

**North Carolina  
Turnpike Authority**

## **Traffic Noise Report**

Western Wake Freeway from NC 55 near Alston  
Avenue to NC 55 near Old Smithfield Road  
Wake County, North Carolina  
STIP Project No. R-2635

June 2007

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Western Wake Freeway from  
NC 55 near Alston Avenue to NC  
55 near Old Smithfield Road  
Wake County, North Carolina  
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North Carolina  
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### 1.0 Project Location and Description

The North Carolina Turnpike Authority (NCTA) proposes to construct a 12.6-mile long, new location roadway (Western Wake Freeway) from NC 55 at SR 1172 (Old Smithfield Road) between Apex and Holly Springs to NC 55 near SR 1630 (Alston Avenue) north of Cary in Wake County, North Carolina (Figure NA-00). The Freeway is proposed as a six-lane, median-divided, fully controlled-access toll facility.

The Western Wake Freeway is an important part of the proposed Raleigh Outer Loop, an element of the Wake County Thoroughfare Plan. The Freeway is intended to relieve congestion on I-440 and other local roadways, such as NC 55 and NC 54. NC 55 is the free alternative route for the Western Wake Freeway.

The proposed toll alternative for Western Wake Freeway has five interchanges located at NC 55 Bypass, US 1, Old US 1, US 64, and Green Level Road. The mainline toll plaza is proposed to be located north of the US 64 interchange with three electronic toll collection (ETC) lanes and two cash lanes for each direction. Toll collection sites are also proposed at the following locations: the US 1 interchange, the Old US 1 interchange, the US 64 interchange, and the Green Level Road interchange. Each of the proposed toll collection plazas associated with these interchanges has one cash lane and one ETC lane.

The cash lanes provide an option for drivers to make their payment on-site. In addition to using dollars and coins, drivers may use credit cards and ATM bank cards for payment at the toll plazas. While drivers will slow to a stop when paying on-site, the technology associated with collecting tolls for drivers using the ETC lanes provides the convenience of maintaining highway speeds without slowing down during payment.

A cash lane option will be provided when Western Wake Freeway is first open to traffic for occasional users and drivers that choose not to open an account. Cash lanes are anticipated to be temporary and are planned to be removed after a few years. This Traffic Noise Report was completed under the assumption that all lanes would be ETC lanes in Design Year 2030.

### 2.0 Characteristics of Noise

Noise is defined as unwanted sound. It is emitted from many sources, including airplanes, factories, railroads, power-generating plants, and highway vehicles. Highway noise, or traffic noise, is a composite of noises from engine exhaust, drive train, and tire-roadway interaction.

The magnitude of noise is described by its sound pressure. A logarithmic scale is used to relate sound pressures to a standard reference level. Sound pressure levels are often defined in terms of frequency-weighted scales (A, B, C, or D). The weighted-A scale is used on environmental studies because it best approximates the frequency response of the human ear. Sound levels measured using A-weighting are expressed as dBA. Throughout this report, references are made to dBA, which means an A-weighted decibel level.

Since sound pressure is continuously varying, the equivalent noise level,  $L_{eq}$ , is used. The  $L_{eq}$  is the equivalent steady-state sound level, which in a defined period of time contains the same amount of acoustic energy as a time-varying sound level during the same period of time. In other words, the fluctuating sound levels of traffic noise are represented in terms of a steady noise level with the same energy content. The  $L_{eq}$  is an energy summation integration and, as such, it can adequately consider single-event noises and does not rely on statistical parameters. This report utilizes the  $L_{eq}$  noise descriptor.

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### 3.0 Procedure

As part of this evaluation, existing noise levels were measured at 24 locations in the vicinity of the proposed project. A noise level measurement was attempted at one additional location, but was aborted due to extensive building construction occurring at the site. The design-year peak-hour  $L_{eq}$  traffic noise levels expected for receptors in the vicinity of the project were predicted. The Federal Highway Administration (FHWA) Traffic Noise Model<sup>®</sup> Version 2.5 (TNM) was used to compare predicted noise levels for the design year (2030) and year 2006 ambient noise levels to determine if traffic noise impacts can be expected from the proposed project. Traffic noise impacts were determined from the North Carolina Department of Transportation's (NCDOT's) approved interpretation of current procedures for the abatement of traffic noise and construction noise, appearing as Part 772 of Title 23 of the Code of Federal Regulations (CFR). When traffic noise impacts were predicted, the analysis included an evaluation of alternate noise-abatement measures.

#### 4.0 Standard Noise Criteria

The FHWA has developed noise abatement criteria and procedures to be used in the planning and design of highways to determine if highway noise levels are compatible with various land uses. The abatement criteria and procedures are presented in 23 CFR 772. The NCDOT has established approved policies and procedures based on its interpretation of those developed by FHWA. A summary of NCDOT's Noise Abatement Criteria (NAC) for various land uses is presented in Tables 1 and 2. The receptors within the vicinity of the project limits were classified as B, C, or E.

**Table 1. Noise Abatement Criteria**

Criteria for Each NCDOT Activity Category Hourly A-Weighted Sound Level – Decibels (dBA)		
Activity Category	L <sub>eq</sub> (h)	Description of Activity Category
A	57 (Exterior)	Lands on which serenity and quiet are of extraordinary significance and serve an important public need and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose.
B	67 (Exterior)	Picnic areas, recreation areas, playgrounds, active sports areas, parks, residences, motels, hotels, schools, churches, libraries, and hospitals.
C	72 (Exterior)	Developed lands, properties, or activities not included in Category A or B above.
D	---	Undeveloped lands.
E	52 (Interior)	Residences, motels, hotels, public meeting rooms, schools, churches, libraries, hospitals, and auditoriums.

Source: North Carolina Department of Transportation Traffic Noise Abatement Policy – September 2004

Noise mitigation measures must be considered when future noise levels either approach or exceed the criteria levels in Table 1, or if there are substantial increases over the ambient noise levels. The NCDOT defines "approach" as within 1 dBA of the A-weighted sound level criteria shown in Table 1. The NCDOT considers a substantial noise increase to occur when predicted design year noise levels substantially exceed existing noise levels, as defined in Table 2. Title 23 of the CFR, Section 772.11(a) states, "In determining and abating traffic noise impacts, primary consideration is to be given to exterior areas. Abatement is usually necessary only where frequent human use occurs and a lowered noise level would be of benefit."

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Table 2. Criteria for Substantial Increase

Hourly A-Weighted Sound Level – Decibels (dBA)	
<u>Existing Leq(h)</u>	<u>Increase</u>
50 or less dBA	15 or more dBA
51 dBA	14 or more dBA
52 dBA	13 or more dBA
53 dBA	12 or more dBA
54 dBA	11 or more dBA
55 or more dBA	10 or more dBA

Source: North Carolina Department of Transportation Traffic Noise Abatement Policy – September 2004

### 5.0 Ambient Noise Levels

Ambient noise measurements were taken in the vicinity of the project to determine existing noise levels for the identified land uses. The purpose of this information was to quantify the existing acoustic environment and to provide a base for assessing the impact of future noise level increases. Field measurements were taken for 15 minutes at each location using a Delta OHM HD 9020 Precision Integrating Sound Level Meter. Information gathered at each meter location included site location, meter location, time of reading, weather conditions, calibration readings, and any unusual noises. Traffic volumes on the surrounding roadways were also counted for five categories to be used in the model calibration: passenger cars, medium trucks, heavy trucks, buses, and motorcycles.

Sites that represent noise-sensitive receptors within the project area were chosen for noise meter readings. Meter readings were used to calibrate TNM to site specific conditions. The meter location sites are shown in Figures NA-01 through NA-12 and listed in Tables 3 and 4. Table 3 lists each site's corresponding measured ambient  $L_{eq}$  noise level, ranging from 34 to 71 dBA, and the TNM calculated noise level for existing conditions based on field-measured traffic volumes. For the majority of sites, the calculated noise levels are within  $\pm 3$  dBA of the measured noise levels. It is common practice that if the field-measured and TNM-modeled existing noise levels are within  $\pm 3$  dBA, the TNM model is considered to be within the accepted level of accuracy. Differences in dBA levels can be attributed to numerous factors, including weather conditions and actual vehicle sound levels. Table 4 provides specific information on meter locations and site conditions.

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Table 3. Ambient Noise Levels (Leq)

Site No.	Location	Noise Level (dBA) Current Analysis Measured	Noise Level (dBA) Modeled TNM Values
1	Intersection of Old Smithfield Road and NC 55 Bypass	71	71
2	Roadside shoulder on Old Holly Springs-Apex Road within the preserved corridor	66	66
3	Driveway adjacent to Pleasant Plains Road east of US 1	51	49
4	Adjacent to soil path near Tingen Road	47	44
5	Front lawn of Pleasant Plains Baptist Church	67	64
6	SE Quadrant of intersection of Kelly Road and Apex Barbeque Road	59	62
7	Vacant lot in Scotts Ridge Subdivision adjacent to and east of the proposed facility	44	42
8	Beaver Trail at the northern entrance of Kelly Glen subdivision	59	61
9	Vacant lot in the SW quadrant of the intersection of Kelly Road and Olive Chapel Road	62	63
10	Shoulder on the west side of Ashley Downs Drive at Olive Chapel Road	65	64
11	SE quadrant at the intersection of Kelly Road and US 64	65	67
12	Vacant lot on Green Level Church Road	54	56
13	NE quadrant at the intersection of Jenks Road and Green Level Church Road	61	63
14	South of Page Road at the intersection of Page Road and Roberts Road	53	54
15	South of Roberts Road just west of proposed facility	54	53

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Site No.	Location	Noise Level (dBA) Current Analysis Measured	Noise Level (dBA) Modeled TNM Values
16	Turner Creek Road just west of the proposed facility	34	—*
17	Just west of Phillips Medical Way at the intersection with Green Level West Road	59	59
18	Vacant lot on Highcroft Drive adjacent to and east of the proposed facility	40	38
19	East side of Old Place Road at the intersection of Old Place Road and Green Hope School Road	60	62
20	East side of Twyla Road at the intersection of Twyla Road and Green Hope School Road	59	58
21	Omitted due to construction in and adjacent to the location	—	—
22	North side of Carpenter Fire Station Road just west of proposed facility	67	67
23	Vacant lot in the Cameron Pond subdivision east of the proposed facility on the north side of Carpenter Fire Station Road	50	46
24	NW edge of parking lot for Panther Creek High School just east of the proposed facility	58	—*
25	South of former Alston Avenue on the west side of NC 55 across from Petty Farm Road	67	70

\*No traffic noise

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**Table 4. Difference in Noise Level, dBA  $L_{eq}(1h)$**

Site No.	Location	Description	Date	Distance to Roadway (ft)	Traffic Speed (mph)	Difference in Noise Level, dBA $L_{eq}(1h)$ (Modeled Minus Measured)
1	Intersection of Old Smithfield Road and NC 55 Bypass	Dirt/Grass	1/17/07	70	55	0
2	Roadside shoulder on Old Holly Springs-Apex Road within the preserved corridor	Dirt/Grass	1/17/07	20	45	0
3	Driveway adjacent to Pleasant Plains Road east of US 1	Gravel	1/17/07	30	65	-2
4	Adjacent to soil path near Tingen Road	Dirt/Grass	1/17/07	75	65	-3
5	Front lawn of Pleasant Plains Baptist Church	Dirt/Grass	1/17/07	50	55	-3
6	SE Quadrant of intersection of Kelly Road and Apex Barbeque Road	Dirt/Grass	2/07/07	50	45	3
7	Vacant lot in Scotts Ridge Subdivision adjacent to and east of the proposed facility	Dirt/Grass	2/08/07	35	25	-2
8	Beaver Trail at the northern entrance of Kelly Glen subdivision	Grass/Asphalt	2/07/07	50	45	2
9	Vacant lot in the SW quadrant of the intersection of Kelly Road and Olive Chapel Road	Dirt/Grass	2/07/07	50	45	1
10	Shoulder on the west side of Ashley Downs Drive at Olive Chapel Road	Grass/Asphalt	2/07/07	44	45	-1
11	SE quadrant at the intersection of Kelly Road and US 64	Dirt/Grass	2/08/07	60	55	2
12	Vacant lot on Green Level Church Road	Dirt/Grass	1/16/07	50	45	2
13	NE quadrant at the intersection of Jenks Road and Green Level Church Road	Dirt/Grass	1/16/07	30	45	2

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Site No.	Location	Description	Date	Distance to Roadway (ft)	Traffic Speed (mph)	Difference in Noise Level, dBA $L_{eq}(1h)$ (Modeled Minus Measured)
14	South of Page Road at the intersection of Page Road and Roberts Road	Dirt/Grass	1/6/07	50	45	1
15	South of Roberts Road just west of proposed facility	Dirt/Grass	1/16/07	30	45	-1
16	Turner Creek Road just west of the proposed facility	Dirt/Grass	1/31/07	50	0	*
17	Just west of Phillips Medical Way at the intersection with Green Level West Road	Dirt/Grass	1/29/07	50	45	0
18	Vacant lot on Highcroft Drive adjacent to and east of the proposed facility	Dirt/Grass	1/31/07	90	25	-2
19	East side of Old Place Road at the intersection of Old Place Road and Green Hope School Road	Dirt/Gravel	1/17/07	50	45	2
20	East side of Twyla Road at the intersection of Twyla Road and Green Hope School Road	Dirt/Grass	1/17/07	50	45	-1
21	Omitted due to construction in and adjacent to the location	—	—	—	—	—
22	North side of Carpenter Fire Station Road just west of proposed facility	Asphalt/Grass	1/24/07	35	45	0
23	Vacant lot in the Cameron Pond subdivision east of the proposed facility on the north side of Carpenter Fire Station Road	Dirt/Grass	1/24/07	50	25	-4
24	NW edge of parking lot for Panther Creek High School just east of the proposed facility	Asphalt	2/07/07	800	0	*
25	West side of NC 55 across from Petty Farm Road	Dirt/Grass	1/31/07	50	55	3.0

\*No traffic noise

### 6.0 Procedure for Predicting Future Noise Levels

TNM uses the number and type of vehicles on the planned roadway, their speeds, the physical characteristics of the road (curves, hills, depressions, elevations, etc.), receptor location and height, and, if applicable, barrier type, barrier ground elevation, and barrier top elevation. Year 2006 ambient noise levels were calculated using weekday p.m. peak traffic volumes within the study area. The peak-hour design year traffic volumes and vehicle classifications were developed from average daily traffic (ADT) projections, which were provided by the NCTA (see Appendix A). The p.m. peak-hour volumes resulted in the highest noise conditions for the study area and were used with the assumed operating speeds. The corridor was modeled in three dimensions using plan, profile and typical sections provided by the NCDOT. The  $L_{eq}$  traffic noise impacts associated with this project are listed in Table 5. Information included in this table consists of the number of impacted receptors in the project study area and the number of expected future noise impacts corresponding to future build conditions without cash toll collection lanes. Future build conditions without cash lanes were used because in the design year all tolls are expected to be collected through the ETC system. Any cash lanes used will have been demolished in the design year. Calculated existing and future build noise levels and estimated noise level increases are provided in Appendix B.

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### **7.0 Traffic Noise Impacts**

According to the NCDOT Traffic Noise Abatement Policy, traffic noise impacts are created when the design year traffic noise levels either (1) approach or exceed the NCDOT noise abatement criteria (NAC) for each appropriate activity category shown in Table 1, or (2) substantially exceed the existing noise levels by the established criteria shown in Table 2.

For this report, 523 receptors within the study area were analyzed. All are classified as FHWA Activity Category B, C, or E (see Table 1).

### 8.0 Traffic Noise Abatement Measures

If traffic noise impacts are predicted, examination and evaluation of alternate noise abatement measures for reducing or eliminating the noise impacts must be considered. Consideration for noise abatement measures has been given to all impacted receptors in the project study area.

#### 8.1 Highway Alignment

Highway alignment selection involves the horizontal and vertical orientation of the proposed improvements in such a way as to minimize impacts and costs. The selection of alternate alignments for noise abatement purposes must consider the balance between noise impacts and other engineering and environmental parameters. For noise abatement, horizontal alignment selection is primarily a matter of sighting the roadway at a sufficient distance from noise-sensitive areas. Changing the highway alignment is not a viable alternative for noise abatement along the project because this corridor has already been established. This project corridor was chosen based on what was found to be the "least environmentally damaging practicable alternative" as described in the FEIS.

#### 8.2 Traffic System Management Measures

Traffic management measures that limit vehicle type, speed, volume, and time of operations are often effective noise-abatement measures. For this project, traffic management measures are not considered appropriate for noise abatement because of their effect on the capacity and level of service of the proposed roadway.

Experience with other projects has shown that a reduction in the speed limit of 10 miles per hour (mph) would result in a noise-level reduction of approximately 1 to 2 dBA. Because most people cannot detect a noise reduction of up to 3 dBA and because reducing the speed limit would reduce roadway capacity, this is not considered a viable noise-abatement measure. This and other traffic system measures are already being considered to be consistent with the project's objective of providing increased traffic capacity throughout the study area.

#### 8.3 Noise Barriers

Noise barriers reduce noise levels by blocking the sound path between a noise-sensitive area and a roadway. This measure is most often used on high-speed,

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limited-access facilities where noise levels are high and there is adequate space for continuous barriers. Physical measures to abate anticipated traffic noise levels can often be applied with a measurable degree of success by the application of these measures to effectively diffract, absorb, and reflect highway traffic noise emissions. Such measures may be constructed from an individual material or a combination of materials, such as concrete, wood, metal, earth, or vegetation. However, these mitigating measures may not be feasible or reasonable in all cases, particularly for receptors that front a primary or secondary roadway in the project area. Reduction of traffic noise from the proposed roadway may not substantially reduce the noise levels at these receptors as a result of the noise-level contributions from the primary or secondary roadways. For isolated receptors or where the application of physical abatement may not achieve a reduction of at least 5 dBA, a noise barrier would not be feasible.

For a noise barrier to provide sufficient noise reduction, it must be high enough and long enough to shield the receptor from significant sections of the highway. Furthermore, to provide a sufficient reduction, a barrier's length would normally be eight times the distance from the barrier to the receptor. For example, a receptor located 50 feet from the barrier would normally require a barrier 400 feet long. An access opening of 40 feet, or 10 percent of the area, would limit its noise reduction to 4 dBA (Fundamentals and Abatement of Highway Traffic Noise, Report No. FHWA-HHI-HEV-73-7976-1, USDOT, chapter 5, section 3.2, page 5-27). Safety at access openings (driveways, crossing streets, etc.) is also a concern because of restricted sight distance. These factors would not allow noise walls to be acceptable abatement measures along right-of-way that is not controlled.

### 8.4 Other Mitigation Measures Considered

The acquisition of property in order to provide buffer zones to minimize noise impacts is not considered to be a feasible noise mitigation measure for this project. The cost to acquire impacted receptors for buffer zones would exceed the abatement threshold of \$35,000 per benefited receptor. The use of buffer zones to minimize impacts to future sensitive areas is not recommended because this can be accomplished through land-use control.

The use of vegetation for noise mitigation is not considered reasonable for this project because of the substantial amount of right-of-way necessary to make vegetative barriers effective. FHWA research has shown that a vegetative barrier should be approximately 100 feet wide to provide a 3 dBA reduction in noise levels. To provide a

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5 dBA reduction, substantial amounts of additional right-of-way would be required. The cost of the additional right-of-way needed to plant sufficient vegetation is estimated to exceed the abatement threshold of \$35,000 per benefited receptor.

Interior noise levels were reviewed for the two churches. The two church receptors are not expected to have future interior noise levels that exceed the NAC.

In order for any of the mitigation/abatement measures described above to be implemented, they must first be found to be reasonable and feasible. According to the NCDOT Traffic Noise Abatement Policy, the following issues should be considered in order to determine feasibility:

1. The topography of the location should be considered when determining if a noise wall can be built.
2. A readily noticeable noise reduction "insertion loss" should be achieved by the placement of the noise abatement measure, a minimum of 5 dBA for front row receptors.
3. Site-specific access, drainage, safety and maintenance requirements should be considered when determining noise reduction levels.
4. Other noise sources in the areas should be considered.
5. Noise abatement on non-controlled or partial access control highways usually is not feasible. However, in areas where property owners have agreed to voluntarily relinquish access rights to the highway, noise abatement may be considered.

According to the NCDOT Traffic Noise Abatement Policy, reasonableness should show that good judgment and common sense were used in making a decision. A finding of reasonableness will include the following:

1. Noise barrier cost - The abatement measure will be constructed at a reasonable allowable cost per benefited receptor (cost effective). This cost per benefited receptor will be less than or equal to the value (V) determined by dividing the number (N) of benefited receptors into the total cost (C) of the barrier system. A benefited receptor is one that experiences a 5 dBA or more reduction in noise levels by the construction of the noise wall. The cost of the barrier system will

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be based on \$15.00 per square foot for the noise mitigation measure plus any other major items necessary for the construction of the measure. These other items could include cost for structure improvements, additional earthwork, additional right-of-way, etc. The reasonable cost effective amount for an impacted area will be \$35,000 per benefited receptor plus an incremental increase of \$500 per dBA average increase (I) in the predicted exterior noise levels of the impacted receptors of the area.

$V = C/N$  which must be equal to or less than  $\$35,000 + \$500(I)$ .

I = Increase in predicted exterior noise levels

### Examples:

Cost of noise mitigation measure = \$350,000

Number of benefited receptors = 12

$V = \$350,000/12 = \$29,166$

Projected noise level (72 dBA) – Existing noise level (69 dBA) = I = 3 dBA

Cost effective amount =  $\$35,000 + \$500(3) = \$36,500$ , therefore, a noise mitigation measure would be considered.

Cost of noise mitigation measure = \$400,000

Number of benefited receptors = 8

$V = \$400,000/8 = \$50,000$

Projected noise level (70 dBA) - Existing noise level (65 dBA) = I = 5 dBA

Cost effective amount =  $\$35,000 + \$500(5) = \$37,500$ ; therefore, a noise mitigation measure would not be considered.

2. Noise Wall height and scale – A major consideration of the reasonableness of a noise wall is the visual impact on the adjoining lands. Specifically, a high noise wall alongside low, single-family residences could have a severe adverse visual

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effect. Considering these factors, the height of the noise wall above the ground should not exceed 25 feet. Furthermore, the horizontal distance of the noise wall from residences should be greater than four times the height of the noise wall from the residences.

3. Difference between existing and future noise levels - When real-life noises are heard, most people find it difficult to detect noise level changes of 2-3 dBA. If the differences between the existing and future noise levels are 3 dBA or less, noise mitigation measures are generally considered unreasonable.
4. Opinions of impacted residents - Support for the proposed noise barrier by front row receptors must be documented due to the visual effect of the proposed measures. The NCTA will solicit the opinions of these receptors and a majority of these receptors must support the construction of the noise abatement measure.
5. Isolated receptors - The cost of abatement measures for isolated receptors versus the noise reduction benefits provided are usually excessive. Therefore, unless special conditions exist, it generally is not considered reasonable to provide noise abatement for isolated receptors.
6. Commercial areas - Businesses usually prefer visibility and accessibility from the highway rather than noise abatement. Therefore, noise abatement for impacted businesses will not be considered unless requested by the business affected.
7. Residential multi-unit complexes –residential multi-unit complexes are evaluated under activity category 'E' (interior condition) of the Noise Abatement Criteria (NAC) Table. If activity category 'B' (exterior condition) of the NAC Table is also determined in areas of the complex, both categories 'B' and 'E' conditions are evaluated of the multiunit complex. Noise mitigation benefits for qualifying NAC activity category 'B' will consider all units of the multi-unit building structure. However, noise mitigation benefits for NAC activity category 'E' will consider only first floor units due to noise wall height constraints. Owner occupied units (apartment, townhouse, etc.) will be treated as a separate voting member.
8. Special use areas – Special use areas include, but are not limited to, school, pre-school and daycare facility playgrounds; special exterior areas of churches, hospitals, retirement homes; parks and camps that would be evaluated for NAC activity category 'B' (exterior condition). Note: A minimum of 25 students is

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required to qualify for exterior activity "B" for playgrounds for pre-school and daycare facilities. To determine cost effectiveness of the noise wall an equivalent number of residents would be determined by using the formula:

Equivalent # of Residences = # Occupants/(# people / residence) \* usage

With: # of occupants = # of students in a school

With: # of people per residence = 3. (Used in Computer Modeling)

Usage = # of hours used per day/ 24 hours per day

### School Example:

Equivalent # of Residents = 500 students/3 \* (4 hrs per day/ 24 hrs per day) = 28

## **9.0 Study Segments**

For the purposes of this study, the project study area was divided into 12 study segments. Figures NA-01 through NA-12 depict the locations of each study segment. Currently, 523 receivers within the study area have been evaluated in this analysis. All are classified as FHWA Activity Category B or C with churches being further classified as Category E if exterior noise impacts were not expected (see Table 1). Impacts associated with each sub-area are listed in Table 5 and are described below.

### **9.1 Study Segment 01 – NC 55 Bypass**

Segment 01 begins near NC 55 and ends just north of the proposed interchange with the NC 55 Bypass. Five receivers would be exposed to noise that exceeds NCDOT's NAC thresholds.

### **9.2 Study Segment 02 – Old Holly Springs-Apex Road**

Segment 02 begins just north of the proposed interchange with the NC 55 Bypass and ends just south of the proposed interchange with US Highway 1 (US 1). Old Holly Springs-Apex Road is included in this segment. One receiver would be exposed to a substantial increase in exterior sound levels.

### **9.3 Study Segment 03 – US 1**

Segment 03 begins just south of the proposed interchange with US 1 and ends just north of the proposed interchange with US 1. One receiver is expected to be exposed to noise that exceeds the NAC. Three receivers would be exposed to a substantial increase in exterior sound levels.

### **9.4 Study Segment 04 – Old US 1**

Segment 04 begins just north of the proposed interchange with US 1 and ends just north of the proposed interchange with Old US 1. Two receivers are expected to be exposed to noise that exceeds the NAC. Two receivers would be exposed to a substantial increase in exterior sound levels.

### **9.5 Study Segment 05 – Kelly Glen**

Segment 05 begins just north of the proposed interchange with Old US 1 and ends just north of the Kelly Glen subdivision near the crossing of Beaver Creek. One hundred ninety-one receivers would be exposed to noise that exceeds the NAC. Forty-nine receivers would be exposed to a substantial increase in exterior sound levels.

### 9.6 Study Segment 06 – Olive Chapel Road

Segment 06 begins at the Beaver Creek crossing north of the Kelly Glen subdivision and ends just north of Olive Chapel Road. This segment includes Olive Chapel Elementary School and the Ashley Downs subdivision. Olive Chapel Elementary School features one main building, 14 modular classroom units and an outdoor playground. The outdoor playground is considered a special use area under the NCDOT Traffic Noise Abatement Policy. The outdoor playground would be exposed to traffic noise levels that exceed the NAC. In addition, 36 receivers would be exposed to noise levels that exceed the NAC and 20 receivers would be exposed to a substantial increase in noise levels, within this study area.

### 9.7 Study Segment 07 – US 64\Kelly Road

Segment 07 begins just south of the proposed interchange with US Highway 64 (US 64) and ends between the proposed crossings of Green Level Church Road and Roberts Road. This segment includes sections of Jenks Road, Green Level Church Road, and Kelly Road. Fourteen receivers would be exposed to noise that exceeds the NAC. Four receivers would be exposed to a substantial increase in exterior sound levels.

### 9.8 Study Segment 08 – Roberts Road\Turner Creek Road

Segment 08 begins south of Roberts Road and ends at the proposed crossing of White Oak Creek. Portions of Turner Creek Road and Roberts Road are included in this segment. Seven receivers would be exposed to noise that exceeds the NAC. Two receivers would be exposed to a substantial increase in exterior sound levels.

### 9.9 Study Segment 09 – White Oak Creek

Segment 09 begins at the proposed crossing of White Oak Creek and ends approximately 0.64 mile south of Green Hope School Road. Two receivers would be exposed to noise that exceeds the NAC. Three receivers would be exposed to a substantial increase in exterior sound levels.

### 9.10 Study Segment 10 – Green Hope School Road\Twyla Road

Segment 10 begins approximately 0.64 mile south of Green Hope School Road and ends approximately 0.84 mile north of Green Hope School Road. Twyla Road is included in its entirety in this segment. Thirteen receivers would be exposed to noise that exceeds the NAC. Twenty receivers would be exposed to a substantial increase in exterior sound levels.

**9.11 Study Segment 11 – Carpenter Fire Station Road\Panther Creek High School**

Segment 11 begins approximately 0.53 mile south of Carpenter Fire Station Road and ends just north of the recently completed Panther Creek High School. A portion of the newly constructed McCrimmon Parkway is included in this segment. Panther Creek High School is considered a receptor for the purposes of traffic noise impact analysis, and would be exposed to a substantial increase in noise levels. However, according to Wake County records, the building permit for Panther Creek High School was issued on May 24, 2005. This date is after the recorded date of public knowledge established by the FHWA's approval of the Record of Decision (April 30, 2004). Therefore, mitigation for traffic noise impacts is not required and the area adjacent to Panther Creek High School was not evaluated for a noise barrier. Thirty-seven receivers would be exposed to noise that exceeds the NAC. Thirty-three receivers, in addition to Panther Creek High School, would be exposed to a substantial increase in exterior sound levels.

**9.12 Study Segment 12 – Northern Intersection with NC 55**

Segment 12 begins approximately 0.44 mile south of the proposed interchange with NC 55 and ends at the proposed interchange with NC 55. This segment crosses the former location of Alston Avenue. Three receivers would be exposed to noise that exceeds the NAC. One receiver would be exposed to a substantial increase in exterior sound levels.

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Table 5. Noise Impact Summary

Roadway Study Area and Land Use	Number of Impacted Receptors	
	Year 2006 Existing	Future Year 2030 Build
<b>Study Segment 01 – NC 55 Bypass</b>		
Category B	0	4
Category C	0	0
Category E	0	0
<b>Study Segment 02 – Old Holly Springs-Apex Road</b>		
Category B	0	1
Category C	0	0
<b>Study Segment 03 – US 1</b>		
Category B	0	4
Category C	0	0
<b>Study Segment 04 – Old US 1</b>		
Category B	0	4
Category C	0	0
<b>Study Segment 05 – Kelly Glen</b>		
Category B	0	240
Category C	0	0
<b>Study Segment 06 – Olive Chapel Road</b>		
Category B	0	58
Category C	0	0
<b>Study Segment 07 – US 64\Kelly Road</b>		
Category B	3	18
Category C	0	0
<b>Study Segment 08 – Roberts Road\Turner Creek Road</b>		
Category B	0	9
Category C	0	0
<b>Study Segment 09 – White Oak Creek</b>		
Category B	0	5
Category C	0	0
<b>Study Segment 10 – Green Hope School Road\Twyla Road</b>		
Category B	0	33
Category C	0	0
<b>Study Segment 11 – Carpenter Fire Station Road\Panther Creek High School</b>		
Category B	0	71
Category C	0	0
<b>Study Segment 12 – Northern Intersection with NC 55</b>		
Category B	0	4
Category C	0	0
<b>Total Study Area – WWP</b>		
Category B	3	451
Category C	0	0

Note: Category E receivers are only represented in this table for study segment 01. No receivers were found to be considered as Category E in any of the other segments.

### 10.0 Noise Barrier Analysis Locations

TNM 2.5 was used to model noise barriers at noise-sensitive locations. The cost of each barrier was estimated (assuming an approximate cost of \$15/ft<sup>2</sup>) and compared with the allowable cost per benefited receptor while meeting the minimum noise reduction goals. NCDOT defines benefited receptors as all receptors that, by the placement of the noise-mitigation measure, receive a minimum noise-level reduction of 5 dBA. Table 6 presents the results of the abatement analysis for the potential barrier sites.

Based on the locations of receivers for which future traffic noise impacts are expected, 11 areas were evaluated to determine whether a noise barrier would be reasonable and feasible. These areas are shown on Figures NA-01, NA-03, NA-04, and NA-05, NA-06, NA-07, and NA-10.

From inspection, it appears that the Highcroft and Cameron Pond subdivisions, due to their density and proximity to the proposed Western Wake Freeway corridor, may be favorable areas for noise barrier consideration (see Figures NA-10 and NA-11). However, because the dates of building permit issuance for those properties occurred after the Record of Decision for the project, those properties were not eligible for noise wall consideration.

Of the 11 noise wall analysis areas, 4 proved to be feasible and reasonable based on the NCDOT Traffic Noise Abatement Policy. This is an addition of one recommended noise barrier over the recommendations made in the August 2002 Design Noise Report for this project. Barrier numbers 5, 6, and 8 were recommended in the previous report and are still recommended. NCTA has committed to constructing these barriers. The additional barrier, barrier number 7, is located adjacent to Olive Chapel Elementary School on the west side of the proposed facility. The primary reasons for noise wall ineffectiveness in other locations are the distance of receivers from the proposed alignment and the low density of receivers in wall analysis areas. TNM results for each barrier analysis can be found in Appendix C.

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**Table 6. Feasibility and Reasonableness of Potential Noise Wall Locations**

Wall Location / Barrier #	Barrier #1	Barrier #2	Barrier #3	Barrier #4	Barrier #5*	Barrier #6*	Barrier #7**	Barrier #8*
Is wall Feasible?	NO	NO	YES	NO	YES	YES	YES	YES
Number of Receptors Impacted Without Wall	1	2	3	1	62	139	26	42
Average Decibel Increase	6	4.0	18	9	21	22	20	21
Number of Benefited Receptors	0	0	3	0	38	116	26	9
Allowable Cost Per Benefited Receptor	\$38,000	\$36,850	\$43,750	\$39,500	\$45,500	\$46,000	\$45,000	\$45,500
Wall Length (ft)	866	1558	1670	738	2945	2880	1050	1580
Average Wall Height (ft)	24	24	23	24	22.2	18.2	17.5	17
Wall Cost (\$15 per ft <sup>2</sup> )	\$311,760	\$560,880	\$576,150	\$265,680	\$980,685	\$786,240	\$275,625	\$402,900
Cost Per Benefited Receptor	---	---	\$192,050	---	\$25,808	\$6,778	\$10,600	\$44,767
Is Wall Reasonable?	---	---	NO	---	YES	YES	YES	YES
Recommend Wall?	NO	NO	NO	NO	YES	YES	YES	YES

\*Recommended in August 2002 report

\*\*Not recommended in August 2002 report

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Table 6 (Continued). Feasibility and Reasonableness of Potential Noise Wall Locations

Wall Location / Barrier #	Barrier #9	Barrier #10	Barrier #11
Is wall Feasible?	YES	YES	YES
Number of Receptors Impacted Without Wall	5	4	8
Average Decibel (dB) Increase	16	12	27
Number of Benefited Receptors	1	1	2
Allowable Cost Per Benefited Receptor	\$ 43,000	\$ 41,000	\$ 48,500
Wall Length (ft)	1725	705	1080
Average Wall Height (ft)	20	21.5	21
Wall Cost (\$15 per ft <sup>2</sup> )	\$516,900	\$227,363	\$340,200
Cost Per Benefited Receptor	\$516,900	\$227,363	\$170,100
Is Wall Reasonable?	NO	NO	NO
Recommend Wall?	NO	NO	NO

### 10.1 Noise Barrier Analysis Location 01

The first noise barrier location analyzed (Barrier 1) is located north of the NC 55/Old Smithfield Road intersection, along the north side of the NC 55 Bypass/Western Wake Freeway Interchange along Ramp C between NC 55 Bypass and NC 55. This barrier location is shown in Figure NA-01. At a maximum height of 25 feet and a length of approximately 870 feet, no receivers were able to receive the minimum 5 dBA noise level reduction; therefore, the wall is not feasible. The noise wall is not recommended for construction.

### 10.2 Noise Barrier Analysis Location 02

The second wall analyzed (Barrier 2) is located north of the NC 55/Old Smithfield Road intersection, along the south side of the NC 55 Bypass/Western Wake Freeway Interchange, along Ramp B. This barrier location is shown in Figure NA-01. At a

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maximum height of 25 feet and a length of approximately 1,560 feet, no receivers were able to receive the minimum 5 dBA noise level reduction. Therefore, the noise wall is not feasible and is not recommended for construction.

### 10.3 Noise Barrier Analysis Location 03

The third wall analyzed (Barrier 3) is located in close proximity to the Western Wake Freeway/US-1 Interchange along Ramp A. This barrier location is shown in Figure NA-03. At an average height of 23 feet and a length of approximately 1,670 feet, three receivers were able to receive the minimum 5 dBA noise level reduction. The \$576,150 noise barrier wall was only able to provide benefit to receivers at a wall cost of \$192,050 per benefited receiver. Based on the NCDOT Traffic Noise Abatement Policy, this noise wall is feasible, but not reasonable, and is not recommended for construction.

### 10.4 Noise Barrier Analysis Location 04

The fourth wall analyzed (Barrier 4) is located between Kelly Road and the Western Wake Freeway Ramp A. This barrier is shown in Figure NA-04. At a maximum height of 25 feet and a length of approximately 740 feet, no receivers were able to receive the minimum 5 dBA noise level reduction. Therefore, the noise wall is not feasible and is not recommended for construction.

### 10.5 Noise Barrier Analysis Location 05

The fifth wall analyzed (Barrier 5) is along the Kelly Glen Subdivision, located between the north side of Kelly Road and the west side of the Western Wake Freeway. This barrier is shown in Figure NA-05. The optimized design of a noise wall that would provide a minimum 5 dBA reduction is approximately 2,945 feet long with an average height of 22.2 feet. The barrier begins at Sta. 248+80 and ends at Sta. 276+83.95. There were 80 receptors included in this barrier analysis. Of these, 62 were expected to have future noise impacts. A maximum of 38 receivers are able to receive at least a 5 dBA reduction in noise levels with a reasonable noise barrier wall. The barrier would have an estimated cost of \$980,685. This equates to approximately, \$25,808 per benefited receptor. Based on the NCDOT Traffic Noise Abatement Policy, the noise wall is reasonable and feasible and, therefore, **recommended for construction**.

### 10.6 Noise Barrier Analysis Location 06

The sixth wall analyzed (Barrier 6) is located along the Scotts Mill Subdivision, located between the east side of the Western Wake Freeway and Scott's Ridge Trail/Magnolia

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Breeze Court. This barrier location is shown in NA-05. The optimized design of a noise wall that would provide a minimum 5 dBA reduction is approximately 2,880 feet long with an average height of 18.2 feet. The barrier begins at Sta. 248+50.7 and ends at Sta. 276+55.2. There were 150 receptors included in this barrier analysis. Of these, 139 were expected to have future noise impacts. A maximum of 116 receivers are able to receive at least a 5 dBA reduction in noise levels with a reasonable noise barrier wall. The barrier would have an estimated cost of \$786,240. This equates to approximately, \$6,778 per benefited receptor. Based on the NCDOT Traffic Noise Abatement Policy, the noise wall is reasonable and feasible and, therefore, **recommended for construction.**

### 10.7 Noise Barrier Analysis Location 07

The seventh wall analyzed (Barrier 7) is located in close proximity to Olive Chapel Elementary School. This barrier location is shown in Figure NA-06. The school consists of a main building, 14 modular classrooms and an outdoor playground. According to the NCDOT Traffic Noise Abatement Policy, the playground is defined as a special use area and would be exposed to noise levels that exceed the NAC. The Olive Chapel Elementary School website lists the student population as 925 for the 2006-2007 school year. The formula provided in the NCDOT Traffic Noise Abatement Policy for determining the equivalent number of residents for special use areas was used to determine cost effectiveness of a noise wall. See Section 8.4 for a detailed explanation of the Equivalent Residents formula. For this analysis, it was assumed that the students would be impacted while outdoors for 2 hours each day. This equates to 26 equivalent receivers for the barrier analysis. The calculation is:

$$\text{Equivalent \# of Residents} = 925 \text{ students} / 3 * (2 \text{ hrs per day} / 24 \text{ hrs per day}) = 26$$

With a barrier at an average height of 17.5 feet and a length of approximately 1,050 feet, the 26 equivalent receivers were able to receive the minimum 5 dBA noise level reduction. The barrier begins at Sta. 291+14.1 and ends at Sta. 301+59.33. The total cost for this wall is estimated at \$275,625. This equates to \$10,600 per benefited receiver. Based on the NCDOT Traffic Noise Abatement Policy, the noise wall is reasonable and feasible and, therefore, recommended for construction.

### 10.8 Noise Barrier Analysis Location 08

The eighth wall analyzed (Barrier 8) is located in close proximity to the Ashley Downs Subdivision, located along the north side of the Western Wake Freeway. Forty-two receivers within the Ashley Downs subdivision would be exposed to noise impacts without a barrier. This barrier location is shown in Figure NA-06. The optimized design

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of a noise wall that would provide a minimum of 5 dBA reduction is approximately 1,580 feet long with an average height of 17 feet. The barrier begins at Sta. 287+35 and ends at Sta. 302+71.7. The barrier would benefit 9 receptors at an estimated cost of \$402,900. This equates to approximately \$44,767 per benefited receptor. Based on the NCDOT Traffic Noise Abatement Policy, the noise wall is reasonable and, therefore, **recommended for construction**. There were 49 receptors included in this barrier analysis. Of these, 42 were expected to have future noise impacts. A maximum of 9 receivers are able to experience at least a 5 dBA reduction in noise levels with a reasonable noise barrier wall.

### 10.9 Noise Barrier Analysis Location 09

The ninth wall analyzed (Barrier 9) is located close to the Western Wake Freeway/US 64 Interchange along Ramp C near Loop C. This barrier location is shown in Figure NA-06 and NA-07. At an optimized average wall height of 20 feet and a length of approximately 1,725 feet, this barrier would benefit 1 receiver at an estimated cost of \$516,900. This equates to \$516,900 per benefited receptor. Based on the NCDOT Traffic Noise Abatement Policy, the noise wall is feasible, but not reasonable, and is not recommended for construction.

### 10.10 Noise Barrier Analysis Location 10

The tenth wall analyzed (Barrier 10) is located close to the Western Wake Freeway/US 64 Interchange along Ramp A near Loop A. This barrier location is shown in Figure NA-07. At a maximum height of 25 feet and a length of approximately 705 feet, 1 receiver was able to receive the minimum 5 dBA noise level reduction. At an estimated cost of \$227,363, this equates to \$227,363 per benefited receptor. The noise wall is feasible, but not reasonable and is not recommended for construction.

### 10.11 Noise Barrier Analysis Location 11

The eleventh wall analyzed (Barrier 11) is located on the west side of Twyla Road on the east side of the Western Wake Freeway. This barrier location is shown in Figure NA-10. At a maximum height of 25 feet and a length of approximately 1,080 feet, this barrier would benefit two receivers at an estimated cost of \$340,200. This equates to \$170,100 for each benefited receptor. The noise wall is feasible, but not reasonable, and is not recommended for construction.

**11.0 Interior Noise Levels at Sensitive Receivers**

Two churches were classified as Category E receivers and were evaluated for interior noise impacts. Both Calvary Deliverance Church (Receiver # R01-01 in Appendix B) and Guard in Christ Jesus Church (Receiver # R01-14 in Appendix B) are included within study segment 1 and were initially evaluated as Category B receivers to determine if exterior noise impacts would be expected. Upon field observations, no exterior areas of frequent human use were identified at either location. Additionally, church activities are not typically associated with peak travel periods. Due to these observations, both churches were then evaluated as Category E uses for interior traffic noise impacts. According to the FHWA Highway Traffic Noise Analysis and Abatement Policy and Guidance dated June 1995, the noise reduction factor for the Calvary Deliverance Church building is 25 dB. The church is a masonry structure and was considered to have single glazed windows. The projected interior noise level for the church is determined by subtracting the noise reduction factor from the predicted exterior noise level. The expected interior noise level for Calvary Deliverance Church is 46 dBA (71 minus 25). This noise level falls short of approaching or exceeding the interior noise level threshold in the NAC. The noise reduction factor for Guard in Christ Jesus Church is 20 dB. The church is a light frame structure with ordinary sash windows. The projected interior noise level for this church is 41 dBA (61 minus 20). Therefore, in the analysis year 2030, neither church is expected to be exposed to interior noise levels that exceed the NAC. Table 7 shows existing and predicted interior noise levels for both churches.

**Table 7. Sensitive Receiver Interior Noise Levels (Leq)**

Receiver No.	Location	Use Category	Existing Interior Noise Level (dBA)	Future Build Interior Noise Level (dBA)
R01-01	Calvary Deliverance Church	E	40	46
R01-14	Guard in Christ Jesus Church	E	35	41

**12.0 Noise Contours – Information to Assist Local Governments**

In accordance with federal and state traffic noise policies, governments are not responsible for providing noise abatement measures for new developments where building permits are issued within the noise impacted area of a proposed highway project after the date of public knowledge. To aid local governments in planning for future development, impact zones are calculated and represented as noise “contours.” Traffic noise “contours” are shown in this analysis as estimated distances from the center of the median of the proposed facility where a receptor could expect to be exposed to traffic noise approaching 67 dBA. They apply to Category B (see Table 1) land uses. The estimated contours are intended to assist local governments in planning for future development near the proposed facility and can be found in Table 8. Traffic noise contours approaching 67 dBA range from 480 feet to 531 feet for the proposed toll alternative.

**Table 8. Traffic Noise Contours for the Toll Alternative**

Location	Contour Distance in Feet – 66 dBA
NC 55 Business to NC 55 Bypass	480 ft
NC 55 Bypass to US 1	531 ft
US 1 to Old US 1	529 ft
Old US 1 to US 64	518 ft
US 64 to Green Level Road	518 ft
Green Level Road to Morrisville Parkway	531 ft
Morrisville Parkway to NC 55	527 ft

### **13.0 Construction Noise**

The major construction elements of this project are expected to be earth removal, hauling, grading, and paving. General construction noise impacts, such as temporary speech interference for passers-by and those individuals living or working near the project, can be expected particularly from paving operations and from the earth moving equipment during grading operations. However, considering the relatively short-term nature of construction noise and the limitation of construction to daytime hours, these impacts are not expected to be substantial. The transmission loss characteristics of nearby natural elements and man-made structures are believed to be sufficient to moderate the effects of intrusive construction noise.

### 14.0 Traffic Noise Comparison: Non-Toll vs. Toll Alternative

The following is a comparison of the traffic noise analysis conducted for the non-toll and toll alternatives. The results of the non-toll noise analysis are documented in the Western Wake Freeway Environmental Impact Statement (2004). The detailed technical analysis can be found in Western Wake Freeway: Design Noise Report (2002).

Both analyses were based on FHWA's 1995 Highway Traffic Noise Analysis and Abatement Policy and Guidance. However, the non-toll analysis was based on NCDOT's Traffic Noise and Abatement Policy (Policy) that existed prior to September 2004, while the toll analysis is based on the updated September 2004 Policy. Further, the non-toll analysis utilized TNM 2.0 while the toll analysis utilizes the updated TNM 2.5. The design year for the non-toll alternative was 2025 while the design year for the toll alternative is 2030. Additional comparisons are shown in Table 9.

Due to differences in methodologies, a direct comparison of noise impacts between the non-toll and toll alternatives would not be appropriate. However, the reduced traffic volumes associated with the toll alternative – even with the later design year – suggest a lesser likelihood for noise impacts when compared to the non-toll alternative. (After adding an additional 5 years to the design year, the toll alternative traffic volumes remain less than the non-toll traffic volumes.) The non-toll and toll traffic volumes are inherently different to account for the traffic diversion that occurs when users intentionally avoid toll roads in favor of “free” routes.

The larger number of receivers evaluated and impacted for the toll alternative is mostly a function of increased development within the project corridor from the time the noise analysis was completed for the non-toll alternative in 2002. Noise impacts for the non-toll alternative would likely be higher than the toll alternative if the analysis were conducted using current data (i.e., traffic, receivers) and existing policies.

The additional barrier recommended for the toll alternative is due to changes in policy rather than to design features of the toll alternative. The NCDOT Policy in effect until September 2004 had no specific methodology for assessing noise impacts to schools. The updated Policy considers schools a “special use area” and makes it more likely that noise walls would be cost-effective. The other three recommended noise barriers for the toll alternative are the same as the three identified for the non-toll alternative. While the dimensions (length and height) of these three barriers may vary slightly

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between the non-toll and toll alternatives, the benefited receivers identified for the non-toll alternative would also benefit for the toll alternative.

**Table 9. Noise Analysis Comparison: Non-Toll vs. Toll Alternative**

	Number of Barrier Analyses Areas <sup>a</sup>	Predicted ADT	Measured Noise Levels <sup>b</sup>	Receivers Evaluated (Impacted)	Barriers Recommended	Contour Ranges <sup>c</sup>
<b>Non-Toll Alternative</b>	13	82,000 – 113,500	48 dBA to 68 dBA	414 (389)	3	300 – 855 ft
<b>Toll Alternative</b>	11	62,800 – 91,200	59 dBA to 67 dBA	523 (451)	4	480 – 531 ft

<sup>a</sup> Due to sparse development in proximity to Ramps B and D of the US 64/Western Wake Freeway interchange, barrier analysis for these two areas are not included for the toll alternative. All other areas analyzed for barriers are the same between the non-toll and toll alternatives.

<sup>b</sup> The noise levels shown are for areas common to both alternatives. Measured noise levels in the overall project area ranged from 43 dBA to 70 dBA for non-toll alternative and from 34 dBA to 71 dBA for the toll alternative.

<sup>c</sup> Contour ranges where exterior sound levels approach 67 dBA for Land Use Category B receivers

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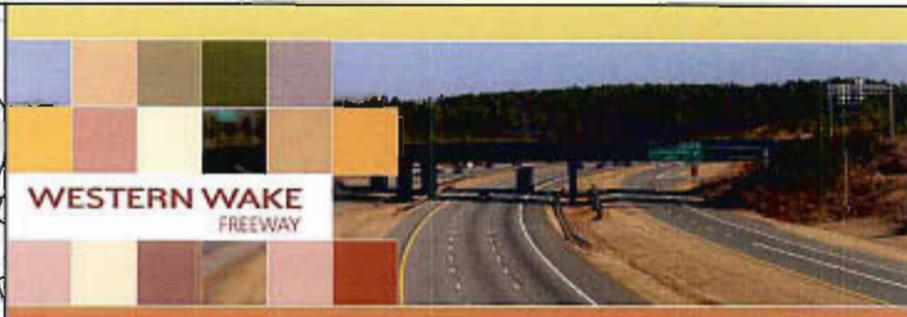
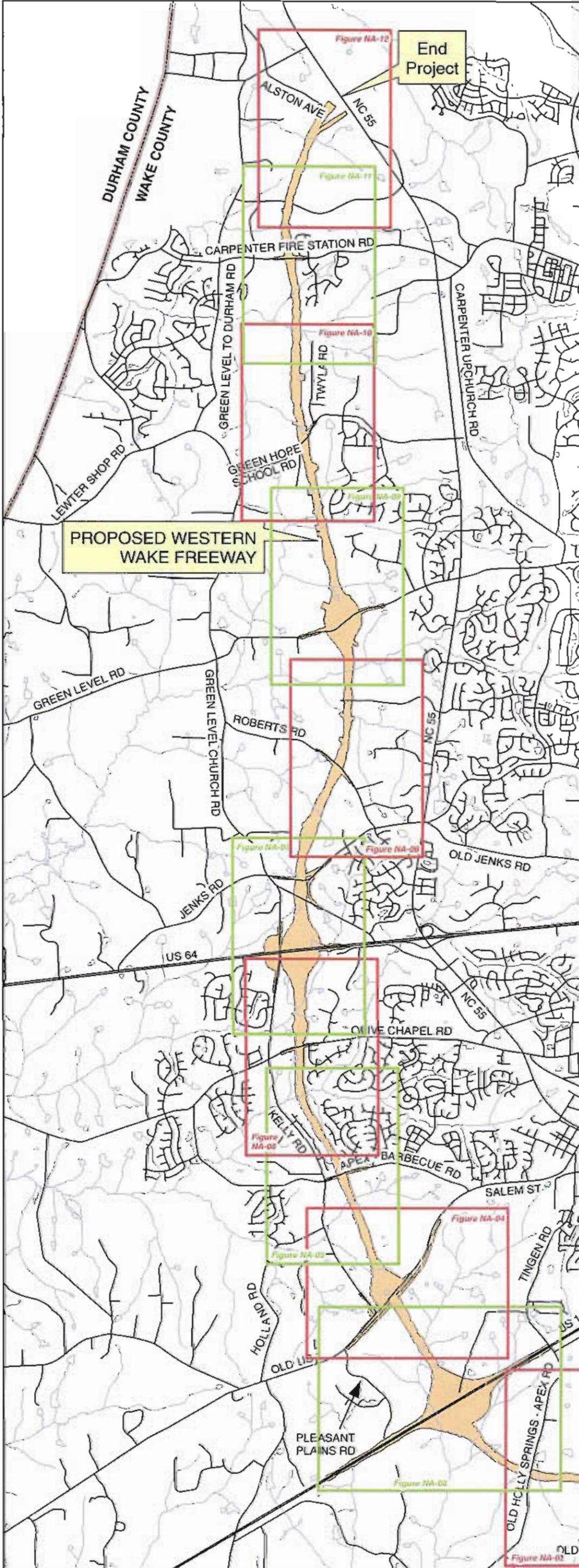
### 15.0 Summary

As a result of the Western Wake Freeway construction, 451 Category B receivers will be impacted by traffic noise. Approximately 86 percent of the receptors within the analysis area would be impacted. Based on the studies so far accomplished, the NCTA intends to install the four feasible and reasonable noise barriers presented in Table 6, Noise Barriers 5 through 8. These four barriers have a total estimated cost of \$2,445,450 and will provide a 5 dBA reduction for 163 residences and one school. If developments occur during the final design where these conditions substantially change, the abatement measures might not be provided<sup>1</sup>. A final decision of the installation of the abatement measure(s) will be made upon completion of the project design and the public involvement processes.

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<sup>1</sup> This only applies to the proposed wall at Olive Chapel Elementary School. The proposed walls at Kelly Glen Subdivision, Scotts Mill Subdivision and Ashley Downs Subdivision were identified in the April 2004 Record of Decision and will be constructed.

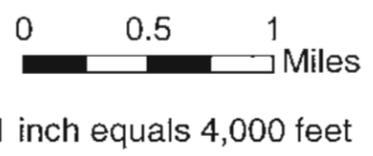
## Figures



**FIGURE NA-00: VICINITY MAP AND OVERALL PROJECT AREA WITH STUDY SEGMENTS**  
**WESTERN WAKE FREEWAY**  
 NCDOT STIP NO. R-2635  
 WAKE COUNTY, NORTH CAROLINA



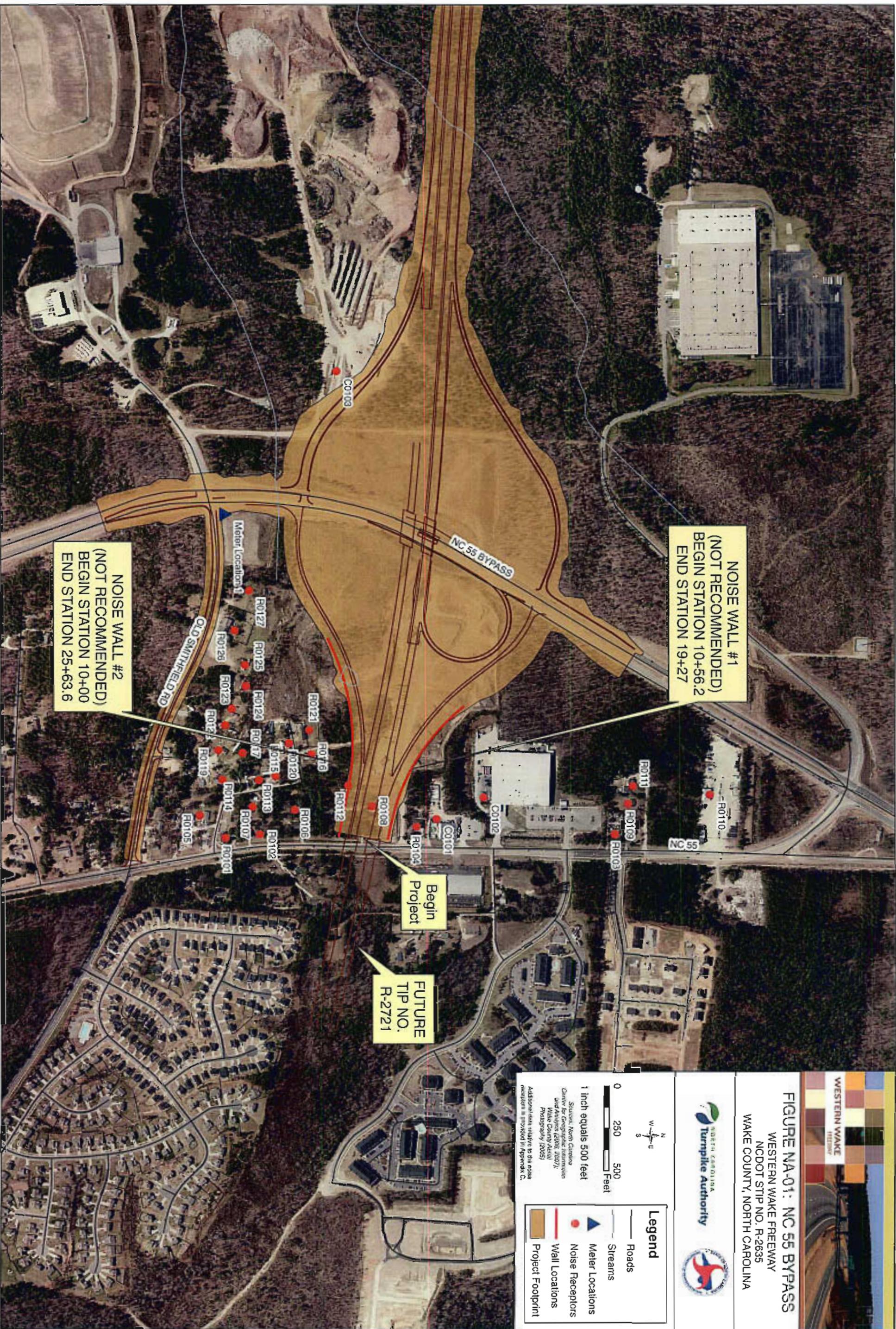
Source: North Carolina Center for Geographic Information and Analysis (2006, 2007)



**Legend**

- Roads
- Streams
- Project Footprint





**NOISE WALL #1  
(NOT RECOMMENDED)**  
 BEGIN STATION 10+56.2  
 END STATION 19+27

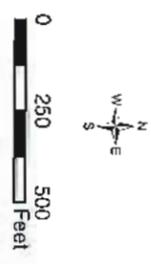
**NOISE WALL #2  
(NOT RECOMMENDED)**  
 BEGIN STATION 10+00  
 END STATION 25+63.6

**Begin  
Project**

**FUTURE  
TIP NO.  
R-2721**



**FIGURE NA-01: NC 55 BYPASS**  
 WESTERN WAKE FREEWAY  
 NCDOT STIP NO. R-2635  
 WAKE COUNTY, NORTH CAROLINA



Source: North Carolina  
 Office for Geographic Information  
 and Analysis (OGI), 2007;  
 Wake County Aerial  
 Photography (2005)  
 Additional data relative to the noise  
 receptors is provided in Appendix C.

Legend	
	Roads
	Streams
	Meter Locations
	Noise Receptors
	Wall Locations
	Project Footprint



**FIGURE NA-02: OLD HOLLY SPRINGS-APEX RD**  
 WESTERN WAKE FREEWAY  
 NCDOT STIP NO. R-2635  
 WAKE COUNTY, NORTH CAROLINA



1 inch equals 500 feet

0 250 500 Feet

North  
 N  
 West  
 W  
 East  
 E  
 South  
 S

**Legend**

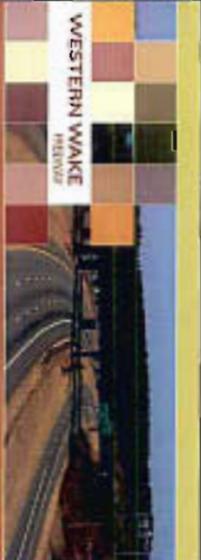
- Roads
- Streams
- Meter Locations
- Noise Receptors
- Project Footprint
- Wall Locations

*Sources: North Carolina Center for Geographic Information and Analysis (2006, 2007); Wake County Aerial Photography (2005). Additional data relative to the noise receptors is provided in Appendix C.*

C0103



NOISE WALL #3  
 (NOT RECOMMENDED)  
 BEGIN STATION 10+01.0  
 END STATION 21+62.6



**FIGURE NA-03: US 1**  
**WESTERN WAKE FREEWAY**  
 NCDOT STIP NO. R-2635  
 WAKE COUNTY, NORTH CAROLINA



0 250 500  
 Feet

1 inch equals 750 feet  
 Source: North Carolina  
 Center for Geographic Information  
 and Analysis (2006, 2007),  
 Wake County Aerial  
 Photography (2009)  
 Additional data relative to the noise  
 receptors is provided in Appendix C.

- Legend**
- Roads
  - Streams
  - Meter Locations
  - Noise Receptors
  - Project Footprint
  - Wall Locations



**FIGURE NA-04: OLD US 1**  
**WESTERN WAKE FREEWAY**  
 NCDOT STIP NO. R-2635  
 WAKE COUNTY, NORTH CAROLINA



**NOISE WALL #4**  
 (NOT RECOMMENDED)  
 BEGIN STATION 23+44.4  
 END STATION 30+63.2

**Legend**

- Roads
- Streams
- Meter Locations
- Noise Receptors
- Project Footprint
- Wall Locations

0 250 500 Feet  
 1 inch equals 750 feet

Sources: North Carolina Center for Geographic Information and Analysis (2006, 2007); Wake County Aerial Photography (2005)

Additional data relative to the noise receptors is provided in Appendix C.





**Legend**

- Roads
- Streams
- Meter Locations
- Noise Receptors
- Project Footprint
- Wall Locations

0 125 250 Feet

1 inch equals 375 feet

Sources: North Carolina Center for Geographic Information and Analysis (2006, 2007); Wake County Aerial Photography (2009)

Additional data relative to the noise receptors is provided in Appendix C.

**WESTERN WAKE**

**FIGURE NA-05: KELLY GLEN**

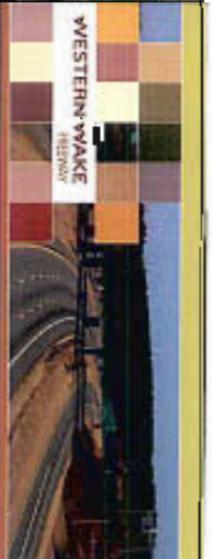
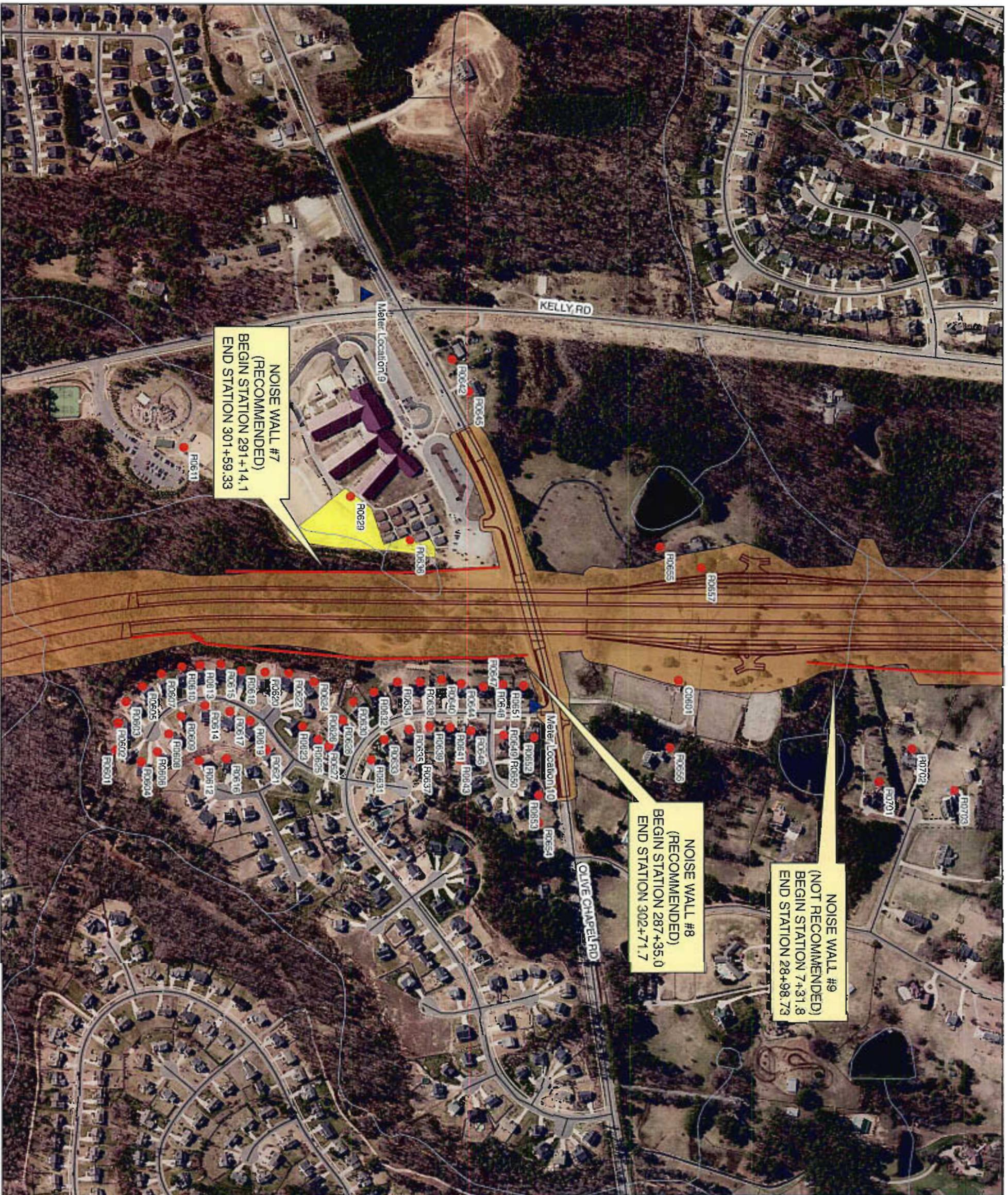
**WESTERN WAKE FREEWAY**

**NC DOT STIP NO. R-2835**

**WAKE COUNTY, NORTH CAROLINA**

**TURRPIE AUTHORITY**

**Wake County**



**FIGURE NA-06: OLIVE CHAPEL RD**  
 WESTERN WAKE FREEWAY  
 NODOT STIP NO. R-2635  
 WAKE COUNTY, NORTH CAROLINA



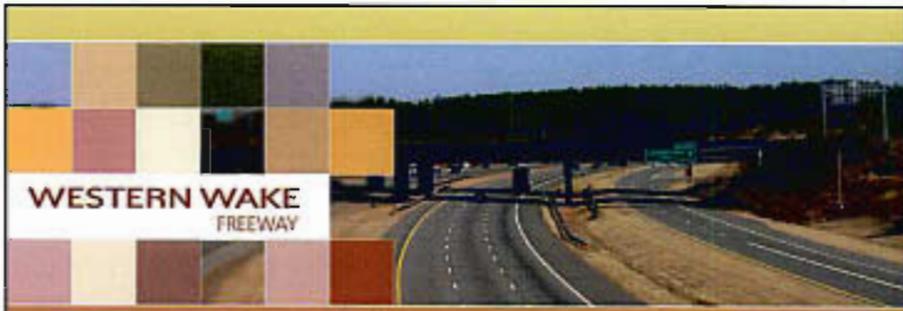
Source: North Carolina Center for Geographic Information and Analysis (2006, 2007), Wake County Aerial Photography (2005)

Additional information available in this report's Appendix 2 is located in Appendix C.

**Legend**

- Roads
- Streams
- ▲ Meter Locations
- Noise Receptors
- Wall Locations
- Project Footprint
- Outdoor Playground Special Use Area

0 125 250 Feet  
 1 inch equals 375 feet



**FIGURE NA-07: US 64/KELLY RD**  
 WESTERN WAKE FREEWAY  
 NCDOT STIP NO. R-2635  
 WAKE COUNTY, NORTH CAROLINA



0 250 500  
 Feet

1 inch equals 625 feet

Sources: North Carolina  
 Center for Geographic Information  
 and Analysis (2006, 2007);  
 Wake County Aerial  
 Photography (2005)

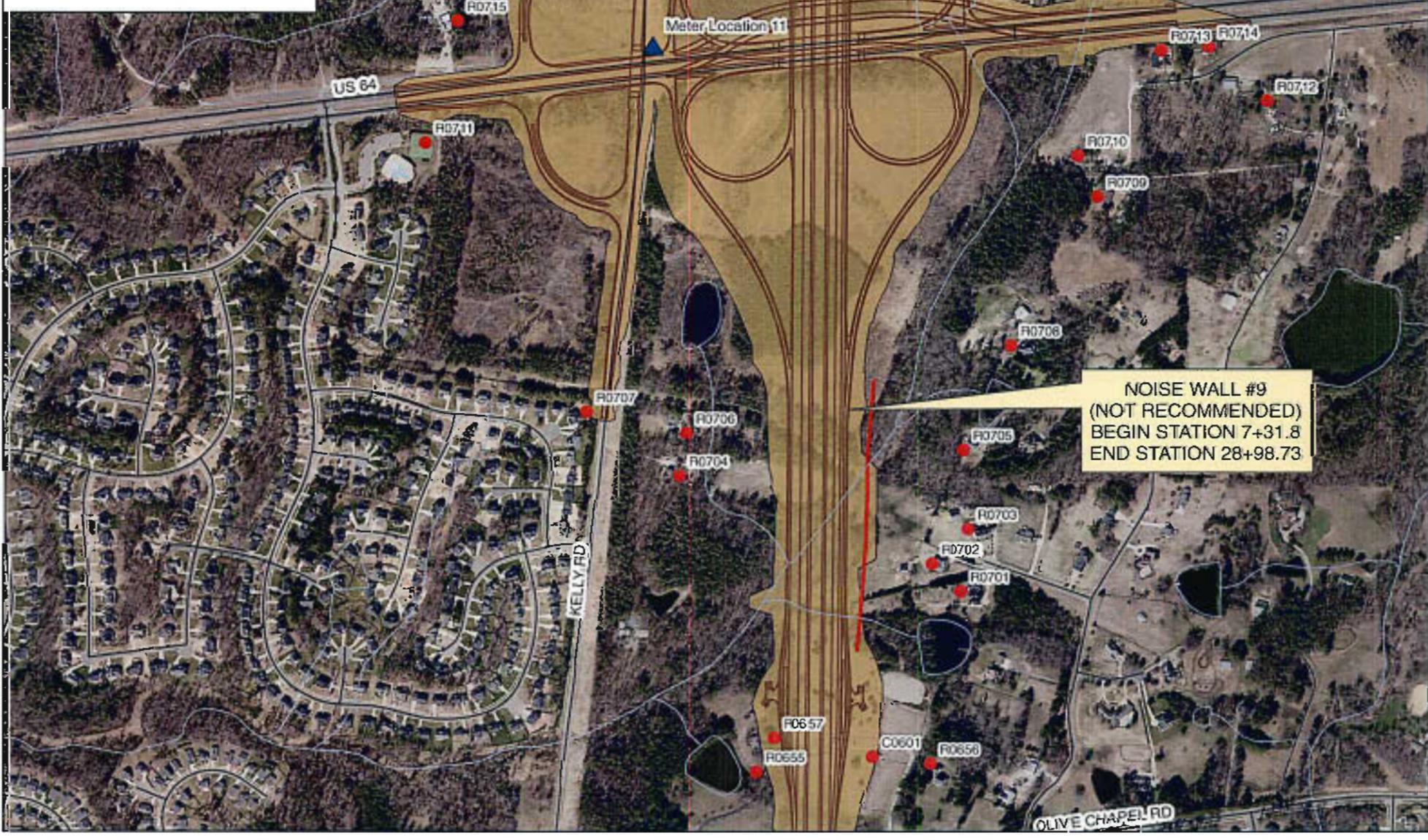
Additional data relative to the noise  
 receptors is provided in Appendix C.

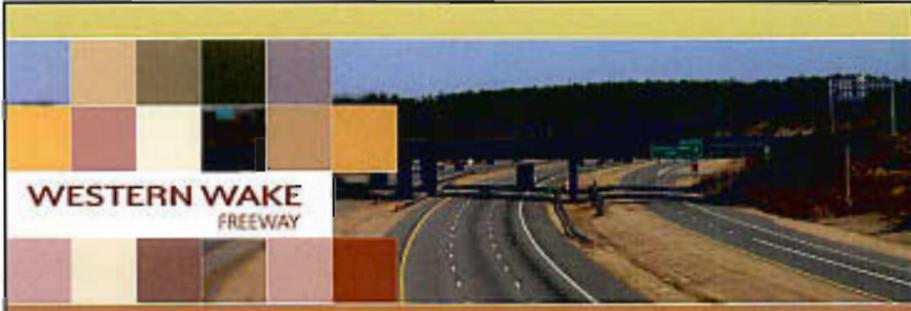
**Legend**

- Roads
- Streams
- ▲ Meter Locations
- Noise Receptors
- Project Footprint
- Wall Locations

NOISE WALL #10  
 (NOT RECOMMENDED)  
 BEGIN STATION 8+26.9  
 END STATION 22+32.4

NOISE WALL #9  
 (NOT RECOMMENDED)  
 BEGIN STATION 7+31.8  
 END STATION 28+98.73





**FIGURE NA-08: ROBERTS RD  
AND TURNER CREEK RD**  
WESTERN WAKE FREEWAY  
NCDOT STIP NO. R-2635  
WAKE COUNTY, NORTH CAROLINA



0 250 500  
Feet

1 inch equals 500 feet

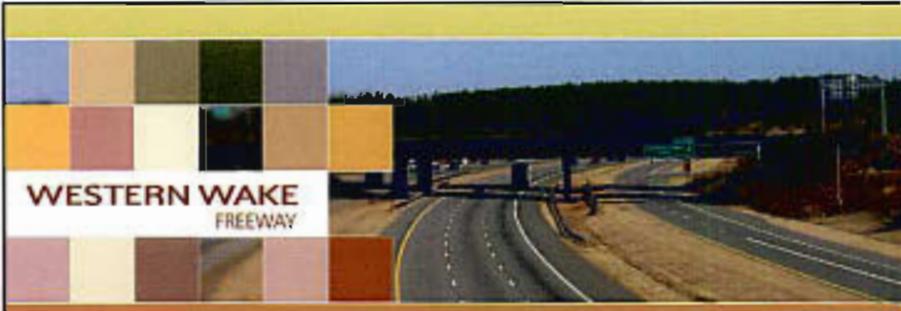
Sources: North Carolina  
Center for Geographic Information  
and Analysis (2006, 2007);  
Wake County Aerial  
Photography (2005)

Additional data relative to the noise  
receptors is provided in Appendix C.

**Legend**

- Roads
- Streams
- ▲ Meter Locations
- Noise Receptors
- Project Footprint
- Wall Locations





**FIGURE NA-09: WHITE OAK CREEK**  
 WESTERN WAKE FREEWAY  
 NCDOT STIP NO. R-2635  
 WAKE COUNTY, NORTH CAROLINA



0 250 500  
 Feet

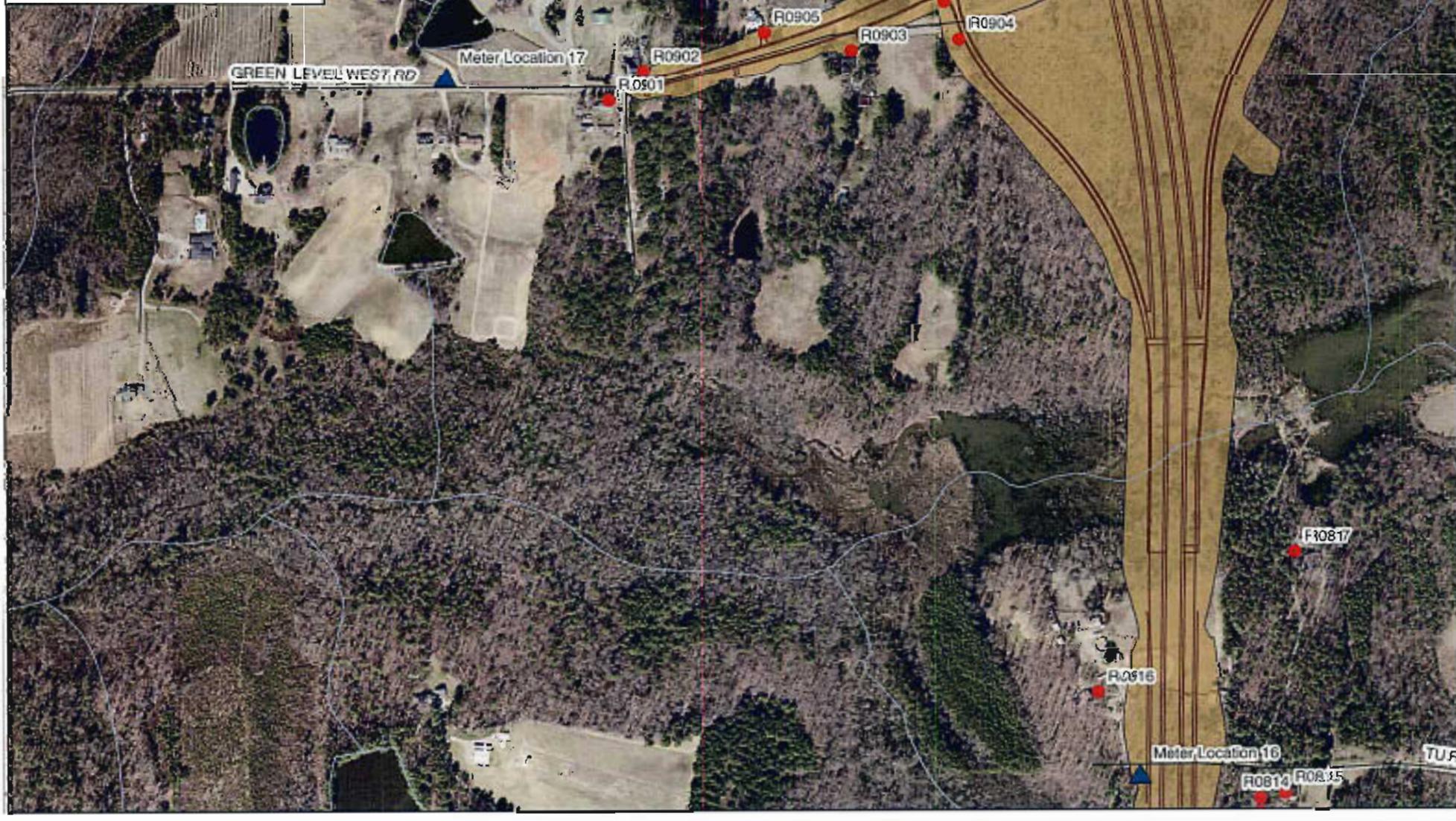
1 inch equals 500 feet

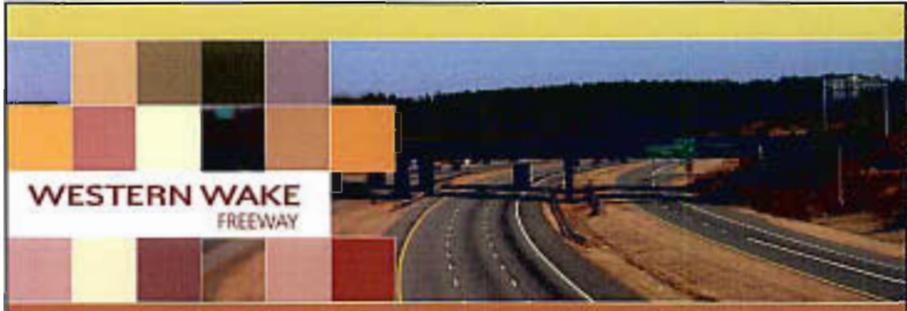
Sources: North Carolina Center for Geographic Information and Analysis (2006, 2007); Wake County Aerial Photography (2005)

Additional data relative to the noise receptors is provided in Appendix C.

**Legend**

- Roads
- Streams
- ▲ Meter Locations
- Noise Receptors
- Project Footprint
- Wall Locations





**FIGURE NA-10: GREEN HOPE SCHOOL RD/TWYLA RD**  
 WESTERN WAKE FREEWAY  
 NCDOT STIP NO. R-2635  
 WAKE COUNTY, NORTH CAROLINA



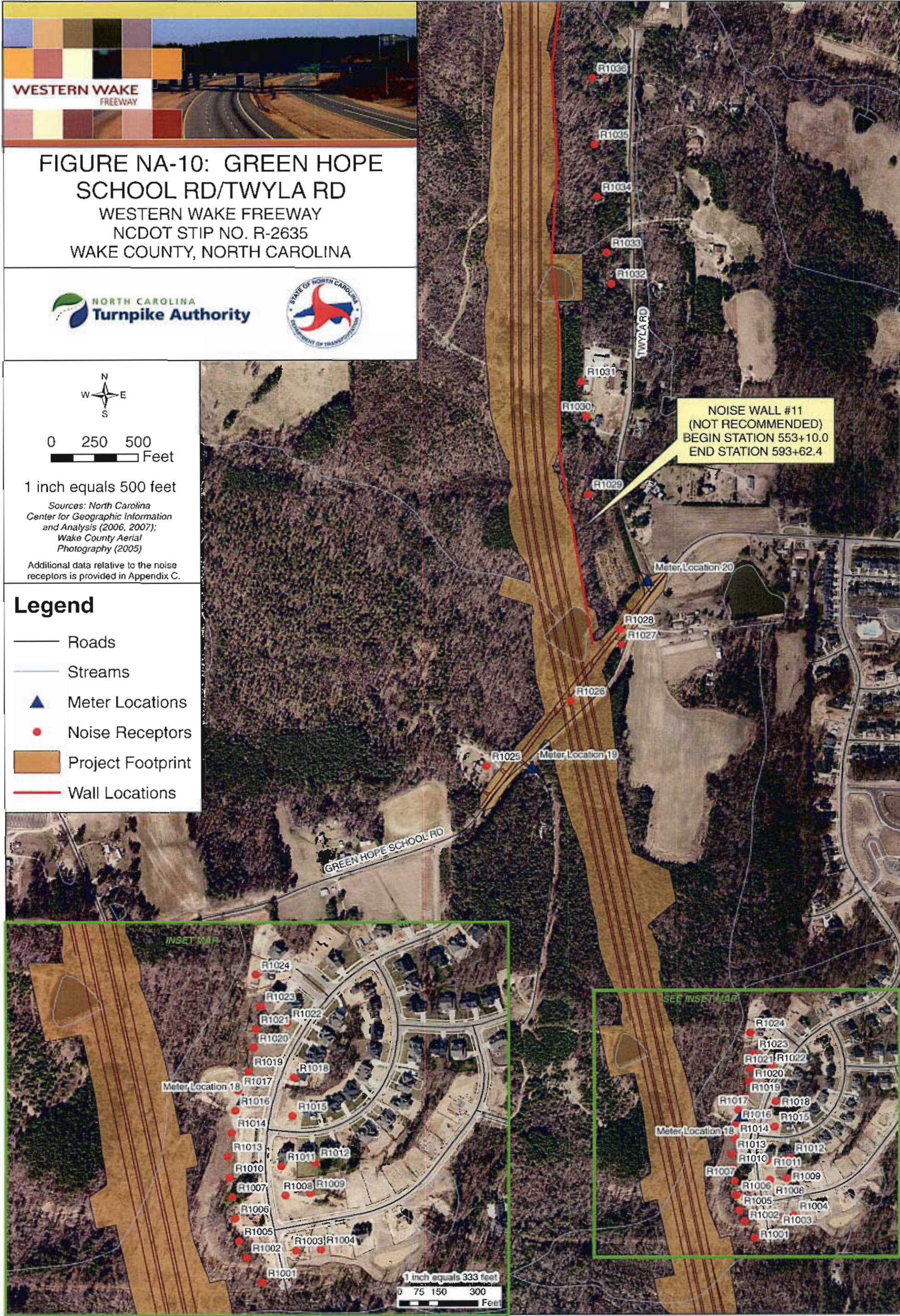
0 250 500 Feet

1 inch equals 500 feet

Sources: North Carolina Center for Geographic Information and Analysis (2006, 2007); Wake County Aerial Photography (2005)  
 Additional data relative to the noise receptors is provided in Appendix C.

**Legend**

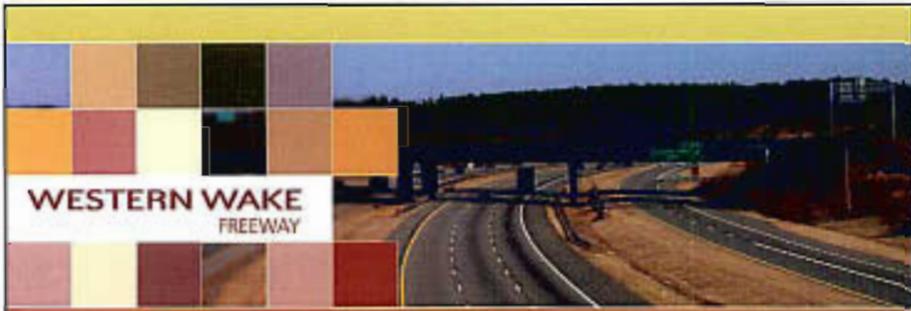
- Roads
- Streams
- ▲ Meter Locations
- Noise Receptors
- Project Footprint
- Wall Locations



**NOISE WALL #11 (NOT RECOMMENDED)**  
 BEGIN STATION 553+10.0  
 END STATION 593+62.4



1 inch equals 333 feet  
 0 75 150 300 Feet



# FIGURE NA-11: CARPENTER FIRE STATION RD/PANTHER CREEK HIGH SCHOOL

WESTERN WAKE FREEWAY  
NCDOT STIP NO. R-2635  
WAKE COUNTY, NORTH CAROLINA



0 250 500  
Feet

1 inch equals 375 feet

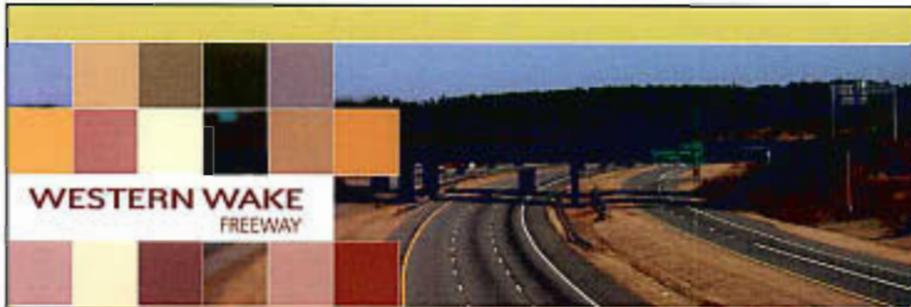
Sources: North Carolina Center for  
Geographic Information and  
Analysis (2006, 2007); Wake County  
Aerial Photography (2005)

Additional data relative to the noise  
receptors is provided in Appendix C.

## Legend

- Roads
- Streams
- ▲ Meter Locations
- Noise Receptors
- Project Footprint
- Wall Locations





# FIGURE NA-12: NORTHERN INTERSECTION WITH NC 55

WESTERN WAKE FREEWAY  
NCDOT STIP NO. R-2635  
WAKE COUNTY, NORTH CAROLINA



0 250 500  
Feet

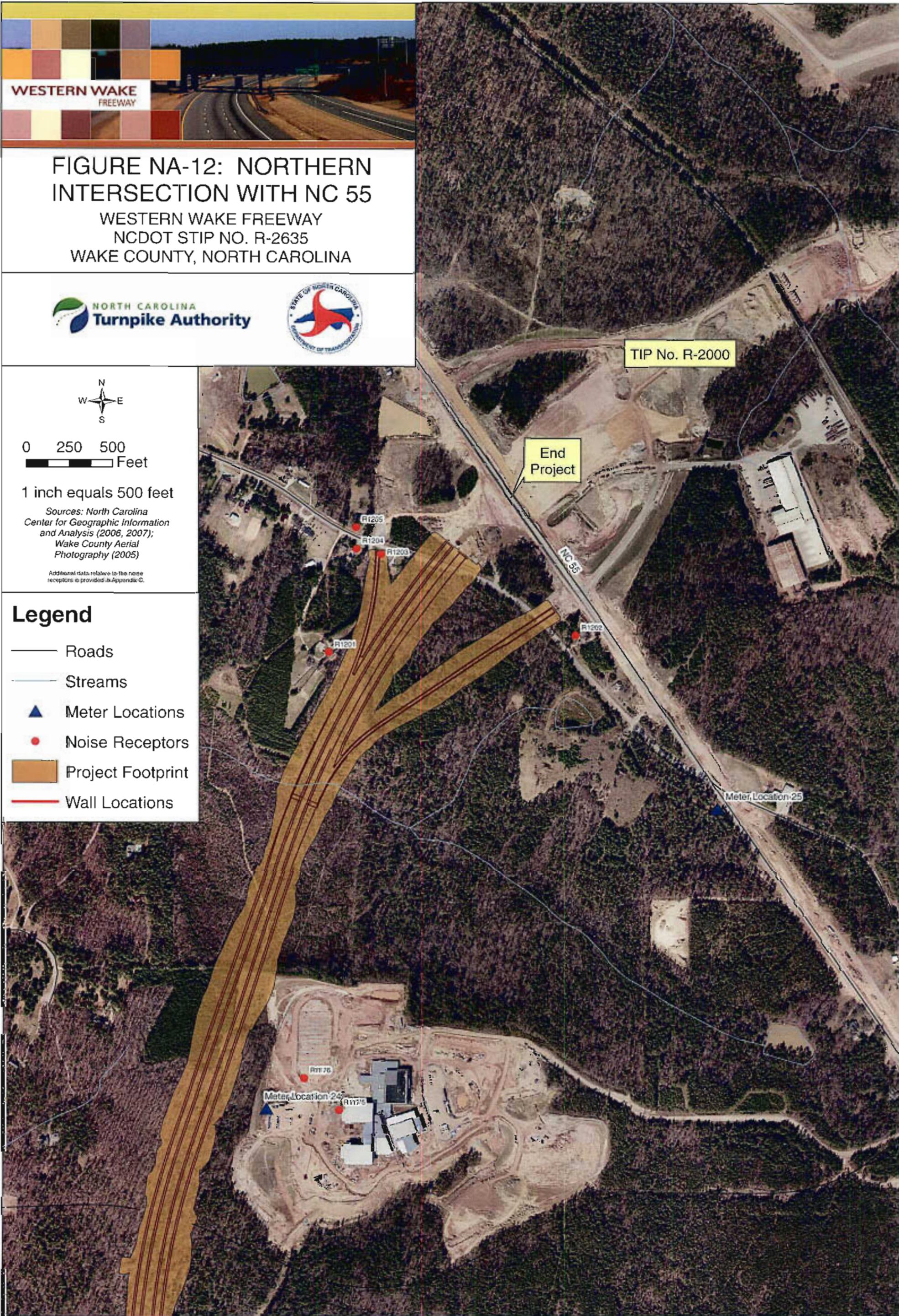
1 inch equals 500 feet

Sources: North Carolina Center for Geographic Information and Analysis (2006, 2007); Wake County Aerial Photography (2005)

Additional data relative to the noise receptors is provided in Appendix C.

## Legend

- Roads
- Streams
- Meter Locations
- Noise Receptors
- Project Footprint
- Wall Locations



## **Appendix A**

NCTA Traffic Volumes





## **Appendix B**

Receiver Results

RESULTS: SOUND LEVELS  
PROJECT/CONTRACT: WWP Re-evaluation R-2635  
RUN: TNM NOISE RESULTS

Receiver Name	No.	Land Use Category	#DUs	Existing LAeq1h (2006)	Future Build (2030)					Number of Impacts		
					LAeq1h		Increase over existing		Type	Exist Sound Lvl	Future Build Increase	Sound Lvl
					Calculated	Crit'n	Calculated	Crit'n				
				dBA	dBA	dBA	dB	dB				
<b>AREA 01</b>												
C01-01	43	C	1	59	67	71	9	10		0	0	0
C01-02	44	C	1	54	63	71	9	11		0	0	0
C01-03	46	C	1	51	63	71	12	14		0	0	0
R01-01	47	B	1	65	71	66	6	10	Snd Lvl	0	0	1
R01-02	48	B	1	66	72	66	6	10	Snd Lvl	0	0	1
R01-03	49	B	1	62	67	66	5	10	Snd Lvl	0	0	1
R01-04	50	B	1	61	69	66	8	10	Snd Lvl	0	0	1
R01-05	51	B	1	58	63	66	6	10		0	0	0
R01-06	52	B	1	57	66	66	9	10	Snd Lvl	0	0	1
R01-07	53	B	1	56	64	66	8	10		0	0	0
R01-09	55	B	1	55	61	66	6	10		0	0	0
R01-10	56	B	1	56	61	68	5	10		0	0	0
R01-11	57	B	1	54	61	68	7	11		0	0	0
R01-13	59	B	1	53	62	68	9	12		0	0	0
R01-14	60	B	1	55	61	68	6	10		0	0	0
R01-15	61	B	1	53	63	68	10	12		0	0	0
R01-16	62	B	1	51	64	68	13	14		0	0	0
R01-17	63	B	1	53	60	66	6	12		0	0	0
R01-19	65	B	1	55	60	68	5	10		0	0	0
R01-20	66	B	1	51	62	66	11	14		0	0	0
R01-21	67	B	1	51	63	66	13	14		0	0	0
R01-22	68	B	1	55	59	66	4	10		0	0	0
R01-23	69	B	1	55	58	66	3	10		0	0	0
R01-24	70	B	1	55	58	66	3	10		0	0	0
R01-25	72	B	1	56	60	68	4	10		0	0	0
R01-26	73	B	1	60	61	66	1	10		0	0	0
R01-27	74	B	1	60	63	66	3	10		0	0	0
<b>AREA TOTALS</b>										0	0	5

<b>AREA 02</b>												
R02-01	4	B	1	41	55	66	15	15	Increase	0	1	0
<b>AREA TOTALS</b>										0	1	0

<b>AREA 03</b>												
R03-01	13	B	1	56	60	66	4	10		0	0	0
R03-02	14	B	1	59	62	66	3	10		0	0	0
R03-03	15	B	1	49	71	66	22	15	Both	0	1	1
R03-04	16	B	1	47	63	66	16	15	Increase	0	1	0
R03-05	17	B	1	46	62	66	16	15	Increase	0	1	0
R03-06	18	B	1	45	61	66	16	15	Increase	0	1	0
R03-09	21	B	1	49	60	66	11	15		0	0	0
R03-10	28	B	1	47	60	66	13	15		0	0	0
R03-11	29	B	1	65	60	66	5	10		0	0	0
R03-12	30	B	1	55	63	66	8	10		0	0	0
C03-01	31	C	1	49	58	71	9	15		0	0	0
<b>AREA TOTALS</b>										0	4	1

<b>AREA 04</b>												
R04-01	14	B	1	49	59	66	10	15		0	0	0
R04-02	15	B	1	55	62	68	7	10		0	0	0
R04-03	16	B	1	46	63	66	18	15	Increase	0	1	0
R04-04	17	B	1	45	67	68	23	15	Both	0	1	1
R04-05	18	B	1	53	65	66	13	12	Increase	0	1	0
R04-07	20	B	1	54	61	68	7	11		0	0	0
R04-10	23	B	1	48	59	68	11	15		0	0	0
R04-11	24	B	1	56	61	66	5	10		0	0	0
R04-12	25	B	1	41	66	68	25	15	Both	0	1	1
<b>AREA TOTALS</b>										0	4	2

Receiver Name	No.	Land Use Category	#DUs	Existing LAeq1h (2006)	Future Build (2030)					Number of Impacts		
					LAeq1h		Increase over existing		Type Impact	Future Build		
					Calculated	Crit'n	Calculated	Crit'n Sub'l Inc		Exist Sound Lvl	Increase	Sound Lvl
dBA	dBA	dBA	dB	dB								
AREA_05												
R05-001	274	B	1	41	64	66	23	15	Increase	0	1	0
R05-002	275	B	1	43	63	66	21	15	Increase	0	1	0
R05-003	276	B	1	53	64	66	11	12		0	0	0
R05-005	278	B	1	58	68	66	10	10	Both	0	1	1
R05-006	279	B	1	56	68	66	12	10	Both	0	1	1
R05-007	280	B	1	56	68	66	13	10	Both	0	1	1
R05-008	281	B	1	57	70	68	13	10	Both	0	1	1
R05-009	282	B	1	50	68	66	18	15	Both	0	1	1
R05-010	283	B	1	51	67	66	16	14	Both	0	1	1
R05-011	284	B	1	49	70	66	21	15	Both	0	1	1
R05-012	285	B	1	56	64	66	7	10		0	0	0
R05-013	286	B	1	59	65	66	6	10		0	0	0
R05-014	287	B	1	51	66	66	16	14	Both	0	1	1
R05-015	288	B	1	47	73	66	26	15	Both	0	1	1
R05-016	289	B	1	56	68	66	11	10	Both	0	1	1
R05-017	290	B	1	57	67	66	11	10	Both	0	1	1
R05-018	291	B	1	55	69	66	14	10	Both	0	1	1
R05-019	292	B	1	57	67	66	11	10	Both	0	1	1
R05-020	293	B	1	57	67	66	11	10	Both	0	1	1
R05-021	294	B	1	60	68	68	8	10	Snd Lvl	0	0	1
R05-022	295	B	1	53	69	68	16	12	Both	0	1	1
R05-023	296	B	1	50	66	66	17	15	Both	0	1	1
R05-024	297	B	1	46	72	66	25	15	Both	0	1	1
R05-025	298	B	1	61	67	68	7	10	Snd Lvl	0	0	1
R05-026	299	B	1	52	69	66	17	13	Both	0	1	1
R05-027	300	B	1	60	67	66	7	10	Snd Lvl	0	0	1
R05-028	301	B	1	60	67	66	7	10	Snd Lvl	0	0	1
R05-029	302	B	1	57	66	66	9	10	Snd Lvl	0	0	1
R05-030	303	B	1	61	67	66	6	10	Snd Lvl	0	0	1
R05-031	304	B	1	51	69	66	18	14	Both	0	1	1
R05-032	305	B	1	60	66	66	6	10	Snd Lvl	0	0	1
R05-033	306	B	1	51	69	66	19	14	Both	0	1	1
R05-034	307	B	1	60	66	66	6	10	Snd Lvl	0	0	1
R05-035	308	B	1	56	66	66	10	10	Both	0	1	1
R05-036	309	B	1	60	66	66	6	10	Snd Lvl	0	0	1
R05-037	310	B	1	60	66	66	6	10	Snd Lvl	0	0	1
R05-038	311	B	1	52	65	66	13	13	Increase	0	1	0
R05-039	312	B	1	55	65	66	11	10	Increase	0	1	0
R05-040	313	B	1	49	70	66	20	15	Both	0	1	1
R05-041	314	B	1	49	67	66	17	15	Both	0	1	1
R05-042	315	B	1	45	72	66	27	15	Both	0	1	1
R05-043	316	B	1	51	65	66	14	14	Increase	0	1	0
R05-044	317	B	1	48	70	66	22	15	Both	0	1	1
R05-045	318	B	1	51	65	66	14	14	Increase	0	1	0
R05-046	319	B	1	49	65	66	16	15	Increase	0	1	0
R05-047	320	B	1	47	70	66	22	15	Both	0	1	1
R05-048	321	B	1	50	64	66	14	15		0	0	0
R05-049	322	B	1	48	66	66	17	15	Both	0	1	1
R05-050	323	B	1	47	70	66	23	15	Both	0	1	1
R05-051	324	B	1	45	71	66	26	15	Both	0	1	1
R05-052	325	B	1	48	66	66	18	15	Both	0	1	1
R05-053	326	B	1	48	67	66	19	15	Both	0	1	1
R05-054	327	B	1	46	70	66	24	15	Both	0	1	1
R05-055	328	B	1	49	63	66	14	15		0	0	0

Receiver Name	No.	Land Use Category	#DUs	Existing LAeq1h (2006) dBA	Future Build (2030)					Number of Impacts		
					LAeq1h		Increase over existing		Type Impact	Exist Sound Lvl	Future Build increase	Sound Lvl
					Calculated	Crit'n	Calculated	Crit'n				
R05-056	329	B	1	47	66	66	19	15	Both	0	1	1
R05-057	330	B	1	46	70	66	24	15	Both	0	1	1
R05-058	331	B	1	47	67	66	20	15	Both	0	1	1
R05-059	332	B	1	45	70	66	25	15	Both	0	1	1
R05-060	333	B	1	48	63	66	15	15	Increase	0	1	0
R05-061	334	B	1	49	68	66	19	15	Both	0	1	1
R05-062	335	B	1	46	66	66	20	15	Both	0	1	1
R05-063	336	B	1	44	71	66	27	15	Both	0	1	1
R05-064	337	B	1	47	62	66	15	15	Increase	0	1	0
R05-065	338	B	1	44	70	66	26	15	Both	0	1	1
R05-066	339	B	1	47	62	66	15	15	Increase	0	1	0
R05-067	340	B	1	44	70	66	26	15	Both	0	1	1
R05-068	341	B	1	46	61	66	15	15	Increase	0	1	0
R05-069	342	B	1	44	70	66	27	15	Both	0	1	1
R05-070	343	B	1	46	61	66	15	15	Increase	0	1	0
R05-071	344	B	1	49	68	66	19	15	Both	0	1	1
R05-072	345	B	1	43	71	66	27	15	Both	0	1	1
R05-073	346	B	1	43	70	66	27	15	Both	0	1	1
R05-074	347	B	1	45	61	66	16	15	Increase	0	1	0
R05-075	348	B	1	44	71	66	27	15	Both	0	1	1
R05-076	349	B	1	45	60	66	16	15	Increase	0	1	0
R05-077	350	B	1	45	60	66	16	15	Increase	0	1	0
R05-078	351	B	1	43	71	66	28	15	Both	0	1	1
R05-079	352	B	1	49	67	66	18	15	Both	0	1	1
R05-080	353	B	1	44	72	66	28	15	Both	0	1	1
R05-081	354	B	1	42	71	66	29	15	Both	0	1	1
R05-082	355	B	1	42	71	66	29	15	Both	0	1	1
R05-083	356	B	1	44	71	66	28	15	Both	0	1	1
R05-084	357	B	1	44	59	66	15	15	Increase	0	1	0
R05-085	358	B	1	41	71	66	29	15	Both	0	1	1
R05-086	359	B	1	43	59	66	16	15	Increase	0	1	0
R05-087	360	B	1	43	59	66	16	15	Increase	0	1	0
R05-088	361	B	1	41	70	66	29	15	Both	0	1	1
R05-089	362	B	1	43	60	66	17	15	Increase	0	1	0
R05-090	363	B	1	41	71	66	30	15	Both	0	1	1
R05-091	364	B	1	43	60	66	17	15	Increase	0	1	0
R05-092	365	B	1	50	68	66	17	15	Both	0	1	1
R05-093	366	B	1	44	71	66	27	15	Both	0	1	1
R05-094	367	B	1	41	70	66	29	15	Both	0	1	1
R05-095	368	B	1	42	64	66	22	15	Increase	0	1	0
R05-096	369	B	1	41	67	66	26	15	Both	0	1	1
R05-097	370	B	1	42	64	66	23	15	Increase	0	1	0
R05-098	371	B	1	51	68	66	18	14	Both	0	1	1
R05-099	372	B	1	41	65	66	23	15	Increase	0	1	0
R05-100	373	B	1	41	67	66	27	15	Both	0	1	1
R05-101	374	B	1	44	71	66	27	15	Both	0	1	1
R05-102	375	B	1	41	65	66	24	15	Increase	0	1	0
R05-103	376	B	1	41	68	66	27	15	Both	0	1	1
R05-104	377	B	1	41	65	66	24	15	Increase	0	1	0
R05-105	378	B	1	41	68	66	28	15	Both	0	1	1
R05-106	379	B	1	41	68	66	28	15	Both	0	1	1
R05-107	380	B	1	41	66	66	25	15	Both	0	1	1
R05-108	381	B	1	44	71	66	27	15	Both	0	1	1
R05-109	382	B	1	41	69	66	28	15	Both	0	1	1
R05-110	383	B	1	51	68	66	18	14	Both	0	1	1
R05-111	384	B	1	41	66	66	25	15	Both	0	1	1
R05-112	385	B	1	41	71	66	30	15	Both	0	1	1
R05-113	386	B	1	41	66	66	26	15	Both	0	1	1
R05-114	387	B	1	41	71	66	31	15	Both	0	1	1
R05-115	388	B	1	41	66	66	26	15	Both	0	1	1
R05-116	389	B	1	41	72	66	31	15	Both	0	1	1
R05-117	390	B	1	41	67	66	26	15	Both	0	1	1
R05-118	391	B	1	41	72	66	31	15	Both	0	1	1
R05-119	392	B	1	51	68	66	17	14	Both	0	1	1
R05-120	393	B	1	44	72	66	26	15	Both	0	1	1
R05-121	394	B	1	41	72	66	31	15	Both	0	1	1
R05-122	395	B	1	41	66	66	26	15	Both	0	1	1
R05-123	396	B	1	41	64	66	24	15	Increase	0	1	0
R05-124	397	B	1	41	67	66	26	15	Both	0	1	1
R05-125	398	B	1	41	65	66	24	15	Increase	0	1	0
R05-126	399	B	1	41	66	66	26	15	Both	0	1	1
R05-127	400	B	1	41	65	66	24	15	Increase	0	1	0
R05-128	401	B	1	41	67	66	26	15	Both	0	1	1
R05-129	402	B	1	44	71	66	27	15	Both	0	1	1

Receiver Name	No.	Land Use Category	#DUs	Existing LAeq1h (2006)	Future Build (2030)					Number of Impacts		
					LAeq1h		Increase over existing		Type Impact	Exist Sound Lvl	Future Build increase	Sound Lvl
					Calculated	Crit'n	Calculated	Crit'n				
				dBA	dBA	dBA	dB					
R05-130	403	B	1	51	67	66	15	14	Both	0	1	1
R05-131	404	B	1	41	65	66	24	15	Increase	0	1	0
R05-132	405	B	1	41	67	66	26	15	Both	0	1	1
R05-133	407	B	1	41	65	66	24	15	Increase	0	1	0
R05-134	408	B	1	41	71	66	30	15	Both	0	1	1
R05-135	409	B	1	41	70	66	30	15	Both	0	1	1
R05-136	410	B	1	41	67	66	26	15	Both	0	1	1
R05-137	411	B	1	41	70	66	29	15	Both	0	1	1
R05-138	412	B	1	41	69	66	28	15	Both	0	1	1
R05-139	413	B	1	41	68	66	28	15	Both	0	1	1
R05-140	414	B	1	41	68	66	27	15	Both	0	1	1
R05-141	415	B	1	41	65	66	24	15	Increase	0	1	0
R05-142	416	B	1	51	66	66	16	14	Both	0	1	1
R05-143	417	B	1	44	71	66	27	15	Both	0	1	1
R05-144	418	B	1	41	65	66	24	15	Increase	0	1	0
R05-145	419	B	1	41	65	66	24	15	Increase	0	1	0
R05-146	420	B	1	41	65	66	24	15	Increase	0	1	0
R05-147	421	B	1	41	73	66	32	15	Both	0	1	1
R05-148	422	B	1	41	75	66	35	15	Both	0	1	1
R05-149	423	B	1	41	65	66	24	15	Increase	0	1	0
R05-150	424	B	1	50	67	66	18	15	Both	0	1	1
R05-151	425	B	1	41	65	66	24	15	Increase	0	1	0
R05-152	426	B	1	43	72	66	28	15	Both	0	1	1
R05-153	427	B	1	41	71	66	30	15	Both	0	1	1
R05-154	428	B	1	49	68	66	19	15	Both	0	1	1
R05-155	429	B	1	43	72	66	29	15	Both	0	1	1
R05-156	430	B	1	41	69	66	28	15	Both	0	1	1
R05-157	431	B	1	41	76	66	35	15	Both	0	1	1
R05-158	432	B	1	43	73	66	29	15	Both	0	1	1
R05-159	433	B	1	49	68	66	20	15	Both	0	1	1
R05-160	434	B	1	41	70	66	29	15	Both	0	1	1
R05-161	435	B	1	41	75	66	34	15	Both	0	1	1
R05-162	436	B	1	43	73	66	31	15	Both	0	1	1
R05-163	437	B	1	48	68	66	20	15	Both	0	1	1
R05-164	438	B	1	41	76	66	35	15	Both	0	1	1
R05-165	439	B	1	41	70	66	29	15	Both	0	1	1
R05-166	440	B	1	43	74	66	31	15	Both	0	1	1
R05-167	441	B	1	48	68	66	20	15	Both	0	1	1
R05-168	442	B	1	41	75	66	34	15	Both	0	1	1
R05-169	443	B	1	41	69	66	28	15	Both	0	1	1
R05-170	444	B	1	42	73	66	31	15	Both	0	1	1
R05-171	445	B	1	41	67	66	26	15	Both	0	1	1
R05-172	446	B	1	48	68	66	20	15	Both	0	1	1
R05-173	447	B	1	41	65	66	25	15	Increase	0	1	0
R05-174	448	B	1	41	71	66	30	15	Both	0	1	1
R05-175	449	B	1	42	73	66	30	15	Both	0	1	1
R05-176	450	B	1	48	68	66	20	15	Both	0	1	1
R05-177	451	B	1	41	73	66	32	15	Both	0	1	1
R05-178	452	B	1	41	70	66	29	15	Both	0	1	1
R05-179	453	B	1	41	74	66	33	15	Both	0	1	1
R05-180	454	B	1	41	68	66	27	15	Both	0	1	1
R05-181	455	B	1	43	73	66	30	15	Both	0	1	1
R05-182	456	B	1	48	67	66	19	15	Both	0	1	1
R05-183	457	B	1	41	66	66	25	15	Both	0	1	1
R05-184	458	B	1	41	67	66	27	15	Both	0	1	1
R05-185	459	B	1	43	72	66	29	15	Both	0	1	1
R05-186	460	B	1	49	66	66	18	15	Both	0	1	1
R05-187	461	B	1	41	73	66	32	15	Both	0	1	1
R05-188	462	B	1	41	67	66	26	15	Both	0	1	1
R05-189	463	B	1	43	72	66	29	15	Both	0	1	1
R05-190	464	B	1	50	66	66	17	15	Both	0	1	1
R05-191	465	B	1	41	72	66	31	15	Both	0	1	1
R05-192	466	B	1	41	67	66	26	15	Both	0	1	1
R05-193	467	B	1	43	70	66	27	15	Both	0	1	1
R05-194	468	B	1	50	66	66	16	15	Both	0	1	1
R05-195	469	B	1	41	70	66	29	15	Both	0	1	1
R05-196	470	B	1	41	71	66	30	15	Both	0	1	1
R05-197	471	B	1	41	67	66	27	15	Both	0	1	1
R05-198	472	B	1	43	70	66	27	15	Both	0	1	1
R05-199	473	B	1	41	70	66	29	15	Both	0	1	1
R05-200	474	B	1	49	66	66	17	15	Both	0	1	1
R05-201	475	B	1	41	67	66	27	15	Both	0	1	1
R05-202	476	B	1	41	70	66	30	15	Both	0	1	1
R05-203	477	B	1	43	70	66	27	15	Both	0	1	1

Receiver Name	No.	Land Use Category	#DUs	Existing LAeq1h (2006)	Future Build (2030)					Number of Impacts		
					LAeq1h		Increase over existing		Type Impact	Exist		Future Build
					Calculated	Crit'n	Calculated	Crit'n		Sub'l Inc	Sound Lvl	increase
					dBA	dBA	dBA	dB	dB			
R05-204	478	B	1	50	66	66	17	15	Both	0	1	1
R05-205	479	B	1	41	71	66	30	15	Both	0	1	1

Receiver Name	No.	Land Use Category	#DUs	Existing LAeq1h (2006)	Future Build (2030)					Number of Impacts		
					LAeq1h		Increase over existing		Type Impact	Exist	Future Build	
					Calculated	Crit'n	Calculated	Crit'n		Sound Lvl	increase	Sound Lvl
dBA	dBA	dB	dB									
R05-206	480	B	1	41	68	66	27	15	Both	0	1	1
R05-207	481	B	1	43	70	66	26	15	Both	0	1	1
R05-208	482	B	1	50	67	66	16	15	Both	0	1	1
R05-209	483	B	1	41	68	66	27	15	Both	0	1	1
R05-210	484	B	1	41	71	66	30	15	Both	0	1	1
R05-211	485	B	1	51	67	66	16	14	Both	0	1	1
R05-212	486	B	1	45	68	66	23	15	Both	0	1	1
R05-213	487	B	1	41	70	66	29	15	Both	0	1	1
R05-214	488	B	1	41	70	66	29	15	Both	0	1	1
R05-215	489	B	1	41	71	66	31	15	Both	0	1	1
R05-216	490	B	1	50	66	66	16	15	Both	0	1	1
R05-217	491	B	1	42	72	66	30	15	Both	0	1	1
R05-218	492	B	1	50	66	66	16	15	Both	0	1	1
R05-219	493	B	1	41	69	66	28	15	Both	0	1	1
R05-220	494	B	1	41	68	66	27	15	Both	0	1	1
R05-221	495	B	1	50	65	66	15	15	Increase	0	1	0
R05-222	496	B	1	41	69	66	28	15	Both	0	1	1
R05-223	497	B	1	41	72	66	31	15	Both	0	1	1
R05-224	498	B	1	44	68	66	24	15	Both	0	1	1
R05-225	499	B	1	42	69	66	27	15	Both	0	1	1
R05-226	500	B	1	41	65	66	24	15	Increase	0	1	0
R05-227	501	B	1	41	67	66	27	15	Both	0	1	1
R05-228	502	B	1	45	66	66	21	15	Both	0	1	1
R05-229	503	B	1	41	65	66	25	15	Increase	0	1	0
R05-230	504	B	1	42	67	66	25	15	Both	0	1	1
R05-231	505	B	1	41	66	66	25	15	Both	0	1	1
R05-232	506	B	1	41	66	66	25	15	Both	0	1	1
R05-233	507	B	1	41	69	66	28	15	Both	0	1	1
R05-234	508	B	1	41	67	66	27	15	Both	0	1	1
R05-235	509	B	1	42	65	66	23	15	Increase	0	1	0
R05-236	510	B	1	41	68	66	27	15	Both	0	1	1
R05-237	511	B	1	41	66	66	26	15	Both	0	1	1
R05-238	512	B	1	41	67	66	26	15	Both	0	1	1
R05-239	513	B	1	41	65	66	24	15	Increase	0	1	0
R05-240	514	B	1	42	64	66	22	15	Increase	0	1	0
R05-241	515	B	1	41	65	66	25	15	Increase	0	1	0
R05-242	516	B	1	41	65	66	24	15	Increase	0	1	0
R05-243	517	B	1	41	64	66	23	15	Increase	0	1	0
R05-244	518	B	1	41	65	66	24	15	Increase	0	1	0
R05-245	520	B	1	41	65	66	24	15	Increase	0	1	0
R05-246	521	B	1	41	64	71	23	15	Increase	0	1	0
AREA TOTALS										0	230	191

Receiver Name	No.	Land Use Category	#DUs	Existing LAeq1h (2006)	Future Build (2030)					Number of Impacts		
					LAeq1h		Increase over existing		Type Impact	Exist Sound Lvl	Future Build Sound Lvl	
					Calculated	Crit'n	Calculated	Crit'n Sub'l Inc				Increase
				dBA	dBA	dBA	dB	dB				
AREA 06												
R06-01	74	B	1	41	63	66	23	15	Increase	0	1	0
R06-02	75	B	1	41	65	66	24	15	Increase	0	1	0
R06-03	76	B	1	41	67	68	26	15	Both	0	1	1
R06-04	77	B	1	41	63	66	23	15	Increase	0	1	0
R06-05	78	B	1	41	68	66	28	15	Both	0	1	1
R06-06	79	B	1	41	64	66	23	15	Increase	0	1	0
R06-07	80	B	1	41	70	66	29	15	Both	0	1	1
R06-08	81	B	1	41	68	66	27	15	Both	0	1	1
R06-09	82	B	1	41	67	66	26	15	Both	0	1	1
R06-10	83	B	1	41	71	66	30	15	Both	0	1	1
R06-11	84	B	1	41	62	66	21	15	Increase	0	1	0
R06-12	85	B	1	41	64	66	23	15	Increase	0	1	0
R06-13	86	B	1	41	72	66	31	15	Both	0	1	1
R06-14	87	B	1	41	68	66	27	15	Both	0	1	1
R06-15	88	B	1	41	72	66	32	15	Both	0	1	1
R06-16	89	B	1	41	62	66	21	15	Increase	0	1	0
R06-17	90	B	1	41	68	66	27	15	Both	0	1	1
R06-18	91	B	1	41	71	66	31	15	Both	0	1	1
R06-19	92	B	1	41	66	66	28	15	Both	0	1	1
R06-20	93	B	1	41	72	66	31	15	Both	0	1	1
R06-21	94	B	1	41	62	66	22	15	Increase	0	1	0
R06-22	95	B	1	41	71	66	31	15	Both	0	1	1
R06-23	96	B	1	41	63	66	22	15	Increase	0	1	0
R06-24	97	B	1	41	70	66	29	15	Both	0	1	1
R06-25	98	B	1	41	61	66	21	15	Increase	0	1	0
R06-26	99	B	1	41	65	66	24	15	Increase	0	1	0
R06-27	100	B	1	41	61	66	20	15	Increase	0	1	0
R06-28	101	B	1	41	63	66	22	15	Increase	0	1	0
R06-29	102	B	1	44	64	66	20	15	Increase	0	1	0
R06-30	103	B	1	41	64	66	24	15	Increase	0	1	0
R06-31	104	B	1	42	57	66	15	15	Increase	0	1	0
R06-32	105	B	1	42	63	66	22	15	Increase	0	1	0
R06-33	106	B	1	43	57	66	15	15	Increase	0	1	0
R06-34	107	B	1	43	63	66	21	15	Increase	0	1	0
R06-35	108	B	1	44	57	66	14	15		0	0	0
R06-36	109	B	1	47	68	66	21	15	Both	0	1	1
R06-37	110	B	1	43	54	66	11	15		0	0	0
R06-38	111	B	1	44	63	66	19	15	Increase	0	1	0
R06-39	112	B	1	45	57	66	12	15		0	0	0
R06-40	113	B	1	46	64	66	18	15	Increase	0	1	0
R06-41	114	B	1	46	59	66	12	15		0	0	0
R06-42	115	B	1	59	67	66	8	10	Snd Lvl	0	0	1
R06-43	116	B	1	46	57	66	11	15		0	0	0
R06-44	117	B	1	48	63	66	16	15	Increase	0	1	0
R06-45	118	B	1	59	67	66	8	10	Snd Lvl	0	0	1
R06-46	119	B	1	48	60	66	12	15		0	0	0
R06-47	120	B	1	50	65	66	14	15		0	0	0
R06-48	121	B	1	54	67	66	13	11	Both	0	1	1
R06-49	122	B	1	53	62	66	9	12		0	0	0
R06-50	123	B	1	54	60	66	5	11		0	0	0
R06-51	124	B	1	59	69	66	10	10	Both	0	1	1
R06-52	125	B	1	59	67	66	7	10	Snd Lvl	0	0	1
R06-53	126	B	1	59	61	66	1	10		0	0	0
R06-54	127	B	1	58	62	66	4	10		0	0	0
R06-55	128	B	1	43	73	66	30	15	Both	0	1	1
R06-56	129	B	1	45	67	66	22	15	Both	0	1	1
AREA TOTALS										0	42	23

Receiver Name	No.	Land Use Category	#DUs	Existing LAeq1h (2006)	Future Build (2030)					Number of Impacts		
					LAeq1h		Increase over existing		Type Impact	Exist	Future Build	
					Calculated	Crit'n	Calculated	Crit'n Sub'l Inc		Sound Lvl	Increase	Sound Lvl
				dBA	dBA	dBA	dB	dB				
<b>AREA 07</b>												
R07-01	41	B	1	41	64	66	23	15	Increase	0	1	0
R07-02	42	B	1	42	67	66	25	15	Both	0	1	1
R07-03	43	B	1	42	63	66	21	15	Increase	0	1	0
R07-04	44	B	1	44	65	66	21	15	Increase	0	1	0
R07-05	45	B	1	44	63	66	20	15	Increase	0	1	0
R07-06	46	B	1	45	66	66	21	15	Both	0	1	1
R07-07	47	B	1	51	60	66	10	14		0	0	0
R07-08	48	B	1	46	60	66	14	15		0	0	0
R07-09	50	B	1	53	60	66	7	12		0	0	0
R07-10	51	B	1	56	62	66	6	10		0	0	0
R07-11	52	B	1	57	60	66	4	10		0	0	0
R07-12	53	B	1	58	63	66	5	10		0	0	0
R07-13	54	B	1	68	74	66	6	10	Snd Lvl	1	0	1
R07-14	55	B	1	68	74	66	6	10	Snd Lvl	1	0	1
R07-15	56	B	1	57	63	66	6	10		0	0	0
R07-17	58	B	1	54	61	66	7	11		0	0	0
R07-19	60	B	1	62	67	66	4	10	Snd Lvl	0	0	1
R07-20	61	B	1	50	59	66	9	15		0	0	0
R07-22	63	B	1	57	62	66	6	10		0	0	0
R07-23	64	B	1	49	69	66	20	15	Both	0	1	1
R07-24	65	B	1	49	66	66	18	15	Both	0	1	1
R07-25	66	B	1	58	67	66	9	10	Snd Lvl	0	0	1
R07-27	68	B	1	50	66	66	16	15	Both	0	1	1
R07-31	72	B	1	60	69	66	9	10	Snd Lvl	0	0	1
R07-32	73	B	1	58	66	66	8	10	Snd Lvl	0	0	1
R07-33	74	B	1	58	65	66	8	10		0	0	0
R07-34	77	B	1	48	71	66	23	15	Both	0	1	1
R07-38	81	B	1	54	64	66	10	11		0	0	0
R07-39	82	B	1	41	69	66	28	15	Both	0	1	1
R07-40	83	B	1	41	70	66	29	15	Both	0	1	1
<b>AREA TOTALS</b>										<b>2</b>	<b>12</b>	<b>14</b>

<b>AREA 08</b>												
Receiver Name	No.	Land Use Category	#DUs	Existing LAeq1h (2006)	Future Build (2030) LAeq1h Calculated	Future Build (2030) Crit'n	Increase over existing Calculated	Increase over existing Crit'n	Type Impact	Exist Sound Lvl	Future Build Increase	Future Build Sound Lvl
R08-01	16	B	1	41	64	66	23	15	Increase	0	1	0
R08-04	19	B	1	52	61	66	9	13		0	0	0
R08-05	20	B	1	52	63	66	11	13		0	0	0
R08-06	21	B	1	51	66	66	15	14	Both	0	1	1
R08-07	22	B	1	41	65	66	25	15	Increase	0	1	0
R08-09	24	B	1	52	68	66	16	13	Both	0	1	1
R08-10	25	B	1	50	64	66	14	15		0	0	0
R08-11	26	B	1	47	61	66	14	15		0	0	0
R08-13	28	B	1	41	70	66	29	15	Both	0	1	1
R08-14	29	B	1	41	70	66	29	15	Both	0	1	1
R08-15	30	B	1	41	67	66	27	15	Both	0	1	1
R08-16	31	B	1	41	72	66	32	15	Both	0	1	1
R08-17	32	B	1	41	67	66	26	15	Both	0	1	1
<b>AREA TOTALS</b>										<b>0</b>	<b>9</b>	<b>7</b>

<b>AREA 09</b>												
Receiver Name	No.	Land Use Category	#DUs	Existing LAeq1h (2006)	Future Build (2030) LAeq1h Calculated	Future Build (2030) Crit'n	Increase over existing Calculated	Increase over existing Crit'n	Type Impact	Exist Sound Lvl	Future Build Increase	Future Build Sound Lvl
R09-01	1	B	1	64	72	66	9	10	Snd Lvl	0	0	1
R09-02	2	B	1	61	70	66	9	10	Snd Lvl	0	0	1
R09-07	10	B	1	53	65	66	12	12	Increase	0	1	0
R09-09	12	B	1	41	63	66	23	15	Increase	0	1	0
R09-10	13	B	1	41	64	66	23	15	Increase	0	1	0
<b>AREA TOTALS</b>										<b>0</b>	<b>3</b>	<b>2</b>

Receiver Name	No.	Land Use Category	#DUs	Existing LAeq1h (2006)	Future Build (2030)					Number of Impacts		
					LAeq1h		Increase over existing		Type Impact	Exist	Future Build	
					Calculated	Crit'n	Calculated	Crit'n		Sound Lvl	Increase	Sound Lvl
					dBA	dBA	dBA	dB				
AREA 10												
R10-01	49	B	1	41	69	66	29	15	Both	0	1	1
R10-02	50	B	1	41	71	66	30	15	Both	0	1	1
R10-03	51	B	1	41	65	66	25	15	Increase	0	1	0
R10-04	52	B	1	41	63	66	23	15	Increase	0	1	0
R10-05	53	B	1	41	71	66	31	15	Both	0	1	1
R10-06	54	B	1	41	71	66	31	15	Both	0	1	1
R10-07	55	B	1	41	71	66	31	15	Both	0	1	1
R10-08	56	B	1	41	65	66	25	15	Increase	0	1	0
R10-09	57	B	1	41	63	66	23	15	Increase	0	1	0
R10-10	58	B	1	41	71	66	30	15	Both	0	1	1
R10-11	59	B	1	41	65	66	25	15	Increase	0	1	0
R10-12	60	B	1	41	63	66	22	15	Increase	0	1	0
R10-13	61	B	1	41	70	66	30	15	Both	0	1	1
R10-14	95	B	1	41	69	66	29	15	Both	0	1	1
R10-15	103	B	1	41	64	66	23	15	Increase	0	1	0
R10-16	104	B	1	41	68	66	28	15	Both	0	1	1
R10-17	105	B	1	41	67	66	27	15	Both	0	1	1
R10-18	106	B	1	41	63	66	22	15	Increase	0	1	0
R10-19	107	B	1	41	66	66	26	15	Both	0	1	1
R10-20	108	B	1	41	65	66	25	15	Increase	0	1	0
R10-21	109	B	1	41	65	66	24	15	Increase	0	1	0
R10-22	110	B	1	41	63	66	22	15	Increase	0	1	0
R10-23	111	B	1	41	64	66	23	15	Increase	0	1	0
R10-24	112	B	1	41	64	66	23	15	Increase	0	1	0
R10-25	113	B	1	48	65	66	17	15	Increase	0	1	0
R10-29	117	B	1	41	69	66	28	15	Both	0	1	1
R10-30	118	B	1	41	62	66	22	15	Increase	0	1	0
R10-31	119	B	1	41	61	66	20	15	Increase	0	1	0
R10-32	120	B	1	41	63	66	23	15	Increase	0	1	0
R10-33	121	B	1	41	63	66	22	15	Increase	0	1	0
R10-34	122	B	1	41	64	66	23	15	Increase	0	1	0
R10-35	123	B	1	41	63	66	23	15	Increase	0	1	0
R10-36	124	B	1	41	66	66	26	15	Both	0	1	1
AREA TOTALS										0	33	13

Receiver Name	No.	Land Use Category	#DUs	Existing LAeq1h (2006)	Future Build (2030)					Number of Impacts		
					LAeq1h		Increase over existing		Type Impact	Exist Sound Lvl	Future Build increase	Sound Lvl
					Calculated	Crit'n	Calculated	Crit'n				
dBA	dBA	dBA	dB	dB								
AREA 11												
R11-01	1	B	1	41	61	66	20	15	Increase	0	1	0
R11-02	2	B	1	41	65	66	25	15	Increase	0	1	0
R11-03	3	B	1	41	63	66	22	15	Increase	0	1	0
R11-04	4	B	1	41	71	68	30	15	Both	0	1	1
R11-05	5	B	1	41	65	66	24	15	Increase	0	1	0
R11-06	6	B	1	41	63	66	22	15	Increase	0	1	0
R11-07	7	B	1	41	71	66	30	15	Both	0	1	1
R11-08	8	B	1	41	68	66	27	15	Both	0	1	1
R11-09	9	B	1	41	64	66	23	15	Increase	0	1	0
R11-10	10	B	1	41	71	66	30	15	Both	0	1	1
R11-11	11	B	1	41	62	66	22	15	Increase	0	1	0
R11-12	12	B	1	41	69	66	29	15	Both	0	1	1
R11-13	13	B	1	41	64	66	24	15	Increase	0	1	0
R11-14	14	B	1	41	67	66	26	15	Both	0	1	1
R11-15	15	B	1	41	63	66	22	15	Increase	0	1	0
R11-16	16	B	1	41	65	66	24	15	Increase	0	1	0
R11-17	17	B	1	41	63	66	22	15	Increase	0	1	0
R11-18	18	B	1	41	67	66	26	15	Both	0	1	1
R11-19	19	B	1	41	63	66	22	15	Increase	0	1	0
R11-20	20	B	1	41	67	66	27	15	Both	0	1	1
R11-21	21	B	1	41	63	66	22	15	Increase	0	1	0
R11-22	22	B	1	41	66	66	25	15	Both	0	1	1
R11-23	23	B	1	41	64	66	24	15	Increase	0	1	0
R11-24	24	B	1	41	63	66	22	15	Increase	0	1	0
R11-25	25	B	1	41	68	66	27	15	Both	0	1	1
R11-26	26	B	1	41	71	66	30	15	Both	0	1	1
R11-27	27	B	1	41	65	66	25	15	Increase	0	1	0
R11-28	28	B	1	41	64	66	23	15	Increase	0	1	0
R11-29	29	B	1	41	72	66	31	15	Both	0	1	1
R11-30	30	B	1	42	65	66	23	15	Increase	0	1	0
R11-31	31	B	1	42	72	66	30	15	Both	0	1	1
R11-32	32	B	1	43	65	66	22	15	Increase	0	1	0
R11-33	33	B	1	44	70	66	26	15	Both	0	1	1
R11-34	34	B	1	44	67	66	23	15	Both	0	1	1
R11-35	35	B	1	52	64	66	12	13		0	0	0
R11-36	36	B	1	55	66	66	12	10	Both	0	1	1
R11-37	37	B	1	64	70	66	7	10	Snd Lvl	0	0	1
R11-38	38	B	1	60	68	66	8	10	Snd Lvl	0	0	1
R11-39	39	B	1	59	64	68	5	10		0	0	0
R11-40	40	B	1	56	68	66	12	10	Both	0	1	1
R11-41	41	B	1	55	63	66	8	10		0	0	0
R11-42	42	B	1	54	68	66	15	11	Both	0	1	1
R11-43	43	B	1	52	63	66	11	13		0	0	0
R11-44	44	B	1	51	68	66	17	14	Both	0	1	1
R11-45	45	B	1	50	64	66	14	15		0	0	0
R11-46	46	B	1	49	69	66	20	15	Both	0	1	1
R11-47	47	B	1	48	64	66	16	15	Increase	0	1	0
R11-48	48	B	1	47	69	66	22	15	Both	0	1	1
R11-49	49	B	1	47	64	66	18	15	Increase	0	1	0
R11-50	50	B	1	47	62	66	16	15	Increase	0	1	0
R11-51	51	B	1	46	63	66	17	15	Increase	0	1	0
R11-52	52	B	1	46	69	66	23	15	Both	0	1	1
R11-53	53	B	1	45	63	66	18	15	Increase	0	1	0
R11-54	54	B	1	44	68	66	24	15	Both	0	1	1
R11-55	55	B	1	44	66	66	21	15	Both	0	1	1
R11-56	56	B	1	44	67	66	23	15	Both	0	1	1
R11-57	57	B	1	43	68	66	25	15	Both	0	1	1
R11-58	58	B	1	42	63	66	21	15	Increase	0	1	0
R11-59	59	B	1	43	69	66	26	15	Both	0	1	1
R11-60	60	B	1	42	64	66	22	15	Increase	0	1	0
R11-61	61	B	1	42	65	66	23	15	Increase	0	1	0
R11-62	62	B	1	42	70	66	28	15	Both	0	1	1
R11-63	63	B	1	42	66	66	24	15	Both	0	1	1
R11-64	64	B	1	41	70	66	29	15	Both	0	1	1
R11-65	65	B	1	41	70	66	29	15	Both	0	1	1
R11-66	66	B	1	41	65	66	24	15	Increase	0	1	0
R11-67	67	B	1	41	64	66	23	15	Increase	0	1	0
R11-68	68	B	1	41	63	66	23	15	Increase	0	1	0
R11-69	69	B	1	41	69	66	28	15	Both	0	1	1
R11-70	70	B	1	41	68	66	28	15	Both	0	1	1
R11-71	71	B	1	41	67	66	26	15	Both	0	1	1
R11-72	72	B	1	41	66	66	25	15	Both	0	1	1
R11-73	73	B	1	41	65	66	24	15	Increase	0	1	0

Receiver Name	No.	Land Use Category	#DUs	Existing LAeq1h (2006)	Future Build (2030)					Number of Impacts		
					LAeq1h		Increase over existing			Exist	Future Build	
					Calculated	Crit'n	Calculated	Crit'n	Type	Sound Lvl	increase	Sound Lvl
					dB	dB	dB	dB	Impact			
R11-74	74	B	1	41	64	66	23	15	Increase	0	1	0
R11-75	75	B	1	41	61	66	20	15	Increase	0	1	0
R11-76	85	B	1	41	64	66	24	15	Increase	0	1	0
AREA TOTALS										0	69	37

Receiver Name	No.	Land Use Category	#DUs	Existing LAeq1h (2006)	Future Build (2030)					Number of Impacts		
					LAeq1h		Increase over existing			Exist	Future Build	
					Calculated	Crit'n	Calculated	Crit'n	Type	Sound Lvl	increase	Sound Lvl
					dBA	dBA	dBA	dB	dB			
AREA 12												
R12-01	6	B	1	41	71	66	29	15	Both	0	1	1
R12-02	7	B	1	62	68	66	6	10	Snd Lvl	0	0	1
R12-04	9	B	1	53	69	66	16	12	Both	0	1	1
R12-05	10	B	1	55	69	66	14	10	Both	0	1	1
AREA TOTALS										0	3	4

## **Appendix C**

### Noise Barrier Results

RESULTS: SOUND LEVELS

PROJECT/CONTRACT: WWP Re-evaluation R-2635

RUN: TNM NOISE RESULTS

Receiver Name	No.	Land Use Category	#DUs	Future Build (2030)		With Barrier				Number of Benefits
				L <sub>Aeq</sub> 1h	Type	Calculated L <sub>Aeq</sub> 1h	Noise Reduction		Calculated minus Goal	
				Calculated	Impact		Calculated	Goal		
				dBA		dBA	dB	dB	dB	

AREA\_01

C01-01	43	C	1	67		63	4	5	-1	0
C01-02	44	C	1	63		59	4	5	-1	0
C01-03	46	C	1	63		63	0	5	-5	0
R01-01	47	B	1	71	Snd Lvl	70	1	5	-4	0
R01-02	48	B	1	72	Snd Lvl	72	0	5	-5	0
R01-03	49	B	1	67	Snd Lvl	67	0	5	-5	0
R01-04	50	B	1	69	Snd Lvl	65	4	5	-1	0
R01-05	51	B	1	63		63	0	5	-5	0
R01-06	52	B	1	66	Snd Lvl	66	0	5	-5	0
R01-07	53	B	1	64		64	0	5	-5	0
R01-09	55	B	1	61		61	0	5	-5	0
R01-10	56	B	1	61		61	0	5	-5	0
R01-11	57	B	1	61		61	0	5	-5	0
R01-13	59	B	1	62		62	0	5	-5	0
R01-14	60	B	1	61		61	0	5	-5	0
R01-15	61	B	1	63		63	0	5	-5	0
R01-16	62	B	1	64		64	0	5	-5	0
R01-17	63	B	1	60		60	0	5	-5	0
R01-19	65	B	1	60		60	0	5	-5	0
R01-20	66	B	1	62		62	0	5	-5	0
R01-21	67	B	1	63		63	0	5	-5	0
R01-22	68	B	1	59		59	0	5	-5	0
R01-23	69	B	1	58		58	0	5	-5	0
R01-24	70	B	1	58		58	0	5	-5	0
R01-25	72	B	1	60		60	0	5	-5	0
R01-26	73	B	1	61		61	0	5	-5	0
R01-27	74	B	1	63		62	1	5	-4	0
AREA TOTALS										0

AREA\_02

R02-01	4	B	1	55	Increase	55	0	5	-5	0
AREA TOTALS										0

Receiver Name	No.	Land Use Category	#DUs	Future Build (2030)		With Barrier				Number of Benefits
				LAeq1h	Type Impact	Calculated LAeq1h	Noise Reduction		Calculated minus Goal	
				Calculated			Calculated	Goal		
				dBA		dBA	dB	dB	dB	

AREA\_03

R03-01	13	B	1	60		60	0	5	-5	0
R03-02	14	B	1	62		62	0	5	-5	0
R03-03	15	B	1	71	Both	58	13	5	8	1
R03-04	16	B	1	63	Increase	57	6	5	1	1
R03-05	17	B	1	62	Increase	57	5	5	0	1
R03-06	18	B	1	61	Increase	57	4	5	-1	0
R03-09	21	B	1	60		60	0	5	-5	0
R03-10	28	B	1	60		60	0	5	-5	0
R03-11	29	B	1	60		60	0	5	-5	0
R03-12	30	B	1	63		63	0	5	-5	0
C03-01	31	C	1	58		58	0	5	-5	0
AREA TOTALS										3

AREA\_04

R04-01	14	B	1	59		59	0	5	-5	0
R04-02	15	B	1	62		62	0	5	-5	0
R04-03	16	B	1	63	Increase	63	0	5	-5	0
R04-04	17	B	1	67	Both	67	0	5	-5	0
R04-05	18	B	1	65	Increase	65	0	5	-5	0
R04-07	20	B	1	61		60	1	5	-4	0
R04-10	23	B	1	59		55	4	5	-1	0
R04-11	24	B	1	61		60	1	5	-4	0
R04-12	25	B	1	66	Both	66	0	5	-5	0
AREA TOTALS										0

AREA\_05

R05-001	274	B	1	64	Increase	64	0	5	-5	0
R05-002	275	B	1	63	Increase	63	0	5	-5	0
R05-003	276	B	1	64		64	0	5	-5	0
R05-005	278	B	1	68	Both	66	2	5	-3	0
R05-006	279	B	1	68	Both	65	3	5	-2	0
R05-007	280	B	1	68	Both	65	3	5	-2	0
R05-008	281	B	1	70	Both	66	4	5	-1	0
R05-009	282	B	1	68	Both	61	7	5	2	1
R05-010	283	B	1	67	Both	61	6	5	1	1
R05-011	284	B	1	70	Both	62	8	5	3	1
R05-012	285	B	1	64		64	0	5	-5	0
R05-013	286	B	1	65		65	0	5	-5	0
R05-014	287	B	1	66	Both	60	6	5	1	1
R05-015	288	B	1	73	Both	63	10	5	5	1
R05-016	289	B	1	68	Both	61	7	5	2	1
R05-017	290	B	1	67	Both	62	5	5	0	1
R05-018	291	B	1	69	Both	61	8	5	3	1
R05-019	292	B	1	67	Both	63	4	5	-1	0
R05-020	293	B	1	67	Both	64	3	5	-2	0

Receiver Name	No.	Land Use Category	#DUs	Future Build (2030)		With Barrier				Number of Benefits
				LAeq1h	Type	Calculated LAeq1h	Noise Reduction		Calculated minus Goal	
				Calculated	Impact		Calculated	Goal		
						dBA	dB	dB	dB	
R05-021	294	B	1	68	Snd Lvl	66	2	5	-3	0
R05-022	295	B	1	69	Both	60	9	5	4	1
R05-023	296	B	1	66	Both	60	6	5	1	1
R05-024	297	B	1	72	Both	62	10	5	5	1
R05-025	298	B	1	67	Snd Lvl	67	0	5	-5	0
R05-026	299	B	1	69	Both	60	9	5	4	1
R05-027	300	B	1	67	Snd Lvl	67	0	5	-5	0
R05-028	301	B	1	67	Snd Lvl	67	0	5	-5	0
R05-029	302	B	1	66	Snd Lvl	64	2	5	-3	0
R05-030	303	B	1	67	Snd Lvl	67	0	5	-5	0
R05-031	304	B	1	69	Both	60	9	5	4	1
R05-032	305	B	1	66	Snd Lvl	66	0	5	-5	0
R05-033	306	B	1	69	Both	60	9	5	4	1
R05-034	307	B	1	66	Snd Lvl	66	0	5	-5	0
R05-035	308	B	1	66	Both	64	2	5	-3	0
R05-036	309	B	1	66	Snd Lvl	66	0	5	-5	0
R05-037	310	B	1	66	Snd Lvl	66	0	5	-5	0
R05-038	311	B	1	65	Increase	57	8	5	3	1
R05-039	312	B	1	65	Increase	63	2	5	-3	0
R05-040	313	B	1	70	Both	60	10	5	5	1
R05-041	314	B	1	67	Both	60	7	5	2	1
R05-042	315	B	1	72	Both	62	10	5	5	1
R05-043	316	B	1	65	Increase	58	7	5	2	1
R05-044	317	B	1	70	Both	61	9	5	4	1
R05-045	318	B	1	65	Increase	58	7	5	2	1
R05-046	319	B	1	65	Increase	55	10	5	5	1
R05-047	320	B	1	70	Both	61	9	5	4	1
R05-048	321	B	1	64		57	7	5	2	1
R05-049	322	B	1	66	Both	55	11	5	6	1
R05-050	323	B	1	70	Both	61	9	5	4	1
R05-051	324	B	1	71	Both	61	10	5	5	1
R05-052	325	B	1	66	Both	56	10	5	5	1
R05-053	326	B	1	67	Both	60	7	5	2	1
R05-054	327	B	1	70	Both	61	9	5	4	1
R05-055	328	B	1	63		58	5	5	0	1
R05-056	329	B	1	66	Both	56	10	5	5	1
R05-057	330	B	1	70	Both	61	9	5	4	1
R05-058	331	B	1	67	Both	56	11	5	6	1
R05-059	332	B	1	70	Both	61	9	5	4	1
R05-060	333	B	1	63	Increase	57	6	5	1	1
R05-061	334	B	1	68	Both	60	8	5	3	1
R05-062	335	B	1	66	Both	56	10	5	5	1
R05-063	336	B	1	71	Both	61	10	5	5	1
R05-064	337	B	1	62	Increase	55	7	5	2	1
R05-065	338	B	1	70	Both	62	8	5	3	1
R05-066	339	B	1	62	Increase	55	7	5	2	1
R05-067	340	B	1	70	Both	62	8	5	3	1

Receiver Name	No.	Land Use Category	#DUs	Future Build (2030)		With Barrier				Number of Benefits
				LAEq1h	Type Impact	Calculated LAeq1h	Noise Reduction		Calculated minus Goal	
				Calculated			Calculated	Goal		
				dBA		dBA	dB	dB	dB	
R05-068	341	B	1	61	Increase	54	7	5	2	1
R05-069	342	B	1	70	Both	62	8	5	3	1
R05-070	343	B	1	61	Increase	54	7	5	2	1
R05-071	344	B	1	68	Both	60	8	5	3	1
R05-072	345	B	1	71	Both	62	9	5	4	1
R05-073	346	B	1	70	Both	62	8	5	3	1
R05-074	347	B	1	61	Increase	53	8	5	3	1
R05-075	348	B	1	71	Both	61	10	5	5	1
R05-076	349	B	1	60	Increase	53	7	5	2	1
R05-077	350	B	1	60	Increase	53	7	5	2	1
R05-078	351	B	1	71	Both	62	9	5	4	1
R05-079	352	B	1	67	Both	60	7	5	2	1
R05-080	353	B	1	72	Both	61	11	5	6	1
R05-081	354	B	1	71	Both	61	10	5	5	1
R05-082	355	B	1	71	Both	61	10	5	5	1
R05-083	356	B	1	71	Both	61	10	5	5	1
R05-084	357	B	1	59	Increase	52	7	5	2	1
R05-085	358	B	1	71	Both	61	10	5	5	1
R05-086	359	B	1	59	Increase	52	7	5	2	1
R05-087	360	B	1	59	Increase	52	7	5	2	1
R05-088	361	B	1	70	Both	60	10	5	5	1
R05-089	362	B	1	60	Increase	52	8	5	3	1
R05-090	363	B	1	71	Both	60	11	5	6	1
R05-091	364	B	1	60	Increase	53	7	5	2	1
R05-092	365	B	1	68	Both	61	7	5	2	1
R05-093	366	B	1	71	Both	61	10	5	5	1
R05-094	367	B	1	70	Both	60	10	5	5	1
R05-095	368	B	1	64	Increase	54	10	5	5	1
R05-096	369	B	1	67	Both	57	10	5	5	1
R05-097	370	B	1	64	Increase	54	10	5	5	1
R05-098	371	B	1	68	Both	60	8	5	3	1
R05-099	372	B	1	65	Increase	54	11	5	6	1
R05-100	373	B	1	67	Both	57	10	5	5	1
R05-101	374	B	1	71	Both	60	11	5	6	1
R05-102	375	B	1	65	Increase	54	11	5	6	1
R05-103	376	B	1	68	Both	58	10	5	5	1
R05-104	377	B	1	65	Increase	54	11	5	6	1
R05-105	378	B	1	68	Both	58	10	5	5	1
R05-106	379	B	1	68	Both	58	10	5	5	1
R05-107	380	B	1	66	Both	53	13	5	8	1
R05-108	381	B	1	71	Both	61	10	5	5	1
R05-109	382	B	1	69	Both	58	11	5	6	1
R05-110	383	B	1	68	Both	60	8	5	3	1
R05-111	384	B	1	66	Both	53	13	5	8	1
R05-112	385	B	1	71	Both	60	11	5	6	1
R05-113	386	B	1	66	Both	53	13	5	8	1
R05-114	387	B	1	71	Both	60	11	5	6	1

Receiver Name	No.	Land Use Category	#DUs	Future Build (2030)		With Barrier				Number of Benefits
				LAeq1h	Type Impact	Calculated LAeq1h	Noise Reduction		Calculated minus Goal	
				Calculated			Calculated	Goal		
				dBA		dBA	dB	dB	dB	
R05-115	388	B	1	66	Both	52	14	5	9	1
R05-116	389	B	1	72	Both	60	12	5	7	1
R05-117	390	B	1	67	Both	53	14	5	9	1
R05-118	391	B	1	72	Both	60	12	5	7	1
R05-119	392	B	1	68	Both	61	7	5	2	1
R05-120	393	B	1	72	Both	61	11	5	6	1
R05-121	394	B	1	72	Both	60	12	5	7	1
R05-122	395	B	1	66	Both	53	13	5	8	1
R05-123	396	B	1	64	Increase	54	10	5	5	1
R05-124	397	B	1	67	Both	53	14	5	9	1
R05-125	398	B	1	65	Increase	55	10	5	5	1
R05-126	399	B	1	66	Both	53	13	5	8	1
R05-127	400	B	1	65	Increase	55	10	5	5	1
R05-128	401	B	1	67	Both	53	14	5	9	1
R05-129	402	B	1	71	Both	61	10	5	5	1
R05-130	403	B	1	67	Both	60	7	5	2	1
R05-131	404	B	1	65	Increase	55	10	5	5	1
R05-132	405	B	1	67	Both	53	14	5	9	1
R05-133	407	B	1	65	Increase	55	10	5	5	1
R05-134	408	B	1	71	Both	59	12	5	7	1
R05-135	409	B	1	70	Both	58	12	5	7	1
R05-136	410	B	1	67	Both	53	14	5	9	1
R05-137	411	B	1	70	Both	57	13	5	8	1
R05-138	412	B	1	69	Both	57	12	5	7	1
R05-139	413	B	1	68	Both	56	12	5	7	1
R05-140	414	B	1	68	Both	56	12	5	7	1
R05-141	415	B	1	65	Increase	55	10	5	5	1
R05-142	416	B	1	66	Both	60	6	5	1	1
R05-143	417	B	1	71	Both	60	11	5	6	1
R05-144	418	B	1	65	Increase	55	10	5	5	1
R05-145	419	B	1	65	Increase	56	9	5	4	1
R05-146	420	B	1	65	Increase	56	9	5	4	1
R05-147	421	B	1	73	Both	61	12	5	7	1
R05-148	422	B	1	75	Both	61	14	5	9	1
R05-149	423	B	1	65	Increase	56	9	5	4	1
R05-150	424	B	1	67	Both	61	6	5	1	1
R05-151	425	B	1	65	Increase	56	9	5	4	1
R05-152	426	B	1	72	Both	60	12	5	7	1
R05-153	427	B	1	71	Both	60	11	5	6	1
R05-154	428	B	1	68	Both	61	7	5	2	1
R05-155	429	B	1	72	Both	61	11	5	6	1
R05-156	430	B	1	69	Both	60	9	5	4	1
R05-157	431	B	1	76	Both	63	13	5	8	1
R05-158	432	B	1	73	Both	61	12	5	7	1
R05-159	433	B	1	68	Both	61	7	5	2	1
R05-160	434	B	1	70	Both	60	10	5	5	1
R05-161	435	B	1	75	Both	63	12	5	7	1

Receiver Name	No.	Land Use Category	#DUs	Future Build (2030)		With Barrier				Number of Benefits
				LAeq1h	Type Impact	Calculated LAeq1h	Noise Reduction		Calculated minus Goal	
				Calculated			Calculated	Goal		
				dBA		dBA	dB	dB	dB	
R05-162	436	B	1	73	Both	62	11	5	6	1
R05-163	437	B	1	68	Both	61	7	5	2	1
R05-164	438	B	1	76	Both	63	13	5	8	1
R05-165	439	B	1	70	Both	60	10	5	5	1
R05-166	440	B	1	74	Both	62	12	5	7	1
R05-167	441	B	1	68	Both	60	8	5	3	1
R05-168	442	B	1	75	Both	63	12	5	7	1
R05-169	443	B	1	69	Both	60	9	5	4	1
R05-170	444	B	1	73	Both	61	12	5	7	1
R05-171	445	B	1	67	Both	59	8	5	3	1
R05-172	446	B	1	68	Both	60	8	5	3	1
R05-173	447	B	1	65	Increase	57	8	5	3	1
R05-174	448	B	1	71	Both	60	11	5	6	1
R05-175	449	B	1	73	Both	61	12	5	7	1
R05-176	450	B	1	68	Both	60	8	5	3	1
R05-177	451	B	1	73	Both	61	12	5	7	1
R05-178	452	B	1	70	Both	60	10	5	5	1
R05-179	453	B	1	74	Both	64	10	5	5	1
R05-180	454	B	1	68	Both	59	9	5	4	1
R05-181	455	B	1	73	Both	62	11	5	6	1
R05-182	456	B	1	67	Both	59	8	5	3	1
R05-183	457	B	1	66	Both	58	8	5	3	1
R05-184	458	B	1	67	Both	58	9	5	4	1
R05-185	459	B	1	72	Both	62	10	5	5	1
R05-186	460	B	1	66	Both	59	7	5	2	1
R05-187	461	B	1	73	Both	63	10	5	5	1
R05-188	462	B	1	67	Both	60	7	5	2	1
R05-189	463	B	1	72	Both	62	10	5	5	1
R05-190	464	B	1	66	Both	59	7	5	2	1
R05-191	465	B	1	72	Both	62	10	5	5	1
R05-192	466	B	1	67	Both	59	8	5	3	1
R05-193	467	B	1	70	Both	61	9	5	4	1
R05-194	468	B	1	66	Both	59	7	5	2	1
R05-195	469	B	1	70	Both	61	9	5	4	1
R05-196	470	B	1	71	Both	62	9	5	4	1
R05-197	471	B	1	67	Both	59	8	5	3	1
R05-198	472	B	1	70	Both	61	9	5	4	1
R05-199	473	B	1	70	Both	62	8	5	3	1
R05-200	474	B	1	66	Both	59	7	5	2	1
R05-201	475	B	1	67	Both	59	8	5	3	1
R05-202	476	B	1	70	Both	62	8	5	3	1
R05-203	477	B	1	70	Both	62	8	5	3	1
R05-204	478	B	1	66	Both	59	7	5	2	1
R05-205	479	B	1	71	Both	62	9	5	4	1
R05-206	480	B	1	68	Both	59	9	5	4	1
R05-207	481	B	1	70	Both	62	8	5	3	1
R05-208	482	B	1	67	Both	60	7	5	2	1

Receiver Name	No.	Land Use Category	#DUs	Future Build (2030)		With Barrier				Number of Benefits
				LAeq1h	Type Impact	Calculate d LAeq1h	Noise Reduction		Calculate d minus Goal	
				Calculated			Calculated	Goal		
				dBA		dBA	dB	dB	dB	
R05-209	483	B	1	68	Both	59	9	5	4	1
R05-210	484	B	1	71	Both	62	9	5	4	1
R05-211	485	B	1	67	Both	60	7	5	2	1
R05-212	486	B	1	68	Both	61	7	5	2	1
R05-213	487	B	1	70	Both	59	11	5	6	1
R05-214	488	B	1	70	Both	59	11	5	6	1
R05-215	489	B	1	71	Both	62	9	5	4	1
R05-216	490	B	1	66	Both	60	6	5	1	1
R05-217	491	B	1	72	Both	64	8	5	3	1
R05-218	492	B	1	66	Both	60	6	5	1	1
R05-219	493	B	1	69	Both	60	9	5	4	1
R05-220	494	B	1	68	Both	60	8	5	3	1
R05-221	495	B	1	65	Increase	61	4	5	-1	0
R05-222	496	B	1	69	Both	61	8	5	3	1
R05-223	497	B	1	72	Both	65	7	5	2	1
R05-224	498	B	1	68	Both	63	5	5	0	1
R05-225	499	B	1	69	Both	64	5	5	0	1
R05-226	500	B	1	65	Increase	58	7	5	2	1
R05-227	501	B	1	67	Both	60	7	5	2	1
R05-228	502	B	1	66	Both	63	3	5	-2	0
R05-229	503	B	1	65	Increase	58	7	5	2	1
R05-230	504	B	1	67	Both	64	3	5	-2	0
R05-231	505	B	1	66	Both	59	7	5	2	1
R05-232	506	B	1	66	Both	60	6	5	1	1
R05-233	507	B	1	69	Both	68	1	5	-4	0
R05-234	508	B	1	67	Both	61	6	5	1	1
R05-235	509	B	1	65	Increase	64	1	5	-4	0
R05-236	510	B	1	68	Both	68	0	5	-5	0
R05-237	511	B	1	66	Both	62	4	5	-1	0
R05-238	512	B	1	67	Both	67	0	5	-5	0
R05-239	513	B	1	65	Increase	65	0	5	-5	0
R05-240	514	B	1	64	Increase	64	0	5	-5	0
R05-241	515	B	1	65	Increase	61	4	5	-1	0
R05-242	516	B	1	65	Increase	61	4	5	-1	0
R05-243	517	B	1	64	Increase	64	0	5	-5	0
R05-244	518	B	1	65	Increase	63	2	5	-3	0
R05-245	520	B	1	65	Increase	65	0	5	-5	0
R05-246	521	B	1	64	Increase	64	0	5	-5	0
AREA TOTALS										206

Receiver Name	No.	Land Use Category	#DUs	Future Build (2030)		With Barrier				Number of Benefits
				LAeq1h	Type Impact	Calculated LAeq1h	Noise Reduction		Calculated minus Goal	
				Calculated			Calculated	Goal		
				dBA		dBA	dB	dB	dB	

AREA 06

R06-01	74	B	1	63	Increase	63	0	5	-5	0
R06-02	75	B	1	65	Increase	65	0	5	-5	0
R06-03	76	B	1	67	Both	66	1	5	-4	0
R06-04	77	B	1	63	Increase	62	1	5	-4	0
R06-05	78	B	1	68	Both	67	1	5	-4	0
R06-06	79	B	1	64	Increase	62	2	5	-3	0
R06-07	80	B	1	70	Both	66	4	5	-1	0
R06-08	81	B	1	68	Both	65	3	5	-2	0
R06-09	82	B	1	67	Both	64	3	5	-2	0
R06-10	83	B	1	71	Both	66	5	5	0	1
R06-11	84	B	1	62	Increase	62	0	5	-5	0
R06-12	85	B	1	64	Increase	62	2	5	-3	0
R06-13	86	B	1	72	Both	65	7	5	2	1
R06-14	87	B	1	68	Both	65	3	5	-2	0
R06-15	88	B	1	72	Both	64	8	5	3	1
R06-16	89	B	1	62	Increase	61	1	5	-4	0
R06-17	90	B	1	68	Both	64	4	5	-1	0
R06-18	91	B	1	71	Both	64	7	5	2	1
R06-19	92	B	1	66	Both	63	3	5	-2	0
R06-20	93	B	1	72	Both	63	9	5	4	1
R06-21	94	B	1	62	Increase	61	1	5	-4	0
R06-22	95	B	1	71	Both	63	8	5	3	1
R06-23	96	B	1	63	Increase	58	5	5	0	1
R06-24	97	B	1	70	Both	62	8	5	3	1
R06-25	98	B	1	61	Increase	57	4	5	-1	0
R06-26	99	B	1	65	Increase	60	5	5	0	1
R06-27	100	B	1	61	Increase	57	4	5	-1	0
R06-28	101	B	1	63	Increase	58	5	5	0	1
R06-29	102	B	13	70	Both	64	5	5	0	13
R06-30	103	B	1	64	Increase	59	5	5	0	1
R06-31	104	B	1	57	Increase	54	3	5	-2	0
R06-32	105	B	1	63	Increase	58	5	5	0	1
R06-33	106	B	1	57	Increase	54	3	5	-2	0
R06-34	107	B	1	63	Increase	59	4	5	-1	0
R06-35	108	B	1	57		55	2	5	-3	0
R06-36	109	B	13	68	Both	63	5	5	0	13
R06-37	110	B	1	54		53	1	5	-4	0
R06-38	111	B	1	63	Increase	59	4	5	-1	0
R06-39	112	B	1	57		55	2	5	-3	0
R06-40	113	B	1	64	Increase	59	5	5	0	1
R06-41	114	B	1	59		55	4	5	-1	0
R06-42	115	B	1	67	Snd Lvl	67	0	5	-5	0
R06-43	116	B	1	57		54	3	5	-2	0
R06-44	117	B	1	63	Increase	59	4	5	-1	0
R06-45	118	B	1	67	Snd Lvl	67	0	5	-5	0

Receiver Name	No.	Land Use Category	#DUs	Future Build (2030)		With Barrier				Number of Benefits
				LAeq1h	Type Impact	Calculated LAeq1h	Noise Reduction		Calculated minus Goal	
				Calculated			Calculated	Goal		
				dBA		dBA	dB	dB	dB	
R06-46	119	B	1	60		56	4	5	-1	0
R06-47	120	B	1	65		59	6	5	1	1
R06-48	121	B	1	67	Both	61	6	5	1	1
R06-49	122	B	1	62		58	4	5	-1	0
R06-50	123	B	1	60		58	2	5	-3	0
R06-51	124	B	1	69	Both	65	4	5	-1	0
R06-52	125	B	1	67	Snd Lvl	65	2	5	-3	0
R06-53	126	B	1	61		60	1	5	-4	0
R06-54	127	B	1	62		61	1	5	-4	0
R06-55	128	B	1	73	Both	73	0	5	-5	0
R06-56	129	B	1	67	Both	67	0	5	-5	0
AREA TOTALS										41

AREA\_07

R07-01	41	B	1	64	Increase	63	1	5	-4	0
R07-02	42	B	1	67	Both	65	2	5	-3	0
R07-03	43	B	1	63	Increase	61	2	5	-3	0
R07-04	44	B	1	65	Increase	65	0	5	-5	0
R07-05	45	B	1	63	Increase	59	4	5	-1	0
R07-06	46	B	1	66	Both	66	0	5	-5	0
R07-07	47	B	1	60		60	0	5	-5	0
R07-08	48	B	1	60		58	2	5	-3	0
R07-09	50	B	1	60		60	0	5	-5	0
R07-10	51	B	1	62		62	0	5	-5	0
R07-11	52	B	1	60		60	0	5	-5	0
R07-12	53	B	1	63		63	0	5	-5	0
R07-13	54	B	1	74	Snd Lvl	74	0	5	-5	0
R07-14	55	B	1	74	Snd Lvl	74	0	5	-5	0
R07-15	56	B	1	63		63	0	5	-5	0
R07-17	58	B	1	61		61	0	5	-5	0
R07-19	60	B	1	67	Snd Lvl	67	0	5	-5	0
R07-20	61	B	1	59		59	0	5	-5	0
R07-22	63	B	1	62		62	0	5	-5	0
R07-23	64	B	1	69	Both	64	5	5	0	1
R07-24	65	B	1	66	Both	61	5	5	0	1
R07-25	66	B	1	67	Snd Lvl	67	0	5	-5	0
R07-27	68	B	1	66	Both	61	5	5	0	1
R07-31	72	B	1	69	Snd Lvl	61	8	5	3	1
R07-32	73	B	1	66	Snd Lvl	62	4	5	-1	0
R07-33	74	B	1	65		62	3	5	-2	0
R07-34	77	B	1	71	Both	71	0	5	-5	0
R07-38	81	B	1	64		64	0	5	-5	0
R07-39	82	B	1	69	Both	69	0	5	-5	0
R07-40	83	B	1	70	Both	70	0	5	-5	0
AREA TOTALS										4

Receiver Name	No.	Land Use Category	#DUs	Future Build (2030)		With Barrier				Number of Benefits
				LAEq1h	Type	Calculated LAeq1h	Noise Reduction		Calculated minus Goal	
				Calculated	Impact		Calculated	Goal		
						dBA	dB	dB	dB	

AREA 08

R08-01	16	B	1	64	Increase	64	0	5	-5	0
R08-04	19	B	1	61		61	0	5	-5	0
R08-05	20	B	1	63		63	0	5	-5	0
R08-06	21	B	1	66	Both	66	0	5	-5	0
R08-07	22	B	1	65	Increase	65	0	5	-5	0
R08-09	24	B	1	68	Both	68	0	5	-5	0
R08-10	25	B	1	64		64	0	5	-5	0
R08-11	26	B	1	61		61	0	5	-5	0
R08-13	28	B	1	70	Both	70	0	5	-5	0
R08-14	29	B	1	70	Both	70	0	5	-5	0
R08-15	30	B	1	67	Both	67	0	5	-5	0
R08-16	31	B	1	72	Both	72	0	5	-5	0
R08-17	32	B	1	67	Both	67	0	5	-5	0
AREA TOTALS										0

AREA 09

R09-01	1	B	1	72	Snd Lvl	72	0	5	-5	0
R09-02	2	B	1	70	Snd Lvl	70	0	5	-5	0
R09-07	10	B	1	65	Increase	65	0	5	-5	0
R09-09	12	B	1	63	Increase	63	0	5	-5	0
R09-10	13	B	1	64	Increase	64	0	5	-5	0
AREA TOTALS										0

AREA 10

R10-01	49	B	1	69	Both	69	0	5	-5	0
R10-02	50	B	1	71	Both	71	0	5	-5	0
R10-03	51	B	1	65	Increase	65	0	5	-5	0
R10-04	52	B	1	63	Increase	63	0	5	-5	0
R10-05	53	B	1	71	Both	71	0	5	-5	0
R10-06	54	B	1	71	Both	71	0	5	-5	0
R10-07	55	B	1	71	Both	71	0	5	-5	0
R10-08	56	B	1	65	Increase	65	0	5	-5	0
R10-09	57	B	1	63	Increase	63	0	5	-5	0
R10-10	58	B	1	71	Both	71	0	5	-5	0
R10-11	59	B	1	65	Increase	65	0	5	-5	0
R10-12	60	B	1	63	Increase	63	0	5	-5	0
R10-13	61	B	1	70	Both	70	0	5	-5	0
R10-14	95	B	1	69	Both	69	0	5	-5	0
R10-15	103	B	1	64	Increase	64	0	5	-5	0
R10-16	104	B	1	68	Both	68	0	5	-5	0
R10-17	105	B	1	67	Both	67	0	5	-5	0
R10-18	106	B	1	63	Increase	63	0	5	-5	0
R10-19	107	B	1	66	Both	66	0	5	-5	0
R10-20	108	B	1	65	Increase	65	0	5	-5	0
R10-21	109	B	1	65	Increase	65	0	5	-5	0

Receiver Name	No.	Land Use Category	#DUs	Future Build (2030)		With Barrier				Number of Benefits
				LAeq1h	Type	Calculated LAeq1h	Noise Reduction		Calculated minus Goal	
				Calculated	Impact		Calculated	Goal		
						dBA	dB	dB	dB	
R10-22	110	B	1	63	Increase	63	0	5	-5	0
R10-23	111	B	1	64	Increase	64	0	5	-5	0
R10-24	112	B	1	64	Increase	64	0	5	-5	0
R10-25	113	B	1	65	Increase	65	0	5	-5	0
R10-29	117	B	1	69	Both	63	6	5	1	1
R10-30	118	B	1	62	Increase	61	1	5	-4	0
R10-31	119	B	1	61	Increase	59	2	5	-3	0
R10-32	120	B	1	63	Increase	58	5	5	0	1
R10-33	121	B	1	63	Increase	59	4	5	-1	0
R10-34	122	B	1	64	Increase	60	4	5	-1	0
R10-35	123	B	1	63	Increase	63	0	5	-5	0
R10-36	124	B	1	66	Both	66	0	5	-5	0
AREA TOTALS										2

AREA 11

R11-01	1	B	1	61	Increase	61	0	5	-5	0
R11-02	2	B	1	65	Increase	65	0	5	-5	0
R11-03	3	B	1	63	Increase	63	0	5	-5	0
R11-04	4	B	1	71	Both	71	0	5	-5	0
R11-05	5	B	1	65	Increase	65	0	5	-5	0
R11-06	6	B	1	63	Increase	63	0	5	-5	0
R11-07	7	B	1	71	Both	71	0	5	-5	0
R11-08	8	B	1	68	Both	68	0	5	-5	0
R11-09	9	B	1	64	Increase	64	0	5	-5	0
R11-10	10	B	1	71	Both	71	0	5	-5	0
R11-11	11	B	1	62	Increase	62	0	5	-5	0
R11-12	12	B	1	69	Both	69	0	5	-5	0
R11-13	13	B	1	64	Increase	64	0	5	-5	0
R11-14	14	B	1	67	Both	67	0	5	-5	0
R11-15	15	B	1	63	Increase	63	0	5	-5	0
R11-16	16	B	1	65	Increase	65	0	5	-5	0
R11-17	17	B	1	63	Increase	63	0	5	-5	0
R11-18	18	B	1	67	Both	67	0	5	-5	0
R11-19	19	B	1	63	Increase	63	0	5	-5	0
R11-20	20	B	1	67	Both	67	0	5	-5	0
R11-21	21	B	1	63	Increase	63	0	5	-5	0
R11-22	22	B	1	66	Both	66	0	5	-5	0
R11-23	23	B	1	64	Increase	64	0	5	-5	0
R11-24	24	B	1	63	Increase	63	0	5	-5	0
R11-25	25	B	1	68	Both	68	0	5	-5	0
R11-26	26	B	1	71	Both	71	0	5	-5	0
R11-27	27	B	1	65	Increase	65	0	5	-5	0
R11-28	28	B	1	64	Increase	64	0	5	-5	0
R11-29	29	B	1	72	Both	72	0	5	-5	0
R11-30	30	B	1	65	Increase	65	0	5	-5	0
R11-31	31	B	1	72	Both	72	0	5	-5	0
R11-32	32	B	1	65	Increase	65	0	5	-5	0

Receiver Name	No.	Land Use Category	#DUs	Future Build (2030)		With Barrier				Number of Benefits
				LAeq1h	Type	Calculated LAeq1h	Noise Reduction		Calculated minus Goal	
				Calculated	Impact		Calculated	Goal		
						dBA	dB	dB	dB	
R11-33	33	B	1	70	Both	70	0	5	-5	0
R11-34	34	B	1	67	Both	67	0	5	-5	0
R11-35	35	B	1	64		64	0	5	-5	0
R11-36	36	B	1	66	Both	66	0	5	-5	0
R11-37	37	B	1	70	Snd Lvl	70	0	5	-5	0
R11-38	38	B	1	68	Snd Lvl	68	0	5	-5	0
R11-39	39	B	1	64		64	0	5	-5	0
R11-40	40	B	1	68	Both	68	0	5	-5	0
R11-41	41	B	1	63		63	0	5	-5	0
R11-42	42	B	1	68	Both	68	0	5	-5	0
R11-43	43	B	1	63		63	0	5	-5	0
R11-44	44	B	1	68	Both	68	0	5	-5	0
R11-45	45	B	1	64		64	0	5	-5	0
R11-46	46	B	1	69	Both	69	0	5	-5	0
R11-47	47	B	1	64	Increase	64	0	5	-5	0
R11-48	48	B	1	69	Both	69	0	5	-5	0
R11-49	49	B	1	64	Increase	64	0	5	-5	0
R11-50	50	B	1	62	Increase	62	0	5	-5	0
R11-51	51	B	1	63	Increase	63	0	5	-5	0
R11-52	52	B	1	69	Both	69	0	5	-5	0
R11-53	53	B	1	63	Increase	63	0	5	-5	0
R11-54	54	B	1	68	Both	68	0	5	-5	0
R11-55	55	B	1	66	Both	66	0	5	-5	0
R11-56	56	B	1	67	Both	67	0	5	-5	0
R11-57	57	B	1	68	Both	68	0	5	-5	0
R11-58	58	B	1	63	Increase	63	0	5	-5	0
R11-59	59	B	1	69	Both	69	0	5	-5	0
R11-60	60	B	1	64	Increase	64	0	5	-5	0
R11-61	61	B	1	65	Increase	65	0	5	-5	0
R11-62	62	B	1	70	Both	70	0	5	-5	0
R11-63	63	B	1	66	Both	66	0	5	-5	0
R11-64	64	B	1	70	Both	70	0	5	-5	0
R11-65	65	B	1	70	Both	70	0	5	-5	0
R11-66	66	B	1	65	Increase	65	0	5	-5	0
R11-67	67	B	1	64	Increase	64	0	5	-5	0
R11-68	68	B	1	63	Increase	63	0	5	-5	0
R11-69	69	B	1	69	Both	69	0	5	-5	0
R11-70	70	B	1	68	Both	68	0	5	-5	0
R11-71	71	B	1	67	Both	67	0	5	-5	0
R11-72	72	B	1	66	Both	66	0	5	-5	0
R11-73	73	B	1	65	Increase	65	0	5	-5	0
R11-74	74	B	1	64	Increase	64	0	5	-5	0
R11-75	75	B	1	61	Increase	61	0	5	-5	0
R11-76	85	B	1	64	Increase	64	0	5	-5	0
AREA TOTALS										0

Receiver Name	No.	Land Use Category	#DUs	Future Build (2030)		With Barrier				Number of Benefits
				LAeq1h	Type Impact	Calculated LAeq1h	Noise Reduction		Calculated minus Goal	
				Calculated			Calculated	Goal		
				dBA		dBA	dB	dB	dB	

AREA 12

R12-01	6	B	1	71	Both	71	0	5	-5	0
R12-02	7	B	1	68	Snd Lvl	68	0	5	-5	0
R12-04	9	B	1	69	Both	69	0	5	-5	0
R12-05	10	B	1	69	Both	69	0	5	-5	0
AREA TOTALS										0