71.9
Medium Trucks:	63.3	61.8	55.5	53.9	62.4	62.6
Heavy Trucks:	73.4	72.0	62.9	64.2	72.5	72.6
Vehicle Noise:	76.2	74.5	69.9	66.7	75.2	75.5

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	222	478	1,030	2,220
CNEL:	234	503	1,085	2,336

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Year 2017 Without Project
Road Name: I-215 SB Fwy
Road Segment: s/o Harley Knox Bl.
Project Name: Knox Business Park
Job Number: 9349

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	47,400 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	4,740 vehicles
Vehicle Speed:	65 mph
Near/Far Lane Distance:	60 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	100.0 feet
Centerline Dist. to Observer:	100.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	93.82%
Medium Trucks:	84.8%	4.9%	10.3%	1.09%
Heavy Trucks:	86.5%	2.7%	10.8%	5.09%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	95.525
Medium Trucks:	95.432
Heavy Trucks:	95.441

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	74.55	3.05	-4.32	-1.20	-4.77	0.000	0.000
Medium Trucks:	84.86	-16.32	-4.31	-1.20	-4.88	0.000	0.000
Heavy Trucks:	88.18	-9.61	-4.31	-1.20	-5.16	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	72.1	70.2	68.4	62.4	71.0	71.6
Medium Trucks:	63.0	61.5	55.2	53.6	62.1	62.3
Heavy Trucks:	73.1	71.6	62.6	63.9	72.2	72.3
Vehicle Noise:	75.8	74.2	69.6	66.4	74.9	75.2

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	211	455	981	2,114
CNEL:	223	479	1,033	2,225

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Year 2017 Without Project
Road Name: I-215 NB Fwy
Road Segment: n/o Harley Knox Bl.
Project Name: Knox Business Park
Job Number: 9349

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	44,700 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	4,470 vehicles
Vehicle Speed:	65 mph
Near/Far Lane Distance:	60 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	100.0 feet
Centerline Dist. to Observer:	100.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	93.82%
Medium Trucks:	84.8%	4.9%	10.3%	1.09%
Heavy Trucks:	86.5%	2.7%	10.8%	5.09%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	95.525
Medium Trucks:	95.432
Heavy Trucks:	95.441

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	74.55	2.79	-4.32	-1.20	-4.77	0.000	0.000
Medium Trucks:	84.86	-16.58	-4.31	-1.20	-4.88	0.000	0.000
Heavy Trucks:	88.18	-9.86	-4.31	-1.20	-5.16	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	71.8	69.9	68.2	62.1	70.7	71.3
Medium Trucks:	62.8	61.3	54.9	53.4	61.8	62.1
Heavy Trucks:	72.8	71.4	62.3	63.6	72.0	72.1
Vehicle Noise:	75.6	74.0	69.3	66.2	74.6	75.0

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	203	438	944	2,033
CNEL:	214	461	993	2,140

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Year 2017 Without Project
Road Name: I-215 NB Fwy
Road Segment: s/o Harley Knox Bl.
Project Name: Knox Business Park
Job Number: 9349

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	34,900 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	3,490 vehicles
Vehicle Speed:	65 mph
Near/Far Lane Distance:	60 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	100.0 feet
Centerline Dist. to Observer:	100.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	93.82%
Medium Trucks:	84.8%	4.9%	10.3%	1.09%
Heavy Trucks:	86.5%	2.7%	10.8%	5.09%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	95.525
Medium Trucks:	95.432
Heavy Trucks:	95.441

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	74.55	1.72	-4.32	-1.20	-4.77	0.000	0.000
Medium Trucks:	84.86	-17.65	-4.31	-1.20	-4.88	0.000	0.000
Heavy Trucks:	88.18	-10.94	-4.31	-1.20	-5.16	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	70.7	68.8	67.1	61.0	69.6	70.2
Medium Trucks:	61.7	60.2	53.8	52.3	60.7	61.0
Heavy Trucks:	71.7	70.3	61.3	62.5	70.9	71.0
Vehicle Noise:	74.5	72.9	68.2	65.1	73.5	73.9

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	172	371	800	1,724
CNEL:	181	391	842	1,814

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Year 2017 Without Project
Road Name: Harley Knox Bl.
Road Segment: e/o Harvill Av.
Project Name: Knox Business Park
Job Number: 9349

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	12,500 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	1,250 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	54 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	100.0 feet
Centerline Dist. to Observer:	100.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	93.82%
Medium Trucks:	84.8%	4.9%	10.3%	1.09%
Heavy Trucks:	86.5%	2.7%	10.8%	5.09%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	96.416
Medium Trucks:	96.324
Heavy Trucks:	96.333

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	-1.15	-4.38	-1.20	-4.77	0.000	0.000
Medium Trucks:	79.45	-20.51	-4.37	-1.20	-4.88	0.000	0.000
Heavy Trucks:	84.25	-13.80	-4.38	-1.20	-5.16	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	61.7	59.8	58.1	52.0	60.6	61.2
Medium Trucks:	53.4	51.9	45.5	43.9	52.4	52.6
Heavy Trucks:	64.9	63.5	54.4	55.7	64.0	64.2
Vehicle Noise:	66.8	65.2	59.8	57.4	65.9	66.1

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	53	114	246	530
CNEL:	55	119	257	553

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Year 2017 Without Project
Road Name: Harley Knox Bl.
Road Segment: e/o I-215 SB Fwy Ramps
Project Name: Knox Business Park
Job Number: 9349

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	22,000 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,200 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	54 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	100.0 feet
Centerline Dist. to Observer:	100.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	93.82%
Medium Trucks:	84.8%	4.9%	10.3%	1.09%
Heavy Trucks:	86.5%	2.7%	10.8%	5.09%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	96.416
Medium Trucks:	96.324
Heavy Trucks:	96.333

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	1.31	-4.38	-1.20	-4.77	0.000	0.000
Medium Trucks:	79.45	-18.06	-4.37	-1.20	-4.88	0.000	0.000
Heavy Trucks:	84.25	-11.34	-4.38	-1.20	-5.16	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	64.2	62.3	60.5	54.5	63.1	63.7
Medium Trucks:	55.8	54.3	47.9	46.4	54.9	55.1
Heavy Trucks:	67.3	65.9	56.9	58.1	66.5	66.6
Vehicle Noise:	69.3	67.7	62.2	59.9	68.3	68.6

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	77	166	359	773
CNEL:	81	174	374	807

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Year 2017 Without Project
Road Name: Harley Knox Bl.
Road Segment: e/o I-215 NB Fwy Ramps
Project Name: Knox Business Park
Job Number: 9349

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	31,000 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	3,100 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	54 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	100.0 feet
Centerline Dist. to Observer:	100.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	93.82%
Medium Trucks:	84.8%	4.9%	10.3%	1.09%
Heavy Trucks:	86.5%	2.7%	10.8%	5.09%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	96.416
Medium Trucks:	96.324
Heavy Trucks:	96.333

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	2.80	-4.38	-1.20	-4.77	0.000	0.000
Medium Trucks:	79.45	-16.57	-4.37	-1.20	-4.88	0.000	0.000
Heavy Trucks:	84.25	-9.86	-4.38	-1.20	-5.16	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	65.7	63.8	62.0	56.0	64.6	65.2
Medium Trucks:	57.3	55.8	49.4	47.9	56.4	56.6
Heavy Trucks:	68.8	67.4	58.4	59.6	68.0	68.1
Vehicle Noise:	70.7	69.2	63.7	61.4	69.8	70.1

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	97	209	451	971
CNEL:	101	218	471	1,014

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Year 2017 Without Project
Road Name: Oleander Av.
Road Segment: e/o Driveway 6
Project Name: Knox Business Park
Job Number: 9349

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	100 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	10 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	36 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	100.0 feet
Centerline Dist. to Observer:	100.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	93.82%
Medium Trucks:	84.8%	4.9%	10.3%	1.09%
Heavy Trucks:	86.5%	2.7%	10.8%	5.09%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	98.494
Medium Trucks:	98.404
Heavy Trucks:	98.413

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	66.51	-21.60	-4.52	-1.20	-4.77	0.000	0.000
Medium Trucks:	77.72	-40.97	-4.51	-1.20	-4.88	0.000	0.000
Heavy Trucks:	82.99	-34.26	-4.51	-1.20	-5.16	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	39.2	37.3	35.5	29.5	38.1	38.7
Medium Trucks:	31.0	29.5	23.2	21.6	30.1	30.3
Heavy Trucks:	43.0	41.6	32.6	33.8	42.2	42.3
Vehicle Noise:	44.7	43.2	37.5	35.4	43.8	44.1

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	2	4	8	18
CNEL:	2	4	9	19

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Year 2017 Without Project
Road Name: Oleander Av.
Road Segment: w/o Harvill Av.
Project Name: Knox Business Park
Job Number: 9349

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	500 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	50 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	36 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	100.0 feet
Centerline Dist. to Observer:	100.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	93.82%
Medium Trucks:	84.8%	4.9%	10.3%	1.09%
Heavy Trucks:	86.5%	2.7%	10.8%	5.09%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	98.494
Medium Trucks:	98.404
Heavy Trucks:	98.413

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	66.51	-14.61	-4.52	-1.20	-4.77	0.000	0.000
Medium Trucks:	77.72	-33.98	-4.51	-1.20	-4.88	0.000	0.000
Heavy Trucks:	82.99	-27.27	-4.51	-1.20	-5.16	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	46.2	44.3	42.5	36.5	45.1	45.7
Medium Trucks:	38.0	36.5	30.2	28.6	37.1	37.3
Heavy Trucks:	50.0	48.6	39.6	40.8	49.2	49.3
Vehicle Noise:	51.7	50.2	44.5	42.4	50.8	51.0

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	5	11	24	52
CNEL:	5	12	25	55

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Year 2017 With Project
Road Name: Harvill Av.
Road Segment: s/o Harley Knox Bl.
Project Name: Knox Business Park
Job Number: 9349

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	13,713	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	1,371	vehicles
Vehicle Speed:	50	mph
Near/Far Lane Distance:	48	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	100.0	feet
Centerline Dist. to Observer:	100.0	feet
Barrier Distance to Observer:	0.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	0.0	feet
Road Elevation:	0.0	feet
Road Grade:	0.0%	
Left View:	-90.0	degrees
Right View:	90.0	degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	89.06%
Medium Trucks:	84.8%	4.9%	10.3%	2.17%
Heavy Trucks:	86.5%	2.7%	10.8%	8.78%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	97.206
Medium Trucks:	97.115
Heavy Trucks:	97.124

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	-1.43	-4.43	-1.20	-4.77	0.000	0.000
Medium Trucks:	81.00	-17.56	-4.43	-1.20	-4.88	0.000	0.000
Heavy Trucks:	85.38	-11.49	-4.43	-1.20	-5.16	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	63.1	61.2	59.5	53.4	62.0	62.7
Medium Trucks:	57.8	56.3	49.9	48.4	56.9	57.1
Heavy Trucks:	68.3	66.8	57.8	59.1	67.4	67.5
Vehicle Noise:	69.7	68.2	62.0	60.4	68.8	69.0

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	83	179	386	832
CNEL:	86	186	401	863

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Year 2017 With Project
Road Name: Harvill Av.
Road Segment: n/o Oleander Av.
Project Name: Knox Business Park
Job Number: 9349

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	13,513	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	1,351	vehicles
Vehicle Speed:	50	mph
Near/Far Lane Distance:	48	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	100.0	feet
Centerline Dist. to Observer:	100.0	feet
Barrier Distance to Observer:	0.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	0.0	feet
Road Elevation:	0.0	feet
Road Grade:	0.0%	
Left View:	-90.0	degrees
Right View:	90.0	degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	88.99%
Medium Trucks:	84.8%	4.9%	10.3%	2.18%
Heavy Trucks:	86.5%	2.7%	10.8%	8.83%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	97.206
Medium Trucks:	97.115
Heavy Trucks:	97.124

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	-1.49	-4.43	-1.20	-4.77	0.000	0.000
Medium Trucks:	81.00	-17.60	-4.43	-1.20	-4.88	0.000	0.000
Heavy Trucks:	85.38	-11.53	-4.43	-1.20	-5.16	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	63.1	61.2	59.4	53.4	62.0	62.6
Medium Trucks:	57.8	56.3	49.9	48.4	56.8	57.1
Heavy Trucks:	68.2	66.8	57.8	59.0	67.4	67.5
Vehicle Noise:	69.7	68.1	62.0	60.3	68.8	69.0

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	83	178	384	827
CNEL:	86	185	398	857

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Year 2017 With Project
Road Name: Harvill Av.
Road Segment: s/o Oleander Av.
Project Name: Knox Business Park
Job Number: 9349

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	11,202	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	1,120	vehicles
Vehicle Speed:	50	mph
Near/Far Lane Distance:	48	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	100.0	feet
Centerline Dist. to Observer:	100.0	feet
Barrier Distance to Observer:	0.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	0.0	feet
Road Elevation:	0.0	feet
Road Grade:	0.0%	
Left View:	-90.0	degrees
Right View:	90.0	degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	93.63%
Medium Trucks:	84.8%	4.9%	10.3%	1.13%
Heavy Trucks:	86.5%	2.7%	10.8%	5.24%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	97.206
Medium Trucks:	97.115
Heavy Trucks:	97.124

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	-2.09	-4.43	-1.20	-4.77	0.000	0.000
Medium Trucks:	81.00	-21.25	-4.43	-1.20	-4.88	0.000	0.000
Heavy Trucks:	85.38	-14.61	-4.43	-1.20	-5.16	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	62.5	60.6	58.8	52.8	61.4	62.0
Medium Trucks:	54.1	52.6	46.3	44.7	53.2	53.4
Heavy Trucks:	65.1	63.7	54.7	55.9	64.3	64.4
Vehicle Noise:	67.2	65.7	60.4	57.9	66.3	66.6

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	57	122	263	567
CNEL:	59	128	275	593

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Year 2017 With Project
Road Name: I-215 SB Fwy
Road Segment: n/o Harley Knox Bl.
Project Name: Knox Business Park
Job Number: 9349

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	51,000	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	5,100	vehicles
Vehicle Speed:	65	mph
Near/Far Lane Distance:	60	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	100.0	feet
Centerline Dist. to Observer:	100.0	feet
Barrier Distance to Observer:	0.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	0.0	feet
Road Elevation:	0.0	feet
Road Grade:	0.0%	
Left View:	-90.0	degrees
Right View:	90.0	degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	93.82%
Medium Trucks:	84.8%	4.9%	10.3%	1.09%
Heavy Trucks:	86.5%	2.7%	10.8%	5.09%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	95.525
Medium Trucks:	95.432
Heavy Trucks:	95.441

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	74.55	3.36	-4.32	-1.20	-4.77	0.000	0.000
Medium Trucks:	84.86	-16.00	-4.31	-1.20	-4.88	0.000	0.000
Heavy Trucks:	88.18	-9.29	-4.31	-1.20	-5.16	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	72.4	70.5	68.7	62.7	71.3	71.9
Medium Trucks:	63.3	61.8	55.5	53.9	62.4	62.6
Heavy Trucks:	73.4	72.0	62.9	64.2	72.5	72.6
Vehicle Noise:	76.2	74.5	69.9	66.7	75.2	75.5

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	222	478	1,030	2,220
CNEL:	234	503	1,085	2,336

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Year 2017 With Project
Road Name: I-215 SB Fwy
Road Segment: s/o Harley Knox Bl.
Project Name: Knox Business Park
Job Number: 9349

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	47,823	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	4,782	vehicles
Vehicle Speed:	65	mph
Near/Far Lane Distance:	60	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	100.0	feet
Centerline Dist. to Observer:	100.0	feet
Barrier Distance to Observer:	0.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	0.0	feet
Road Elevation:	0.0	feet
Road Grade:	0.0%	
Left View:	-90.0	degrees
Right View:	90.0	degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	93.54%
Medium Trucks:	84.8%	4.9%	10.3%	1.15%
Heavy Trucks:	86.5%	2.7%	10.8%	5.31%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	95.525
Medium Trucks:	95.432
Heavy Trucks:	95.441

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	74.55	3.07	-4.32	-1.20	-4.77	0.000	0.000
Medium Trucks:	84.86	-16.03	-4.31	-1.20	-4.88	0.000	0.000
Heavy Trucks:	88.18	-9.39	-4.31	-1.20	-5.16	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	72.1	70.2	68.4	62.4	71.0	71.6
Medium Trucks:	63.3	61.8	55.4	53.9	62.4	62.6
Heavy Trucks:	73.3	71.9	62.8	64.1	72.4	72.6
Vehicle Noise:	76.0	74.4	69.7	66.6	75.0	75.4

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	216	466	1,004	2,162
CNEL:	227	490	1,055	2,274

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Year 2017 With Project
Road Name: I-215 NB Fwy
Road Segment: n/o Harley Knox Bl.
Project Name: Knox Business Park
Job Number: 9349

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	45,853	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	4,585	vehicles
Vehicle Speed:	65	mph
Near/Far Lane Distance:	60	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	100.0	feet
Centerline Dist. to Observer:	100.0	feet
Barrier Distance to Observer:	0.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	0.0	feet
Road Elevation:	0.0	feet
Road Grade:	0.0%	
Left View:	-90.0	degrees
Right View:	90.0	degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	92.75%
Medium Trucks:	84.8%	4.9%	10.3%	1.33%
Heavy Trucks:	86.5%	2.7%	10.8%	5.92%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	95.525
Medium Trucks:	95.432
Heavy Trucks:	95.441

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	74.55	2.85	-4.32	-1.20	-4.77	0.000	0.000
Medium Trucks:	84.86	-15.59	-4.31	-1.20	-4.88	0.000	0.000
Heavy Trucks:	88.18	-9.09	-4.31	-1.20	-5.16	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	71.9	70.0	68.2	62.2	70.8	71.4
Medium Trucks:	63.8	62.3	55.9	54.3	62.8	63.0
Heavy Trucks:	73.6	72.2	63.1	64.4	72.7	72.8
Vehicle Noise:	76.1	74.5	69.6	66.7	75.1	75.4

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	220	473	1,020	2,197
CNEL:	231	497	1,070	2,306

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Year 2017 With Project
Road Name: I-215 NB Fwy
Road Segment: s/o Harley Knox Bl.
Project Name: Knox Business Park
Job Number: 9349

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	34,900	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	3,490	vehicles
Vehicle Speed:	65	mph
Near/Far Lane Distance:	60	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	100.0	feet
Centerline Dist. to Observer:	100.0	feet
Barrier Distance to Observer:	0.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	0.0	feet
Road Elevation:	0.0	feet
Road Grade:	0.0%	
Left View:	-90.0	degrees
Right View:	90.0	degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	93.82%
Medium Trucks:	84.8%	4.9%	10.3%	1.09%
Heavy Trucks:	86.5%	2.7%	10.8%	5.09%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	95.525
Medium Trucks:	95.432
Heavy Trucks:	95.441

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	74.55	1.72	-4.32	-1.20	-4.77	0.000	0.000
Medium Trucks:	84.86	-17.65	-4.31	-1.20	-4.88	0.000	0.000
Heavy Trucks:	88.18	-10.94	-4.31	-1.20	-5.16	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	70.7	68.8	67.1	61.0	69.6	70.2
Medium Trucks:	61.7	60.2	53.8	52.3	60.7	61.0
Heavy Trucks:	71.7	70.3	61.3	62.5	70.9	71.0
Vehicle Noise:	74.5	72.9	68.2	65.1	73.5	73.9

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	172	371	800	1,724
CNEL:	181	391	842	1,814

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Year 2017 With Project
Road Name: Harley Knox Bl.
Road Segment: e/o Harvill Av.
Project Name: Knox Business Park
Job Number: 9349

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	14,313	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	1,431	vehicles
Vehicle Speed:	45	mph
Near/Far Lane Distance:	54	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	100.0	feet
Centerline Dist. to Observer:	100.0	feet
Barrier Distance to Observer:	0.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	0.0	feet
Road Elevation:	0.0	feet
Road Grade:	0.0%	
Left View:	-90.0	degrees
Right View:	90.0	degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	89.26%
Medium Trucks:	84.8%	4.9%	10.3%	2.12%
Heavy Trucks:	86.5%	2.7%	10.8%	8.62%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	96.416
Medium Trucks:	96.324
Heavy Trucks:	96.333

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	-0.77	-4.38	-1.20	-4.77	0.000	0.000
Medium Trucks:	79.45	-17.01	-4.37	-1.20	-4.88	0.000	0.000
Heavy Trucks:	84.25	-10.92	-4.38	-1.20	-5.16	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	62.1	60.2	58.4	52.4	61.0	61.6
Medium Trucks:	56.9	55.4	49.0	47.4	55.9	56.1
Heavy Trucks:	67.8	66.3	57.3	58.5	66.9	67.0
Vehicle Noise:	69.1	67.5	61.2	59.8	68.2	68.4

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	75	162	350	754
CNEL:	78	168	363	781

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Year 2017 With Project
Road Name: Harley Knox Bl.
Road Segment: e/o I-215 SB Fwy Ramps
Project Name: Knox Business Park
Job Number: 9349

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	23,390	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	2,339	vehicles
Vehicle Speed:	45	mph
Near/Far Lane Distance:	54	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	100.0	feet
Centerline Dist. to Observer:	100.0	feet
Barrier Distance to Observer:	0.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	0.0	feet
Road Elevation:	0.0	feet
Road Grade:	0.0%	
Left View:	-90.0	degrees
Right View:	90.0	degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	91.61%
Medium Trucks:	84.8%	4.9%	10.3%	1.59%
Heavy Trucks:	86.5%	2.7%	10.8%	6.81%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	96.416
Medium Trucks:	96.324
Heavy Trucks:	96.333

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	1.47	-4.38	-1.20	-4.77	0.000	0.000
Medium Trucks:	79.45	-16.14	-4.37	-1.20	-4.88	0.000	0.000
Heavy Trucks:	84.25	-9.82	-4.38	-1.20	-5.16	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	64.4	62.5	60.7	54.6	63.3	63.9
Medium Trucks:	57.7	56.2	49.9	48.3	56.8	57.0
Heavy Trucks:	68.9	67.4	58.4	59.7	68.0	68.1
Vehicle Noise:	70.4	68.9	62.9	61.1	69.5	69.7

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	93	199	430	926
CNEL:	96	207	447	962

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Year 2017 With Project
Road Name: Harley Knox Bl.
Road Segment: e/o I-215 NB Fwy Ramps
Project Name: Knox Business Park
Job Number: 9349

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	31,237	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	3,124	vehicles
Vehicle Speed:	45	mph
Near/Far Lane Distance:	54	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	100.0	feet
Centerline Dist. to Observer:	100.0	feet
Barrier Distance to Observer:	0.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	0.0	feet
Road Elevation:	0.0	feet
Road Grade:	0.0%	
Left View:	-90.0	degrees
Right View:	90.0	degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	93.74%
Medium Trucks:	84.8%	4.9%	10.3%	1.11%
Heavy Trucks:	86.5%	2.7%	10.8%	5.15%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	96.416
Medium Trucks:	96.324
Heavy Trucks:	96.333

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	2.83	-4.38	-1.20	-4.77	0.000	0.000
Medium Trucks:	79.45	-16.46	-4.37	-1.20	-4.88	0.000	0.000
Heavy Trucks:	84.25	-9.77	-4.38	-1.20	-5.16	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	65.7	63.8	62.0	56.0	64.6	65.2
Medium Trucks:	57.4	55.9	49.5	48.0	56.5	56.7
Heavy Trucks:	68.9	67.5	58.5	59.7	68.1	68.2
Vehicle Noise:	70.8	69.2	63.8	61.4	69.9	70.2

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	98	211	456	981
CNEL:	102	221	476	1,024

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Year 2017 With Project
Road Name: Oleander Av.
Road Segment: e/o Driveway 6
Project Name: Knox Business Park
Job Number: 9349

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	2,215	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	222	vehicles
Vehicle Speed:	40	mph
Near/Far Lane Distance:	36	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	100.0	feet
Centerline Dist. to Observer:	100.0	feet
Barrier Distance to Observer:	0.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	0.0	feet
Road Elevation:	0.0	feet
Road Grade:	0.0%	
Left View:	-90.0	degrees
Right View:	90.0	degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	63.33%
Medium Trucks:	84.8%	4.9%	10.3%	8.04%
Heavy Trucks:	86.5%	2.7%	10.8%	28.63%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	98.494
Medium Trucks:	98.404
Heavy Trucks:	98.413

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	66.51	-9.86	-4.52	-1.20	-4.77	0.000	0.000
Medium Trucks:	77.72	-18.82	-4.51	-1.20	-4.88	0.000	0.000
Heavy Trucks:	82.99	-13.30	-4.51	-1.20	-5.16	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	50.9	49.0	47.3	41.2	49.8	50.4
Medium Trucks:	53.2	51.7	45.3	43.8	52.2	52.5
Heavy Trucks:	64.0	62.6	53.5	54.8	63.1	63.2
Vehicle Noise:	64.5	63.1	54.9	55.3	63.6	63.8

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	38	81	175	377
CNEL:	39	83	179	386

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Year 2017 With Project
Road Name: Oleander Av.
Road Segment: w/o Harvill Av.
Project Name: Knox Business Park
Job Number: 9349

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	2,615	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	262	vehicles
Vehicle Speed:	40	mph
Near/Far Lane Distance:	36	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	100.0	feet
Centerline Dist. to Observer:	100.0	feet
Barrier Distance to Observer:	0.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	0.0	feet
Road Elevation:	0.0	feet
Road Grade:	0.0%	
Left View:	-90.0	degrees
Right View:	90.0	degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	68.00%
Medium Trucks:	84.8%	4.9%	10.3%	6.98%
Heavy Trucks:	86.5%	2.7%	10.8%	25.03%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	98.494
Medium Trucks:	98.404
Heavy Trucks:	98.413

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	66.51	-8.83	-4.52	-1.20	-4.77	0.000	0.000
Medium Trucks:	77.72	-18.72	-4.51	-1.20	-4.88	0.000	0.000
Heavy Trucks:	82.99	-13.17	-4.51	-1.20	-5.16	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	52.0	50.1	48.3	42.2	50.9	51.5
Medium Trucks:	53.3	51.8	45.4	43.9	52.3	52.6
Heavy Trucks:	64.1	62.7	53.7	54.9	63.3	63.4
Vehicle Noise:	64.7	63.2	55.2	55.4	63.8	64.0

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	39	83	180	387
CNEL:	40	86	184	397

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Year 2035 Without Project
Road Name: Harvill Av.
Road Segment: s/o Harley Knox Bl.
Project Name: Knox Business Park
Job Number: 9349

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	23,600	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	2,360	vehicles
Vehicle Speed:	50	mph
Near/Far Lane Distance:	48	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	100.0	feet
Centerline Dist. to Observer:	100.0	feet
Barrier Distance to Observer:	0.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	0.0	feet
Road Elevation:	0.0	feet
Road Grade:	0.0%	
Left View:	-90.0	degrees
Right View:	90.0	degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	93.82%
Medium Trucks:	84.8%	4.9%	10.3%	1.09%
Heavy Trucks:	86.5%	2.7%	10.8%	5.09%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	97.206
Medium Trucks:	97.115
Heavy Trucks:	97.124

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	1.16	-4.43	-1.20	-4.77	0.000	0.000
Medium Trucks:	81.00	-18.21	-4.43	-1.20	-4.88	0.000	0.000
Heavy Trucks:	85.38	-11.50	-4.43	-1.20	-5.16	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	65.7	63.8	62.1	56.0	64.6	65.2
Medium Trucks:	57.2	55.7	49.3	47.7	56.2	56.4
Heavy Trucks:	68.3	66.8	57.8	59.0	67.4	67.5
Vehicle Noise:	70.4	68.8	63.6	61.0	69.5	69.7

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	92	198	427	919
CNEL:	96	207	447	962

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Year 2035 Without Project
Road Name: Harvill Av.
Road Segment: n/o Oleander Av.
Project Name: Knox Business Park
Job Number: 9349

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	23,600	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	2,360	vehicles
Vehicle Speed:	50	mph
Near/Far Lane Distance:	48	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	100.0	feet
Centerline Dist. to Observer:	100.0	feet
Barrier Distance to Observer:	0.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	0.0	feet
Road Elevation:	0.0	feet
Road Grade:	0.0%	
Left View:	-90.0	degrees
Right View:	90.0	degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	93.82%
Medium Trucks:	84.8%	4.9%	10.3%	1.09%
Heavy Trucks:	86.5%	2.7%	10.8%	5.09%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	97.206
Medium Trucks:	97.115
Heavy Trucks:	97.124

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	1.16	-4.43	-1.20	-4.77	0.000	0.000
Medium Trucks:	81.00	-18.21	-4.43	-1.20	-4.88	0.000	0.000
Heavy Trucks:	85.38	-11.50	-4.43	-1.20	-5.16	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	65.7	63.8	62.1	56.0	64.6	65.2
Medium Trucks:	57.2	55.7	49.3	47.7	56.2	56.4
Heavy Trucks:	68.3	66.8	57.8	59.0	67.4	67.5
Vehicle Noise:	70.4	68.8	63.6	61.0	69.5	69.7

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	92	198	427	919
CNEL:	96	207	447	962

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Year 2035 Without Project
Road Name: Harvill Av.
Road Segment: s/o Oleander Av.
Project Name: Knox Business Park
Job Number: 9349

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	28,600	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	2,860	vehicles
Vehicle Speed:	50	mph
Near/Far Lane Distance:	48	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	100.0	feet
Centerline Dist. to Observer:	100.0	feet
Barrier Distance to Observer:	0.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	0.0	feet
Road Elevation:	0.0	feet
Road Grade:	0.0%	
Left View:	-90.0	degrees
Right View:	90.0	degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	93.82%
Medium Trucks:	84.8%	4.9%	10.3%	1.09%
Heavy Trucks:	86.5%	2.7%	10.8%	5.09%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	97.206
Medium Trucks:	97.115
Heavy Trucks:	97.124

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	1.99	-4.43	-1.20	-4.77	0.000	0.000
Medium Trucks:	81.00	-17.38	-4.43	-1.20	-4.88	0.000	0.000
Heavy Trucks:	85.38	-10.66	-4.43	-1.20	-5.16	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	66.6	64.7	62.9	56.8	65.5	66.1
Medium Trucks:	58.0	56.5	50.1	48.6	57.0	57.3
Heavy Trucks:	69.1	67.7	58.6	59.9	68.2	68.4
Vehicle Noise:	71.2	69.6	64.4	61.8	70.3	70.6

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	105	225	485	1,045
CNEL:	109	236	508	1,094

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Year 2035 Without Project
Road Name: I-215 SB Fwy
Road Segment: n/o Harley Knox Bl.
Project Name: Knox Business Park
Job Number: 9349

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	68,600	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	6,860	vehicles
Vehicle Speed:	65	mph
Near/Far Lane Distance:	60	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	100.0	feet
Centerline Dist. to Observer:	100.0	feet
Barrier Distance to Observer:	0.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	0.0	feet
Road Elevation:	0.0	feet
Road Grade:	0.0%	
Left View:	-90.0	degrees
Right View:	90.0	degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	93.82%
Medium Trucks:	84.8%	4.9%	10.3%	1.09%
Heavy Trucks:	86.5%	2.7%	10.8%	5.09%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	95.525
Medium Trucks:	95.432
Heavy Trucks:	95.441

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	74.55	4.65	-4.32	-1.20	-4.77	0.000	0.000
Medium Trucks:	84.86	-14.72	-4.31	-1.20	-4.88	0.000	0.000
Heavy Trucks:	88.18	-8.00	-4.31	-1.20	-5.16	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	73.7	71.8	70.0	64.0	72.6	73.2
Medium Trucks:	64.6	63.1	56.8	55.2	63.7	63.9
Heavy Trucks:	74.7	73.2	64.2	65.5	73.8	73.9
Vehicle Noise:	77.4	75.8	71.2	68.0	76.5	76.8

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	271	583	1,256	2,705
CNEL:	285	613	1,321	2,847

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Year 2035 Without Project
Road Name: I-215 SB Fwy
Road Segment: s/o Harley Knox Bl.
Project Name: Knox Business Park
Job Number: 9349

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	62,400 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	6,240 vehicles
Vehicle Speed:	65 mph
Near/Far Lane Distance:	60 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	100.0 feet
Centerline Dist. to Observer:	100.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	93.82%
Medium Trucks:	84.8%	4.9%	10.3%	1.09%
Heavy Trucks:	86.5%	2.7%	10.8%	5.09%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	95.525
Medium Trucks:	95.432
Heavy Trucks:	95.441

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	74.55	4.24	-4.32	-1.20	-4.77	0.000	0.000
Medium Trucks:	84.86	-15.13	-4.31	-1.20	-4.88	0.000	0.000
Heavy Trucks:	88.18	-8.41	-4.31	-1.20	-5.16	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	73.3	71.4	69.6	63.5	72.2	72.8
Medium Trucks:	64.2	62.7	56.4	54.8	63.3	63.5
Heavy Trucks:	74.3	72.8	63.8	65.0	73.4	73.5
Vehicle Noise:	77.0	75.4	70.8	67.6	76.1	76.4

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	254	547	1,179	2,539
CNEL:	267	576	1,241	2,673

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Year 2035 Without Project
Road Name: I-215 NB Fwy
Road Segment: n/o Harley Knox Bl.
Project Name: Knox Business Park
Job Number: 9349

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	69,400 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	6,940 vehicles
Vehicle Speed:	65 mph
Near/Far Lane Distance:	60 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	100.0 feet
Centerline Dist. to Observer:	100.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	93.82%
Medium Trucks:	84.8%	4.9%	10.3%	1.09%
Heavy Trucks:	86.5%	2.7%	10.8%	5.09%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	95.525
Medium Trucks:	95.432
Heavy Trucks:	95.441

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	74.55	4.70	-4.32	-1.20	-4.77	0.000	0.000
Medium Trucks:	84.86	-14.67	-4.31	-1.20	-4.88	0.000	0.000
Heavy Trucks:	88.18	-7.95	-4.31	-1.20	-5.16	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	73.7	71.8	70.1	64.0	72.6	73.2
Medium Trucks:	64.7	63.2	56.8	55.3	63.7	64.0
Heavy Trucks:	74.7	73.3	64.3	65.5	73.9	74.0
Vehicle Noise:	77.5	75.9	71.2	68.1	76.5	76.9

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	273	587	1,265	2,726
CNEL:	287	618	1,332	2,869

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Year 2035 Without Project
Road Name: I-215 NB Fwy
Road Segment: s/o Harley Knox Bl.
Project Name: Knox Business Park
Job Number: 9349

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	52,900 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	5,290 vehicles
Vehicle Speed:	65 mph
Near/Far Lane Distance:	60 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	100.0 feet
Centerline Dist. to Observer:	100.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	93.82%
Medium Trucks:	84.8%	4.9%	10.3%	1.09%
Heavy Trucks:	86.5%	2.7%	10.8%	5.09%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	95.525
Medium Trucks:	95.432
Heavy Trucks:	95.441

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	74.55	3.52	-4.32	-1.20	-4.77	0.000	0.000
Medium Trucks:	84.86	-15.85	-4.31	-1.20	-4.88	0.000	0.000
Heavy Trucks:	88.18	-9.13	-4.31	-1.20	-5.16	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	72.5	70.6	68.9	62.8	71.5	72.1
Medium Trucks:	63.5	62.0	55.6	54.1	62.6	62.8
Heavy Trucks:	73.5	72.1	63.1	64.3	72.7	72.8
Vehicle Noise:	76.3	74.7	70.1	66.9	75.4	75.7

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	227	490	1,056	2,275
CNEL:	239	516	1,111	2,394

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Year 2035 Without Project
Road Name: Harley Knox Bl.
Road Segment: e/o Harvill Av.
Project Name: Knox Business Park
Job Number: 9349

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	34,000 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	3,400 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	54 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	100.0 feet
Centerline Dist. to Observer:	100.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	93.82%
Medium Trucks:	84.8%	4.9%	10.3%	1.09%
Heavy Trucks:	86.5%	2.7%	10.8%	5.09%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	96.416
Medium Trucks:	96.324
Heavy Trucks:	96.333

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	3.20	-4.38	-1.20	-4.77	0.000	0.000
Medium Trucks:	79.45	-16.17	-4.37	-1.20	-4.88	0.000	0.000
Heavy Trucks:	84.25	-9.45	-4.38	-1.20	-5.16	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	66.1	64.2	62.4	56.4	65.0	65.6
Medium Trucks:	57.7	56.2	49.8	48.3	56.8	57.0
Heavy Trucks:	69.2	67.8	58.8	60.0	68.4	68.5
Vehicle Noise:	71.1	69.6	64.1	61.8	70.2	70.5

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	103	222	479	1,033
CNEL:	108	232	500	1,078

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Year 2035 Without Project
Road Name: Harley Knox Bl.
Road Segment: e/o I-215 SB Fwy Ramps
Project Name: Knox Business Park
Job Number: 9349

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	28,000	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	2,800	vehicles
Vehicle Speed:	45	mph
Near/Far Lane Distance:	54	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	100.0	feet
Centerline Dist. to Observer:	100.0	feet
Barrier Distance to Observer:	0.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	0.0	feet
Road Elevation:	0.0	feet
Road Grade:	0.0%	
Left View:	-90.0	degrees
Right View:	90.0	degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	77.5%	12.9%	9.6%	93.82%
Medium Trucks:	84.8%	4.9%	10.3%	1.09%
Heavy Trucks:	86.5%	2.7%	10.8%	5.09%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	96.416
Medium Trucks:	96.324
Heavy Trucks:	96.333

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	68.46	2.36	-4.38	-1.20	*-4.77*	0.000	0.000
Medium Trucks:	79.45	-17.01	-4.37	-1.20	*-4.88*	0.000	0.000
Heavy Trucks:	84.25	-10.30	-4.38	-1.20	*-5.16*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	65.2	63.3	61.6	55.5	64.1	64.7
Medium Trucks:	56.9	55.4	49.0	47.4	55.9	56.1
Heavy Trucks:	68.4	67.0	57.9	59.2	67.5	67.7
Vehicle Noise:	70.3	68.7	63.3	60.9	69.4	69.6

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	91	195	421	907
CNEL:	95	204	440	947

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Year 2035 Without Project
Road Name: Harley Knox Bl.
Road Segment: e/o I-215 NB Fwy Ramps
Project Name: Knox Business Park
Job Number: 9349

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	36,400	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	3,640	vehicles
Vehicle Speed:	45	mph
Near/Far Lane Distance:	54	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	100.0	feet
Centerline Dist. to Observer:	100.0	feet
Barrier Distance to Observer:	0.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	0.0	feet
Road Elevation:	0.0	feet
Road Grade:	0.0%	
Left View:	-90.0	degrees
Right View:	90.0	degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	77.5%	12.9%	9.6%	93.82%
Medium Trucks:	84.8%	4.9%	10.3%	1.09%
Heavy Trucks:	86.5%	2.7%	10.8%	5.09%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	96.416
Medium Trucks:	96.324
Heavy Trucks:	96.333

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	68.46	3.50	-4.38	-1.20	*-4.77*	0.000	0.000
Medium Trucks:	79.45	-15.87	-4.37	-1.20	*-4.88*	0.000	0.000
Heavy Trucks:	84.25	-9.16	-4.38	-1.20	*-5.16*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	66.4	64.5	62.7	56.7	65.3	65.9
Medium Trucks:	58.0	56.5	50.1	48.6	57.0	57.3
Heavy Trucks:	69.5	68.1	59.1	60.3	68.7	68.8
Vehicle Noise:	71.4	69.9	64.4	62.1	70.5	70.8

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	108	233	502	1,081
CNEL:	113	243	524	1,128

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Year 2035 Without Project
Road Name: Oleander Av.
Road Segment: e/o Driveway 6
Project Name: Knox Business Park
Job Number: 9349

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	6,600	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	660	vehicles
Vehicle Speed:	40	mph
Near/Far Lane Distance:	36	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	100.0	feet
Centerline Dist. to Observer:	100.0	feet
Barrier Distance to Observer:	0.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	0.0	feet
Road Elevation:	0.0	feet
Road Grade:	0.0%	
Left View:	-90.0	degrees
Right View:	90.0	degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	77.5%	12.9%	9.6%	93.82%
Medium Trucks:	84.8%	4.9%	10.3%	1.09%
Heavy Trucks:	86.5%	2.7%	10.8%	5.09%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	98.494
Medium Trucks:	98.404
Heavy Trucks:	98.413

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	66.51	-3.41	-4.52	-1.20	*-4.77*	0.000	0.000
Medium Trucks:	77.72	-22.78	-4.51	-1.20	*-4.88*	0.000	0.000
Heavy Trucks:	82.99	-16.06	-4.51	-1.20	*-5.16*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	57.4	55.5	53.7	47.7	56.3	56.9
Medium Trucks:	49.2	47.7	41.4	39.8	48.3	48.5
Heavy Trucks:	61.2	59.8	50.8	52.0	60.4	60.5
Vehicle Noise:	62.9	61.4	55.7	53.6	62.0	62.3

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	29	63	136	292
CNEL:	30	66	141	304

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Year 2035 Without Project
Road Name: Oleander Av.
Road Segment: w/o Harvill Av.
Project Name: Knox Business Park
Job Number: 9349

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	6,600	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	660	vehicles
Vehicle Speed:	40	mph
Near/Far Lane Distance:	36	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	100.0	feet
Centerline Dist. to Observer:	100.0	feet
Barrier Distance to Observer:	0.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	0.0	feet
Road Elevation:	0.0	feet
Road Grade:	0.0%	
Left View:	-90.0	degrees
Right View:	90.0	degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	77.5%	12.9%	9.6%	93.82%
Medium Trucks:	84.8%	4.9%	10.3%	1.09%
Heavy Trucks:	86.5%	2.7%	10.8%	5.09%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	98.494
Medium Trucks:	98.404
Heavy Trucks:	98.413

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	66.51	-3.41	-4.52	-1.20	*-4.77*	0.000	0.000
Medium Trucks:	77.72	-22.78	-4.51	-1.20	*-4.88*	0.000	0.000
Heavy Trucks:	82.99	-16.06	-4.51	-1.20	*-5.16*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	57.4	55.5	53.7	47.7	56.3	56.9
Medium Trucks:	49.2	47.7	41.4	39.8	48.3	48.5
Heavy Trucks:	61.2	59.8	50.8	52.0	60.4	60.5
Vehicle Noise:	62.9	61.4	55.7	53.6	62.0	62.3

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	29	63	136	292
CNEL:	30	66	141	304

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Year 2035 With Project
Road Name: Harvill Av.
Road Segment: s/o Harley Knox Bl.
Project Name: Knox Business Park
Job Number: 9349

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	25,413	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	2,541	vehicles
Vehicle Speed:	50	mph
Near/Far Lane Distance:	48	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	100.0	feet
Centerline Dist. to Observer:	100.0	feet
Barrier Distance to Observer:	0.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	0.0	feet
Road Elevation:	0.0	feet
Road Grade:	0.0%	
Left View:	-90.0	degrees
Right View:	90.0	degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	91.25%
Medium Trucks:	84.8%	4.9%	10.3%	1.67%
Heavy Trucks:	86.5%	2.7%	10.8%	7.08%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	97.206
Medium Trucks:	97.115
Heavy Trucks:	97.124

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	1.36	-4.43	-1.20	-4.77	0.000	0.000
Medium Trucks:	81.00	-16.02	-4.43	-1.20	-4.88	0.000	0.000
Heavy Trucks:	85.38	-9.74	-4.43	-1.20	-5.16	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	65.9	64.0	62.3	56.2	64.8	65.4
Medium Trucks:	59.4	57.8	51.5	49.9	58.4	58.6
Heavy Trucks:	70.0	68.6	59.5	60.8	69.2	69.3
Vehicle Noise:	71.7	70.2	64.4	62.3	70.8	71.0

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	113	243	523	1,127
CNEL:	117	253	544	1,172

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Year 2035 With Project
Road Name: Harvill Av.
Road Segment: n/o Oleander Av.
Project Name: Knox Business Park
Job Number: 9349

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	25,413	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	2,541	vehicles
Vehicle Speed:	50	mph
Near/Far Lane Distance:	48	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	100.0	feet
Centerline Dist. to Observer:	100.0	feet
Barrier Distance to Observer:	0.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	0.0	feet
Road Elevation:	0.0	feet
Road Grade:	0.0%	
Left View:	-90.0	degrees
Right View:	90.0	degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	91.25%
Medium Trucks:	84.8%	4.9%	10.3%	1.67%
Heavy Trucks:	86.5%	2.7%	10.8%	7.08%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	97.206
Medium Trucks:	97.115
Heavy Trucks:	97.124

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	1.36	-4.43	-1.20	-4.77	0.000	0.000
Medium Trucks:	81.00	-16.02	-4.43	-1.20	-4.88	0.000	0.000
Heavy Trucks:	85.38	-9.74	-4.43	-1.20	-5.16	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	65.9	64.0	62.3	56.2	64.8	65.4
Medium Trucks:	59.4	57.8	51.5	49.9	58.4	58.6
Heavy Trucks:	70.0	68.6	59.5	60.8	69.2	69.3
Vehicle Noise:	71.7	70.2	64.4	62.3	70.8	71.0

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	113	243	523	1,127
CNEL:	117	253	544	1,172

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Year 2035 With Project
Road Name: Harvill Av.
Road Segment: s/o Oleander Av.
Project Name: Knox Business Park
Job Number: 9349

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	28,902	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	2,890	vehicles
Vehicle Speed:	50	mph
Near/Far Lane Distance:	48	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	100.0	feet
Centerline Dist. to Observer:	100.0	feet
Barrier Distance to Observer:	0.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	0.0	feet
Road Elevation:	0.0	feet
Road Grade:	0.0%	
Left View:	-90.0	degrees
Right View:	90.0	degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	93.75%
Medium Trucks:	84.8%	4.9%	10.3%	1.10%
Heavy Trucks:	86.5%	2.7%	10.8%	5.15%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	97.206
Medium Trucks:	97.115
Heavy Trucks:	97.124

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	2.03	-4.43	-1.20	-4.77	0.000	0.000
Medium Trucks:	81.00	-17.25	-4.43	-1.20	-4.88	0.000	0.000
Heavy Trucks:	85.38	-10.57	-4.43	-1.20	-5.16	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	66.6	64.7	62.9	56.9	65.5	66.1
Medium Trucks:	58.1	56.6	50.2	48.7	57.2	57.4
Heavy Trucks:	69.2	67.8	58.7	60.0	68.3	68.5
Vehicle Noise:	71.3	69.7	64.5	61.9	70.4	70.7

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	106	228	491	1,058
CNEL:	111	238	514	1,106

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Year 2035 With Project
Road Name: I-215 SB Fwy
Road Segment: n/o Harley Knox Bl.
Project Name: Knox Business Park
Job Number: 9349

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	68,600	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	6,860	vehicles
Vehicle Speed:	65	mph
Near/Far Lane Distance:	60	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	100.0	feet
Centerline Dist. to Observer:	100.0	feet
Barrier Distance to Observer:	0.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	0.0	feet
Road Elevation:	0.0	feet
Road Grade:	0.0%	
Left View:	-90.0	degrees
Right View:	90.0	degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	93.82%
Medium Trucks:	84.8%	4.9%	10.3%	1.09%
Heavy Trucks:	86.5%	2.7%	10.8%	5.09%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	95.525
Medium Trucks:	95.432
Heavy Trucks:	95.441

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	74.55	4.65	-4.32	-1.20	-4.77	0.000	0.000
Medium Trucks:	84.86	-14.72	-4.31	-1.20	-4.88	0.000	0.000
Heavy Trucks:	88.18	-8.00	-4.31	-1.20	-5.16	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	73.7	71.8	70.0	64.0	72.6	73.2
Medium Trucks:	64.6	63.1	56.8	55.2	63.7	63.9
Heavy Trucks:	74.7	73.2	64.2	65.5	73.8	73.9
Vehicle Noise:	77.4	75.8	71.2	68.0	76.5	76.8

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	271	583	1,256	2,705
CNEL:	285	613	1,321	2,847

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Year 2035 With Project
Road Name: I-215 SB Fwy
Road Segment: s/o Harley Knox Bl.
Project Name: Knox Business Park
Job Number: 9349

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	62,823 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	6,282 vehicles
Vehicle Speed:	65 mph
Near/Far Lane Distance:	60 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	100.0 feet
Centerline Dist. to Observer:	100.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	93.61%
Medium Trucks:	84.8%	4.9%	10.3%	1.13%
Heavy Trucks:	86.5%	2.7%	10.8%	5.26%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	95.525
Medium Trucks:	95.432
Heavy Trucks:	95.441

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	74.55	4.26	-4.32	-1.20	-4.77	0.000	0.000
Medium Trucks:	84.86	-14.91	-4.31	-1.20	-4.88	0.000	0.000
Heavy Trucks:	88.18	-8.25	-4.31	-1.20	-5.16	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	73.3	71.4	69.6	63.6	72.2	72.8
Medium Trucks:	64.4	62.9	56.6	55.0	63.5	63.7
Heavy Trucks:	74.4	73.0	64.0	65.2	73.6	73.7
Vehicle Noise:	77.1	75.5	70.8	67.7	76.2	76.5

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	258	557	1,199	2,583
CNEL:	272	585	1,261	2,717

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Year 2035 With Project
Road Name: I-215 NB Fwy
Road Segment: n/o Harley Knox Bl.
Project Name: Knox Business Park
Job Number: 9349

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	70,553 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	7,055 vehicles
Vehicle Speed:	65 mph
Near/Far Lane Distance:	60 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	100.0 feet
Centerline Dist. to Observer:	100.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	93.12%
Medium Trucks:	84.8%	4.9%	10.3%	1.24%
Heavy Trucks:	86.5%	2.7%	10.8%	5.63%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	95.525
Medium Trucks:	95.432
Heavy Trucks:	95.441

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	74.55	4.74	-4.32	-1.20	-4.77	0.000	0.000
Medium Trucks:	84.86	-14.00	-4.31	-1.20	-4.88	0.000	0.000
Heavy Trucks:	88.18	-7.44	-4.31	-1.20	-5.16	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	73.8	71.9	70.1	64.0	72.7	73.3
Medium Trucks:	65.3	63.8	57.5	55.9	64.4	64.6
Heavy Trucks:	75.2	73.8	64.8	66.0	74.4	74.5
Vehicle Noise:	77.8	76.2	71.4	68.4	76.9	77.2

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	287	618	1,332	2,869
CNEL:	301	649	1,399	3,014

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Year 2035 With Project
Road Name: I-215 NB Fwy
Road Segment: s/o Harley Knox Bl.
Project Name: Knox Business Park
Job Number: 9349

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	52,900 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	5,290 vehicles
Vehicle Speed:	65 mph
Near/Far Lane Distance:	60 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	100.0 feet
Centerline Dist. to Observer:	100.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	93.82%
Medium Trucks:	84.8%	4.9%	10.3%	1.09%
Heavy Trucks:	86.5%	2.7%	10.8%	5.09%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	95.525
Medium Trucks:	95.432
Heavy Trucks:	95.441

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	74.55	3.52	-4.32	-1.20	-4.77	0.000	0.000
Medium Trucks:	84.86	-15.85	-4.31	-1.20	-4.88	0.000	0.000
Heavy Trucks:	88.18	-9.13	-4.31	-1.20	-5.16	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	72.5	70.6	68.9	62.8	71.5	72.1
Medium Trucks:	63.5	62.0	55.6	54.1	62.6	62.8
Heavy Trucks:	73.5	72.1	63.1	64.3	72.7	72.8
Vehicle Noise:	76.3	74.7	70.1	66.9	75.4	75.7

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	227	490	1,056	2,275
CNEL:	239	516	1,111	2,394

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Year 2035 With Project
Road Name: Harley Knox Bl.
Road Segment: e/o Harvill Av.
Project Name: Knox Business Park
Job Number: 9349

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	35,813 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	3,581 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	54 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	100.0 feet
Centerline Dist. to Observer:	100.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	92.00%
Medium Trucks:	84.8%	4.9%	10.3%	1.50%
Heavy Trucks:	86.5%	2.7%	10.8%	6.50%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	96.416
Medium Trucks:	96.324
Heavy Trucks:	96.333

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	3.34	-4.38	-1.20	-4.77	0.000	0.000
Medium Trucks:	79.45	-14.54	-4.37	-1.20	-4.88	0.000	0.000
Heavy Trucks:	84.25	-8.17	-4.38	-1.20	-5.16	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	66.2	64.3	62.6	56.5	65.1	65.7
Medium Trucks:	59.3	57.8	51.5	49.9	58.4	58.6
Heavy Trucks:	70.5	69.1	60.1	61.3	69.7	69.8
Vehicle Noise:	72.1	70.6	64.7	62.8	71.2	71.5

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	120	259	558	1,202
CNEL:	125	269	580	1,250

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Year 2035 With Project
Road Name: Harley Knox Bl.
Road Segment: e/o I-215 SB Fwy Ramps
Project Name: Knox Business Park
Job Number: 9349

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	29,390 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,939 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	54 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	100.0 feet
Centerline Dist. to Observer:	100.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	92.06%
Medium Trucks:	84.8%	4.9%	10.3%	1.49%
Heavy Trucks:	86.5%	2.7%	10.8%	6.46%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	96.416
Medium Trucks:	96.324
Heavy Trucks:	96.333

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	2.49	-4.38	-1.20	-4.77	0.000	0.000
Medium Trucks:	79.45	-15.44	-4.37	-1.20	-4.88	0.000	0.000
Heavy Trucks:	84.25	-9.06	-4.38	-1.20	-5.16	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	65.4	63.5	61.7	55.6	64.3	64.9
Medium Trucks:	58.4	56.9	50.6	49.0	57.5	57.7
Heavy Trucks:	69.6	68.2	59.2	60.4	68.8	68.9
Vehicle Noise:	71.2	69.7	63.8	61.9	70.3	70.6

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	105	226	487	1,050
CNEL:	109	235	507	1,092

Monday, June 08, 2015

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Year 2035 With Project
Road Name: Harley Knox Bl.
Road Segment: e/o I-215 NB Fwy Ramps
Project Name: Knox Business Park
Job Number: 9349

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	36,637 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	3,664 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	54 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	100.0 feet
Centerline Dist. to Observer:	100.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	93.75%
Medium Trucks:	84.8%	4.9%	10.3%	1.10%
Heavy Trucks:	86.5%	2.7%	10.8%	5.14%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	96.416
Medium Trucks:	96.324
Heavy Trucks:	96.333

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	3.52	-4.38	-1.20	-4.77	0.000	0.000
Medium Trucks:	79.45	-15.78	-4.37	-1.20	-4.88	0.000	0.000
Heavy Trucks:	84.25	-9.08	-4.38	-1.20	-5.16	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	66.4	64.5	62.7	56.7	65.3	65.9
Medium Trucks:	58.1	56.6	50.2	48.7	57.1	57.4
Heavy Trucks:	69.6	68.2	59.1	60.4	68.7	68.9
Vehicle Noise:	71.5	69.9	64.5	62.1	70.6	70.8

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	109	235	506	1,091
CNEL:	114	245	528	1,138

Monday, June 08, 2015

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Year 2035 With Project
Road Name: Oleander Av.
Road Segment: e/o Driveway 6
Project Name: Knox Business Park
Job Number: 9349

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	8,715 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	872 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	36 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	100.0 feet
Centerline Dist. to Observer:	100.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	86.07%
Medium Trucks:	84.8%	4.9%	10.3%	2.85%
Heavy Trucks:	86.5%	2.7%	10.8%	11.07%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	98.494
Medium Trucks:	98.404
Heavy Trucks:	98.413

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	66.51	-2.57	-4.52	-1.20	-4.77	0.000	0.000
Medium Trucks:	77.72	-17.37	-4.51	-1.20	-4.88	0.000	0.000
Heavy Trucks:	82.99	-11.48	-4.51	-1.20	-5.16	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	58.2	56.3	54.6	48.5	57.1	57.7
Medium Trucks:	54.6	53.1	46.8	45.2	53.7	53.9
Heavy Trucks:	65.8	64.4	55.3	56.6	64.9	65.1
Vehicle Noise:	66.8	65.3	58.3	57.5	65.9	66.1

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	53	114	247	531
CNEL:	55	118	254	548

Monday, June 08, 2015

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Year 2035 With Project
Road Name: Oleander Av.
Road Segment: w/o Harvill Av.
Project Name: Knox Business Park
Job Number: 9349

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	8,715 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	872 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	36 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	100.0 feet
Centerline Dist. to Observer:	100.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	86.07%
Medium Trucks:	84.8%	4.9%	10.3%	2.85%
Heavy Trucks:	86.5%	2.7%	10.8%	11.07%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	98.494
Medium Trucks:	98.404
Heavy Trucks:	98.413

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	66.51	-2.57	-4.52	-1.20	-4.77	0.000	0.000
Medium Trucks:	77.72	-17.37	-4.51	-1.20	-4.88	0.000	0.000
Heavy Trucks:	82.99	-11.48	-4.51	-1.20	-5.16	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	58.2	56.3	54.6	48.5	57.1	57.7
Medium Trucks:	54.6	53.1	46.8	45.2	53.7	53.9
Heavy Trucks:	65.8	64.4	55.3	56.6	64.9	65.1
Vehicle Noise:	66.8	65.3	58.3	57.5	65.9	66.1

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	53	114	247	531
CNEL:	55	118	254	548

Monday, June 08, 2015

APPENDIX 9.1:

REFERENCE NOISE SOURCE PHOTOS

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Reference Measurement: Motivational Fulfillment
6810 Bickmore Avenue, Chino

Motivational Fulfillment_01

Motivational Fulfillment_02

Motivational Fulfillment_03

Source_1-1

Source_1-2

Source_1-3

Reference Measurement: Motivational Fulfillment
6810 Bickmore Avenue, Chino

Source_1-4

Source_2-1

Source_2-2

Source_2-3

Source_2-4

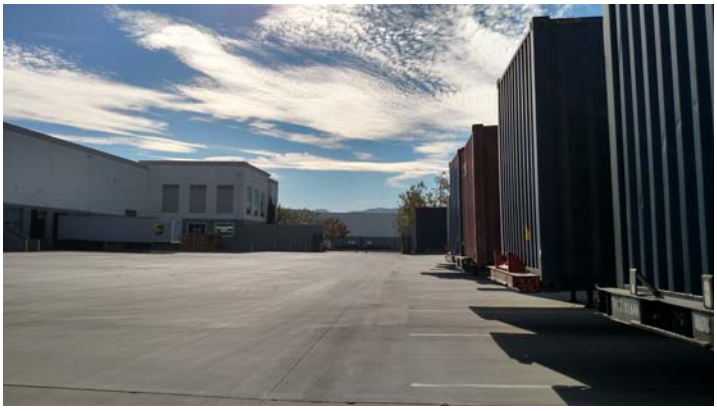
Source_2-5

Reference Measurement: Motivational Fulfillment
6810 Bickmore Avenue, Chino

Source_2-6

Source_2-7

Source_2-8



Source_2-9

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APPENDIX 9.2:

STATIONARY-SOURCE NOISE CALCULATIONS

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STATIONARY SOURCE NOISE PREDICTION MODEL

1/24/2017

Observer Location: **R1**
Source: Unloading/Docking Activity
Condition: n/a

Project Name: Knox Business Park
Job Number: 9349
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	2,598.0	feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	2,598.0	feet	*Noise Source Height:*	8.0 feet
Barrier Distance to Observer:	0.0	feet	*Observer Height:*	5.0 feet
Observer Elevation:	1,705.0	feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	1,625.0	feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	1,705.0	feet		

20 = 6 dBA per doubling of distance
15 = 4.5 dBA per doubling of distance

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	30.0	67.2	64.2	67.2	71.8	75.6	80.0
Distance Attenuation	2,598.0	-38.8	-38.8	-38.8	-38.8	-38.8	-38.8
Shielding (Barrier Attenuation)	2,598.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		28.4	25.4	28.4	33.0	36.8	41.2
60 Minute Hourly Adjustment		**28.4**	**25.4**	**28.4**	**33.0**	**36.8**	**41.2**

STATIONARY SOURCE NOISE PREDICTION MODEL

1/24/2017

Observer Location: **R2**
Source: Unloading/Docking Activity
Condition: n/a

Project Name: Knox Business Park
Job Number: 9349
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	1,685.0	feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	1,685.0	feet	*Noise Source Height:*	8.0 feet
Barrier Distance to Observer:	0.0	feet	*Observer Height:*	5.0 feet
Observer Elevation:	1,696.0	feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	1,625.0	feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	1,696.0	feet		

20 = 6 dBA per doubling of distance
15 = 4.5 dBA per doubling of distance

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	30.0	67.2	64.2	67.2	71.8	75.6	80.0
Distance Attenuation	1,685.0	-35.0	-35.0	-35.0	-35.0	-35.0	-35.0
Shielding (Barrier Attenuation)	1,685.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		32.2	29.2	32.2	36.8	40.6	45.0
60 Minute Hourly Adjustment		**32.2**	**29.2**	**32.2**	**36.8**	**40.6**	**45.0**

STATIONARY SOURCE NOISE PREDICTION MODEL

1/24/2017

Observer Location: **R3**
Source: Unloading/Docking Activity
Condition: n/a

Project Name: Knox Business Park
Job Number: 9349
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	1,577.0	feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	1,577.0	feet	*Noise Source Height:*	8.0 feet
Barrier Distance to Observer:	0.0	feet	*Observer Height:*	5.0 feet
Observer Elevation:	1,730.0	feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	1,625.0	feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	1,730.0	feet		

20 = 6 dBA per doubling of distance
15 = 4.5 dBA per doubling of distance

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	30.0	67.2	64.2	67.2	71.8	75.6	80.0
Distance Attenuation	1,577.0	-34.4	-34.4	-34.4	-34.4	-34.4	-34.4
Shielding (Barrier Attenuation)	1,577.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		32.8	29.8	32.8	37.4	41.2	45.6
60 Minute Hourly Adjustment		**32.8**	**29.8**	**32.8**	**37.4**	**41.2**	**45.6**

STATIONARY SOURCE NOISE PREDICTION MODEL

1/24/2017

Observer Location: **R4**
Source: Unloading/Docking Activity
Condition: n/a

Project Name: Knox Business Park
Job Number: 9349
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	1,164.0	feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	1,164.0	feet	*Noise Source Height:*	8.0 feet
Barrier Distance to Observer:	0.0	feet	*Observer Height:*	5.0 feet
Observer Elevation:	1,707.0	feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	1,625.0	feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	1,650.0	feet		

20 = 6 dBA per doubling of distance
15 = 4.5 dBA per doubling of distance

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	30.0	67.2	64.2	67.2	71.8	75.6	80.0
Distance Attenuation	1,164.0	-31.8	-31.8	-31.8	-31.8	-31.8	-31.8
Shielding (Barrier Attenuation)	1,164.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		35.4	32.4	35.4	40.0	43.8	48.2
60 Minute Hourly Adjustment		**35.4**	**32.4**	**35.4**	**40.0**	**43.8**	**48.2**

STATIONARY SOURCE NOISE PREDICTION MODEL

1/24/2017

Observer Location: **R5**
Source: Unloading/Docking Activity
Condition: n/a

Project Name: Knox Business Park
Job Number: 9349
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	881.0	feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	881.0	feet	*Noise Source Height:*	8.0 feet
Barrier Distance to Observer:	0.0	feet	*Observer Height:*	5.0 feet
Observer Elevation:	1,635.0	feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	1,615.0	feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	1,635.0	feet		

20 = 6 dBA per doubling of distance
15 = 4.5 dBA per doubling of distance

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	30.0	67.2	64.2	67.2	71.8	75.6	80.0
Distance Attenuation	881.0	-29.4	-29.4	-29.4	-29.4	-29.4	-29.4
Shielding (Barrier Attenuation)	881.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		37.8	34.8	37.8	42.4	46.2	50.6
60 Minute Hourly Adjustment		**37.8**	**34.8**	**37.8**	**42.4**	**46.2**	**50.6**

STATIONARY SOURCE NOISE PREDICTION MODEL

1/24/2017

Observer Location: **R6**
Source: Unloading/Docking Activity
Condition: n/a

Project Name: Knox Business Park
Job Number: 9349
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	276.0	feet	***Barrier Height:***	**8.0 feet**
Noise Distance to Barrier:	81.0	feet	*Noise Source Height:*	8.0 feet
Barrier Distance to Observer:	195.0	feet	*Observer Height:*	5.0 feet
Observer Elevation:	1,608.0	feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	1,580.0	feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	1,600.0	feet		

20 = 6 dBA per doubling of distance
15 = 4.5 dBA per doubling of distance

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	30.0	67.2	64.2	67.2	71.8	75.6	80.0
Distance Attenuation	276.0	-19.3	-19.3	-19.3	-19.3	-19.3	-19.3
Shielding (Barrier Attenuation)	81.0	-11.0	-11.0	-11.0	-11.0	-11.0	-11.0
Raw (Distance + Barrier)		36.9	33.9	36.9	41.5	45.3	49.7
60 Minute Hourly Adjustment		**36.9**	**33.9**	**36.9**	**41.5**	**45.3**	**49.7**

STATIONARY SOURCE NOISE PREDICTION MODEL

1/24/2017

Observer Location: **R7**
Source: Unloading/Docking Activity
Condition: n/a

Project Name: Knox Business Park
Job Number: 9349
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	998.0	feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	102.0	feet	*Noise Source Height:*	8.0 feet
Barrier Distance to Observer:	896.0	feet	*Observer Height:*	5.0 feet
Observer Elevation:	1,560.0	feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	1,575.0	feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	1,571.0	feet		

20 = 6 dBA per doubling of distance
15 = 4.5 dBA per doubling of distance

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	30.0	67.2	64.2	67.2	71.8	75.6	80.0
Distance Attenuation	998.0	-30.4	-30.4	-30.4	-30.4	-30.4	-30.4
Shielding (Barrier Attenuation)	102.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		36.8	33.8	36.8	41.4	45.2	49.6
60 Minute Hourly Adjustment		**36.8**	**33.8**	**36.8**	**41.4**	**45.2**	**49.6**

STATIONARY SOURCE NOISE PREDICTION MODEL

1/24/2017

Observer Location: **R8**
Source: Unloading/Docking Activity
Condition: n/a

Project Name: Knox Business Park
Job Number: 9349
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	1,310.0	feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	1,310.0	feet	*Noise Source Height:*	8.0 feet
Barrier Distance to Observer:	0.0	feet	*Observer Height:*	5.0 feet
Observer Elevation:	1,540.0	feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	1,575.0	feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	1,540.0	feet		

20 = 6 dBA per doubling of distance
15 = 4.5 dBA per doubling of distance

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	30.0	67.2	64.2	67.2	71.8	75.6	80.0
Distance Attenuation	1,310.0	-32.8	-32.8	-32.8	-32.8	-32.8	-32.8
Shielding (Barrier Attenuation)	1,310.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		34.4	31.4	34.4	39.0	42.8	47.2
60 Minute Hourly Adjustment		**34.4**	**31.4**	**34.4**	**39.0**	**42.8**	**47.2**

APPENDIX 9.3:

CUMULATIVE STATIONARY-SOURCE NOISE CALCULATIONS

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STATIONARY SOURCE NOISE PREDICTION MODEL 6/24/2015

Observer Location: **R1** *Project Name:* Knox Business Park
Source: RC6 *Job Number:* 9349
Condition: Cumulative Developments *Analyst:* A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	9,651.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	9,651.0 feet	*Noise Source Height:*	8.0 feet
Barrier Distance to Observer:	0.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0 feet	20 = 6 dBA per doubling of distance 15 = 4.5 dBA per doubling of distance	

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	30.0	67.2	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	9,651.0	-50.1	-50.1	-50.1	-50.1	-50.1	-50.1
Shielding (Barrier Attenuation)	9,651.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		17.1	-50.1	-50.1	-50.1	-50.1	-50.1
60 Minute Hourly Adjustment		**17.1**	**-50.1**	**-50.1**	**-50.1**	**-50.1**	**-50.1**

STATIONARY SOURCE NOISE PREDICTION MODEL 6/24/2015

Observer Location: **R1** *Project Name:* Knox Business Park
Source: RC2 *Job Number:* 9349
Condition: Cumulative Developments *Analyst:* A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	2,800.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	2,800.0 feet	*Noise Source Height:*	8.0 feet
Barrier Distance to Observer:	0.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0 feet	20 = 6 dBA per doubling of distance 15 = 4.5 dBA per doubling of distance	

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	30.0	67.2	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	2,800.0	-39.4	-39.4	-39.4	-39.4	-39.4	-39.4
Shielding (Barrier Attenuation)	2,800.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		27.8	-39.4	-39.4	-39.4	-39.4	-39.4
60 Minute Hourly Adjustment		**27.8**	**-39.4**	**-39.4**	**-39.4**	**-39.4**	**-39.4**

STATIONARY SOURCE NOISE PREDICTION MODEL 6/24/2015

Observer Location: **R1** *Project Name:* Knox Business Park
Source: P13 *Job Number:* 9349
Condition: Cumulative Developments *Analyst:* A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	7,590.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	7,590.0 feet	*Noise Source Height:*	8.0 feet
Barrier Distance to Observer:	0.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0 feet	20 = 6 dBA per doubling of distance 15 = 4.5 dBA per doubling of distance	

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	30.0	67.2	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	7,590.0	-48.1	-48.1	-48.1	-48.1	-48.1	-48.1
Shielding (Barrier Attenuation)	7,590.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		19.1	-48.1	-48.1	-48.1	-48.1	-48.1
60 Minute Hourly Adjustment		**19.1**	**-48.1**	**-48.1**	**-48.1**	**-48.1**	**-48.1**

STATIONARY SOURCE NOISE PREDICTION MODEL 6/24/2015

Observer Location: **R1** *Project Name:* Knox Business Park
Source: RC10 *Job Number:* 9349
Condition: Cumulative Developments *Analyst:* A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	.2,687.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	.2,687.0 feet	*Noise Source Height:*	8.0 feet
Barrier Distance to Observer:	0.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0 feet	20 = 6 dBA per doubling of distance 15 = 4.5 dBA per doubling of distance	

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	30.0	67.2	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	12,687.0	-52.5	-52.5	-52.5	-52.5	-52.5	-52.5
Shielding (Barrier Attenuation)	12,687.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		14.7	-52.5	-52.5	-52.5	-52.5	-52.5
60 Minute Hourly Adjustment		**14.7**	**-52.5**	**-52.5**	**-52.5**	**-52.5**	**-52.5**

STATIONARY SOURCE NOISE PREDICTION MODEL 6/24/2015

Observer Location: **R1** *Project Name:* Knox Business Park
Source: P20 *Job Number:* 9349
Condition: Cumulative Developments *Analyst:* A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	11,100.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	11,100.0 feet	*Noise Source Height:*	8.0 feet
Barrier Distance to Observer:	0.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0 feet	20 = 6 dBA per doubling of distance 15 = 4.5 dBA per doubling of distance	

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	30.0	67.2	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	11,100.0	-51.4	-51.4	-51.4	-51.4	-51.4	-51.4
Shielding (Barrier Attenuation)	11,100.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		15.8	-51.4	-51.4	-51.4	-51.4	-51.4
60 Minute Hourly Adjustment		**15.8**	**-51.4**	**-51.4**	**-51.4**	**-51.4**	**-51.4**

STATIONARY SOURCE NOISE PREDICTION MODEL 6/24/2015

Observer Location: **R1** *Project Name:* Knox Business Park
Source: RC12 *Job Number:* 9349
Condition: Cumulative Developments *Analyst:* A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	9,054.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	9,054.0 feet	*Noise Source Height:*	5.0 feet
Barrier Distance to Observer:	0.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0 feet	*Drop Off Coefficient:*	15.0
Barrier Elevation:	0.0 feet	20 = 6 dBA per doubling of distance 15 = 4.5 dBA per doubling of distance	

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	5.0	60.1	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	9,054.0	-48.9	-48.9	-48.9	-48.9	-48.9	-48.9
Shielding (Barrier Attenuation)	9,054.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		11.2	-48.9	-48.9	-48.9	-48.9	-48.9
60 Minute Hourly Adjustment		**11.2**	**-48.9**	**-48.9**	**-48.9**	**-48.9**	**-48.9**

STATIONARY SOURCE NOISE PREDICTION MODEL 6/24/2015

Observer Location: **R1** *Project Name:* Knox Business Park
Source: RC13 *Job Number:* 9349
Condition: Cumulative Developments *Analyst:* A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	13,514.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	13,514.0 feet	*Noise Source Height:*	8.0 feet
Barrier Distance to Observer:	0.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0 feet	20 = 6 dBA per doubling of distance 15 = 4.5 dBA per doubling of distance	

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	30.0	67.2	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	13,514.0	-53.1	-53.1	-53.1	-53.1	-53.1	-53.1
Shielding (Barrier Attenuation)	13,514.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		14.1	-53.1	-53.1	-53.1	-53.1	-53.1
60 Minute Hourly Adjustment		**14.1**	**-53.1**	**-53.1**	**-53.1**	**-53.1**	**-53.1**

STATIONARY SOURCE NOISE PREDICTION MODEL 6/24/2015

Observer Location: **R1** *Project Name:* Knox Business Park
Source: RC15 *Job Number:* 9349
Condition: Cumulative Developments *Analyst:* A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	9,714.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	9,714.0 feet	*Noise Source Height:*	8.0 feet
Barrier Distance to Observer:	0.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0 feet	20 = 6 dBA per doubling of distance 15 = 4.5 dBA per doubling of distance	

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	30.0	67.2	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	9,714.0	-50.2	-50.2	-50.2	-50.2	-50.2	-50.2
Shielding (Barrier Attenuation)	9,714.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		17.0	-50.2	-50.2	-50.2	-50.2	-50.2
60 Minute Hourly Adjustment		**17.0**	**-50.2**	**-50.2**	**-50.2**	**-50.2**	**-50.2**

STATIONARY SOURCE NOISE PREDICTION MODEL 6/24/2015

Observer Location: **R1** *Project Name:* Knox Business Park
Source: P47 *Job Number:* 9349
Condition: Cumulative Developments *Analyst:* A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	7,461.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	7,461.0 feet	*Noise Source Height:*	8.0 feet
Barrier Distance to Observer:	0.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0 feet	20 = 6 dBA per doubling of distance 15 = 4.5 dBA per doubling of distance	

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	30.0	67.2	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	7,461.0	-47.9	-47.9	-47.9	-47.9	-47.9	-47.9
Shielding (Barrier Attenuation)	7,461.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		19.3	-47.9	-47.9	-47.9	-47.9	-47.9
60 Minute Hourly Adjustment		**19.3**	**-47.9**	**-47.9**	**-47.9**	**-47.9**	**-47.9**

STATIONARY SOURCE NOISE PREDICTION MODEL 6/24/2015

Observer Location: **R1** *Project Name:* Knox Business Park
Source: RC1 *Job Number:* 9349
Condition: Cumulative Developments *Analyst:* A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	169.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	169.0 feet	*Noise Source Height:*	8.0 feet
Barrier Distance to Observer:	0.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0 feet	20 = 6 dBA per doubling of distance 15 = 4.5 dBA per doubling of distance	

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	30.0	67.2	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	169.0	-15.0	-15.0	-15.0	-15.0	-15.0	-15.0
Shielding (Barrier Attenuation)	169.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		52.2	-15.0	-15.0	-15.0	-15.0	-15.0
60 Minute Hourly Adjustment		**52.2**	**-15.0**	**-15.0**	**-15.0**	**-15.0**	**-15.0**

STATIONARY SOURCE NOISE PREDICTION MODEL 6/24/2015

Observer Location: **R1** *Project Name:* Knox Business Park
Source: RC22 *Job Number:* 9349
Condition: Cumulative Developments *Analyst:* A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	1,812.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	1,812.0 feet	*Noise Source Height:*	8.0 feet
Barrier Distance to Observer:	0.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0 feet	20 = 6 dBA per doubling of distance 15 = 4.5 dBA per doubling of distance	

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	30.0	67.2	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	1,812.0	-35.6	-35.6	-35.6	-35.6	-35.6	-35.6
Shielding (Barrier Attenuation)	1,812.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		31.6	-35.6	-35.6	-35.6	-35.6	-35.6
60 Minute Hourly Adjustment		**31.6**	**-35.6**	**-35.6**	**-35.6**	**-35.6**	**-35.6**

STATIONARY SOURCE NOISE PREDICTION MODEL 6/24/2015

Observer Location: **R2** *Project Name:* Knox Business Park
Source: RC6 *Job Number:* 9349
Condition: Cumulative Developments *Analyst:* A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	.0,814.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	.0,814.0 feet	*Noise Source Height:*	8.0 feet
Barrier Distance to Observer:	0.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0 feet	20 = 6 dBA per doubling of distance 15 = 4.5 dBA per doubling of distance	

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	30.0	67.2	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	10,814.0	-51.1	-51.1	-51.1	-51.1	-51.1	-51.1
Shielding (Barrier Attenuation)	10,814.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		16.1	-51.1	-51.1	-51.1	-51.1	-51.1
60 Minute Hourly Adjustment		**16.1**	**-51.1**	**-51.1**	**-51.1**	**-51.1**	**-51.1**

STATIONARY SOURCE NOISE PREDICTION MODEL 6/24/2015

Observer Location: **R2** *Project Name:* Knox Business Park
Source: RC2 *Job Number:* 9349
Condition: Cumulative Developments *Analyst:* A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	2,110.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	2,110.0 feet	*Noise Source Height:*	8.0 feet
Barrier Distance to Observer:	0.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0 feet	20 = 6 dBA per doubling of distance 15 = 4.5 dBA per doubling of distance	

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	30.0	67.2	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	2,110.0	-36.9	-36.9	-36.9	-36.9	-36.9	-36.9
Shielding (Barrier Attenuation)	2,110.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		30.3	-36.9	-36.9	-36.9	-36.9	-36.9
60 Minute Hourly Adjustment		**30.3**	**-36.9**	**-36.9**	**-36.9**	**-36.9**	**-36.9**

STATIONARY SOURCE NOISE PREDICTION MODEL 6/24/2015

Observer Location: **R2** *Project Name:* Knox Business Park
Source: P13 *Job Number:* 9349
Condition: Cumulative Developments *Analyst:* A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	7,023.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	7,023.0 feet	*Noise Source Height:*	8.0 feet
Barrier Distance to Observer:	0.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0 feet	20 = 6 dBA per doubling of distance 15 = 4.5 dBA per doubling of distance	

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	30.0	67.2	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	7,023.0	-47.4	-47.4	-47.4	-47.4	-47.4	-47.4
Shielding (Barrier Attenuation)	7,023.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		19.8	-47.4	-47.4	-47.4	-47.4	-47.4
60 Minute Hourly Adjustment		**19.8**	**-47.4**	**-47.4**	**-47.4**	**-47.4**	**-47.4**

STATIONARY SOURCE NOISE PREDICTION MODEL 6/24/2015

Observer Location: **R2** *Project Name:* Knox Business Park
Source: RC10 *Job Number:* 9349
Condition: Cumulative Developments *Analyst:* A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	.1,406.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	.1,406.0 feet	*Noise Source Height:*	8.0 feet
Barrier Distance to Observer:	0.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0 feet	20 = 6 dBA per doubling of distance 15 = 4.5 dBA per doubling of distance	

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	30.0	67.2	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	11,406.0	-51.6	-51.6	-51.6	-51.6	-51.6	-51.6
Shielding (Barrier Attenuation)	11,406.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		15.6	-51.6	-51.6	-51.6	-51.6	-51.6
60 Minute Hourly Adjustment		**15.6**	**-51.6**	**-51.6**	**-51.6**	**-51.6**	**-51.6**

STATIONARY SOURCE NOISE PREDICTION MODEL 6/24/2015

Observer Location: **R2** *Project Name:* Knox Business Park
Source: P20 *Job Number:* 9349
Condition: Cumulative Developments *Analyst:* A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	9,911.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	9,911.0 feet	*Noise Source Height:*	8.0 feet
Barrier Distance to Observer:	0.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0 feet	20 = 6 dBA per doubling of distance 15 = 4.5 dBA per doubling of distance	

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	30.0	67.2	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	9,911.0	-50.4	-50.4	-50.4	-50.4	-50.4	-50.4
Shielding (Barrier Attenuation)	9,911.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		16.8	-50.4	-50.4	-50.4	-50.4	-50.4
60 Minute Hourly Adjustment		**16.8**	**-50.4**	**-50.4**	**-50.4**	**-50.4**	**-50.4**

STATIONARY SOURCE NOISE PREDICTION MODEL 6/24/2015

Observer Location: **R2** *Project Name:* Knox Business Park
Source: RC12 *Job Number:* 9349
Condition: Cumulative Developments *Analyst:* A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	7,792.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	7,792.0 feet	*Noise Source Height:*	5.0 feet
Barrier Distance to Observer:	0.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0 feet	*Drop Off Coefficient:*	15.0
Barrier Elevation:	0.0 feet	20 = 6 dBA per doubling of distance 15 = 4.5 dBA per doubling of distance	

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	5.0	60.1	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	7,792.0	-47.9	-47.9	-47.9	-47.9	-47.9	-47.9
Shielding (Barrier Attenuation)	7,792.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		12.2	-47.9	-47.9	-47.9	-47.9	-47.9
60 Minute Hourly Adjustment		**12.2**	**-47.9**	**-47.9**	**-47.9**	**-47.9**	**-47.9**

STATIONARY SOURCE NOISE PREDICTION MODEL 6/24/2015

Observer Location: **R2** *Project Name:* Knox Business Park
Source: RC13 *Job Number:* 9349
Condition: Cumulative Developments *Analyst:* A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	12,230.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	12,230.0 feet	*Noise Source Height:*	8.0 feet
Barrier Distance to Observer:	0.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0 feet	20 = 6 dBA per doubling of distance 15 = 4.5 dBA per doubling of distance	

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	30.0	67.2	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	12,230.0	-52.2	-52.2	-52.2	-52.2	-52.2	-52.2
Shielding (Barrier Attenuation)	12,230.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		15.0	-52.2	-52.2	-52.2	-52.2	-52.2
60 Minute Hourly Adjustment		**15.0**	**-52.2**	**-52.2**	**-52.2**	**-52.2**	**-52.2**

STATIONARY SOURCE NOISE PREDICTION MODEL 6/24/2015

Observer Location: **R2** *Project Name:* Knox Business Park
Source: RC15 *Job Number:* 9349
Condition: Cumulative Developments *Analyst:* A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	8,634.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	8,634.0 feet	*Noise Source Height:*	8.0 feet
Barrier Distance to Observer:	0.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0 feet	20 = 6 dBA per doubling of distance 15 = 4.5 dBA per doubling of distance	

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	30.0	67.2	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	8,634.0	-49.2	-49.2	-49.2	-49.2	-49.2	-49.2
Shielding (Barrier Attenuation)	8,634.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		18.0	-49.2	-49.2	-49.2	-49.2	-49.2
60 Minute Hourly Adjustment		**18.0**	**-49.2**	**-49.2**	**-49.2**	**-49.2**	**-49.2**

STATIONARY SOURCE NOISE PREDICTION MODEL 6/24/2015

Observer Location: **R2** *Project Name:* Knox Business Park
Source: P47 *Job Number:* 9349
Condition: Cumulative Developments *Analyst:* A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	6,684.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	6,684.0 feet	*Noise Source Height:*	8.0 feet
Barrier Distance to Observer:	0.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0 feet	20 = 6 dBA per doubling of distance 15 = 4.5 dBA per doubling of distance	

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	30.0	67.2	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	6,684.0	-47.0	-47.0	-47.0	-47.0	-47.0	-47.0
Shielding (Barrier Attenuation)	6,684.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		20.2	-47.0	-47.0	-47.0	-47.0	-47.0
60 Minute Hourly Adjustment		**20.2**	**-47.0**	**-47.0**	**-47.0**	**-47.0**	**-47.0**

STATIONARY SOURCE NOISE PREDICTION MODEL 6/24/2015

Observer Location: **R2** *Project Name:* Knox Business Park
Source: RC22 *Job Number:* 9349
Condition: Cumulative Developments *Analyst:* A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	1,699.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	1,699.0 feet	*Noise Source Height:*	8.0 feet
Barrier Distance to Observer:	0.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0 feet	20 = 6 dBA per doubling of distance 15 = 4.5 dBA per doubling of distance	

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	30.0	67.2	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	1,699.0	-35.1	-35.1	-35.1	-35.1	-35.1	-35.1
Shielding (Barrier Attenuation)	1,699.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		32.1	-35.1	-35.1	-35.1	-35.1	-35.1
60 Minute Hourly Adjustment		**32.1**	**-35.1**	**-35.1**	**-35.1**	**-35.1**	**-35.1**

STATIONARY SOURCE NOISE PREDICTION MODEL 6/24/2015

Observer Location: **R3** *Project Name:* Knox Business Park
Source: RC6 *Job Number:* 9349
Condition: Cumulative Developments *Analyst:* A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	11,562.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	11,562.0 feet	*Noise Source Height:*	8.0 feet
Barrier Distance to Observer:	0.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0 feet	20 = 6 dBA per doubling of distance 15 = 4.5 dBA per doubling of distance	

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	30.0	67.2	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	11,562.0	-51.7	-51.7	-51.7	-51.7	-51.7	-51.7
Shielding (Barrier Attenuation)	11,562.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		15.5	-51.7	-51.7	-51.7	-51.7	-51.7
60 Minute Hourly Adjustment		**15.5**	**-51.7**	**-51.7**	**-51.7**	**-51.7**	**-51.7**

STATIONARY SOURCE NOISE PREDICTION MODEL 6/24/2015

Observer Location: **R3** *Project Name:* Knox Business Park
Source: RC2 *Job Number:* 9349
Condition: Cumulative Developments *Analyst:* A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	2,308.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	2,308.0 feet	*Noise Source Height:*	8.0 feet
Barrier Distance to Observer:	0.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0 feet	20 = 6 dBA per doubling of distance 15 = 4.5 dBA per doubling of distance	

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	30.0	67.2	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	2,308.0	-37.7	-37.7	-37.7	-37.7	-37.7	-37.7
Shielding (Barrier Attenuation)	2,308.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		29.5	-37.7	-37.7	-37.7	-37.7	-37.7
60 Minute Hourly Adjustment		**29.5**	**-37.7**	**-37.7**	**-37.7**	**-37.7**	**-37.7**

STATIONARY SOURCE NOISE PREDICTION MODEL 6/24/2015

Observer Location: **R3** *Project Name:* Knox Business Park
Source: P13 *Job Number:* 9349
Condition: Cumulative Developments *Analyst:* A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	7,158.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	7,158.0 feet	*Noise Source Height:*	8.0 feet
Barrier Distance to Observer:	0.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0 feet	20 = 6 dBA per doubling of distance 15 = 4.5 dBA per doubling of distance	

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	30.0	67.2	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	7,158.0	-47.6	-47.6	-47.6	-47.6	-47.6	-47.6
Shielding (Barrier Attenuation)	7,158.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		19.6	-47.6	-47.6	-47.6	-47.6	-47.6
60 Minute Hourly Adjustment		**19.6**	**-47.6**	**-47.6**	**-47.6**	**-47.6**	**-47.6**

STATIONARY SOURCE NOISE PREDICTION MODEL 6/24/2015

Observer Location: **R3** *Project Name:* Knox Business Park
Source: RC10 *Job Number:* 9349
Condition: Cumulative Developments *Analyst:* A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	10,756.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	10,756.0 feet	*Noise Source Height:*	8.0 feet
Barrier Distance to Observer:	0.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0 feet	20 = 6 dBA per doubling of distance 15 = 4.5 dBA per doubling of distance	

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	30.0	67.2	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	10,756.0	-51.1	-51.1	-51.1	-51.1	-51.1	-51.1
Shielding (Barrier Attenuation)	10,756.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		16.1	-51.1	-51.1	-51.1	-51.1	-51.1
60 Minute Hourly Adjustment		**16.1**	**-51.1**	**-51.1**	**-51.1**	**-51.1**	**-51.1**

STATIONARY SOURCE NOISE PREDICTION MODEL 6/24/2015

Observer Location: **R3** *Project Name:* Knox Business Park
Source: P20 *Job Number:* 9349
Condition: Cumulative Developments *Analyst:* A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	9,457.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	9,457.0 feet	*Noise Source Height:*	8.0 feet
Barrier Distance to Observer:	0.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0 feet	20 = 6 dBA per doubling of distance 15 = 4.5 dBA per doubling of distance	

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	30.0	67.2	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	9,457.0	-50.0	-50.0	-50.0	-50.0	-50.0	-50.0
Shielding (Barrier Attenuation)	9,457.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		17.2	-50.0	-50.0	-50.0	-50.0	-50.0
60 Minute Hourly Adjustment		**17.2**	**-50.0**	**-50.0**	**-50.0**	**-50.0**	**-50.0**

STATIONARY SOURCE NOISE PREDICTION MODEL 6/24/2015

Observer Location: **R3** *Project Name:* Knox Business Park
Source: RC12 *Job Number:* 9349
Condition: Cumulative Developments *Analyst:* A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	7,228.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	7,228.0 feet	*Noise Source Height:*	5.0 feet
Barrier Distance to Observer:	0.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0 feet	*Drop Off Coefficient:*	15.0
Barrier Elevation:	0.0 feet	20 = 6 dBA per doubling of distance 15 = 4.5 dBA per doubling of distance	

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	5.0	60.1	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	7,228.0	-47.4	-47.4	-47.4	-47.4	-47.4	-47.4
Shielding (Barrier Attenuation)	7,228.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		12.7	-47.4	-47.4	-47.4	-47.4	-47.4
60 Minute Hourly Adjustment		**12.7**	**-47.4**	**-47.4**	**-47.4**	**-47.4**	**-47.4**

STATIONARY SOURCE NOISE PREDICTION MODEL 6/24/2015

Observer Location: **R3** *Project Name:* Knox Business Park
Source: RC13 *Job Number:* 9349
Condition: Cumulative Developments *Analyst:* A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	11,615.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	11,615.0 feet	*Noise Source Height:*	8.0 feet
Barrier Distance to Observer:	0.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0 feet	20 = 6 dBA per doubling of distance 15 = 4.5 dBA per doubling of distance	

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	30.0	67.2	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	11,615.0	-51.8	-51.8	-51.8	-51.8	-51.8	-51.8
Shielding (Barrier Attenuation)	11,615.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		15.4	-51.8	-51.8	-51.8	-51.8	-51.8
60 Minute Hourly Adjustment		**15.4**	**-51.8**	**-51.8**	**-51.8**	**-51.8**	**-51.8**

STATIONARY SOURCE NOISE PREDICTION MODEL 6/24/2015

Observer Location: **R3** *Project Name:* Knox Business Park
Source: RC15 *Job Number:* 9349
Condition: Cumulative Developments *Analyst:* A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	7,878.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	7,878.0 feet	*Noise Source Height:*	8.0 feet
Barrier Distance to Observer:	0.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0 feet	20 = 6 dBA per doubling of distance 15 = 4.5 dBA per doubling of distance	

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	30.0	67.2	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	7,878.0	-48.4	-48.4	-48.4	-48.4	-48.4	-48.4
Shielding (Barrier Attenuation)	7,878.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		18.8	-48.4	-48.4	-48.4	-48.4	-48.4
60 Minute Hourly Adjustment		**18.8**	**-48.4**	**-48.4**	**-48.4**	**-48.4**	**-48.4**

STATIONARY SOURCE NOISE PREDICTION MODEL 6/24/2015

Observer Location: **R3** *Project Name:* Knox Business Park
Source: P47 *Job Number:* 9349
Condition: Cumulative Developments *Analyst:* A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	6,683.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	6,683.0 feet	*Noise Source Height:*	8.0 feet
Barrier Distance to Observer:	0.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0 feet	20 = 6 dBA per doubling of distance 15 = 4.5 dBA per doubling of distance	

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	30.0	67.2	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	6,683.0	-47.0	-47.0	-47.0	-47.0	-47.0	-47.0
Shielding (Barrier Attenuation)	6,683.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		20.2	-47.0	-47.0	-47.0	-47.0	-47.0
60 Minute Hourly Adjustment		**20.2**	**-47.0**	**-47.0**	**-47.0**	**-47.0**	**-47.0**

STATIONARY SOURCE NOISE PREDICTION MODEL 6/24/2015

Observer Location: **R3** *Project Name:* Knox Business Park
Source: RC1 *Job Number:* 9349
Condition: Cumulative Developments *Analyst:* A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	132.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	132.0 feet	*Noise Source Height:*	8.0 feet
Barrier Distance to Observer:	0.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0 feet	20 = 6 dBA per doubling of distance 15 = 4.5 dBA per doubling of distance	

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	30.0	67.2	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	132.0	-12.9	-12.9	-12.9	-12.9	-12.9	-12.9
Shielding (Barrier Attenuation)	132.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		54.3	-12.9	-12.9	-12.9	-12.9	-12.9
60 Minute Hourly Adjustment		**54.3**	**-12.9**	**-12.9**	**-12.9**	**-12.9**	**-12.9**

STATIONARY SOURCE NOISE PREDICTION MODEL 6/24/2015

Observer Location: **R3** *Project Name:* Knox Business Park
Source: RC22 *Job Number:* 9349
Condition: Cumulative Developments *Analyst:* A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	2,260.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	2,260.0 feet	*Noise Source Height:*	8.0 feet
Barrier Distance to Observer:	0.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0 feet	20 = 6 dBA per doubling of distance 15 = 4.5 dBA per doubling of distance	

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	30.0	67.2	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	2,260.0	-37.5	-37.5	-37.5	-37.5	-37.5	-37.5
Shielding (Barrier Attenuation)	2,260.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		29.7	-37.5	-37.5	-37.5	-37.5	-37.5
60 Minute Hourly Adjustment		**29.7**	**-37.5**	**-37.5**	**-37.5**	**-37.5**	**-37.5**

STATIONARY SOURCE NOISE PREDICTION MODEL 6/24/2015

Observer Location: **R4** *Project Name:* Knox Business Park
Source: RC6 *Job Number:* 9349
Condition: Cumulative Developments *Analyst:* A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	11,647.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	11,647.0 feet	*Noise Source Height:*	8.0 feet
Barrier Distance to Observer:	0.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0 feet	20 = 6 dBA per doubling of distance 15 = 4.5 dBA per doubling of distance	

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	30.0	67.2	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	11,647.0	-51.8	-51.8	-51.8	-51.8	-51.8	-51.8
Shielding (Barrier Attenuation)	11,647.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		15.4	-51.8	-51.8	-51.8	-51.8	-51.8
60 Minute Hourly Adjustment		**15.4**	**-51.8**	**-51.8**	**-51.8**	**-51.8**	**-51.8**

STATIONARY SOURCE NOISE PREDICTION MODEL 6/24/2015

Observer Location: **R4** *Project Name:* Knox Business Park
Source: RC2 *Job Number:* 9349
Condition: Cumulative Developments *Analyst:* A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	1,965.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	1,965.0 feet	*Noise Source Height:*	8.0 feet
Barrier Distance to Observer:	0.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0 feet	20 = 6 dBA per doubling of distance 15 = 4.5 dBA per doubling of distance	

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	30.0	67.2	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	1,965.0	-36.3	-36.3	-36.3	-36.3	-36.3	-36.3
Shielding (Barrier Attenuation)	1,965.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		30.9	-36.3	-36.3	-36.3	-36.3	-36.3
60 Minute Hourly Adjustment		**30.9**	**-36.3**	**-36.3**	**-36.3**	**-36.3**	**-36.3**

STATIONARY SOURCE NOISE PREDICTION MODEL 6/24/2015

Observer Location: **R4** *Project Name:* Knox Business Park
Source: P13 *Job Number:* 9349
Condition: Cumulative Developments *Analyst:* A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	6,787.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	6,787.0 feet	*Noise Source Height:*	8.0 feet
Barrier Distance to Observer:	0.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0 feet	20 = 6 dBA per doubling of distance 15 = 4.5 dBA per doubling of distance	

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	30.0	67.2	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	6,787.0	-47.1	-47.1	-47.1	-47.1	-47.1	-47.1
Shielding (Barrier Attenuation)	6,787.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		20.1	-47.1	-47.1	-47.1	-47.1	-47.1
60 Minute Hourly Adjustment		**20.1**	**-47.1**	**-47.1**	**-47.1**	**-47.1**	**-47.1**

STATIONARY SOURCE NOISE PREDICTION MODEL 6/24/2015

Observer Location: **R4** *Project Name:* Knox Business Park
Source: RC10 *Job Number:* 9349
Condition: Cumulative Developments *Analyst:* A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	10,516.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	10,516.0 feet	*Noise Source Height:*	8.0 feet
Barrier Distance to Observer:	0.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0 feet	20 = 6 dBA per doubling of distance 15 = 4.5 dBA per doubling of distance	

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	30.0	67.2	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	10,516.0	-50.9	-50.9	-50.9	-50.9	-50.9	-50.9
Shielding (Barrier Attenuation)	10,516.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		16.3	-50.9	-50.9	-50.9	-50.9	-50.9
60 Minute Hourly Adjustment		**16.3**	**-50.9**	**-50.9**	**-50.9**	**-50.9**	**-50.9**

STATIONARY SOURCE NOISE PREDICTION MODEL 6/24/2015

Observer Location: **R4** *Project Name:* Knox Business Park
Source: P20 *Job Number:* 9349
Condition: Cumulative Developments *Analyst:* A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	9,072.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	9,072.0 feet	*Noise Source Height:*	8.0 feet
Barrier Distance to Observer:	0.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0 feet	20 = 6 dBA per doubling of distance 15 = 4.5 dBA per doubling of distance	

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	30.0	67.2	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	9,072.0	-49.6	-49.6	-49.6	-49.6	-49.6	-49.6
Shielding (Barrier Attenuation)	9,072.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		17.6	-49.6	-49.6	-49.6	-49.6	-49.6
60 Minute Hourly Adjustment		**17.6**	**-49.6**	**-49.6**	**-49.6**	**-49.6**	**-49.6**

STATIONARY SOURCE NOISE PREDICTION MODEL 6/24/2015

Observer Location: **R4** *Project Name:* Knox Business Park
Source: RC12 *Job Number:* 9349
Condition: Cumulative Developments *Analyst:* A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	6,922.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	6,922.0 feet	*Noise Source Height:*	5.0 feet
Barrier Distance to Observer:	0.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0 feet	*Drop Off Coefficient:*	15.0
Barrier Elevation:	0.0 feet	20 = 6 dBA per doubling of distance 15 = 4.5 dBA per doubling of distance	

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	5.0	60.1	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	6,922.0	-47.1	-47.1	-47.1	-47.1	-47.1	-47.1
Shielding (Barrier Attenuation)	6,922.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		13.0	-47.1	-47.1	-47.1	-47.1	-47.1
60 Minute Hourly Adjustment		**13.0**	**-47.1**	**-47.1**	**-47.1**	**-47.1**	**-47.1**

STATIONARY SOURCE NOISE PREDICTION MODEL 6/24/2015

Observer Location: **R4** *Project Name:* Knox Business Park
Source: RC13 *Job Number:* 9349
Condition: Cumulative Developments *Analyst:* A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	.1,343.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	.1,343.0 feet	*Noise Source Height:*	8.0 feet
Barrier Distance to Observer:	0.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0 feet	20 = 6 dBA per doubling of distance 15 = 4.5 dBA per doubling of distance	

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	30.0	67.2	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	11,343.0	-51.6	-51.6	-51.6	-51.6	-51.6	-51.6
Shielding (Barrier Attenuation)	11,343.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		15.6	-51.6	-51.6	-51.6	-51.6	-51.6
60 Minute Hourly Adjustment		**15.6**	**-51.6**	**-51.6**	**-51.6**	**-51.6**	**-51.6**

STATIONARY SOURCE NOISE PREDICTION MODEL 6/24/2015

Observer Location: **R4** *Project Name:* Knox Business Park
Source: RC15 *Job Number:* 9349
Condition: Cumulative Developments *Analyst:* A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	7,904.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	7,904.0 feet	*Noise Source Height:*	8.0 feet
Barrier Distance to Observer:	0.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0 feet	20 = 6 dBA per doubling of distance 15 = 4.5 dBA per doubling of distance	

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	30.0	67.2	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	7,904.0	-48.4	-48.4	-48.4	-48.4	-48.4	-48.4
Shielding (Barrier Attenuation)	7,904.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		18.8	-48.4	-48.4	-48.4	-48.4	-48.4
60 Minute Hourly Adjustment		**18.8**	**-48.4**	**-48.4**	**-48.4**	**-48.4**	**-48.4**

STATIONARY SOURCE NOISE PREDICTION MODEL 6/24/2015

Observer Location: **R4** *Project Name:* Knox Business Park
Source: P47 *Job Number:* 9349
Condition: Cumulative Developments *Analyst:* A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	6,268.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	6,268.0 feet	*Noise Source Height:*	8.0 feet
Barrier Distance to Observer:	0.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0 feet	20 = 6 dBA per doubling of distance 15 = 4.5 dBA per doubling of distance	

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	30.0	67.2	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	6,268.0	-46.4	-46.4	-46.4	-46.4	-46.4	-46.4
Shielding (Barrier Attenuation)	6,268.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		20.8	-46.4	-46.4	-46.4	-46.4	-46.4
60 Minute Hourly Adjustment		**20.8**	**-46.4**	**-46.4**	**-46.4**	**-46.4**	**-46.4**

STATIONARY SOURCE NOISE PREDICTION MODEL 6/24/2015

Observer Location: **R4** *Project Name:* Knox Business Park
Source: RC1 *Job Number:* 9349
Condition: Cumulative Developments *Analyst:* A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	103.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	103.0 feet	*Noise Source Height:*	8.0 feet
Barrier Distance to Observer:	0.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0 feet	20 = 6 dBA per doubling of distance 15 = 4.5 dBA per doubling of distance	

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	30.0	67.2	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	103.0	-10.7	-10.7	-10.7	-10.7	-10.7	-10.7
Shielding (Barrier Attenuation)	103.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		56.5	-10.7	-10.7	-10.7	-10.7	-10.7
60 Minute Hourly Adjustment		**56.5**	**-10.7**	**-10.7**	**-10.7**	**-10.7**	**-10.7**

STATIONARY SOURCE NOISE PREDICTION MODEL 6/24/2015

Observer Location: **R4** *Project Name:* Knox Business Park
Source: RC22 *Job Number:* 9349
Condition: Cumulative Developments *Analyst:* A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	2,057.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	2,057.0 feet	*Noise Source Height:*	8.0 feet
Barrier Distance to Observer:	0.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0 feet	20 = 6 dBA per doubling of distance 15 = 4.5 dBA per doubling of distance	

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	30.0	67.2	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	2,057.0	-36.7	-36.7	-36.7	-36.7	-36.7	-36.7
Shielding (Barrier Attenuation)	2,057.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		30.5	-36.7	-36.7	-36.7	-36.7	-36.7
60 Minute Hourly Adjustment		**30.5**	**-36.7**	**-36.7**	**-36.7**	**-36.7**	**-36.7**

STATIONARY SOURCE NOISE PREDICTION MODEL 6/24/2015

Observer Location: **R5** *Project Name:* Knox Business Park
Source: RC6 *Job Number:* 9349
Condition: Cumulative Developments *Analyst:* A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	.2,511.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	.2,511.0 feet	*Noise Source Height:*	8.0 feet
Barrier Distance to Observer:	0.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0 feet	20 = 6 dBA per doubling of distance 15 = 4.5 dBA per doubling of distance	

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	30.0	67.2	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	12,511.0	-52.4	-52.4	-52.4	-52.4	-52.4	-52.4
Shielding (Barrier Attenuation)	12,511.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		14.8	-52.4	-52.4	-52.4	-52.4	-52.4
60 Minute Hourly Adjustment		**14.8**	**-52.4**	**-52.4**	**-52.4**	**-52.4**	**-52.4**

STATIONARY SOURCE NOISE PREDICTION MODEL 6/24/2015

Observer Location: **R5** *Project Name:* Knox Business Park
Source: RC2 *Job Number:* 9349
Condition: Cumulative Developments *Analyst:* A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	1,980.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	1,980.0 feet	*Noise Source Height:*	8.0 feet
Barrier Distance to Observer:	0.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0 feet	20 = 6 dBA per doubling of distance 15 = 4.5 dBA per doubling of distance	

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	30.0	67.2	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	1,980.0	-36.4	-36.4	-36.4	-36.4	-36.4	-36.4
Shielding (Barrier Attenuation)	1,980.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		30.8	-36.4	-36.4	-36.4	-36.4	-36.4
60 Minute Hourly Adjustment		**30.8**	**-36.4**	**-36.4**	**-36.4**	**-36.4**	**-36.4**

STATIONARY SOURCE NOISE PREDICTION MODEL 6/24/2015

Observer Location: **R5** *Project Name:* Knox Business Park
Source: P13 *Job Number:* 9349
Condition: Cumulative Developments *Analyst:* A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	5,980.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	5,980.0 feet	*Noise Source Height:*	8.0 feet
Barrier Distance to Observer:	0.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0 feet	20 = 6 dBA per doubling of distance 15 = 4.5 dBA per doubling of distance	

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	30.0	67.2	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	5,980.0	-46.0	-46.0	-46.0	-46.0	-46.0	-46.0
Shielding (Barrier Attenuation)	5,980.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		21.2	-46.0	-46.0	-46.0	-46.0	-46.0
60 Minute Hourly Adjustment		**21.2**	**-46.0**	**-46.0**	**-46.0**	**-46.0**	**-46.0**

STATIONARY SOURCE NOISE PREDICTION MODEL 6/24/2015

Observer Location: **R5** *Project Name:* Knox Business Park
Source: RC10 *Job Number:* 9349
Condition: Cumulative Developments *Analyst:* A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	9,176.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	9,176.0 feet	*Noise Source Height:*	8.0 feet
Barrier Distance to Observer:	0.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0 feet	20 = 6 dBA per doubling of distance 15 = 4.5 dBA per doubling of distance	

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	30.0	67.2	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	9,176.0	-49.7	-49.7	-49.7	-49.7	-49.7	-49.7
Shielding (Barrier Attenuation)	9,176.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		17.5	-49.7	-49.7	-49.7	-49.7	-49.7
60 Minute Hourly Adjustment		**17.5**	**-49.7**	**-49.7**	**-49.7**	**-49.7**	**-49.7**

STATIONARY SOURCE NOISE PREDICTION MODEL 6/24/2015

Observer Location: **R5** *Project Name:* Knox Business Park
Source: P20 *Job Number:* 9349
Condition: Cumulative Developments *Analyst:* A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	7,634.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	7,634.0 feet	*Noise Source Height:*	8.0 feet
Barrier Distance to Observer:	0.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0 feet	20 = 6 dBA per doubling of distance 15 = 4.5 dBA per doubling of distance	

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	30.0	67.2	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	7,634.0	-48.1	-48.1	-48.1	-48.1	-48.1	-48.1
Shielding (Barrier Attenuation)	7,634.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		19.1	-48.1	-48.1	-48.1	-48.1	-48.1
60 Minute Hourly Adjustment		**19.1**	**-48.1**	**-48.1**	**-48.1**	**-48.1**	**-48.1**

STATIONARY SOURCE NOISE PREDICTION MODEL 6/24/2015

Observer Location: **R5** *Project Name:* Knox Business Park
Source: RC12 *Job Number:* 9349
Condition: Cumulative Developments *Analyst:* A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	5,514.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	5,514.0 feet	*Noise Source Height:*	5.0 feet
Barrier Distance to Observer:	0.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0 feet	*Drop Off Coefficient:*	15.0
Barrier Elevation:	0.0 feet	20 = 6 dBA per doubling of distance 15 = 4.5 dBA per doubling of distance	

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	5.0	60.1	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	5,514.0	-45.6	-45.6	-45.6	-45.6	-45.6	-45.6
Shielding (Barrier Attenuation)	5,514.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		14.5	-45.6	-45.6	-45.6	-45.6	-45.6
60 Minute Hourly Adjustment		**14.5**	**-45.6**	**-45.6**	**-45.6**	**-45.6**	**-45.6**

STATIONARY SOURCE NOISE PREDICTION MODEL 6/24/2015

Observer Location: **R5** *Project Name:* Knox Business Park
Source: RC13 *Job Number:* 9349
Condition: Cumulative Developments *Analyst:* A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	9,972.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	9,972.0 feet	*Noise Source Height:*	8.0 feet
Barrier Distance to Observer:	0.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0 feet	20 = 6 dBA per doubling of distance 15 = 4.5 dBA per doubling of distance	

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	30.0	67.2	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	9,972.0	-50.4	-50.4	-50.4	-50.4	-50.4	-50.4
Shielding (Barrier Attenuation)	9,972.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		16.8	-50.4	-50.4	-50.4	-50.4	-50.4
60 Minute Hourly Adjustment		**16.8**	**-50.4**	**-50.4**	**-50.4**	**-50.4**	**-50.4**

STATIONARY SOURCE NOISE PREDICTION MODEL 6/24/2015

Observer Location: **R5** *Project Name:* Knox Business Park
Source: RC15 *Job Number:* 9349
Condition: Cumulative Developments *Analyst:* A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	7,203.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	7,203.0 feet	*Noise Source Height:*	8.0 feet
Barrier Distance to Observer:	0.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0 feet	20 = 6 dBA per doubling of distance 15 = 4.5 dBA per doubling of distance	

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	30.0	67.2	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	7,203.0	-47.6	-47.6	-47.6	-47.6	-47.6	-47.6
Shielding (Barrier Attenuation)	7,203.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		19.6	-47.6	-47.6	-47.6	-47.6	-47.6
60 Minute Hourly Adjustment		**19.6**	**-47.6**	**-47.6**	**-47.6**	**-47.6**	**-47.6**

STATIONARY SOURCE NOISE PREDICTION MODEL 6/24/2015

Observer Location: **R5** *Project Name:* Knox Business Park
Source: P47 *Job Number:* 9349
Condition: Cumulative Developments *Analyst:* A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	5,248.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	5,248.0 feet	*Noise Source Height:*	8.0 feet
Barrier Distance to Observer:	0.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0 feet	20 = 6 dBA per doubling of distance 15 = 4.5 dBA per doubling of distance	

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	30.0	67.2	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	5,248.0	-44.9	-44.9	-44.9	-44.9	-44.9	-44.9
Shielding (Barrier Attenuation)	5,248.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		22.3	-44.9	-44.9	-44.9	-44.9	-44.9
60 Minute Hourly Adjustment		**22.3**	**-44.9**	**-44.9**	**-44.9**	**-44.9**	**-44.9**

STATIONARY SOURCE NOISE PREDICTION MODEL 6/24/2015

Observer Location: **R5** *Project Name:* Knox Business Park
Source: RC1 *Job Number:* 9349
Condition: Cumulative Developments *Analyst:* A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	223.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	223.0 feet	*Noise Source Height:*	8.0 feet
Barrier Distance to Observer:	0.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0 feet	20 = 6 dBA per doubling of distance 15 = 4.5 dBA per doubling of distance	

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	30.0	67.2	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	223.0	-17.4	-17.4	-17.4	-17.4	-17.4	-17.4
Shielding (Barrier Attenuation)	223.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		49.8	-17.4	-17.4	-17.4	-17.4	-17.4
60 Minute Hourly Adjustment		**49.8**	**-17.4**	**-17.4**	**-17.4**	**-17.4**	**-17.4**

STATIONARY SOURCE NOISE PREDICTION MODEL 6/24/2015

Observer Location: **R5** *Project Name:* Knox Business Park
Source: RC22 *Job Number:* 9349
Condition: Cumulative Developments *Analyst:* A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	2,594.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	2,594.0 feet	*Noise Source Height:*	8.0 feet
Barrier Distance to Observer:	0.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0 feet	20 = 6 dBA per doubling of distance 15 = 4.5 dBA per doubling of distance	

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	30.0	67.2	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	2,594.0	-38.7	-38.7	-38.7	-38.7	-38.7	-38.7
Shielding (Barrier Attenuation)	2,594.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		28.5	-38.7	-38.7	-38.7	-38.7	-38.7
60 Minute Hourly Adjustment		**28.5**	**-38.7**	**-38.7**	**-38.7**	**-38.7**	**-38.7**

STATIONARY SOURCE NOISE PREDICTION MODEL 6/24/2015

Observer Location: **R6** *Project Name:* Knox Business Park
Source: RC6 *Job Number:* 9349
Condition: Cumulative Developments *Analyst:* A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	.1,970.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	.1,970.0 feet	*Noise Source Height:*	8.0 feet
Barrier Distance to Observer:	0.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0 feet	20 = 6 dBA per doubling of distance 15 = 4.5 dBA per doubling of distance	

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	30.0	67.2	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	11,970.0	-52.0	-52.0	-52.0	-52.0	-52.0	-52.0
Shielding (Barrier Attenuation)	11,970.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		15.2	-52.0	-52.0	-52.0	-52.0	-52.0
60 Minute Hourly Adjustment		**15.2**	**-52.0**	**-52.0**	**-52.0**	**-52.0**	**-52.0**

STATIONARY SOURCE NOISE PREDICTION MODEL 6/24/2015

Observer Location: **R6** *Project Name:* Knox Business Park
Source: RC2 *Job Number:* 9349
Condition: Cumulative Developments *Analyst:* A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	1,392.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	1,392.0 feet	*Noise Source Height:*	8.0 feet
Barrier Distance to Observer:	0.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0 feet	20 = 6 dBA per doubling of distance 15 = 4.5 dBA per doubling of distance	

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	30.0	67.2	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	1,392.0	-33.3	-33.3	-33.3	-33.3	-33.3	-33.3
Shielding (Barrier Attenuation)	1,392.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		33.9	-33.3	-33.3	-33.3	-33.3	-33.3
60 Minute Hourly Adjustment		**33.9**	**-33.3**	**-33.3**	**-33.3**	**-33.3**	**-33.3**

STATIONARY SOURCE NOISE PREDICTION MODEL 6/24/2015

Observer Location: **R6** *Project Name:* Knox Business Park
Source: P13 *Job Number:* 9349
Condition: Cumulative Developments *Analyst:* A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	5,395.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	5,395.0 feet	*Noise Source Height:*	8.0 feet
Barrier Distance to Observer:	0.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0 feet	20 = 6 dBA per doubling of distance 15 = 4.5 dBA per doubling of distance	

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	30.0	67.2	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	5,395.0	-45.1	-45.1	-45.1	-45.1	-45.1	-45.1
Shielding (Barrier Attenuation)	5,395.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		22.1	-45.1	-45.1	-45.1	-45.1	-45.1
60 Minute Hourly Adjustment		**22.1**	**-45.1**	**-45.1**	**-45.1**	**-45.1**	**-45.1**

STATIONARY SOURCE NOISE PREDICTION MODEL 6/24/2015

Observer Location: **R6** *Project Name:* Knox Business Park
Source: RC10 *Job Number:* 9349
Condition: Cumulative Developments *Analyst:* A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	9,407.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	9,407.0 feet	*Noise Source Height:*	8.0 feet
Barrier Distance to Observer:	0.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0 feet	20 = 6 dBA per doubling of distance 15 = 4.5 dBA per doubling of distance	

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	30.0	67.2	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	9,407.0	-49.9	-49.9	-49.9	-49.9	-49.9	-49.9
Shielding (Barrier Attenuation)	9,407.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		17.3	-49.9	-49.9	-49.9	-49.9	-49.9
60 Minute Hourly Adjustment		**17.3**	**-49.9**	**-49.9**	**-49.9**	**-49.9**	**-49.9**

STATIONARY SOURCE NOISE PREDICTION MODEL 6/24/2015

Observer Location: **R6** *Project Name:* Knox Business Park
Source: P20 *Job Number:* 9349
Condition: Cumulative Developments *Analyst:* A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	7,560.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	7,560.0 feet	*Noise Source Height:*	8.0 feet
Barrier Distance to Observer:	0.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0 feet	20 = 6 dBA per doubling of distance 15 = 4.5 dBA per doubling of distance	

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	30.0	67.2	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	7,560.0	-48.0	-48.0	-48.0	-48.0	-48.0	-48.0
Shielding (Barrier Attenuation)	7,560.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		19.2	-48.0	-48.0	-48.0	-48.0	-48.0
60 Minute Hourly Adjustment		**19.2**	**-48.0**	**-48.0**	**-48.0**	**-48.0**	**-48.0**

STATIONARY SOURCE NOISE PREDICTION MODEL 6/24/2015

Observer Location: **R6** *Project Name:* Knox Business Park
Source: RC12 *Job Number:* 9349
Condition: Cumulative Developments *Analyst:* A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	5,647.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	5,647.0 feet	*Noise Source Height:*	5.0 feet
Barrier Distance to Observer:	0.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0 feet	*Drop Off Coefficient:*	15.0
Barrier Elevation:	0.0 feet	20 = 6 dBA per doubling of distance 15 = 4.5 dBA per doubling of distance	

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	5.0	60.1	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	5,647.0	-45.8	-45.8	-45.8	-45.8	-45.8	-45.8
Shielding (Barrier Attenuation)	5,647.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		14.3	-45.8	-45.8	-45.8	-45.8	-45.8
60 Minute Hourly Adjustment		**14.3**	**-45.8**	**-45.8**	**-45.8**	**-45.8**	**-45.8**

STATIONARY SOURCE NOISE PREDICTION MODEL 6/24/2015

Observer Location: **R6** *Project Name:* Knox Business Park
Source: RC13 *Job Number:* 9349
Condition: Cumulative Developments *Analyst:* A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	10,145.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	10,145.0 feet	*Noise Source Height:*	8.0 feet
Barrier Distance to Observer:	0.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0 feet	20 = 6 dBA per doubling of distance 15 = 4.5 dBA per doubling of distance	

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	30.0	67.2	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	10,145.0	-50.6	-50.6	-50.6	-50.6	-50.6	-50.6
Shielding (Barrier Attenuation)	10,145.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		16.6	-50.6	-50.6	-50.6	-50.6	-50.6
60 Minute Hourly Adjustment		**16.6**	**-50.6**	**-50.6**	**-50.6**	**-50.6**	**-50.6**

STATIONARY SOURCE NOISE PREDICTION MODEL 6/24/2015

Observer Location: **R6** *Project Name:* Knox Business Park
Source: RC15 *Job Number:* 9349
Condition: Cumulative Developments *Analyst:* A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	7,758.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	7,758.0 feet	*Noise Source Height:*	8.0 feet
Barrier Distance to Observer:	0.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0 feet	20 = 6 dBA per doubling of distance 15 = 4.5 dBA per doubling of distance	

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	30.0	67.2	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	7,758.0	-48.3	-48.3	-48.3	-48.3	-48.3	-48.3
Shielding (Barrier Attenuation)	7,758.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		18.9	-48.3	-48.3	-48.3	-48.3	-48.3
60 Minute Hourly Adjustment		**18.9**	**-48.3**	**-48.3**	**-48.3**	**-48.3**	**-48.3**

STATIONARY SOURCE NOISE PREDICTION MODEL 6/24/2015

Observer Location: **R6** *Project Name:* Knox Business Park
Source: P47 *Job Number:* 9349
Condition: Cumulative Developments *Analyst:* A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	4,704.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	4,704.0 feet	*Noise Source Height:*	8.0 feet
Barrier Distance to Observer:	0.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0 feet	20 = 6 dBA per doubling of distance 15 = 4.5 dBA per doubling of distance	

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	30.0	67.2	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	4,704.0	-43.9	-43.9	-43.9	-43.9	-43.9	-43.9
Shielding (Barrier Attenuation)	4,704.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		23.3	-43.9	-43.9	-43.9	-43.9	-43.9
60 Minute Hourly Adjustment		**23.3**	**-43.9**	**-43.9**	**-43.9**	**-43.9**	**-43.9**

STATIONARY SOURCE NOISE PREDICTION MODEL 6/24/2015

Observer Location: **R6** *Project Name:* Knox Business Park
Source: RC22 *Job Number:* 9349
Condition: Cumulative Developments *Analyst:* A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	2,120.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	2,120.0 feet	*Noise Source Height:*	8.0 feet
Barrier Distance to Observer:	0.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0 feet	20 = 6 dBA per doubling of distance 15 = 4.5 dBA per doubling of distance	

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	30.0	67.2	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	2,120.0	-37.0	-37.0	-37.0	-37.0	-37.0	-37.0
Shielding (Barrier Attenuation)	2,120.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		30.2	-37.0	-37.0	-37.0	-37.0	-37.0
60 Minute Hourly Adjustment		**30.2**	**-37.0**	**-37.0**	**-37.0**	**-37.0**	**-37.0**

STATIONARY SOURCE NOISE PREDICTION MODEL 6/24/2015

Observer Location: **R7** *Project Name:* Knox Business Park
Source: RC6 *Job Number:* 9349
Condition: Cumulative Developments *Analyst:* A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	12,679.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	12,679.0 feet	*Noise Source Height:*	8.0 feet
Barrier Distance to Observer:	0.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0 feet	20 = 6 dBA per doubling of distance 15 = 4.5 dBA per doubling of distance	

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	30.0	67.2	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	12,679.0	-52.5	-52.5	-52.5	-52.5	-52.5	-52.5
Shielding (Barrier Attenuation)	12,679.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		14.7	-52.5	-52.5	-52.5	-52.5	-52.5
60 Minute Hourly Adjustment		**14.7**	**-52.5**	**-52.5**	**-52.5**	**-52.5**	**-52.5**

STATIONARY SOURCE NOISE PREDICTION MODEL 6/24/2015

Observer Location: **R7** *Project Name:* Knox Business Park
Source: RC2 *Job Number:* 9349
Condition: Cumulative Developments *Analyst:* A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	1,963.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	1,963.0 feet	*Noise Source Height:*	8.0 feet
Barrier Distance to Observer:	0.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0 feet	20 = 6 dBA per doubling of distance 15 = 4.5 dBA per doubling of distance	

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	30.0	67.2	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	1,963.0	-36.3	-36.3	-36.3	-36.3	-36.3	-36.3
Shielding (Barrier Attenuation)	1,963.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		30.9	-36.3	-36.3	-36.3	-36.3	-36.3
60 Minute Hourly Adjustment		**30.9**	**-36.3**	**-36.3**	**-36.3**	**-36.3**	**-36.3**

STATIONARY SOURCE NOISE PREDICTION MODEL 6/24/2015

Observer Location: **R7** *Project Name:* Knox Business Park
Source: P13 *Job Number:* 9349
Condition: Cumulative Developments *Analyst:* A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	4,551.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	4,551.0 feet	*Noise Source Height:*	8.0 feet
Barrier Distance to Observer:	0.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0 feet	20 = 6 dBA per doubling of distance 15 = 4.5 dBA per doubling of distance	

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	30.0	67.2	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	4,551.0	-43.6	-43.6	-43.6	-43.6	-43.6	-43.6
Shielding (Barrier Attenuation)	4,551.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		23.6	-43.6	-43.6	-43.6	-43.6	-43.6
60 Minute Hourly Adjustment		**23.6**	**-43.6**	**-43.6**	**-43.6**	**-43.6**	**-43.6**

STATIONARY SOURCE NOISE PREDICTION MODEL 6/24/2015

Observer Location: **R7** *Project Name:* Knox Business Park
Source: RC10 *Job Number:* 9349
Condition: Cumulative Developments *Analyst:* A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	8,149.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	8,149.0 feet	*Noise Source Height:*	8.0 feet
Barrier Distance to Observer:	0.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0 feet	20 = 6 dBA per doubling of distance 15 = 4.5 dBA per doubling of distance	

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	30.0	67.2	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	8,149.0	-48.7	-48.7	-48.7	-48.7	-48.7	-48.7
Shielding (Barrier Attenuation)	8,149.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		18.5	-48.7	-48.7	-48.7	-48.7	-48.7
60 Minute Hourly Adjustment		**18.5**	**-48.7**	**-48.7**	**-48.7**	**-48.7**	**-48.7**

STATIONARY SOURCE NOISE PREDICTION MODEL 6/24/2015

Observer Location: **R7** *Project Name:* Knox Business Park
Source: P20 *Job Number:* 9349
Condition: Cumulative Developments *Analyst:* A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	5,965.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	5,965.0 feet	*Noise Source Height:*	8.0 feet
Barrier Distance to Observer:	0.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0 feet	20 = 6 dBA per doubling of distance 15 = 4.5 dBA per doubling of distance	

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	30.0	67.2	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	5,965.0	-46.0	-46.0	-46.0	-46.0	-46.0	-46.0
Shielding (Barrier Attenuation)	5,965.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		21.2	-46.0	-46.0	-46.0	-46.0	-46.0
60 Minute Hourly Adjustment		**21.2**	**-46.0**	**-46.0**	**-46.0**	**-46.0**	**-46.0**

STATIONARY SOURCE NOISE PREDICTION MODEL 6/24/2015

Observer Location: **R7** *Project Name:* Knox Business Park
Source: RC12 *Job Number:* 9349
Condition: Cumulative Developments *Analyst:* A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	4,262.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	4,262.0 feet	*Noise Source Height:*	5.0 feet
Barrier Distance to Observer:	0.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0 feet	*Drop Off Coefficient:*	15.0
Barrier Elevation:	0.0 feet	20 = 6 dBA per doubling of distance 15 = 4.5 dBA per doubling of distance	

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	5.0	60.1	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	4,262.0	-44.0	-44.0	-44.0	-44.0	-44.0	-44.0
Shielding (Barrier Attenuation)	4,262.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		16.1	-44.0	-44.0	-44.0	-44.0	-44.0
60 Minute Hourly Adjustment		**16.1**	**-44.0**	**-44.0**	**-44.0**	**-44.0**	**-44.0**

STATIONARY SOURCE NOISE PREDICTION MODEL 6/24/2015

Observer Location: **R7** *Project Name:* Knox Business Park
Source: RC13 *Job Number:* 9349
Condition: Cumulative Developments *Analyst:* A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	8,813.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	8,813.0 feet	*Noise Source Height:*	8.0 feet
Barrier Distance to Observer:	0.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0 feet	20 = 6 dBA per doubling of distance 15 = 4.5 dBA per doubling of distance	

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	30.0	67.2	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	8,813.0	-49.4	-49.4	-49.4	-49.4	-49.4	-49.4
Shielding (Barrier Attenuation)	8,813.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		17.8	-49.4	-49.4	-49.4	-49.4	-49.4
60 Minute Hourly Adjustment		**17.8**	**-49.4**	**-49.4**	**-49.4**	**-49.4**	**-49.4**

STATIONARY SOURCE NOISE PREDICTION MODEL 6/24/2015

Observer Location: **R7** *Project Name:* Knox Business Park
Source: RC15 *Job Number:* 9349
Condition: Cumulative Developments *Analyst:* A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	7,433.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	7,433.0 feet	*Noise Source Height:*	8.0 feet
Barrier Distance to Observer:	0.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0 feet	20 = 6 dBA per doubling of distance 15 = 4.5 dBA per doubling of distance	

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	30.0	67.2	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	7,433.0	-47.9	-47.9	-47.9	-47.9	-47.9	-47.9
Shielding (Barrier Attenuation)	7,433.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		19.3	-47.9	-47.9	-47.9	-47.9	-47.9
60 Minute Hourly Adjustment		**19.3**	**-47.9**	**-47.9**	**-47.9**	**-47.9**	**-47.9**

STATIONARY SOURCE NOISE PREDICTION MODEL 6/24/2015

Observer Location: **R7** — *Project Name:* Knox Business Park
Source: P47 — *Job Number:* 9349
Condition: Cumulative Developments — *Analyst:* A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	3,509.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	3,509.0 feet	*Noise Source Height:*	8.0 feet
Barrier Distance to Observer:	0.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0 feet	20 = 6 dBA per doubling of distance 15 = 4.5 dBA per doubling of distance	

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	30.0	67.2	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	3,509.0	-41.4	-41.4	-41.4	-41.4	-41.4	-41.4
Shielding (Barrier Attenuation)	3,509.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		25.8	-41.4	-41.4	-41.4	-41.4	-41.4
60 Minute Hourly Adjustment		**25.8**	**-41.4**	**-41.4**	**-41.4**	**-41.4**	**-41.4**

STATIONARY SOURCE NOISE PREDICTION MODEL 6/24/2015

Observer Location: **R7** — *Project Name:* Knox Business Park
Source: RC1 — *Job Number:* 9349
Condition: Cumulative Developments — *Analyst:* A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	67.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	67.0 feet	*Noise Source Height:*	8.0 feet
Barrier Distance to Observer:	0.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0 feet	20 = 6 dBA per doubling of distance 15 = 4.5 dBA per doubling of distance	

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	30.0	67.2	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	67.0	-7.0	-7.0	-7.0	-7.0	-7.0	-7.0
Shielding (Barrier Attenuation)	67.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		60.2	-7.0	-7.0	-7.0	-7.0	-7.0
60 Minute Hourly Adjustment		**60.2**	**-7.0**	**-7.0**	**-7.0**	**-7.0**	**-7.0**

STATIONARY SOURCE NOISE PREDICTION MODEL 6/24/2015

Observer Location: **R7** — *Project Name:* Knox Business Park
Source: RC22 — *Job Number:* 9349
Condition: Cumulative Developments — *Analyst:* A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	3,300.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	3,300.0 feet	*Noise Source Height:*	8.0 feet
Barrier Distance to Observer:	0.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0 feet	20 = 6 dBA per doubling of distance 15 = 4.5 dBA per doubling of distance	

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	30.0	67.2	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	3,300.0	-40.8	-40.8	-40.8	-40.8	-40.8	-40.8
Shielding (Barrier Attenuation)	3,300.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		26.4	-40.8	-40.8	-40.8	-40.8	-40.8
60 Minute Hourly Adjustment		**26.4**	**-40.8**	**-40.8**	**-40.8**	**-40.8**	**-40.8**

STATIONARY SOURCE NOISE PREDICTION MODEL 6/24/2015

Observer Location: **R8** — *Project Name:* Knox Business Park
Source: RC6 — *Job Number:* 9349
Condition: Cumulative Developments — *Analyst:* A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	.1,140.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	.1,140.0 feet	*Noise Source Height:*	8.0 feet
Barrier Distance to Observer:	0.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0 feet	20 = 6 dBA per doubling of distance 15 = 4.5 dBA per doubling of distance	

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	30.0	67.2	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	11,140.0	-51.4	-51.4	-51.4	-51.4	-51.4	-51.4
Shielding (Barrier Attenuation)	11,140.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		15.8	-51.4	-51.4	-51.4	-51.4	-51.4
60 Minute Hourly Adjustment		**15.8**	**-51.4**	**-51.4**	**-51.4**	**-51.4**	**-51.4**

STATIONARY SOURCE NOISE PREDICTION MODEL 6/24/2015

Observer Location: **R8** *Project Name:* Knox Business Park
Source: RC2 *Job Number:* 9349
Condition: Cumulative Developments *Analyst:* A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	218.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	218.0 feet	*Noise Source Height:*	8.0 feet
Barrier Distance to Observer:	0.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0 feet	20 = 6 dBA per doubling of distance 15 = 4.5 dBA per doubling of distance	

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	30.0	67.2	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	218.0	-17.2	-17.2	-17.2	-17.2	-17.2	-17.2
Shielding (Barrier Attenuation)	218.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		50.0	-17.2	-17.2	-17.2	-17.2	-17.2
60 Minute Hourly Adjustment		**50.0**	**-17.2**	**-17.2**	**-17.2**	**-17.2**	**-17.2**

STATIONARY SOURCE NOISE PREDICTION MODEL 6/24/2015

Observer Location: **R8** *Project Name:* Knox Business Park
Source: P13 *Job Number:* 9349
Condition: Cumulative Developments *Analyst:* A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	2,773.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	2,773.0 feet	*Noise Source Height:*	8.0 feet
Barrier Distance to Observer:	0.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0 feet	20 = 6 dBA per doubling of distance 15 = 4.5 dBA per doubling of distance	

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	30.0	67.2	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	2,773.0	-39.3	-39.3	-39.3	-39.3	-39.3	-39.3
Shielding (Barrier Attenuation)	2,773.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		27.9	-39.3	-39.3	-39.3	-39.3	-39.3
60 Minute Hourly Adjustment		**27.9**	**-39.3**	**-39.3**	**-39.3**	**-39.3**	**-39.3**

STATIONARY SOURCE NOISE PREDICTION MODEL 6/24/2015

Observer Location: **R8** *Project Name:* Knox Business Park
Source: RC10 *Job Number:* 9349
Condition: Cumulative Developments *Analyst:* A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	9,453.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	9,453.0 feet	*Noise Source Height:*	8.0 feet
Barrier Distance to Observer:	0.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0 feet	20 = 6 dBA per doubling of distance 15 = 4.5 dBA per doubling of distance	

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	30.0	67.2	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	9,453.0	-50.0	-50.0	-50.0	-50.0	-50.0	-50.0
Shielding (Barrier Attenuation)	9,453.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		17.2	-50.0	-50.0	-50.0	-50.0	-50.0
60 Minute Hourly Adjustment		**17.2**	**-50.0**	**-50.0**	**-50.0**	**-50.0**	**-50.0**

STATIONARY SOURCE NOISE PREDICTION MODEL 6/24/2015

Observer Location: **R8** *Project Name:* Knox Business Park
Source: P20 *Job Number:* 9349
Condition: Cumulative Developments *Analyst:* A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	6,552.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	6,552.0 feet	*Noise Source Height:*	8.0 feet
Barrier Distance to Observer:	0.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0 feet	20 = 6 dBA per doubling of distance 15 = 4.5 dBA per doubling of distance	

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	30.0	67.2	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	6,552.0	-46.8	-46.8	-46.8	-46.8	-46.8	-46.8
Shielding (Barrier Attenuation)	6,552.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		20.4	-46.8	-46.8	-46.8	-46.8	-46.8
60 Minute Hourly Adjustment		**20.4**	**-46.8**	**-46.8**	**-46.8**	**-46.8**	**-46.8**

STATIONARY SOURCE NOISE PREDICTION MODEL 6/24/2015

Observer Location: **R8** *Project Name:* Knox Business Park
Source: RC12 *Job Number:* 9349
Condition: Cumulative Developments *Analyst:* A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	5,495.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	5,495.0 feet	*Noise Source Height:*	5.0 feet
Barrier Distance to Observer:	0.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0 feet	*Drop Off Coefficient:*	15.0
Barrier Elevation:	0.0 feet	20 = 6 dBA per doubling of distance 15 = 4.5 dBA per doubling of distance	

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	5.0	60.1	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	5,495.0	-45.6	-45.6	-45.6	-45.6	-45.6	-45.6
Shielding (Barrier Attenuation)	5,495.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		14.5	-45.6	-45.6	-45.6	-45.6	-45.6
60 Minute Hourly Adjustment		**14.5**	**-45.6**	**-45.6**	**-45.6**	**-45.6**	**-45.6**

STATIONARY SOURCE NOISE PREDICTION MODEL 6/24/2015

Observer Location: **R8** *Project Name:* Knox Business Park
Source: RC13 *Job Number:* 9349
Condition: Cumulative Developments *Analyst:* A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	9,950.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	9,950.0 feet	*Noise Source Height:*	8.0 feet
Barrier Distance to Observer:	0.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0 feet	20 = 6 dBA per doubling of distance 15 = 4.5 dBA per doubling of distance	

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	30.0	67.2	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	9,950.0	-50.4	-50.4	-50.4	-50.4	-50.4	-50.4
Shielding (Barrier Attenuation)	9,950.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		16.8	-50.4	-50.4	-50.4	-50.4	-50.4
60 Minute Hourly Adjustment		**16.8**	**-50.4**	**-50.4**	**-50.4**	**-50.4**	**-50.4**

STATIONARY SOURCE NOISE PREDICTION MODEL 6/24/2015

Observer Location: **R8** *Project Name:* Knox Business Park
Source: RC15 *Job Number:* 9349
Condition: Cumulative Developments *Analyst:* A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	9,327.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	9,327.0 feet	*Noise Source Height:*	8.0 feet
Barrier Distance to Observer:	0.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0 feet	20 = 6 dBA per doubling of distance 15 = 4.5 dBA per doubling of distance	

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	30.0	67.2	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	9,327.0	-49.9	-49.9	-49.9	-49.9	-49.9	-49.9
Shielding (Barrier Attenuation)	9,327.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		17.3	-49.9	-49.9	-49.9	-49.9	-49.9
60 Minute Hourly Adjustment		**17.3**	**-49.9**	**-49.9**	**-49.9**	**-49.9**	**-49.9**

STATIONARY SOURCE NOISE PREDICTION MODEL 6/24/2015

Observer Location: **R8** *Project Name:* Knox Business Park
Source: P47 *Job Number:* 9349
Condition: Cumulative Developments *Analyst:* A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	2,160.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	2,160.0 feet	*Noise Source Height:*	8.0 feet
Barrier Distance to Observer:	0.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0 feet	20 = 6 dBA per doubling of distance 15 = 4.5 dBA per doubling of distance	

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	30.0	67.2	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	2,160.0	-37.1	-37.1	-37.1	-37.1	-37.1	-37.1
Shielding (Barrier Attenuation)	2,160.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		30.1	-37.1	-37.1	-37.1	-37.1	-37.1
60 Minute Hourly Adjustment		**30.1**	**-37.1**	**-37.1**	**-37.1**	**-37.1**	**-37.1**

STATIONARY SOURCE NOISE PREDICTION MODEL

6/24/2015

Observer Location: **R8**
Source: RC22
Condition: Cumulative Developments

Project Name: Knox Business Park
Job Number: 9349
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	2,803.0	feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	2,803.0	feet	*Noise Source Height:*	8.0 feet
Barrier Distance to Observer:	0.0	feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0	feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0	feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0	feet		

20 = 6 dBA per doubling of distance
15 = 4.5 dBA per doubling of distance

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	30.0	67.2	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	2,803.0	-39.4	-39.4	-39.4	-39.4	-39.4	-39.4
Shielding (Barrier Attenuation)	2,803.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		27.8	-39.4	-39.4	-39.4	-39.4	-39.4
60 Minute Hourly Adjustment		**27.8**	**-39.4**	**-39.4**	**-39.4**	**-39.4**	**-39.4**

APPENDIX 10.1:

CONSTRUCTION REFERENCE NOISE LEVEL MEASUREMENTS MEMO

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URBAN CROSSROADS
41 Corporate Park | Suite 300 | Irvine, CA 92606 | (949) 660-1994
www.urbanXroads.com

SUBJECT: CONSTRUCTION REFERENCE NOISE LEVEL MEASUREMENTS MEMO

This Construction Reference Noise Level Measurements Memo has been prepared to summarize the sample reference noise level measurements collected by Urban Crossroads, Inc. To describe peak construction noise activities, we have historically relied on reference noise level measurements provided in the Federal Highway Administration (FHWA) Roadway Construction Noise Model (RCNM). However, our experience demonstrates that the RCNM significantly overstates the predicted construction noise levels. This is largely due the fact that RCNM is based on construction equipment data collected from the Central Artery/Tunnel project in Boston, Massachusetts in the early 1990's. Due to substantial changes in the air quality emission requirements in the State of California Air Resources Board (ARB), the RCNM reference noise level measurements do not adequately describe modern construction equipment noise levels. In addition, the RCNM methodology places all construction equipment at a single point near the property line. This scenario simply does not occur in the real world as typical construction activity represents a variety of equipment operating at different locations throughout the project site.

REFERENCE NOISE LEVEL MEASUREMENTS

To estimate a project's construction-related noise levels, sample reference noise level measurements of similar construction activities were collected by Urban Crossroads, Inc. to describe the different stages of construction. The reference noise levels are intended to represent typical construction noise levels when multiple pieces of equipment are operating simultaneously at a construction site. The following reference noise level measurements were collected from existing construction operations with similar equipment as those expected with future construction of comparable land uses. Appendix A includes the data collected from each of the reference noise level measurements adjusted to present noise levels at a uniform reference distance of 50 feet. Appendix B includes the reference noise source photos by identification number ("ID"). Table 1 summarizes the reference noise level measurements. The reference noise level measurements are identified by land use type and location below.

BUSINESS PARK CONSTRUCTION SITE, CITY OF IRVINE

On Wednesday, October 14th, 2015, Urban Crossroads, Inc. collected short-term construction noise level measurements at a business park construction site located at the northwest corner of Barranca Parkway and Alton Parkway in the City of Irvine. The reference noise level measurements include the following noise source activities: a truck pass-by and background dozer activity (ID 1) and dozer activity (ID 2). Both measurements were taken at a distance of approximately 30 feet from the source and represent typical construction activities during the grading stage of construction.

RESIDENTIAL CONSTRUCTION SITE, CITY OF RANCHO MISSION VIEJO

On Tuesday, October 20th, 2015, Urban Crossroads, Inc. collected short-term construction noise level measurements at a residential construction site located in the unincorporated area within the County of Orange known as Rancho Mission Viejo. The reference noise level measurements include the following noise source activities: construction vehicle maintenance (ID 3), foundation trenching (ID 4), rough grading activities (ID 5), and residential building framing (ID 6). All reference measurements were taken at this location at a distance of approximately 30 feet from the noise source.

INDUSTRIAL SITE, CITY OF ONTARIO

Additional short-term reference noise level measurements were collected on Friday, October 30th, 2015, by Urban Crossroads, Inc. at an active industrial construction site in the City of Ontario. The reference noise level measurements represent the grading activities associated with industrial/warehousing construction. Five reference noise level measurements were taken at this location to describe: a water truck pass-by and backup alarm (ID 7), a dozer pass-by (ID 8), two scrapers and a water truck pass-by (ID 9), two scrapers pass-by (ID 10), and scraper, water truck and dozer activities over a 30-minute period (ID 11). All reference measurements taken at this location were at a distance of approximately 30 feet from the source.

INDUSTRIAL SITE, CITY OF REDLANDS

On July 1st, 2015, Urban Crossroads, Inc. collected short-term construction noise level measurements of a nighttime concrete pour at an industrial construction site located at 27334 San Bernardino Avenue in the City of Redlands. The reference noise level measurements include the following nighttime building construction and paving-related noise source activities: concrete mixer truck movements (ID 12), concrete paver activities (ID 13), concrete mixer pour & paving activities (ID 14), concrete mixer backup alarms and air brakes (ID 15), and a one-hour measurement over the duration of all reference measurements at this location of concrete mixer pour activities (ID 16).

TABLE 1: CONSTRUCTION REFERENCE NOISE LEVEL MEASUREMENTS SUMMARY

ID	Noise Source	Reference Distance From Source (Feet)	Reference Noise Levels @ Reference Distance		Reference Noise Levels @ 50 Feet[6]	
			dBA Leq	dBA Lmax	dBA Leq	dBA Lmax
1	Truck Pass-Bys & Dozer Activity[1]	30'	63.6	68.1	59.2	63.7
2	Dozer Activity[1]	30'	68.6	76.4	64.2	72.0
3	Construction Vehicle Maintenance Activities[2]	30'	71.9	74.8	67.5	70.4
4	Foundation Trenching[2]	30'	72.6	74.9	68.2	70.5
5	Rough Grading Activities[2]	30'	77.9	84.8	73.5	80.4
6	Residential Framing[3]	30'	66.7	76.7	62.3	72.3
7	Water Truck Pass-By & Backup Alarm[4]	30'	76.3	82.3	71.9	77.9
8	Dozer Pass-By[4]	30'	84.0	89.9	79.6	85.5
9	Two Scrapers & Water Truck Pass-By[4]	30'	83.4	89.0	79.0	84.6
10	Two Scrapers Pass-By[4]	30'	83.7	86.9	79.3	82.5
11	Scraper, Water Truck, & Dozer Activity[4]	30'	79.7	87.7	75.3	83.3
12	Concrete Mixer Truck Movements[5]	50'	71.2	73.1	71.2	73.1
13	Concrete Paver Activities[5]	30'	70.0	75.7	65.6	71.3
14	Concrete Mixer Pour & Paving Activities[5]	30'	70.3	76.3	65.9	71.9
15	Concrete Mixer Backup Alarms & Air Brakes[5]	50'	71.6	78.8	71.6	78.8
16	Concrete Mixer Pour Activities[5]	50'	67.7	79.2	67.7	79.2

[1] As measured by Urban Crossroads, Inc. on 10/14/15 at a business park construction site located at the northwest corner of Barranca Parkway and Alton Parkway in the City of Irvine.
[2] As measured by Urban Crossroads, Inc. on 10/20/15 at a construction site located in Rancho Mission Viejo.
[3] As measured by Urban Crossroads, Inc. on 10/20/15 at a residential construction site located in Rancho Mission Viejo.
[4] As measured by Urban Crossroads, Inc. on 10/30/15 during grading operations within an industrial construction site located in the City of Ontario.
[5] Reference noise level measurements were collected from a nighttime concrete pour at an industrial construction site, located at 27334 San Bernardino Avenue in the City of Redlands, between 1:00 a.m. to 2:00 a.m. on 7/1/15.
[6] Reference noise levels are calculated at 50 feet using a drop off rate of 6 dBA per doubling of distance (point source).

MODELED AND MEASURED CONSTRUCTION NOISE LEVELS

A RCNM construction noise analysis was prepared by Urban Crossroads, Inc. on October 17th, 2014 for an industrial project site in the City of Ontario. The noise levels due to construction in the industrial portion of the project site (Planning Area 1) were estimated at up to thirteen receiver locations to determine the potential noise impacts at adjacent sensitive land uses. Returning to the same industrial project site over a year later, in October 2015, Urban Crossroads, Inc. collected noise level measurements at the same receiver locations to validate the modeled RCNM construction noise levels with actual construction noise level measurements collected in the field. The grading stage of construction was chosen for this comparison since grading activities typically represent the worst-case construction activities due to the number and size of the mobile equipment used in the grading process.

MODELED CONSTRUCTION NOISE LEVELS

As shown on Table 2, the modeled RCNM noise levels during the grading stage of construction were estimated to produce a noise level approaching 92.6 dBA Leq at a distance of 50 feet from the project site boundary. The RCNM noise levels reflect the combined construction noise level impacts of excavators, graders, tractors, loaders, backhoes, rubber tired dozers, and scrapers producing a noise level of 92.6 dBA Leq. At nearby receiver locations, this results in a short-term construction noise level approaching 88.2 dBA Leq.

TABLE 2: RCNM MODELED CONSTRUCTION NOISE LEVELS

Equipment Type[1]	Quantity	Usage Factor[2]	Hours Of Operation[3]	Reference Noise Level @ 50 Feet (dBA Leq)	Combined Level @ 50 Feet (dBA Leq)
Excavator	2	40%	3.2	81.0	80.0
Grader	8	40%	3.2	85.0	90.1
Tractor/Loader/Backhoe	5	40%	3.2	78.0	81.0
Rubber Tired Dozer	2	40%	3.2	79.0	78.0
Scraper	5	40%	3.2	84.0	87.0
Combined Hourly Noise Levels 50 Feet (Leq dBA)					92.6

Receiver Location	Distance To Property Line (Feet)[4]	Distance Attenuation (dBA Leq)[5]	Estimated Noise Barrier Attenuation (dBA Leq)	Construction Noise Level (dBA Leq)
R2	83'	-4.4	0.0	88.2
R3	78'	-3.9	-5.6	83.1

[1] Source: FHWA's Roadway Construction Noise Model, January 2006.
[2] Estimates the fraction of time each piece of equipment is operating at full power during a construction operation.
[3] Represents the actual hours of peak construction equipment activity out of a typical 8 hour workday.
[4] Distance from the nearest point of construction activity to the nearest receiver.
[5] Point (stationary) source drop off rate of 6.0 dBA per doubling of distance.

MEASURED CONSTRUCTION NOISE LEVELS

To describe the actual construction noise levels based on typical conditions, short-term construction noise level measurements were collected in the field during grading activities at receiver locations R2 and R3. Appendix C includes study area photos of the measurement locations and the construction activities observed from each location at the project site. To validate the construction noise levels, measurements were collected during continuous on-site grading activities on Friday, October 30th, and again on Friday, November 6th, 2015.

Grading activities observed on the site during the short-term noise level measurements include water trucks queuing and refilling at a stationary tank, trencher activity, up to three scrapers operating simultaneously, and dozer activity. The water truck queuing activity was the closest equipment observed near the project site boundaries due to the stationary location of the water refill tank, at a distance of approximately 100 feet from the receiver locations. The trencher was observed at a distance of roughly 600 feet from the receiver locations, and the scrapers and dozer activities were at approximately 900 feet from the receiver locations. Additional stationary scrapers were located at a distance of approximately 700 feet from the receiver locations. Additional background construction noise sources include forklifts, cranes, and man lifts used in the building construction stage of a portion of the site located roughly 900 feet southeast of the receiver locations. The construction activities observed during the short-term measurements represent typical grading activities within an industrial construction site, with multiple pieces of equipment operating at varying distances from the project site boundaries.

Table 3 shows the modeled RCNM noise levels using the actual distances from each receiver location to the nearest equipment activity observed during the short-term noise level measurements. Based on the RCNM model, the peak grading construction noise levels would range from 80.9 to 86.5 dBA Leq when equipment is located at 100 feet from each receiver location. By calculating the modeled RCNM noise level at each location, a comparison can be made between the modeled and measured grading construction noise levels to calibrate the construction noise model.

TABLE 3: MODELED CONSTRUCTION NOISE LEVELS BASED ON ACTUAL EQUIPMENT DISTANCES

Equipment Type[1]	Quantity	Usage Factor[2]	Hours Of Operation[3]	Reference Noise Level @ 50 Feet (dBA Leq)	Combined Level @ 50 Feet (dBA Leq)
Excavator	2	40%	3.2	81.0	80.0
Grader	8	40%	3.2	85.0	90.1
Tractor/Loader/Backhoe	5	40%	3.2	78.0	81.0
Rubber Tired Dozer	2	40%	3.2	79.0	78.0
Scraper	5	40%	3.2	84.0	87.0
Combined Hourly Noise Levels 50 Feet (Leq dBA)					92.6

Receiver Location	Distance To Closest Equipment Activity (Feet)[4]	Distance Attenuation (dBA Leq)[5]	Estimated Noise Barrier Attenuation (dBA Leq)	Construction Noise Level (dBA Leq)
R2	100'	-6.0	0.0	86.5
R3	100'	-6.0	-5.6	80.9

[1] Source: FHWA's Roadway Construction Noise Model, January 2006.
[2] Estimates the fraction of time each piece of equipment is operating at full power during a construction operation.
[3] Represents the actual hours of peak construction equipment activity out of a typical 8 hour workday.
[4] Distance from the nearest point of construction activity to the nearest receiver.
[5] Point (stationary) source drop off rate of 6.0 dBA per doubling of distance.

To determine the project-only construction noise levels at each receiver location during the grading activities observed at the project site, the ambient without project noise level measurements are compared to the short-term with project noise level measurements. The ambient noise level measurements from the original noise study are shown on Table 4 in addition to the new short-term noise level measurements collected during typical grading activity at the receiver locations on Day 1, Friday, October 30th 2015. By subtracting the previous ambient noise level from the new combined (project construction plus ambient) noise level measurements at each receiver, the project-only construction noise levels can be logarithmically calculated. Table 4 shows the project-only construction noise levels ranged from 61.4 to 63.4 dBA Leq, and are significantly lower than those modeled with the RCNM at the same receiver locations.

Based on the Day 1 analysis, the differences between the peak RCNM model and typical measured construction noise levels range from 19.6 to 23.2 dBA Leq. This analysis demonstrates how the RCNM overstates the potential construction noise level impacts by placing all equipment at a single point at the project site boundary. In reality, the grading equipment within the project site was observed to operate in different locations throughout the project site. . In addition, the typical construction noise levels

measured at the receiver locations reflect modern construction equipment noise level emissions that are largely overstated using the older RCNM reference noise levels.

TABLE 4: DAY 1 CONSTRUCTION NOISE LEVEL COMPARISON

Original Noise Study			Calibration			
Receiver Location[1]	Measured Daytime Ambient Noise Levels (dBA Leq)[2]	Peak Modeled RCNM Grading Construction Noise Levels (dBA Leq)[3]	Calculated RCNM Noise Levels to Closest Observed Equipment (dBA Leq)[4]	Measured Typical Grading Construction Noise Levels at Receivers (dBA Leq)[5]	Calculated Project-Only Construction Noise Levels (dBA Leq)[6]	Difference Between Modeled & Measured Noise Levels (dBA Leq)[7]
R2	70.3	88.2	86.5	71.1	63.4	23.2
R3	68.3	83.1	80.9	69.1	61.4	19.6

[1] Receiver locations from the construction noise analysis which are closest to the Planning Area 1 construction activities.
[2] Ambient noise level measurements taken on 3/13/14 at the receiver locations during the Ontario industrial project noise study.
[3] Estimated construction noise levels based on the RCNM peak construction noise analysis methodology. These conditions are not likely to occur as the RCNM assumes all equipment is operating simultaneously at a single point at the project site boundary.
[4] Modeled RCNM construction noise levels at each receiver location based on the observed distance to the nearest construction equipment activity during the noise level measurements, shown on Table 3.
[5] Measured noise levels at the receiver locations during one hour of typical grading activities in the center of the construction site.
[6] Project only construction noise levels calculated based on the logarithmic noise level difference between the measured noise levels during grading activity and the ambient without project noise levels measured at each receiver location.
[7] Difference between the peak RCNM modeled noise levels and the typical noise levels measured at the receiver locations during typical grading activities.

Similarly, the Day 2 short-term construction noise level measurements are shown on Table 5 in relation to the RCNM modeled noise levels. Table 5 shows the project-only construction noise levels ranged from 64.1 to 65.3 dBA Leq, and are significantly lower than those modeled with the RCNM at the same receiver locations. Based on the Day 2 analysis, the differences between the peak RCNM model and typical measured construction noise levels range from 16.8 to 21.2 dBA Leq. This Day 2 analysis is consistent with the Day 1 typical grading construction noise level measurements taken a week later at the same receiver locations.

TABLE 5: DAY 2 CONSTRUCTION NOISE LEVEL COMPARISON

Original Noise Study			Calibration			
Receiver Location[1]	Measured Daytime Ambient Noise Levels (dBA Leq)[2]	Peak Modeled RCNM Grading Construction Noise Levels (dBA Leq)[3]	Calculated RCNM Noise Levels to Closest Observed Equipment (dBA Leq)[4]	Measured Typical Grading Construction Noise Levels at Receivers (dBA Leq)[5]	Calculated Project-Only Construction Noise Levels (dBA Leq)[6]	Difference Between Modeled & Measured Noise Levels (dBA Leq)[7]
R2	70.3	88.2	86.5	71.5	65.3	21.2
R3	68.3	83.1	80.9	69.7	64.1	16.8

[1] Receiver locations from the construction noise analysis which are closest to the Planning Area 1 construction activities.
[2] Ambient noise level measurements taken on 3/13/14 at the receiver locations during the Ontario industrial project noise study.
[3] Estimated construction noise levels based on the RCNM peak construction noise analysis methodology. These conditions are not likely to occur as the RCNM assumes all equipment is operating simultaneously at a single point at the project site boundary.
[4] Modeled RCNM construction noise levels at each receiver location based on the observed distance to the nearest construction equipment activity during the noise level measurements, shown on Table 3.
[5] Measured noise levels at the receiver locations during one hour of typical grading activities in the center of the construction site.
[6] Project only construction noise levels calculated based on the logarithmic noise level difference between the measured noise levels during grading activity and the ambient without project noise levels measured at each receiver location.
[7] Difference between the peak RCNM modeled noise levels and the typical noise levels measured at the receiver locations during typical grading activities.

CONCLUSIONS

The sample reference noise level measurements were taken by Urban Crossroads, Inc. in order to better describe the noise levels from various typical construction activities at different land use types. To quantify the difference between the modeled RCNM and measured construction noise levels in the field, Urban Crossroads, Inc. compared the modeled results of a RCNM construction noise level analysis with the actual measured noise levels observed in the field during typical grading activities at the same project site. While the RCNM equipment database and methodology provides conservative, worst-case, construction noise levels for specific pieces of equipment, our field measurements show how the RCNM methodology overstates the noise levels experienced at the nearby receiver locations during actual construction activities.

This analysis demonstrates how the RCNM overstates the potential construction noise level impacts by placing all equipment at a single point at the project site boundary. In reality based on our observations in the field, the grading equipment within the project site was observed to operate at different locations throughout the project site. In addition, the typical construction noise levels measured at the receiver locations reflect modern construction equipment noise level emissions that are largely overstated using the older RCNM reference noise levels. The reference noise level measurements presented in this memo are, therefore, representative of typical construction noise levels to accurately describe potential construction noise impacts at nearby receiver locations for a given project. This memo presents typical construction activity reference noise levels. Detailed site specific analysis is needed to assess potential

construction noise level impacts at nearby sensitive receiver locations on a project by project basis and to identify the appropriate mitigation measures as needed at future construction sites.

Prepared by:

URBAN CROSSROADS, INC.

Bill Lawson, P.E., INCE
Principal

Alex Wolfe
Assistant Analyst

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APPENDIX A

REFERENCE NOISE LEVEL MEASUREMENTS SUMMARY TABLE

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Appendix A

Construction Equipment Reference Noise Levels

ID	Reference Source	Type of Project (Land Use)	Typical Construction Stage(s)	Reference Measurement Duration (h:mm:ss)	Reference Distance From Source (Feet)	Reference Noise Levels		Reference Noise Levels @ 50 Feet	
						dBA Leq	dBA Lmax	dBA Leq	dBA Lmax
1	Truck Pass-Bys & Dozer Activity	Business Park	Grading	0:01:15	30'	63.6	68.1	59.2	63.7
2	Dozer Activity	Business Park	Grading	0:01:00	30'	68.6	76.4	64.2	72.0
3	Construction Vehicle Maintenance Activities	Residential	Grading	0:01:00	30'	71.9	74.8	67.5	70.4
4	Foundation Trenching	Residential	Trenching, Building Const.	0:01:01	30'	72.6	74.9	68.2	70.5
5	Rough Grading Activities	Residential	Grading	0:05:00	30'	77.9	84.8	73.5	80.4
6	Residential Framing	Residential	Building Const.	0:02:00	30'	66.7	76.7	62.3	72.3
7	Water Truck Pass-By & Backup Alarm	Industrial	Grading	0:00:45	30'	76.3	82.3	71.9	77.9
8	Dozer Pass-By	Industrial	Grading	0:00:32	30'	84.0	89.9	79.6	85.5
9	Two Scrapers & Water Truck Pass-By	Industrial	Grading	0:00:32	30'	83.4	89.0	79.0	84.6
10	Two Scrapers Pass-By	Industrial	Grading	0:00:30	30'	83.7	86.9	79.3	82.5
11	Scraper, Water Truck, & Dozer Activity	Industrial	Grading	0:30:00	30'	79.7	87.7	75.3	83.3
12	Concrete Mixer Truck Movements	Industrial	Building Const., Paving	0:01:00	50'	71.2	*73.1*	71.2	73.1
13	Concrete Paver Activities	Industrial	Building Const., Paving	0:01:00	30'	70.0	*75.7*	65.6	71.3
14	Concrete Mixer Pour & Paving Activities	Industrial	Building Const., Paving	0:01:00	30'	70.3	*76.3*	65.9	71.9
15	Concrete Mixer Backup Alarms & Air Brakes	Industrial	Building Const., Paving	0:00:20	50'	71.6	*78.8*	71.6	78.8
16	Concrete Mixer Pour Activities	Industrial	Building Const., Paving	1:00:00	50'	67.7	79.2	67.7	79.2

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APPENDIX B

REFERENCE NOISE SOURCE PHOTOS

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Construction Reference Noise Source Photos

1.1_TruckPass-By&DozerActivity
33, 39' 0.101600", 117, 43' 56.773600"

2.1_DozerActivity
33, 39' 0.101600", 117, 43' 56.773600"

3.1_ConstructionVehicleMaintenance
33, 31' 16.600000", 117, 36' 58.060000"

4.1_FoundationTrenching
33, 32' 8.530000", 117, 35' 55.490000"

4.2_FoundationTrenching
33, 32' 8.540000", 117, 35' 55.710000"

5.1_RoughGradingActivities
33, 31' 16.710000", 117, 37' 0.530000"

Construction Reference Noise Source Photos

5.2_RoughGradingActivities
33, 31' 16.600000", 117, 37' 0.450000"

5.3_RoughGradingActivities
33, 31' 16.570000", 117, 37' 0.450000"

5.4_RoughGradingActivities
33, 31' 16.660000", 117, 37' 0.310000"

6.1_ResidentialFraming
33, 32' 15.610000", 117, 36' 2.740000"

7.1_WaterTruckPassBy&BackupAlarm
34, 4' 19.318500", 117, 36' 25.015800"

8.1_DozerPass-By
34, 4' 19.373400", 117, 36' 24.988400"

Construction Reference Noise Source Photos

9.1_TwoScrapers&WaterTruckPass-By
34, 4' 19.332200", 117, 36' 24.988400"

10.1_TwoScrapersPass-By
34, 4' 19.373400", 117, 36' 25.070800"

10.2_TwoScrapersPass-By
34, 4' 19.373400", 117, 36' 25.070800"

11.1_Scraper,WaterTruck,&DozerActivity
34, 4' 19.373400", 117, 36' 25.070800"

11.2_Scraper,WaterTruck,&DozerActivity
34, 4' 19.318500", 117, 36' 25.125700"

11.3_Scraper,WaterTruck,&DozerActivity
34, 4' 19.346000", 117, 36' 25.043300"

Construction Reference Noise Source Photos

11.4_Scraper,WaterTruck,&DozerActivity
34, 4' 19.291000", 117, 36' 25.070800"

12.1_ConcreteMixerTruckMovements
34, 4' 43.200000", 117, 12' 25.779400"

13.1_ConcretePaverActivities
34, 4' 43.625700", 117, 12' 25.312500"

14.1_ConcreteMixerPour&PavingActivities
34, 4' 42.746800", 117, 12' 24.955400"

15.1_ConcreteMixerBackupAlarms&AirBrakes
34, 4' 43.666900", 117, 12' 24.763100"

16.1_ConcreteMixerPourActivities
34, 4' 43.158800", 117, 12' 25.944200"

APPENDIX C

SHORT-TERM MEASUREMENTS & CONSTRUCTION ACTIVITY PHOTOS

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ConstructionSite_1
34, 4' 39.808000", 117, 36' 22.955900"

ConstructionSite_2
34, 4' 39.808000", 117, 36' 22.955900"

ConstructionSite_3
34, 4' 39.533300", 117, 36' 23.312900"

ConstructionSite_4
34, 4' 39.533300", 117, 36' 23.312900"

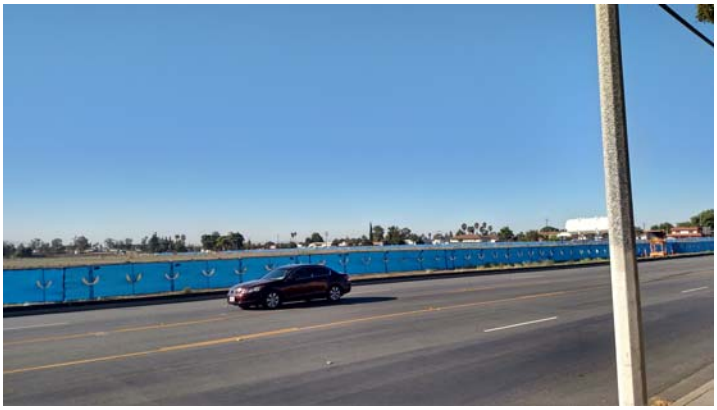
ConstructionSite_5
34, 4' 39.341100", 117, 36' 28.064500"

ConstructionSite_6
34, 4' 39.684400", 117, 36' 23.477700"

ConstructionSite_7
34, 4' 39.684400", 117, 36' 23.477700"

R2
34, 4' 39.341100", 117, 36' 28.064500"

R2_South
34, 4' 39.217500", 117, 36' 29.108200"

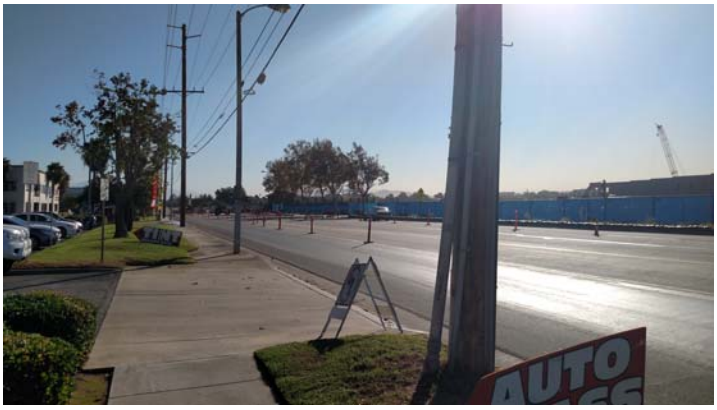


R2_Southwest
34, 4' 39.217500", 117, 36' 29.108200"

R2_Southwest2
34, 4' 39.505900", 117, 36' 28.970900"

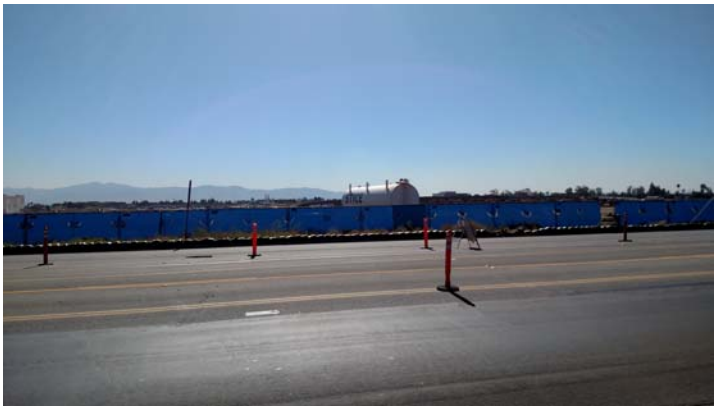
R2_West
34, 4' 39.217500", 117, 36' 29.108200"

R3
34, 4' 39.972800", 117, 36' 16.803500"

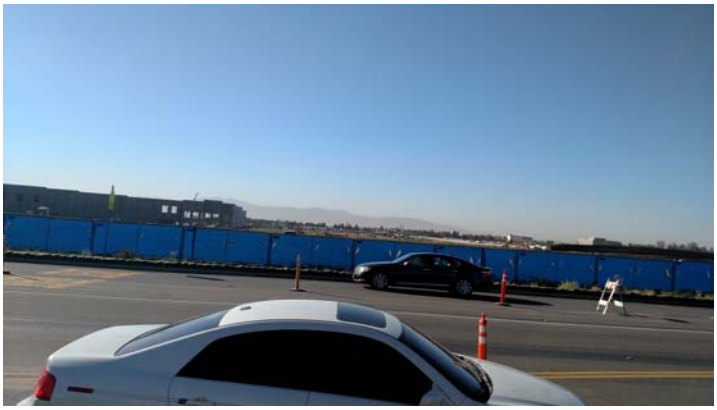


R3_E
34, 4' 39.972800", 117, 36' 16.803500"

R3_South
34, 4' 39.972800", 117, 36' 16.803500"



R3_South2
34, 4' 39.519600", 117, 36' 17.050700"



R3_South3
34, 4' 39.698100", 117, 36' 14.221800"

R3_Southeast
34, 4' 39.698100", 117, 36' 14.221800"

R3_Southwest
34, 4' 39.972800", 117, 36' 16.803500"

APPENDIX 10.2:

CONSTRUCTION TEMPORARY NOISE BARRIER ATTENUATION CALCULATIONS

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STATIONARY SOURCE NOISE PREDICTION MODEL

11/30/2015

Observer Location: **R6**
Source: Demolition through Landscaping
Condition: Construction

Project Name: Knox Business Park
Job Number: 9349
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	191.0	feet	***Barrier Height:***	**6.0 feet**
Noise Distance to Barrier:	10.0	feet	*Noise Source Height:*	8.0 feet
Barrier Distance to Observer:	181.0	feet	*Observer Height:*	5.0 feet
Observer Elevation:	1,599.0	feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	1,595.0	feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	1,599.0	feet		

20 = 6 dBA per doubling of distance
15 = 4.5 dBA per doubling of distance

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	50.0	79.6	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	191.0	-11.6	-11.6	-11.6	-11.6	-11.6	-11.6
Shielding (Barrier Attenuation)	10.0	-6.7	-6.7	-6.7	-6.7	-6.7	-6.7
Raw (Distance + Barrier)		61.3	-18.3	-18.3	-18.3	-18.3	-18.3
60 Minute Hourly Adjustment		**61.3**	**-18.3**	**-18.3**	**-18.3**	**-18.3**	**-18.3**

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