MD 4 (PATUXENT BEACH ROAD) PROJECT PLANNING STUDY

NOISE TECHNICAL ANALYSIS

FINAL REPORT

August 19, 2009

Calvert County & St. Mary's County, Maryland

Study Area Description
From MD 235 to Patuxent Point Parkway

Submitted To

MARYLAND DEPARTMENT OF TRANSPORTATION
STATE HIGHWAY ADMINISTRATION

OFFICE OF PLANNING AND PRELIMINARY ENGINEERING

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A. Project Description and Background

The Maryland State Highway Administration (SHA) and Federal Highway Administration (FHWA) are conducting a Project Planning Study for MD 4 in Calvert County and St. Mary's County. The project limits extend from the MD 235 intersection in St. Mary's County to the intersection of MD 2/MD 4 and Patuxent Point Parkway in Calvert County, Maryland (see Study Area Location Map, Map 1 – Section 5). The MD 4 corridor is approximately 3 miles in length, and includes the Thomas Johnson Memorial Bridge.

MD 4 is one of Maryland's original state roads. It extends approximately 65 miles from the Washington, D.C. to its terminus at MD 5, just south of Leonardtown, Maryland. The highway runs from Washington, D.C. to the southeast, connecting with I-495. After crossing I-495, MD 4 continues in a southward direction for a short distance before intersecting Marlboro Pike (a former alignment of MD 4); it then turns east and upgrades into a four-lane limited-access highway. Between 1962 and 1972, MD 4 was diverted along Southern Maryland Boulevard (then MD 416) and combined with MD 2. During this time, MD 4 replaced MD 2's companion route MD 416 for almost the entire length of Calvert County. MD 2-4, a four-lane at-grade divided highway, ended simultaneously at the southern tip of Calvert County. After the Thomas Johnson Memorial Bridge was built, MD 4 was extended across the bridge into St. Mary's County to its terminus at MD 5. This stretch of MD 4 is a two-lane undivided roadway.

The Thomas Johnson Memorial Bridge, named after the first governor of Maryland, was completed in 1977. It is a two-lane, 28-foot wide roadway with no sidewalks. The existing bridge is approximately 1.3 miles in length and spans both the Patuxent River and Town Creek. The vertical clearance at its highest point is 140 feet.

The bridge was last inspected in September 2007, and received a satisfactory rating. The bridge was closed for several months in 1990 to strengthen selected pier caps, and most recently, the aluminum expansion joints were replaced. The bridge has a Bridge Sufficiency Rating (BSR) of 67.9. A BSR of 50 or below is generally necessary to be eligible for federal bridge replacement funding.

A public boat ramp is located underneath the Thomas Johnson Memorial Bridge within existing SHA right-of-way on the Calvert County side.

SHA evaluates highway noise in two separate categories, Type 1 and Type 2. A Type 1 study is performed when new highways are constructed or existing highways are expanded. A Type 2 analysis is performed along existing highways independent of roadway improvements.

The MD 4 Planning Study involves proposed highway improvements which increase capacity, making this a Type 1 noise analysis. This report presents the results of the Noise Technical Analysis associated with the MD 4 Planning Study.

B. Purpose and Need of Project

The purpose of the project is to improve existing capacity and traffic operations, and to increase vehicular and pedestrian safety along MD 4 while supporting existing and planned development in the area. This project extends from MD 235 to Patuxent Point Parkway. MD 4 provides commuters in the area with access to points north, including Washington, D.C., as well as points south, including the Naval Air Station Patuxent River. MD 4 is also the main evacuation route for the Calvert Cliffs Nuclear Power Station. The enhancements to MD 4 would improve access, mobility, and safety for local, regional, and inter-regional traffic, including passenger and transit vehicles.

MD 4 currently is a four-lane divided roadway from Washington, D.C. to the Thomas Johnson Memorial Bridge, a distance of approximately 60 miles. At the bridge, the roadway reduces to a two-lane undivided roadway.

The residential development in the area just north of Solomons Island has increased substantially over the past few years. Over 43 percent of Calvert County residents commute outside of the county. In St. Mary's County, the Naval Air Station Patuxent River now hosts over 17,000 people, including active-duty service members, civil-service employees, defense contractor employees, and military dependents. The total employment for St. Mary's County is approximately 49,000 persons, including the Naval Air Station Patuxent River. MD 4 is the primary evacuation route in the event of an emergency at the Calvert Cliffs Nuclear Power Plant.

Between 2003 and 2005, a total of 123 crashes occurred along the project corridor, which is significantly greater than the statewide average for similar roadways.

In addition to the need for capacity and safety improvements, bicycle and pedestrian access is restricted between St. Mary's and Calvert Counties. There is currently bicycle and pedestrian access along MD 4 south of the bridge in St. Mary's County, but it ends at the bridge. There is also bicycle and pedestrian access along MD 4 north of the bridge in Calvert County. The Thomas Johnson Memorial Bridge does not provide a dedicated bicycle/pedestrian lane.

As of 2005, under the Base Realignment and Closure (BRAC) program, there were 84 additional civilian jobs created at the Patuxent Naval Air Station.

C. Alternates Retained for Detailed Study

Based on public comments from the October 2 and 3, 2007, Open House meetings and subsequent brainstorming sessions with project staff, SHA developed an initial set of alternative concepts for improvements to MD 4. The study area was broken into three sections: the Patuxent River Crossing (also referred to as the MD 4 Mainline Build Alternatives), the MD 4 Mainline Widening, and the MD 4/MD 235 Intersection. A total of five Patuxent River Crossing alternatives, a MD 4 Mainline widening option, and four MD 4/MD 235 intersection options were developed during the Phase I Planning Study to take to the Alternates Public Workshops on June 16 and 17, 2008.

During the Phase II Planning Study SHA determined through detailed engineering and traffic analysis that the study area should be broken into the following four sections to ensure logical breaks for each section:

- MD 4 Mainline, Calvert County - extends from the northern study limit (MD 4/Patuxent Point Parkway Intersection) to Solomons Cemetery in Calvert County
- Patuxent River Crossing - extends from Solomons Cemetery in Calvert County to Patuxent Beach Road in St. Mary's County
- MD 4 Mainline Widening, St. Mary's County – extends from Patuxent Beach Road to just beyond Patuxent Boulevard in St. Mary's County
- MD 4/MD 235 Intersection – extends from just beyond Patuxent Boulevard in St. Mary's County to the MD 4/MD 235 Intersection

The project team recommended that the following alternatives be retained for detailed study (ARDS):

MD 4 Mainline Alternatives
- Alternative 1: No-Build
- Alternative 2: Transportation Systems Management (TSM)
- MD 4 Mainline, Calvert County
- MD 4 Mainline Widening, St. Mary's County

Patuxent River Crossings
- Alternative 3: Two-Lane Parallel Span
- Alternative 4: Four-Lane Parallel Span

MD 4/MD 235 Intersection Options
- Option A: Continuous Flow Intersection
- Option B: At-Grade Intersection with One-Directional Flyover
- Option D: Single Point Urban Interchange

1. No-Build Alternative

No major improvements are proposed under Alternative 1, the No-Build Alternative. Minor short-term improvements would occur as part of routine maintenance and safety operations. The bridge would have to undergo re-decking during the next 15-25 years. The No-Build Alternative does not address future traffic concerns or the purpose and need for the project. It serves as the baseline for comparing the impacts and benefits associated with the build alternatives that have been retained for detailed study.

2. Transportation Systems Management (TSM)

The Transportation Systems Management (TSM) Alternative consists of spot improvements and access management along the corridor to address short-term safety, operational, and public concerns at specific locations. TSM improvements could generally be constructed with relatively low costs and environmental impacts, but would provide no substantial improvements to address future concerns. TSM strategies being considered for this corridor include:

- Removing the off-ramp from MD 4 to MD 2 to eliminate congestion
- Closing access points from MD 4 to the parallel access road in Calvert County
- Closing the northern access point to South Patuxent Beach Road
- Providing Modified "T" intersections along MD 4
- Converting the existing shoulder to a travel lane to provide two travel lanes along northbound MD 4 from MD 235 to the Thomas Johnson Memorial Bridge
- Separating the intersection improvements as a stand-alone project

3. Build Alternatives

MD 4 Mainline Alternatives

MD 4 Mainline, Calvert County

The MD 4 median would be widened to a four-foot-wide open grass median from north of the Patuxent River crossing to the MD 4/Patuxent Point Parkway Intersection. Existing access points along MD 4 will be altered to redirect incoming traffic.

MD 4 Mainline Widening, St. Mary's County

MD 4 would be widened to a four-line divided roadway from Patuxent Beach Road to just beyond Patuxent Boulevard in St. Mary's County, with a 30-foot-wide open grass median. The typical section would consist of two 12-foot-wide lanes in each direction, a 10-foot-wide outside shoulder, and a four-foot-wide inside shoulder. Turn lanes may be added to all intersections along MD 4. An option for a 10-foot-wide bicycle and pedestrian facility to be constructed to the south side of MD 4, separated by a 10-foot-wide buffer, is included. (**Map No. 10**)

Patuxent River Crossings

Alternative 3: Two-Lane Parallel Span

Alternative 3 (**Map No. 11**) is a new, two-lane bridge that will be built parallel to the existing Thomas Johnson Memorial Bridge. With this alternative, the existing bridge will be kept open to traffic and converted to carry traffic in the southbound direction. The new span will carry traffic in the northbound direction and will consist of two 12-foot-wide travel lanes, a four-foot-wide inside shoulder, and a 10-foot-wide outside shoulder. In addition, the bridge will have a 10-foot-wide shared-use bicycle/pedestrian path separated by a concrete barrier. To avoid the piles and footings of the existing bridge, the new bridge will be placed a minimum of 25 to 75 feet from the existing bridge, depending on the size and placement of the existing piles and footings. The vertical profile of the bridge is expected to stay the same, with a 140-foot-high vertical clearance in the Patuxent River shipping channel.

Alternative 4: Four-Lane Parallel Span

This alternative is a new four-lane bridge that will be built parallel to the existing Thomas Johnson Memorial Bridge (**Map No. 12**). Upon completion of the new bridge, the existing bridge will be demolished. In each direction, the bridge will consist of two 12-foot-wide lanes, a four-foot-wide inside shoulder, and a 10-foot-wide outside shoulder. In addition, there will be a 10-foot-wide shared-use bicycle/pedestrian lane on one side of the bridge, which will be separated from the shoulder by a concrete barrier. To avoid the piles and footings of the existing bridge, the new bridge will be placed a minimum of 25 to 75 feet from the existing bridge, depending on the size and placement of the existing piles and footings. The height of the new bridge will be determined after a more detailed study of the Patuxent River shipping channel is completed.

MD 4/MD 235 Intersection Options

Option A: Continuous Flow Intersection

This option (**Map No. 13**) takes the left-turning traffic at the intersection of MD 4 and MD 235 and moves it to the left of oncoming traffic. Under this option, each direction at the intersection will be made into a two-lane, continuous-flow leg. MD 4 will carry two through lanes in each direction, and MD 235 will maintain three through lanes in each direction. This option will take the single traffic signal and disperse traffic through five traffic signals.

Option B: At-Grade Intersection with One-Directional Flyover

This option (**Map No. 14**) takes traffic turning left from southbound MD 4 to southbound MD 235 and moves it onto a single-lane flyover ramp to avoid the MD 4/MD 235 intersection. The traffic signal will remain for all other intersection movements. MD 4 will carry two through lanes in each direction, and MD 235 will maintain three through lanes in each direction. MD 235 will have two left-turn lanes in each direction, and northbound MD 4 will have two left-turn lanes. Northbound MD 235 will have a free-flowing right turn onto northbound MD 4, and northbound MD 4 will have a free-flowing right turn onto southbound MD 235.

Option D: Single Point Urban Interchange

This option (**Map No. 15**) is a grade-separated interchange option, with MD 4 crossing over MD 235. Option D keeps all through traffic on MD 235 flowing (without a traffic signal) and directs all left turns through an interchange above MD 235. Right turns are free movements. Through traffic along MD 4 will also

cross through the Single point Urban Interchange, with two through lanes in each direction. MD 235 will have three through lanes in each direction.

D. Highway Noise Fundamentals

A discussion on Highway Noise Fundamentals is included, because it helps define many of the terms and criteria utilized in this report.

The extent to which individuals are affected by noise sources is controlled by several factors, including:

- The duration and frequency of sound
- The distance between the sound source and the receptor
- The intervening natural or man-made barriers or structures
- The ambient environment

The level of highway traffic noise depends primarily upon the following:

- The volume of traffic
- The speed of traffic
- The number of trucks in the flow of traffic

Generally, traffic noise is increased by heavier traffic volumes, higher speeds, and greater numbers of trucks. Consequently, the Federal Highway Administration (FHWA) has established the following vehicle categories to use in traffic noise analysis:

- Heavy-duty trucks, defined as vehicles having three or more axles
- Medium duty trucks, defined as vehicles with two axles and six wheels
- Automobiles, defined as vehicles with two axles and four wheels
- Buses
- Motorcycles

Heavy-duty trucks typically produce more noise than medium-duty trucks traveling at the same speed. Medium duty trucks, in turn, typically generate more noise than automobiles.

Traffic noise is measured and described according to FHWA guidelines, which allows the use of the hourly equivalent sound level [Leq (h)] as the primary descriptor for noise analysis. Leq (h) is defined as the equivalent steady state sound level, which in one hour contains the same acoustic energy as the time-varying sound level during the same one-hour period.

The unit of measure for the Leq is the “A-weighted” decibel [dB(A)]. The dB(A) scale de-emphasizes the very low and very high frequencies and emphasizes the middle frequencies, thereby closely approximating the frequency response of the human ear. Table 1.A provides examples of common outdoor noise levels and their respective noise level decibels. To place the noise levels into a context that some people can more easily relate to, Table 1.A also provides the equivalent common indoor noise levels.

TABLE 1.A Common Outdoor And Indoor Noise Levels[1]

Common Outdoor Noise Levels	Noise Level Decibels	Common Indoor Noise Levels
	110	Rock Band
Jet Fly Over at 1,000 feet	100	Inside Subway Train (NY)
Gas Lawn Mower at 3 feet		
Diesel Truck at 50 feet	90	Food Blender at 3 feet
Noisy Urban Daytime	80	Garbage Disposal at 3 feet or Shouting at 3 feet
Gas Lawn Mower at 100 feet	70	Vacuum Cleaner at 10 feet
Commercial Area	65	Normal Speech at 3 feet
	60	
		Large Business Office
Quiet Urban Daytime	50	Dishwasher Next Room
Quiet Urban Nighttime	40	Small Theater, Large Conference Room (Background)
Quiet Suburban Nighttime		Library
	30	
Quiet Rural Nighttime		Bedroom at Night, Concert Hall (Background)
	20	
		Broadcast & Recording Studio
	10	Threshold of Hearing
	0	

1. Adapted from Guide on Evaluation and Attenuation of Traffic Noise, AASHTO-1974.

Typically, noise level changes between 2 and 3 dB(A) are barely perceptible, while a change of 5 dB(A) is readily noticeable by most people. An increase of 10 dB(A) is usually perceived as a doubling of loudness, and conversely, noise is perceived to be reduced by one-half when a sound level is reduced by 10 dB(A).

E. Federal Noise Abatement Criteria

The determination of traffic noise impacts is based on the relationship between the ambient, projected future noise levels and the established noise abatement criteria (NAC) for the study area. The effects of noise are judged in accordance with the Federal Highway Administration guidelines as established by 23 Code of Federal Regulations (CFR), Part 772 and current SHA Policies. The Federal Noise Abatement Criteria provided in TABLE 1.B are based on specific land uses and are used in determining the need for studying noise attenuation measures. The majority of the study area evaluated in this report is Land Use Category B, which has a noise impact level of 67 db(A). Per FHWA NAC, a residence is considered "impacted" when traffic noise approaches or exceeds 67 db(A). In defining the term "approaches," SHA has adopted 66 db(A) as the impact threshold.

Table 1.B Noise Abatement Criteria (NAC) Hourly A-Weighted Sound Level in Decibels [dB(A)][1]

Activity Category	Leq(h)	L_{10}(h)	Description of Activity Category
A	57 (Exterior)	60 (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)	70 (Exterior)	Picnic areas, recreation areas, playgrounds, active sports areas, parks, residences, motels, hotels, schools, churches, libraries, and hospitals.
C	72 (Exterior)	75 (Exterior)	Developed lands, properties, or activities not included in Categories A or B above.
D	--	--	Undeveloped lands.
E	52 (Interior)	55 (Interior)	Residences, motels, hotels, public meeting rooms, schools, churches, libraries, hospitals, and auditoriums.

1. *Either Leq(h) or L_{10}(h) (but not both) may be used on a project. These sound levels are only to be used to determine impact. Noise abatement should be designed to achieve a substantial noise reduction - not the noise abatement criteria.*

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A. PROJECT STUDY AREA DESCRIPTION

The project study area extends three miles along MD 4 from MD 235 to the intersection of MD 2/MD 4 and Patuxent Point Parkway.

B. NOISE SENSITIVE AREA DESCRIPTION

Noise Sensitive Areas (NSAs) can be residential, as well as non-residential. Residential NSAs include single-family residences, single-family attached residences (townhouses), and multi-family residences (condominiums and apartments), motels and hotels. Non-residential NSAs include recreation areas, playgrounds, active sports areas, parks, schools, churches, libraries, and hospitals. Country clubs and golf courses are not considered noise sensitive areas.

Noise has been measured and/or modeled at selected points throughout the study area within the NSAs and these locations are referred to as 'Receptors'. In this study, receptors have been labeled according to the following convention: 'M' receptors were both measured in the field and modeled, 'R' receptors were only modeled.

MD 235 and MD 4 are the dominant noise sources for Noise Sensitive Areas (NSA's) within the project limits. Noise modeling was performed at fourteen NSA's on this project. Noise measurements were performed at thirteen of the fourteen NSA's.

The Noise Sensitive Areas NSA's in this study are defined by Activity Category B, as shown in Table 1.B in this Section.

The following describes each NSA:

NSA-01 (represented by Receptors M-26 and M-27) is a residential community of single-family homes located on the south side of MD 4. The closest residences to MD 4 are located along Woodland Acres Road, Oak Drive and Christy Court. The closest residence is located 190 feet from the shoulder of MD 4. Access to the residences is from Woodland Acres Road and Christy Court via individual driveways. See Map No. 2 for location.

NSA -02 (represented by Receptor M-28) consists of the Patuxent River Assembly of God Church located on the north side of MD 4. The church is air-conditioned. There is an outdoor playground 300 feet from the shoulder of MD 4, behind the church. Access to the church is directly off of MD 4, across from Oak Drive. See Map No. 2 for location.

NSA -03 (represented by Receptor M-25) consists of single-family homes along Lous Way, which is located on the north side of MD 4. The closest residence is located 290 feet from the shoulder of MD 4. Access to the residences is from Lous Way via individual driveways. See Map No. 2 for location.

NSA -04 (represented by Receptor M-24, R-06 & R-07) consists of single-family homes along Clements Lane and Elmbrook Drive, which is located on the south side of MD 4. The closest residence is located 170 feet from the shoulder of MD 4. Access to the residences is from Clements Lane and Elmbrook Drive via individual driveways. See Maps No. 2 & 2a for location.

NSA-05 (represented by Receptor M-22) consists of single-family homes along Shady Mile Drive, which is located on the south side of MD 4. The closest residence is located 260 feet from the shoulder of MD 4. Access to the residences is from Shady Mile Drive. See Maps No. 2 & 2a for location.

NSA-06 (represented by Receptors M-20, M-21, M-23, and Receptors R-08 thru R-12) consists of single-family homes along Kingston Creek Road and Seven Gables Lane along the north side of MD 4. This NSA also includes the Patuxent Presbyterian Church which has a playground situated between the church building and MD 4. The church is air conditioned. The closest residence is located 110 feet from the shoulder of MD 4. The playground is 110 feet from the shoulder of MD 4. Access to the church and residences is from individual driveways along Kingston Creek Road and Seven Gables Lane. See Map No. 2a for location.

NSA-07 (represented by Receptors M-12, M-15, M-19 & R-18) consists of single-family residences along South Patuxent Beach Road. NSA-07 is located on the south side of MD 4. The closest residence (M-12) is located 130 feet from MD 4. Access to the residences is from South Patuxent Beach Road via individual driveways. See Maps No. 2a & 2b for location.

NSA-08 (represented by Receptor M-11) consists of single-family homes along Town Creek Drive. NSA-08 is located on a peninsula on the south side of MD 4 adjacent to the Thomas Johnson Bridge. The closest residence (M-11) is located 360 feet from MD 4. Access to these residences is from Town Creek Drive. See Map No. 2b for location.

NSA-09 (represented by Receptors M-16, M-17 & M-18, R-03 & R-04, R-13 thru R-17) consists of single-family residences with access from Gross Drive, Kingston Shores Lane, and also located along North Patuxent Beach Road. NSA-09 is located on the north side of MD 4. The closest residence (M-18) is located 100 feet from the shoulder on MD 4. Access is from Gross Drive, Kingston Shores Lane and North Patuxent Beach Road. See Maps No. 2a & 2b for location.

NSA-10 (represented by Receptors M-13 and M-14) consists of single-family residences along Wild Rose lane, North Patuxent Beach Road, St. Clair Road and Clarks Road. NSA-10 is located on the north side of MD 4 between Kingston Creek Road and N. Patuxent Beach Road. The community is located below the Thomas Johnson Memorial bridge along the west shore of the Patuxent River. The closest residence (M-13) is located 100 feet from MD 4. Access to the residences is from local roads within the community. See Map No. 2b for location.

NSA-11 (represented by Receptors M-07, M-08 & M-10) consists of single-family residences along North Patuxent Beach Road and Bill Dixon Road. NSA-11 includes residences directly south and to the north of the Thomas Johnson Bridge. Access to the residences is from Bill Dixon Road and North Patuxent Beach Road within the community. See Map No. 2c for location.

NSA-12 (represented by Receptors M-05, M-06 & M-09) consists of single-family residences along North Patuxent Beach Road and Bill Dixon Road. NSA-12 includes residences to the south of the Thomas Johnson Bridge. Access to the residences is from Bill Dixon Road and North Patuxent Beach Road within the community. See Map No. 2c for location.

NSA-13 (represented by Receptors M-03, M-04 and R-19) consists of single-family residences along South Solomons Island Road near Lore Road. NSA-13 is located on the south side of MD 4. The closest residence is located 150 feet from the shoulder of MD 4. Access to the residences is from Lore Road and South Solomons Island Road. See Map No. 2c for location.

NSA-14 (represented by Receptors R-01,R-02 & R-05) consists of single-family homes being used as either residences or commercial establishments in the northeast quadrant of the MD 235/ MD 4 intersection. Access to the homes and businesses is provided by individual driveways off of northbound MD 235. See Map No. 2 for location.

The southeast quadrant of the MD 235/ MD 4 intersection has been re-zoned commercial and therefore was not considered a noise sensitive area. On the west side of MD 235 near the intersection, there is a mobile home park which is slated for re-development, so therefore this area was not included in the study. The remainder of the development on the west side of the intersection is commercial use.

C. AMBIENT NOISE LEVEL MEASUREMENTS

Introduction

Field measurements of ambient noise levels were performed to determine the existing (2009) noise levels and to use in establishing reference points in the TNM Model Calibration, which is described in Section 3. The noise measurements were conducted using Metrosonics dB 308 and dB 3080 noise analyzers. Twenty-four hour and short-term (twenty-minute) measurements were performed.

The highway noise measurements were performed in conformance with the U.S. Department of Transportation FHWA's Measurement of Highway-Related Noise (FHWA-PD-96-046 May 1996).

Noise Measurement Data

Thirty-one (31) Noise Measurements were taken at thirty (30) Receptor Sites. TABLE 2.A details the location and duration of each measurement. The related Data, Tables and Figures for each Receptor are located in Appendix A. The location of the Receptor Sites is depicted on the TNM Model Calibration Map (Map 2, 2a, 2b & 2c) located in Section 5.

TABLE 2.A Noise Measurement Schedule

Receptor Number	Residence Address or Property Description	Land Use Type	Location	Date	Interval	Duration	
M-01	Woodland Acres Road	Residential	Front Yard	04/16/2009	1200-1200	24-hr	
M-02	Shady Mile Drive	Cul De Sac	Cul De Sac	04/16/2009	1200-1200	24-hr	
M-03	14120 Solomons Island Road South	Residential	Front Yard	05/12/2009	1100-1100	24-hr	
M-04	14120 Solomons Island Rd., S.	Single-Family	Front Yard	05/20/2009	1000-1020		20-min
M-05	24131 N. Patuxent Beach Road	Single- Family	Front Yard	05/20/2009	1000-1020		20-min
M-06	24163 N. Patuxent Beach Road	Single- Family	Back Yard	05/20/2009	1000-1020		20-min
M-07	24087 N. Patuxent Beach Road	Single- Family	Back Yard	05/20/2009	1000-1020		20-min
M-08	24080 N. Patuxent Beach Road	Single- Family	Back Yard	05/20/2009	1000-1020		20-min
M-09	23719 Bill Dixon Road	Single- Family	Side Yard	05/20/2009	1120-1140		20-min
M-10	23788 Bill Dixon Road	Single- Family	Front Yard	05/20/2009	1120-1140		20-min
M-11	23633 Town Creek Drive	Single- Family	Back Yard	05/20/2009	1120-1140		20-min
M-12	25969 S. Patuxent Beach Road	Single- Family	Side Yard	05/20/2009	1120-1140		20-min
M-13	45970 Wild Rose Lane	Single- Family	Front Yard	05/20/2009	1120-1140		20-min
M-14	45920 Wild Rose Lane	Single- Family	Front Yard	05/20/2009	1040-1100		20-min
M-15	23635 S. Patuxent Beach Road	Single- Family	Back Yard	05/20/2009	1040-1100		20-min

TABLE 2.A Noise Measurement Schedule

Receptor Number	Residence Address or Property Description	Land Use Type	Location	Date	Interval	Duration	
M-16	23702 W. Patuxent Beach Road	Single- Family	Front Yard	05/20/2009	1040-1100		20-min
M-17	23612 Kingston Shores Lane	Single- Family	Back Yard	05/20/2009	1040-1100		20-min
M-18	23550 Gross Drive	Single- Family	Back Yard	05/20/2009	1040-1100		20-min
M-19	23415 S. Patuxent Beach Road	Single- Family	Back Yard	05/20/2009	1200-1220		20-min
M-20	45606 Seven Gables Lane	Single- Family	Front Yard	05/20/2009	1200-1220		20-min
M-21	23338 Kingston Creek Road	Single- Family	Side Yard	05/20/2009	1200-1220		20-min
M-22	23322 Shady Mile Drive	Single- Family	Back Yard	05/20/2009	1200-1220		20-min
M-23	23421 Kingston Creek Road	Church	Playground	05/20/2009	1200-1220		20-min
M-24	45222 Clements Lane	Single- Family	Back Yard	05/20/2009	1240-1300		20-min
M-25	23445 Lous Way	Single- Family	Front Yard	05/20/2009	1240-1300		20-min
M-26	23275 Christy Court	Single- Family	Back Yard	05/20/2009	1240-1300		20-min
M-27	23190 Woodland Acres Road	Single- Family	Front Yard	05/20/2009	1240-1300		20-min
M-28	45020 Patuxent Beach Road	Church	Playground	05/20/2009	1240-1300		20-min
M-29[1]	See Fig. A.29,Appendix A	Residential	----	06/30/2009	1100-1120		20-min
M-30[1]	See Fig. A.29,Appendix A	Residential	----	06/30/2009	1140-1200		20-min
M-31[1]	See Fig. A.29,Appendix A	Residential	----	06/30/2009	1320-1340		20-min
Total Number of 24-Hour Noise Measurements						**3**	
Total Number of Short-term Noise Measurements							**28**

1. This short-term measurement was performed to determine background noise.

24-Hour Noise Measurements

Three (3) 24-Hour Noise Measurements were taken within the study area. The hourly equivalent sound levels, Leq(h), were calculated for the 24-Hour tests. See Appendix A for the calculation description. The hourly equivalent sound levels defined each 24-Hour Noise Measurement Site's *loudest hour* and *loudest hour level*. The *loudest hour* is the hour at which the highest hourly equivalent sound level occurs. The *loudest hour* may not be at the peak traffic hour; it may occur when traffic volumes are lower but the truck mix or vehicle speeds are higher.

TABLE 2.B provides the *loudest hour* and the *loudest hour level*, Leq(h) for the 24-Hour Noise Measurements. In accordance with SHA guidelines, the Leq(h) is rounded to the nearest whole decibel.

TABLE 2.B 24-Hour Noise Measurement Loudest Hour Summary

Receptor Number	Residence Address or Property Description		Land Use Type	Start Date	Loudest Hour[1]	Loudest Hour Level[2]	Receptor Impacted by Noise[3] (Yes)	(No)
M-01		Woodland Acres Road	Residential- Empty	04/16/09	0600, 0700, 1500, 1800	72	Yes	
M-02[4]	Cul De Sac	Shady Mile Drive	Cul De Sac	04/16/09	1500	72	Yes[4]	
M-03	14120	Solomons Island Road South	Residence	05/12/09	1500	67	Yes[5]	

1. *The Loudest Hour is the hour at which the highest hourly equivalent sound levels occur. The Loudest Hour may not be at the peak traffic hour but instead, may occur when traffic volumes are lower but the truck mix or vehicle speeds are higher. The Loudest Hour Range may last for several hours and may occur more than once during a given day.*
2. *All Noise Levels are represented as hourly equivalent sound levels [Leq(h)] with units in A-weighted decibels [dB(A)]. The Level is rounded to the nearest whole decibel in accordance with SHA guidelines.*
3. *Impacted receptors are where measured highway noise levels equal or exceed 66 dB(A).*
4. *Measurement site not in a residential area. Measurement was performed solely to determine the diurnal nature of the roadway noise, and not to determine the specific noise level at the site.*
5. *This impact was possiblyy due to drive-by influence from Solomons Island Road S.*

Short-term Noise Measurements

Twenty-eight (28) Short-term Noise Measurements (20-minute duration) were taken in the study area. The 20-minute equivalent sound level, Leq(20-min), was calculated for each Short-term Noise Measurement. See Appendix A for the calculation description. The Short-term Noise Measurements were used in the TNM Model Calibration, which is described in Section 3. In addition, three background measurements (M-29, M-30 & M-31) were performed for establishing the background noise in the area.

TABLE 2.C summarizes the *measured noise level* for each of the Short-term Noise Measurements. The Level is rounded to the nearest whole decibel in accordance with SHA guidelines. See Appendix A for a site sketch, photographs and table of data collected for each noise measurement performed for this study. Site sketches are not provided for short-term tests used for background noise determination.

TABLE 2.C Short-term Noise Measurement Summary

Receptor Number	Residence Address or Property Description	Land Use Type	Date	Interval	Measured Noise Level[1]	Receptor Impacted by Noise[2] (Yes)	(No)
M-04	14120 Solomons Island Rd., S.	Single-Family	05/20/2009	1000-1020	60		No
M-05	24131 N. Patuxent Beach Road	Single- Family	05/20/2009	1000-1020	56		No
M-06	24163 N. Patuxent Beach Road	Single- Family	05/20/2009	1000-1020	55		No
M-07	24087 N. Patuxent Beach Road	Single- Family	05/20/2009	1000-1020	55		No
M-08	24080 N. Patuxent Beach Road	Single- Family	05/20/2009	1000-1020	62		No
M-09	23719 Bill Dixon Road	Single- Family	05/20/2009	1120-1140	53		No
M-10	23788 Bill Dixon Road	Single- Family	05/20/2009	1120-1140	55		No
M-11	23633 Town Creek Drive	Single- Family	05/20/2009	1120-1140	57		No
M-12	25969 S. Patuxent Beach Road	Single- Family	05/20/2009	1120-1140	59		No
M-13	45970 Wild Rose Lane	Single- Family	05/20/2009	1120-1140	57		No
M-14	45920 Wild Rose Lane	Single- Family	05/20/2009	1040-1100	56		No
M-15	23635 S. Patuxent Beach Road	Single- Family	05/20/2009	1040-1100	60		No
M-16	23702 W. Patuxent Beach Road	Single- Family	05/20/2009	1040-1100	54		No
M-17	23612 Kingston Shores Lane	Single- Family	05/20/2009	1040-1100	58		No
M-18	23550 Gross Drive	Single- Family	05/20/2009	1040-1100	65		No
M-19	23415 S. Patuxent Beach Road	Single- Family	05/20/2009	1200-1220	58		No
M-20	45606 Seven Gables Lane	Single- Family	05/20/2009	1200-1220	58		No
M-21	23338 Kingston Creek Road	Single- Family	05/20/2009	1200-1220	57		No
M-22	23322 Shady Mile Drive	Single- Family	05/20/2009	1200-1220	56		No
M-23	23421 Kingston Creek Road	Church	05/20/2009	1200-1220	62		No
M-24	45222 Clements Lane	Single- Family	05/20/2009	1240-1300	60		No
M-25	23445 Lous Way	Single- Family	05/20/2009	1240-1300	52		No
M-26	23275 Christy Court	Single- Family	05/20/2009	1240-1300	54		No
M-27	23190 Woodland Acres Road	Single- Family	05/20/2009	1240-1300	56		No
M-28	45020 Patuxent Beach Road	Church	05/20/2009	1240-1300	49		No
M-29[3]	See Fig. A.29, Appendix A	Residential	06/30/2009	1100-1120	47		No
M-30[3]	See Fig. A.29, Appendix A	Residential	06/30/2009	1140-1200	46		No
M-31[3]	See Fig. A.29, Appendix A	Residential	06/30/2009	1320-1340	45		No
					Total Number of Impacted Receptors	**0**	

1. *All Noise Levels are represented as hourly equivalent sound levels [Leq(h)] with units in A-weighted decibels [dB(A)]. The Level is rounded to the nearest whole decibel in accordance with SHA guidelines.*
2. *Impacted receptors are where measured highway noise levels equal or exceed 66 dB(A).*
3. *This Short-term Noise Measurement was performed to determine background noise within the study area.*

Traffic Monitoring Sessions

The Short-term Noise Measurements, except for the background measurements performed at M-29, M-30 and M-31 , were collected during six (6) 20-minute Traffic Monitoring Sessions in which classified traffic counts were obtained concurrently with the noise measurements. The traffic counts were then used in the TNM Model Calibration, which is described in Section 3. The related Data, Tables, and Figures for each Traffic Monitoring Session are located in Appendix B.

The dates and times of the six Sessions are listed below:

Traffic Monitoring Session 1	(TMS01)	May 20, 2009	1000-1020 Hours
Traffic Monitoring Session 2	(TMS02)	May 20, 2009	1040-1100 Hours
Traffic Monitoring Session 3	(TMS03)	May 20, 2009	1120-1140 Hours
Traffic Monitoring Session 4	(TMS04)	May 20, 2009	1200-1220 Hours
Traffic Monitoring Session 5	(TMS05)	May 20, 2009	1240-1300 Hours
Traffic Monitoring Session 6	(TMS06)	May 20, 2009	1340-1400 Hours

Impacts

The noise sensitive areas within the study area include residences. Therefore, the area surrounding the buildings is considered an outdoor noise sensitive use area which corresponds to the FHWA Noise Abatement Criteria land use Category B. Two churches are also located within the study area with the outdoor use being playgrounds. These areas also correspond to the FHWA Noise Abatement Criteria land use Category B.

The receptor sites were established in the noise sensitive open spaces with an objective of developing a 66 dB(A) Contour that would help define the impacts as defined by Category B in Table 1.B, Noise Abatement Criteria.

None of the short-term measurements approached or exceeded the Noise Abatement Criteria of 67 dB(A); none were at 66 dB(A) or above.

The short-term measurement results may not represent the most extensive recurring noise impacts in the study area. The TNM Model Calibration Map (Map 2, 2a, 2b & 2c) located in Section 5, depicts the measured noise levels.

The Existing Worst Case Noise Levels (2008) developed in the TNM model are shown and discussed in Section 3 of this report.

MD 4 (PATUXENT BEACH ROAD)
PROJECT PLANNING STUDY

Calvert County and St. Mary's County, Maryland

NOISE ANALYSIS
TECHNICAL REPORT

FINAL
August 19, 2009

Section 3
PREDICTED NOISE LEVELS FROM THE PROPOSED IMPROVEMENTS

Submitted To

MARYLAND STATE HIGHWAY ADMINISTRATION

OFFICE OF PLANNING AND PRELIMINARY ENGINEERING

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A. PREDICTION METHODOLOGY

Introduction

Worst case noise levels were predicted using TNM Version 2.5 for the following conditions: Existing, 2030 No-Build (Alternative 1), and the 2030 Build condition. The 2030 Build condition included the three interchange/ intersection options at MD 235 as well as two bridge alternatives at the Thomas Johnson Bridge.

A calibrated TNM model of existing conditions was used to create the TNM runs predicting future conditions. The TNM Model Calibration evaluates the model's ability to reproduce the Measured Noise Levels found in the study area.

TNM 2.5 Model Calibration

Calibration is the procedure used to validate the accuracy of a particular Traffic Noise Model (TNM 2.5), using measured highway traffic noise levels and the concurrent highway traffic counts. SHA considers a TNM Model to be properly calibrated when the modeled noise levels are within ±3 dB(A) of the measured noise levels for most of the receptors. In order to bring a model into calibration, modifications such as additional terrain and structural elements can be added to the model and re-tested until the SHA calibration criteria are met.

Some of the short-term highway traffic noise measurements were performed concurrently with traffic monitoring sessions. Six, 20-minute traffic monitoring sessions were conducted on May 20, 2009 (from 10:00 am to 2:00 pm).

The noise measurements at M-29, M-30 & M-31 were not performed during a traffic monitoring session because they were performed only to determine the background noise level, which does not include traffic noise. Therefore, these receptors are not included in the calibration data in Table 3.A.

Traffic counts were performed for MD 4 and MD 235 which are the primary contributors to the traffic noise environment. Traffic speed was also checked on MD 4 and MD 235 during the Traffic Monitoring Sessions using a radar gun.

After the noise measurements and traffic counts were obtained, a TNM model was developed for the entire study area. Each noise measurement receptor was entered in the model, represented as a TNM modeled receptor. All pertinent roadways, terrain, and structural elements were entered in the model to adequately characterize the noise path across the study area from the roadway noise source(s) to the modeled receptors.

TNM runs *TMS01* thru *TMS06* were created and run, using the traffic conditions observed during each of the six traffic monitoring sessions. TABLE 3.A compares the Modeled Noise Levels from TNM Runs, *TMS01* thru *TMS06,* to the Measured Noise Levels.

After review of the background measurement results and reviewing the instantaneous readings during the background measurements, a background noise level of 43 dB(A) was added to all receptors. This was the average L_{90} noise level of the three background measurements that were performed. In order to be consistent with the calibration methodology, all predicted noise levels in this report also include 43 dB(A) of background noise.

Review of the initial calibration results indicated all except three receptors (M-08, M-15 & M-18) calibrated to within 3 dB(A) of the measured noise levels. The noise level at M-08 modeled 6 dB(A) lower than the measured

noise level and M-18 modeled 4 dB(A) lower. Measurements were performed twice at Receptor M-15 which calibrated one of the two times it was measured, so therefore it was considered to be calibrated.

We believe the reason receptor M-08 models 6 dB(A) lower is due to the noise from the underside of the bridge structure as vehicles ride over it. TNM does not account for this noise. Therefore an adjustment factor of +4 dB(A) has been added to bring the Predicted noise level to within 2 dB(A) of the measured level, which is similar to the calibration difference of the surrounding receptors.

We did not find any apparent reason in the models for receptor M-18 modelling 4 dB(A) lower than measured. An adjustment factor of +3 dB(A) was added to Receptor M-18. No adjustment factor was added to Receptor M-15 because a measurement was taken here during two Traffic Monitoring Sessions and one of them calibrated.

The TNM Model Calibration Analysis Maps (Map 2, 2a, 2b and 2c) located in Section 5, depict the noise measurement location, the measured noise levels, the modeled noise levels (with background adjustment) and the difference between the measured and the modeled noise levels for each Traffic Monitoring Session. Additional documentation of the TNM Model Input and TNM Model Calibration is located in Appendix C and D respectively.

TABLE 3.A TNM Model Calibration Summary

Receptor Number[1]	Address	Measured Noise Level[2]	Modeled Noise Level[3]	Adjustment Factor	Predicted Noise Level[5]	Difference[4]	Calibrating Model Point (Yes)[6]	(No)[7]
M-04	14120 Solomons Island Rd., S.	60	57		57	-3	Yes	
M-05	24131 N. Patuxent Beach Road	56	54		54	-2	Yes	
M-06	24163 N. Patuxent Beach Road	55	53		53	-2	Yes	
M-07	24087 N. Patuxent Beach Road	55	55		55	0	Yes	
M-08	24080 N. Patuxent Beach Road	62	56	+4	60	-2	Yes	
M-09	23719 Bill Dixon Road	53	53		53	0	Yes	
		54	56		56	+2	Yes	
M-10	23788 Bill Dixon Road	55	53		53	-2	Yes	
M-11	23633 Town Creek Drive	55	52		52	-3	Yes	
		55	55		55	0	Yes	
M-12	25969 S. Patuxent Beach Road	59	57		57	-2	Yes	
		60	61		61	+1	Yes	
M-13	45970 Wild Rose Lane	57	56		56	-1	Yes	
		60	59		59	-1	Yes	
M-14	45920 Wild Rose Lane	56	55		55	-1	Yes	
M-15	23635 S. Patuxent Beach Road	60	61		61	+1	Yes	
		62	66		66	+4		No[8]
M-16	23702 W. Patuxent Beach Road	54	56		56	+2	Yes	
M-17	23612 Kingston Shores Lane	58	58		58	0	Yes	
M-18	23550 Gross Drive	65	61	+3	64	-1	Yes	

TABLE 3.A TNM Model Calibration Summary

Receptor Number[1]	Address		Measured Noise Level[2]	Modeled Noise Level[3]	Adjustment Factor	Predicted Noise Level[5]	Difference[4]	Calibrating Model Point (Yes)[6]	(No)[7]
M-19	23415	S. Patuxent Beach Road	58	58		58	0	Yes	
M-20	45606	Seven Gables Lane	58	57		57	-1	Yes	
M-21	23338	Kingston Creek Road	57	60		60	+3	Yes	
M-22	23322	Shady Mile Drive	53	51		51	-2	Yes	
M-23	23421	Kingston Creek Road	62	63		63	+1	Yes	
M-24	45222	Clements Lane	60	61		61	+1	Yes	
M-25	23445	Lous Way	52	51		51	-1	Yes	
M-26	23275	Christy Court	54	55		55	+1	Yes	
M-27	23190	Woodland Acres Road	56	55		55	-1	Yes	
M-28	45020	Patuxent Beach Road	49	48		48	-1	Yes	
Calibrating Model Points								**25**	**0**[8]

1. *The Noise Measurement Receptor Number represents the Noise Measurement Receptor Sites for the field measurements (See Appendix A for Noise Measurement Data). All Receptors are Short-term Noise Measurement Receptor Sites. The Receptor Number also represents the TNM Modeled Receptor Site Number used in TNM Runs.*
2. *The Measured Noise Level is the field monitored noise level (Leq[h]). All noise levels are rounded to the nearest whole decibel.*
3. *The Modeled Noise Level is the TNM "Calculated" Noise Level (Leq[h]) using the field counted traffic with 43 dB(A) added to the TNM result. All noise levels are rounded to the nearest whole decibel.*
4. *The Difference shown is the difference between the Measured Noise Level and the Predicted Noise Level. The difference is rounded to the nearest whole decibel. A negative number implies that the Predicted Noise Level is less than the Measured Noise Level.*
5. *The Predicted Noise Level is the sum of the TNM Calculated Noise Level plus 43 dB(A) background, plus an adjustment factor shown in this table.*
6. *Calibrating Model Point: The Predicted Noise Level is within 3 dB(A) of the Measured Noise Level*
7. *Non-Calibrating Model Point: The difference between the Predicted Noise Level and the Measured Noise Level is greater than 3 dB(A).*
8. *M-15 was considered calibrated since one of the two measurements at M-15 calibrated.*

B. SUMMARY OF TRAFFIC PARAMETERS

Traffic data for the TNM models was obtained from SHA, Travel Forecasting Division of the Office of Planning and Preliminary Engineering (OPPE) in a memorandum dated April 23, 2009, and updated with subsequent revisions . The traffic data included design hourly volumes, Average Daily Traffic, truck percentages (total percentage and breakdown by light, medium and heavy trucks), diurnal traffic curves, peak and off-peak operating speeds, directional split, and Level of Service (LOS) volumes and operating speeds for the C/D and D/E breakpoints.

The Level of Service 'D/E' break traffic volumes were compared to the predicted traffic volumes to determine the worst case traffic scenario. This worst case traffic scenario was input into TNM for the Existing Worst Case conditions. Level of Service 'D/E' break traffic flow theoretically produces the worst case noise scenario. As the noisiest scenario, LOS 'D/E' break volumes are used in the model when the peak traffic hour volumes are at LOS 'E', or 'F' conditions. If the peak hourly volumes are less than LOS 'D/E' break volumes (i.e. the roadway operates at LOS 'A', 'B', 'C', or 'D') then the worst case noise scenario occurs during the peak traffic hour and that corresponding traffic volume. See Appendix E for specific LOS 'D/E' break and traffic volumes, and speeds used in the TNM models.

Because the side road traffic volume is very small compared to the volumes on MD 4, the side road traffic volumes are not included in the models.

Generally, a traffic noise model should utilize traffic volumes expected to produce the highest traffic noise levels that can reasonably be expected to occur for the study area. Therefore, the traffic volumes derived from the traffic monitoring sessions were replaced with theoretical traffic volumes provided by SHA in developing the 2009 Existing Worst Case conditions.

After inputting and running both the AM and PM forecasted peak hour traffic volumes in the TNM models for the 2009 Existing Worst Case conditions, it was determined that the PM traffic produced the same or higher noise levels than AM traffic for all except one of the receptors, R-19. The highest of the AM and PM levels for each receptor, including background and adjustment factors, are shown in Tables 3.A thru 3.C.

Comparing the Existing Worst Case Noise Levels developed in TNM, to the Measured Levels, it will be noted that at some of the receptors, the Existing Worst Case Noise Levels are less than the Measured Levels. This is due to the TNM model calibrating low, but within acceptable 3 dB(A) allowance and/ or lower, theoretical speed developed for the Level of Service D/E than was observed in the field during the Traffic Monitoring Sessions.

C. PREDICTION RESULTS FOR EACH ALTERNATE

TNM 2.5 models were developed for the Existing Worst Case, 2030 No-Build, and 2030 Build models. The 2030 Build models consisted of the following:

- Three options along MD 235
  - Option A, Continuous Flow Intersection
  - Option B, At- Grade Intersection with One Directional Flyover
  - Option D, Single Point Urban Diamond
- One MD 4 Build option between MD 235 and the Thomas Johnson bridge.
- Two options at the Thomas Johnson bridge; 2-lane parallel bridge and 4-lane parallel bridge

Receptors within 1500 feet of the MD 235 improvements were modeled in the MD 235 TNM models. Receptors within 1500 feet of the Thomas Johnson bridge alternates were included in the Bridge models. The remainder of the receptors were included in the MD 4 Mainline Alternative model.

The Traffic Noise Model(s) were validated in accordance with the accepted calibration process. To use these models to predict worse case traffic noise levels and sound barrier performance, predicted 2030 traffic volumes were used in the analysis. Both AM and PM traffic conditions were analyzed to determine which produced the loudest noise conditions. The PM traffic produced noise levels that were as loud or louder for each of the receptors in the Existing Worst Case and No- Build models. The loudest of the AM or PM condition is reported for the Build Condition models.

The twenty-five short-term measurement receptors (M-04 thru M-28) that were used for model calibration, were also used for predicting the TNM noise levels, barrier design and analysis. In addition, nineteen additional model receptors were incorporated into the models (R-01 thru R-19). TABLE 3.B,3.C and 3.D indicate the predicted noise levels for the Existing Worst Case, 2030 No-Build, and 2030 Build conditions. The Existing Worst Case Conditions Maps 3, 3a, 3b & 3c in Section 5 depict the 66-dB(A) contour, predicted existing worst case noise levels and impacted residences. The Predicted Noise Level Maps 4, 4a, 4b, 5, 5a & 5b in Section 5 depict the predicted noise levels, the 66-dB(A) Contour and the impacted receptors for the 2030 No-Build, 2030 Build conditions.

TABLE 3.B PREDICTED NOISE LEVELS – MD 235 Options

Receptor Number[2]	ADDRESS	Existing Worst Case Traffic Noise Level[1]	2030 No Build Predicted Noise Level[1]	OPTION A	OPTION B	OPTION D
				2030 Build Predicted Noise Level[1]		
NSA-01						
M-26	23275 Christy Court	56	56	61	62	62
M-27	23190 Woodland Acres Road	62	63	64	62	65
NSA-02						
M-28	45020 Patuxent Beach Road	50	50	54	54	53
NSA-14						
R-01	23230 Three Notch Road	71	72	72	72	72
R-02	23182 Three Notch Road	71	72	72	72	n/a[3]
R-05	23186 Three Notch Road	60	61	63	62	61

1. *A noise level of 43 dB(A) was added to the TNM results in order to account for the presence of background noise because TNM does not account for background noise.*
2. *A Receptor Number beginning with "M" represents a measured location and a Receptor Number beginning with "R" represents a modeled receptor only.*
3. *R-02 is being displaced by this Option.*

TABLE 3.C PREDICTED NOISE LEVELS – MD 4 Mainline Alternative

Receptor Number[2]	ADDRESS	Existing Worst Case Traffic Noise Level[1]	2030 No-Build Predicted Noise Level[1]	2030 Build Predicted Noise Level[1]
NSA-03				
M-25	23445 Lous Way	49	49	55
NSA -04				
M-24	45222 Clements Lane	58	58	67
R-06	45218 Clements Lane	51	51	57
R-07	45275 Clements Lane	51	51	58
NSA- 05				
M-22	23322 Shady Mile Drive	50	50	57
NSA - 06				
M-20	45606 Seven Gables Lane	56	56	71
M-21	23338 Kingston Creek Road	58	58	70
M-23	23241 Kingston Creek Road	61	61	70
R-08	23338 Kingston Creek Road	61	61	71
R-09	23350 Kingston Creek Road	55	55	62
R-10	45600 Seven Gables Lane	49	49	56
R-11	25569 Seven Gables Lane	61	61	70
R-12	23451 Seven Gables Lane	55	55	63
NSA- 07				
M-19	23415 S. Patuxent Beach Road	56	56	64
NSA - 09				
M-17	23612 Kingston Shores Lane	60	60	68
M-18	23550 Gross Drive	67	67	76
R-03	23530 Gross Drive	58	58	65
R-04	23552 Gross Drive	60	60	68
R-13	23560 Gross Drive	53	53	60
R-14	23613 Kingstons Shores Lane	54	54	61
R-15	23628 Kingstons Shores Lane	58	58	65

1. *A noise level of 43 dB(A) was added to the TNM results in order to account for the presence of background noise because TNM does not account for background noise.*
2. *A Receptor Number beginning with "M" represents a measured location and a Receptor Number beginning with "R" represents a modeled receptor only.*

TABLE 3.D PREDICTED NOISE LEVELS – Bridge Alternates

Receptor Number[2]	ADDRESS	Existing Worst Case Traffic Noise Level[1]	2030 No Build Predicted Noise Level[1]	2-LANE PARALLEL 2030 Build Predicted Noise Level[1]	4-LANE PARALLEL 2030 Build Predicted Noise Level[1]
NSA-07					
M-12	25969 S. Patuxent Beach Road	59	59	62	64
M-15	23635 S. Patuxent Beach Road	64	64	69	69
R- 18	23596 S. Patuxent Beach Road	57	57	65	65
NSA-08					
M-11	23633 Town Creek Drive	53	53	58	60
NSA - 09					
M-16	23702 W. Patuxent Beach Road	58	58	67	67
R-16	23690 W. Patuxent Beach Road	54	54	60	61
R-17	23708 W. Patuxent Beach Road	55	55	63	62
NSA -10					
M-13	45970 Wild Rose Lane	58	58	65	60
M-14	45920 Wild Rose Lane	57	57	64	62
NSA - 11					
M-07	24087 N. Patuxent Beach Road	54	54	58	56
M-08	24080 N. Patuxent Beach Road	58	58	61	61
M-10	23788 Bill Dixon Road	55	55	60	59
NSA-12					
M-05	24131 N. Patuxent Beach Road	53	53	52	54
M-06	24163 N. Patuxent Beach Road	53	53	53	56
M-09	23719 Bill Dixon Road	55	55	57	59
NSA-13					
M-04	14120 Solomons Island Road S.	57	57	64	65
R-19	14130 Solomons Island Road S.	56	56	63	63

1. *A noise level of 43dB(A) was added to the TNM results in order to account for the presence of background noise because TNM does not account for background noise.*
2. *A Receptor Number beginning with "M" represents a measured location and a Receptor Number beginning with "R" represents a modeled receptor only.*

MD 4 (PATUXENT BEACH ROAD)
PROJECT PLANNING STUDY

Calvert County and St. Mary's County, Maryland

NOISE ANALYSIS TECHNICAL REPORT

FINAL
August 19, 2009

Section 4
IMPACT ASSESSMENT

Submitted To

MARYLAND STATE HIGHWAY ADMINISTRATION

OFFICE OF PLANNING AND PRELIMINARY ENGINEERING

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A. Impact Assessment

For a Type 1 analysis, a NSA warrants consideration of noise abatement if:

a) the majority of the development existed prior to the date of approval of the proposed highway improvements, and
b) it is considered impacted by traffic noise in the future build conditions.

Traffic noise impacts are determined using the following criteria:

- Predicted future noise levels equal or exceed 66 dB(A)
- There is an increase over existing noise levels of 10 dB(A) or more

TABLE 4.A, 4.B and 4.C compare the modeled existing worst case noise levels to the 2030 No-Build and 2030 Build noise levels. It also compares the 2030 No-Build Condition to the 2030 Build conditions.

'Highlight' in the 2030 Build Predicted Noise Level column for any alternate indicates that receptor is impacted at 66 dB(A) or above. 'Highlight' in the corresponding Difference column for any alternate indicates that receptor has an increase of 10 dB(A) or more over the existing conditions. All noise levels are rounded to the nearest whole decibel.

In Section 5, the predicted noise levels, the 66 dB(A) Contour and the impacted residences for each modeled condition is shown on Maps 3, 3a, 3b & 3c for the Existing Worst Case; Maps 4, 4a, 4b & 4c for the No-Build condition; Maps 5, 5a, & 5b for the MD 235 Build Options; Map 6 for the mainline widening and Maps 7 and 7a for the 2-Lane bridge Option, and Maps 8 and 8a for the 4-Lane bridge Option. See Appendix F for the TNM Leq Tables.

In this study, the Existing Worst Case noise levels and the 2030 No-Build condition are the same for most of the receptors because many of the roadway segments are already at Level of Service D in the existing condition, so if the roadway is not widened, the model traffic volumes and speeds do not change. However, with the higher volumes of traffic in the 2030 conditions, it can be expected that the Level of Service will be at Level of Service D for a longer period through the day, and therefore the loudest noise periods can be expected to be longer, or at different times of the day in the 2030 No-Build condition than in the Existing Worst Case condition.

TABLE 4.A Predicted Noise Levels and Impact Analysis – MD 235 Options

Receptor Number[1]	Existing Worst Case Traffic Noise Level[2]	2030 No Build Predicted Noise Level[2]	Difference from Existing Worst Case to 2030 No- Build	OPTION A		OPTION B		OPTION D	
				2030 Build Predicted Noise Level [2,3,]	Difference from 2030 No-Build to 2030 Build	2030 Build Predicted Noise Level [2,3,]	Difference from 2030 No-Build to 2030 Build	2030 Build Predicted Noise Level [2,3,]	Difference from 2030 No- Build to 2030 Build
NSA -01									
M-26	56	56	0	61	+5	62	+6	62	+6
M-27	62	63	+1	64	+1	62	-1	65	+2
NSA-02									
M-28	50	50	0	54	+4	54	+4	53	+3
NSA-14									
R-01	71	72	+1	72	0	72	0	72	0
R-02	71	72	+1	72	0	72	0	n/a	-
R-05	60	61	+1	63	+2	62	+1	61	0

LEGEND

[ ] **Impact[3]**

1. *A Receptor Number beginning with "M" represents a measured location and a Receptor Number beginning with "R" represents a modeled receptor only.*
2. *A noise level of 43 dB(A) was added to the TNM results in order to account for the presence of background because TNM does not account for background noise.*
3. *Impacted receptors are those where the predicted noise levels equal or exceed 66 dB(A) or there is an increase over existing noise levels of 10 dB(A) or more.*
4. *R-02 is being displaced by this option.*

TABLE 4.B Predicted Noise Levels and Impact Analysis – MD 4 Mainline

Receptor Number[1]	Existing Worst Case Traffic Noise Level[2]	2030 No Build Predicted Noise Level[2]	Difference from Existing Worst Case to 2030 No- Build	2030 Build Predicted Noise Level [2,3]	Difference from 2030 No- Build to 2030 Build
NSA-03					
M-25	49	49	0	55	+6
NSA-04					
M-24	58	58	0	67	+9
R-06	51	51	0	57	+6
R-07	51	51	0	58	+7
NSA-05					
M-22	50	50	0	57	+7
NSA-06					
M-20	56	56	0	71	+15
M-21	58	58	0	70	+12
M-23	61	61	0	70	+9
R-08	61	61	0	71	+10
R-09	55	55	0	62	+7
R-10	49	49	0	56	+7
R-11	61	61	0	70	+9
R-12	55	55	0	63	+8
NSA-07					
M-19	56	56	0	64	+8
NSA-09					
M-17	60	60	0	68	+8
M-18	67	67	0	76	+9
R-03	58	58	0	65	+7
R-04	60	60	0	68	+8
R-13	53	53	0	60	+7
R-14	54	54	0	61	+7
R-15	58	58	0	65	+7

LEGEND

[ ] **Impact[3]**

1. A Receptor Number beginning with "M" represents a measured location and a Receptor Number beginning with "R" represents a modeled receptor only.
2. A noise level of 43 dB(A) was added to the TNM results in order to account for the presence of background because TNM does not account for background noise.
3. Impacted receptors are those where the predicted noise levels equal or exceed 66 dB(A) or there is an increase over existing noise levels of 10 dB(A) or more.

TABLE 4.C Predicted Noise Levels and Impact Analysis – Bridge Alternates

Receptor Number[1]	Existing Worst Case Traffic Noise Level[2]	2030 No Build Predicted Noise Level[2]	Difference from Existing Worst Case to 2030 No- Build	2 –LANE PARALLEL		4-LANE PARALLEL	
				2030 Build Predicted Noise Level [2,3]	Difference from 2030 No-Build to 2030 Build	2030 Build Predicted Noise Level [2,3]	Difference from 2030 No-Build to 2030 Build
NSA -07							
M-12	59	59	0	62	+3	64	+5
M-15	64	64	0	69	+5	69	+5
R-18	57	57	0	65	+8	65	+8
NSA-08							
M-11	53	53	0	58	+5	60	+7
NSA-09							
M-16	58	58	0	67	+9	67	+9
R-16	54	54	0	60	+6	61	+7
R-17	55	55	0	63	+8	62	+7
NSA-10							
M-13	58	58	0	65	+7	60	+2
M-14	57	57	0	64	+7	62	+5
NSA-11							
M-07	54	54	0	58	+4	56	+2
M-08	58	58	0	61	+3	61	+3
M-10	55	55	0	60	+5	59	+4
NSA-12							
M-05	53	53	0	52	-1	54	+1
M-06	53	53	0	53	0	56	+3
M-09	55	55	0	57	+2	59	+4
NSA-13							
M-04	57	57	0	64	+7	65	+8
R-19	56	56	0	63	+7	63	+7

LEGEND

Impact[3]

1. A Receptor Number beginning with "M" represents a measured location and a Receptor Number beginning with "R" represents a modeled receptor only.

2. A noise level of 43 dB(A) was added to the TNM results in order to account for the presence of background because TNM does not account for background noise.

3. Impacted receptors are those where the predicted noise levels equal or exceed 66 dB(A) or there is an increase over existing noise levels of 10 dB(A) or more.

Impact Summary

NSA-01
The existing residences in this NSA **are not impacted** under the worst-case 2030 No-Build or 2030 Build Conditions. See Table 4.A for the predicted noise levels.

NSA-02
The existing Church in this NSA **is not impacted** under the worst-case 2030 No-Build or 2030 Build Conditions. See Table 4.A for the predicted noise levels.

NSA-03
The existing residences in this NSA **are not impacted** under the worst-case 2030 No-Build or 2030 Build Conditions. See Table 4.B for the predicted noise levels.

NSA-04
The existing residences in this NSA are not impacted under the worst-case 2030 No-Build, but **are impacted** under the 2030 Build Conditions. See Table 4.B for the predicted noise levels.

NSA-05
The existing residences in this NSA **are not impacted** under the worst-case 2030 No-Build or the 2030 Build Conditions. See Table 4.B for the predicted noise levels.

NSA-06
The existing Church and residences in this NSA are not impacted under the worst-case 2030 No-Build, but **are impacted** under the 2030 Build Conditions. See Table 4.B for the predicted noise levels.

NSA-07
The existing residences in this NSA are not impacted under the worst-case 2030 No-Build, but **are impacted** under the 2030 Build Conditions for both the 2-Lane Parallel Bridge Option and the 4-Lane Parallel Bridge Option. See Tables 4.B and 4.C for the predicted noise levels.

NSA-08
The existing residences in this NSA **are not impacted** under the worst-case 2030 No-Build or 2030 Build Conditions. See Table 4.C for the predicted noise levels.

NSA-09
The existing residences in this NSA **are impacted** under the worst-case 2030 No-Build and 2030 Build Conditions for both the 2-Lane Parallel Bridge Option and the 4-Lane Parallel Bridge Option. See Tables 4.B and 4.C for the predicted noise levels.

NSA-10
The existing residences in this NSA **are not impacted** under the worst-case 2030 No-Build or 2030 Build Conditions. See Table 4.C for the predicted noise levels.

NSA-11
The existing residences in this NSA **are not impacted** under the worst-case 2030 No-Build or 2030 Build Conditions. See Table 4.C for the predicted noise levels.

NSA-12
The existing residences in this NSA **are not impacted** under the worst-case 2030 No-Build or 2030 Build Conditions. See Table 4.C for the predicted noise levels.

NSA-13
The existing residences in this NSA **are not impacted** under the worst-case 2030 No-Build or 2030 Build Condition, for either the 2-Lane or 4-Lane Parallel Bridge Option. See Table 4.C for the predicted noise levels.

NSA-14
Existing residences in this NSA **are impacted** under the worst-case 2030 No-Build and 2030 Build Conditions under intersection Options A,B and D. See Table 4.A for the predicted noise levels.

B. Feasibility and Reasonableness

According to the SHA *Sound Barrier Policy*, decisions concerning the provision of sound barriers will be made after evaluation of the feasibility and reasonableness criteria. Sound barrier feasibility is defined as the engineering and acoustical ability to provide effective noise reduction. The determination of the feasibility of a sound barrier is dependent upon the relationship of the highway to the adjacent community. The elevations of the highway and adjacent development must be such that a barrier of reasonable height can be constructed to provide a desirable noise reduction of 7 to 10 dB(A) at first row residences. Other factors such as available right-of-way, constructability, and safety are also considered in determining sound barrier feasibility. Reasonableness includes such factors as cost, desires of the affected community, the relationship of no-build to build noise levels, aesthetics, and environmental considerations.

1. Feasibility

The design of a sound barrier may be feasible provided the following criteria can be met:

- Noise levels can be reduced by 7 dB(A) or more at impacted receptors.
- Placement of a sound barrier does not restrict vehicular or pedestrian access.
- Construction of a sound barrier does not cause any safety or maintenance problems.
- A sound barrier can be constructed given topography, drainage, utilities, etc.
- A sound barrier will not have a significant impact on a 4(f) resource.
- There are no non-highway noise sources that would reduce or limit barrier effectiveness.

2. Reasonableness

A sound barrier may be considered to be reasonable when the following criteria are met

- The majority of impacted residences will receive a 7 dB(A) or greater noise reduction.
- A 3 dB(A) or greater change in design year build noise levels over design year no-build noise levels is expected to result from the proposed action.
- The cumulative effects of highway improvements in the design-year build noise levels at receptors that existed when prior improvements were made is equal to or greater than 3 dB(A).
- Predicted noise levels equal or exceed 72 dB(A) and there is any increase in noise levels comparing predicted future no-build conditions and future build conditions.
- Existing noise levels are expected to increase by 10 dB(A) or more and predicted future noise levels equal or exceed 57 dB(A).
- The sound barrier will not have significant negative visual impact at impacted residences.

- The cost of noise abatement is equal to or less than $50,000 per benefited residence.
- There are no special circumstances, i.e. historical/ cultural significance at the community.

C. Barrier Design

Sound barriers were investigated for NSA's meeting the impact criteria. The feasibility and reasonableness of each barrier is presented below in the Feasibility and Reasonableness charts for each NSA.

In developing the cost per residence, only impacted receptors receiving 3 dB(A) or more insertion loss, and non-impacted receptors receiving 5 dB(A) or more insertion loss are considered benefitted and included in the cost per residence calculation.

Churches have been identified as ten (10) equivalent residences.

NSA-04

A sound barrier was investigated to determine the feasibility of providing noise abatement to NSA-04 which is impacted in the design year 2030 under the Build Condition. The results indicated that a sound barrier can provide 10 dB(A) reduction. The barrier would be approximately 1,297 feet long and vary in height from 14 feet to 22 feet with an area of 29,047 SF.

The barrier would benefit one impacted residence (M-24). The cost of the barrier using a cost of $34.00/SF would be $987,598. The cost per residence would be $ 987,598.

Barrier Feasibility and Reasonableness worksheets are provided below in Tables 4.D and 4.E.

The barrier location, the 2030 Build and Build Barrier noise levels, and insertion lossses are shown on Maps No. 9, 9a.,9b. and 9c. in Section 5.

TABLE 4.D NSA-04 Policy Feasibility Evaluation

Feasibility Criteria	Yes / No[1]
1. Noise Levels can be reduced by 7 dB(A) or more at impacted residences.	Yes
2. Placement of barrier will not restrict pedestrian or vehicular access.	Yes
3. Construction of a barrier will not cause safety or maintenance problems.	Yes
4. Sound Barrier can be constructed given topography, drainage, utilities, etc.	Yes
5. Sound Barrier will not have [a] significant adverse impact on [a] Section 4(f) resource.	Yes
6. There are no non-highway noise sources that would reduce barrier effectiveness.	Yes

1. *Yes indicates that the criteria is true, No indicates that the criteria is false.*

TABLE 4.E NSA-04 Policy Reasonableness Evaluation

Reasonableness Criteria	Yes / No[1]
1. Majority of impacted residences will receive a 7 dB(A) or greater noise reduction.	Yes
2. A 3 dB(A) or greater change in design year build noise levels over design year no-build noise levels is expected to result from the proposed action,	Yes
3. The cumulative effects of highway improvements in the design year build noise levels at receptors that existed when prior improvements were made is equal to or greater than 3 dB(A).	n/a
4. Noise levels equal or exceed 72 dB(A) at impacted residences.	No
5. Existing noise levels are expected to increase by 10 dB(A) or more and predicted future noise levels equal or exceed 57 dB(A)	No
6. Sound barriers will not have [a] significant negative visual impact at impacted residences.	Yes
7. The cost of noise abatement is equal to or less than $50,000 per benefited residence.	No
8. There are no special circumstances, i.e. historical/cultural significance at this community.	Yes

1. *Yes indicates that the criteria is true, No indicates that the criteria is false.*

NSA- 06

A sound barrier was investigated to determine the feasibility of providing noise abatement to NSA-06 which is impacted in the design year 2030 under the Build Condition. The results indicated that a sound barrier can provide 10 dB(A) reduction. The barrier would be approximately 3,258 feet long and vary in height from 10 feet to 14 feet with an area of 43,823 SF.

The barrier would protect the outside playground area at the Patuxent Presbyterian Church (M-23) and four impacted residences (R-08,R-11,M-20 & M-23).The Church is included in the cost per residence calculation as 10 equivalent residences. Using a cost of $34.00/ SF the cost of the barrier would be $ 1,489,982. The cost per residence is $106,427.

Barrier feasibility and Reasonableness worksheets are provided below in Tables 4.F and 4.G.

The barrier location, the 2030 Build and Build Barrier predicted noise levels, and insertion losses are shown on Maps No. 9c. in Section 5.

TABLE 4.F NSA-06 Policy Feasibility Evaluation

Feasibility Criteria	Yes / No[1]
1. Noise Levels can be reduced by 7 dB(A) or more at impacted residences.	Yes
2. Placement of barrier will not restrict pedestrian or vehicular access.	Yes
3. Construction of a barrier will not cause safety or maintenance problems.	Yes
4. Sound Barrier can be constructed given topography, drainage, utilities, etc.	Yes
5. Sound Barrier will not have [a] significant adverse impact on [a] Section 4(f) resource.	Yes
6. There are no non-highway noise sources that would reduce barrier effectiveness.	Yes

1. Yes indicates that the criteria is true, No indicates that the criteria is false.

TABLE 4.G NSA-06 Policy Reasonableness Evaluation

Reasonableness Criteria	Yes / No[1]
1. Majority of impacted residences will receive a 7 dB(A) or greater noise reduction.	Yes
2. A 3 dB(A) or greater change in design year build noise levels over design year no-build noise levels is expected to result from the proposed action,	Yes
3. The cumulative effects of highway improvements in the design year build noise levels at receptors that existed when prior improvements were made is equal to or greater than 3 dB(A).	n/a
4. Noise levels equal or exceed 72 dB(A) at impacted residences.	No
5. Existing noise levels are expected to increase by 10 dB(A) or more and predicted future noise levels equal or exceed 57 dB(A)	No
6. Sound barriers will not have [a] significant negative visual impact at impacted residences.	Yes[2]
7. The cost of noise abatement is equal to or less than $50,000 per benefited residence.	No
8. There are no special circumstances, i.e. historical/cultural significance at this community.	Yes

1. Yes indicates that the criteria is true, No indicates that the criteria is false.
2. The Church may not be in favor of constructing a barrier which would block their visibility from the road.

NSA- 07 (2-Lane Parallel Bridge & 4-Lane Parallel Bridge)

A sound barrier was investigated to determine the feasibility of providing noise abatement to at NSA-07 which is impacted in the design year 2030 under the Build Condition for both the 2-Lane Parallel Bridge Option and the 4-Lane Parallel Bridge Option. The results indicated that a sound barrier can provide 10 dB(A) reduction. The barrier would be approximately 1,496 feet long and vary in height from 10 feet to 16 feet with an area of 23,917 SF.

Using a cost of $34.00/ SF, the construction cost of the barrier would be $ 813,178. The barrier would benefit one impacted receptor and one non-impacted receptor. The cost per residence would be $406,589.

Barrier feasibility and Reasonableness worksheets are provided below in Tables 4.H and 4.I.

The barrier location, the 2030 Build and Build Barrier predicted noise levels, and insertion losses are shown on Maps No. 9d. in Section 5.

TABLE 4.H NSA-07 2-Lane & 4-Lane Parallel Bridge Policy Feasibility Evaluation

Feasibility Criteria	Yes / No[1]
1. Noise Levels can be reduced by 7 dB(A) or more at impacted residences.	**Yes**
2. Placement of barrier will not restrict pedestrian or vehicular access.	**Yes**
3. Construction of a barrier will not cause safety or maintenance problems.	**Yes**
4. Sound Barrier can be constructed given topography, drainage, utilities, etc.	**Yes**
5. Sound Barrier will not have [a] significant adverse impact on [a] Section 4(f) resource.	**Yes**
6. There are no non-highway noise sources that would reduce barrier effectiveness.	**Yes**

1. Yes indicates that the criteria is true, No indicates that the criteria is false.

TABLE 4.I NSA-07 2-Lane & 4-Lane Parallel Bridge Policy Reasonableness Evaluation

Reasonableness Criteria	Yes / No[1]
1. Majority of impacted residences will receive a 7 dB(A) or greater noise reduction.	**Yes**
2. A 3 dB(A) or greater change in design year build noise levels over design year no-build noise levels is expected to result from the proposed action,	**Yes**
3. The cumulative effects of highway improvements in the design year build noise levels at receptors that existed when prior improvements were made is equal to or greater than 3 dB(A).	**n/a**
4. Noise levels equal or exceed 72 dB(A) at impacted residences.	**No**
5. Existing noise levels are expected to increase by 10 dB(A) or more and predicted future noise levels equal or exceed 57 dB(A)	**No**
6. Sound barriers will not have [a] significant negative visual impact at impacted residences.	**Yes**
7. The cost of noise abatement is equal to or less than $50,000 per benefited residence.	**No**
8. There are no special circumstances, i.e. historical/cultural significance at this community.	**Yes**

1. Yes indicates that the criteria is true, No indicates that the criteria is false.

NSA- 09 (2-Lane Parallel Bridge & 4-Lane Parallel Bridge)

A sound barrier was investigated to determine the feasibility of providing noise abatement to NSA-09 which is impacted in the design year 2030 No-Build and Build Conditions for both the 2-Lane Parallel Bridge Option and the 4-Lane Parallel Bridge Option. The results indicated that a sound barrier can provide 10 dB(A) reduction. The barrier is in two sections and would be approximately 2,559 feet long and vary in height from 10 feet to 16 feet with an area of 39,319 SF.

Using a cost of $34.00/ SF, the construction cost of the barrier would be $1,336,846. The barrier would benefit 5 non-impacted residences and 4 impacted residences. The cost per residence would be $148,538.

Barrier feasibility and Reasonableness worksheets are provided below in Tables 4.J and 4.K.

The barrier location, the 2030 Build and Build Barrier predicted noise levels, and insertion losses are shown on Map No. 9d. in Section 5 for the 2-lane Parallel Bridge Option, AM condition. The 4-lane Parallel bridge results are similar.

TABLE 4.J NSA-09 2-Lane & 4-Lane Parallel Bridge Policy Feasibility Evaluation

Feasibility Criteria	Yes / No[1]
1. Noise Levels can be reduced by 7 dB(A) or more at impacted residences.	Yes
2. Placement of barrier will not restrict pedestrian or vehicular access.	Yes
3. Construction of a barrier will not cause safety or maintenance problems.	Yes
4. Sound Barrier can be constructed given topography, drainage, utilities, etc.	Yes
5. Sound Barrier will not have [a] significant adverse impact on [a] Section 4(f) resource.	Yes
6. There are no non-highway noise sources that would reduce barrier effectiveness.	Yes

1. Yes indicates that the criteria is true, No indicates that the criteria is false.

TABLE 4.K NSA-09 2-Lane & 4-Lane Parallel Bridge Policy Reasonableness Evaluation

Reasonableness Criteria	Yes / No[1]
1. Majority of impacted residences will receive a 7 dB(A) or greater noise reduction.	Yes
2. A 3 dB(A) or greater change in design year build noise levels over design year no-build noise levels is expected to result from the proposed action,	Yes
3. The cumulative effects of highway improvements in the design year build noise levels at receptors that existed when prior improvements were made is equal to or greater than 3 dB(A).	n/a
4. Noise levels equal or exceed 72 dB(A) at impacted residences.	Yes
5. Existing noise levels are expected to increase by 10 dB(A) or more and predicted future noise levels equal or exceed 57 dB(A)	Yes
6. Sound barriers will not have [a] significant negative visual impact at impacted residences.	Yes
7. The cost of noise abatement is equal to or less than $50,000 per benefited residence.	No
8. There are no special circumstances, i.e. historical/cultural significance at this community.	Yes

1. Yes indicates that the criteria is true, No indicates that the criteria is false.

NSA-14: Option A, Continuous Flow Intersection

A sound barrier was investigated to determine the feasibility of providing noise abatement to NSA-14 which is impacted in the design year 2030 under both the No-Build and the Build Conditions for the MD 235 intersection Option A. The results indicated that a sound barrier can provide 10 dB(A) reduction. The barrier would be approximately 1,100 feet long and vary in height from 10 feet to 14 feet with an area of 14,876 SF.

Using a cost of $34.00/ SF, the construction cost of the barrier would be $505,784. The barrier will benefit 2 impacted residences. The cost per residence would be $252,892.

Barrier feasibility and Reasonableness worksheets are provided below in Tables 4.L and 4.M.

The barrier location, the 2030 Build and Build Barrier predicted noise levels, and insertion losses are shown on Map No. 9 in Section 5.

TABLE 4.L NSA-14 Option A Policy Feasibility Evaluation

Feasibility Criteria	Yes / No[1]
1. Noise Levels can be reduced by 7 dB(A) or more at impacted residences.	**Yes**
2. Placement of barrier will not restrict pedestrian or vehicular access.	**Yes[2]**
3. Construction of a barrier will not cause safety or maintenance problems.	**Yes**
4. Sound Barrier can be constructed given topography, drainage, utilities, etc.	**Yes**
5. Sound Barrier will not have [a] significant adverse impact on [a] Section 4(f) resource.	**Yes**
6. There are no non-highway noise sources that would reduce barrier effectiveness.	**Yes**

1. Yes indicates that the criteria is true, No indicates that the criteria is false.
2. Access is being provided from the rear of the properties.

TABLE 4.M NSA-14 Option A Policy Reasonableness Evaluation

Reasonableness Criteria	Yes / No[1]
1. Majority of impacted residences will receive a 7 dB(A) or greater noise reduction.	**Yes**
2. A 3 dB(A) or greater change in design year build noise levels over design year no-build noise levels is expected to result from the proposed action,	**Yes**
3. The cumulative effects of highway improvements in the design year build noise levels at receptors that existed when prior improvements were made is equal to or greater than 3 dB(A).	**n/a**
4. Noise levels equal or exceed 72 dB(A) at impacted residences.	**Yes**
5. Existing noise levels are expected to increase by 10 dB(A) or more and predicted future noise levels equal or exceed 57 dB(A)	**No**
6. Sound barriers will not have [a] significant negative visual impact at impacted residences.	**Yes[2]**
7. The cost of noise abatement is equal to or less than $50,000 per benefited residence.	**No**
8. There are no special circumstances, i.e. historical/cultural significance at this community.	**Yes**

1. Yes indicates that the criteria is true, No indicates that the criteria is false.
2. The commercial properties will not be visible from MD 235 if the sound barrier is constructed.

NSA-14: Option B, At-Grade intersection with Flyover

A sound barrier was investigated to determine the feasibility of providing noise abatement to NSA-14 which is impacted in the design year 2030 under both the No-Build and the Build Conditions for the MD 235 intersection Option B. The results indicated that a sound barrier can provide 10 dB(A) reduction. The barrier would be approximately 1,100 feet long and vary in height from 10 feet to 12 feet with an area of 13,192 SF.

Using a cost of $34.00/ SF, the construction cost of the barrier would be $448,528. The barrier will benefit 2 impacted residences. The cost per residence would be $224,264.

Barrier feasibility and Reasonableness worksheets are provided below in Tables 4.N and 4.O.

The barrier location, the 2030 Build and Build Barrier predicted noise levels, and insertion losses are shown on Map No. 9a. in Section 5.

TABLE 4.N NSA-14 Option B Policy Feasibility Evaluation

Feasibility Criteria	Yes / No[1]
1. Noise Levels can be reduced by 7 dB(A) or more at impacted residences.	**Yes**
2. Placement of barrier will not restrict pedestrian or vehicular access.	**No[2]**
3. Construction of a barrier will not cause safety or maintenance problems.	**Yes**
4. Sound Barrier can be constructed given topography, drainage, utilities, etc.	**Yes**
5. Sound Barrier will not have [a] significant adverse impact on [a] Section 4(f) resource.	**Yes**
6. There are no non-highway noise sources that would reduce barrier effectiveness.	**Yes**

1. Yes indicates that the criteria is true, No indicates that the criteria is false.
2. Access will be required from the rear of the properties, similar to Options A & D.

TABLE 4.O NSA-14 Option B Policy Reasonableness Evaluation

Reasonableness Criteria	Yes / No[1]
1. Majority of impacted residences will receive a 7 dB(A) or greater noise reduction.	**Yes**
2. A 3 dB(A) or greater change in design year build noise levels over design year no-build noise levels is expected to result from the proposed action,	**Yes**
3. The cumulative effects of highway improvements in the design year build noise levels at receptors that existed when prior improvements were made is equal to or greater than 3 dB(A).	**n/a**
4. Noise levels equal or exceed 72 dB(A) at impacted residences.	**Yes**
5. Existing noise levels are expected to increase by 10 dB(A) or more and predicted future noise levels equal or exceed 57 dB(A)	**No**
6. Sound barriers will not have [a] significant negative visual impact at impacted residences.	**Yes[2]**
7. The cost of noise abatement is equal to or less than $50,000 per benefited residence.	**No**
8. There are no special circumstances, i.e. historical/cultural significance at this community.	**Yes**

1. Yes indicates that the criteria is true, No indicates that the criteria is false.
2. The commercial properties will not be visible from MD 235 if the noise barrier is constructed.

NSA-14: Option D, Single Point Urban Diamond

A sound barrier was investigated to determine the feasibility of providing noise abatement to NSA-14 which is impacted in the design year 2030 under both the No-Build and the Build Conditions for the MD 235 intersection Option D. The results indicated that a sound barrier can provide 10 dB(A) reduction. The barrier would be approximately 500 feet long and vary in height from 10 feet to 12 feet with an area of 6,132 SF.

Using a cost of $34.00/ SF, the construction cost of the barrier would be $208,488. The barrier will benefit 1 impacted residence. The cost per residence would be $208,488. One of two of the impacted residences is displaced under this alternate.

Barrier feasibility and Reasonableness worksheets are provided below in Tables 4.P and 4.Q.

The barrier location, the 2030 Build and Build Barrier predicted noise levels, and insertion losses are shown on Map No. 9b. in Section 5.

TABLE 4.P NSA-14 Option D Policy Feasibility Evaluation

Feasibility Criteria	Yes / No[1]
1. Noise Levels can be reduced by 7 dB(A) or more at impacted residences.	**Yes**
2. Placement of barrier will not restrict pedestrian or vehicular access.	**Yes[2]**
3. Construction of a barrier will not cause safety or maintenance problems.	**Yes**
4. Sound Barrier can be constructed given topography, drainage, utilities, etc.	**Yes**
5. Sound Barrier will not have [a] significant adverse impact on [a] Section 4(f) resource.	**Yes**
6. There are no non-highway noise sources that would reduce barrier effectiveness.	**Yes**

1. Yes indicates that the criteria is true, No indicates that the criteria is false.
2. Access is being provided from the rear of the properties.

TABLE 4.Q NSA-14 Option D Policy Reasonableness Evaluation

Reasonableness Criteria	Yes / No[1]
1. Majority of impacted residences will receive a 7 dB(A) or greater noise reduction.	**Yes**
2. A 3 dB(A) or greater change in design year build noise levels over design year no-build noise levels is expected to result from the proposed action,	**Yes**
3. The cumulative effects of highway improvements in the design year build noise levels at receptors that existed when prior improvements were made is equal to or greater than 3 dB(A).	**n/a**
4. Noise levels equal or exceed 72 dB(A) at impacted residences.	**Yes**
5. Existing noise levels are expected to increase by 10 dB(A) or more and predicted future noise levels equal or exceed 57 dB(A)	**No**
6. Sound barriers will not have [a] significant negative visual impact at impacted residences.	**Yes[2]**
7. The cost of noise abatement is equal to or less than $50,000 per benefited residence.	**No**
8. There are no special circumstances, i.e. historical/cultural significance at this community.	**Yes**

1. Yes indicates that the criteria is true, No indicates that the criteria is false.
2. The commercial properties will not be visible from MD 235 if the noise barrier is constructed.

D. Construction Impacts

During construction of the project, the residences closest to the construction area will likely be impacted by construction noise as a result of the project. In order to minimize the impact to the residential community, all proposed construction will comply with applicable Federal, State and Local noise control regulations, as well as the Occupational Safety and Health Act of 1970. Where practicable, construction activity should be confined to time periods that will create a minimum amount of disturbance to the community.

The Contractor should use only equipment adapted to operate with the least possible noise, and should conduct his work so that annoyance to occupants of nearby property and the general public will be reduced to a minimum.

E. Coordination with Local Officials

Preventing noise sensitive land uses from locating adjacent to state highways within high noise areas is the responsibility of local land use and zoning processes. The control of highway noise, to be effective and comprehensive, must be done in partnership between SHA and local land use planning officials. The SHA will furnish the results of all highway traffic noise analyses to local government officials and will encourage local communities and developers to practice noise compatible development. Local coordination will specifically be accomplished through the distribution of highway project environmental documents and noise study reports.

F. Summary of Results

- Noise mitigation **is not warranted** in NSA-01, NSA-02 or NSA-03.
- Noise mitigation **is warranted** in NSA-04 and requires further consideration.
- Noise mitigation **is not warranted** in NSA-05.
- Noise mitigation **is warranted** in NSA-06 and requires further consideration.
- Noise mitigation **is warranted** in NSA-07 for the 2-Lane and 4-Lane Parallel Bridge Options and requires further consideration.
- Moise mitigation **is not warranted** in NSA-08.
- Noise mitigation **is warranted** in NSA-09 for the 2-Lane and 4-Lane Parallel Bridge Options and requires further consideration.
- Noise mitigation **is not warranted** in NSA-10, NSA-11, NSA-12 or NSA-13.
- Noise mitigation **is warranted** in NSA-14 under Options A,B and D and requires further consideration.

MD 4 (PATUXENT BEACH ROAD)
PROJECT PLANNING STUDY

Calvert County and St. Mary's County, Maryland

NOISE ANALYSIS TECHNICAL REPORT

FINAL
AUGUST 19, 2009

Section 5
MAPS

Submitted To

MARYLAND STATE HIGHWAY ADMINISTRATION

OFFICE OF PLANNING AND PRELIMINARY ENGINEERING

Prepared By

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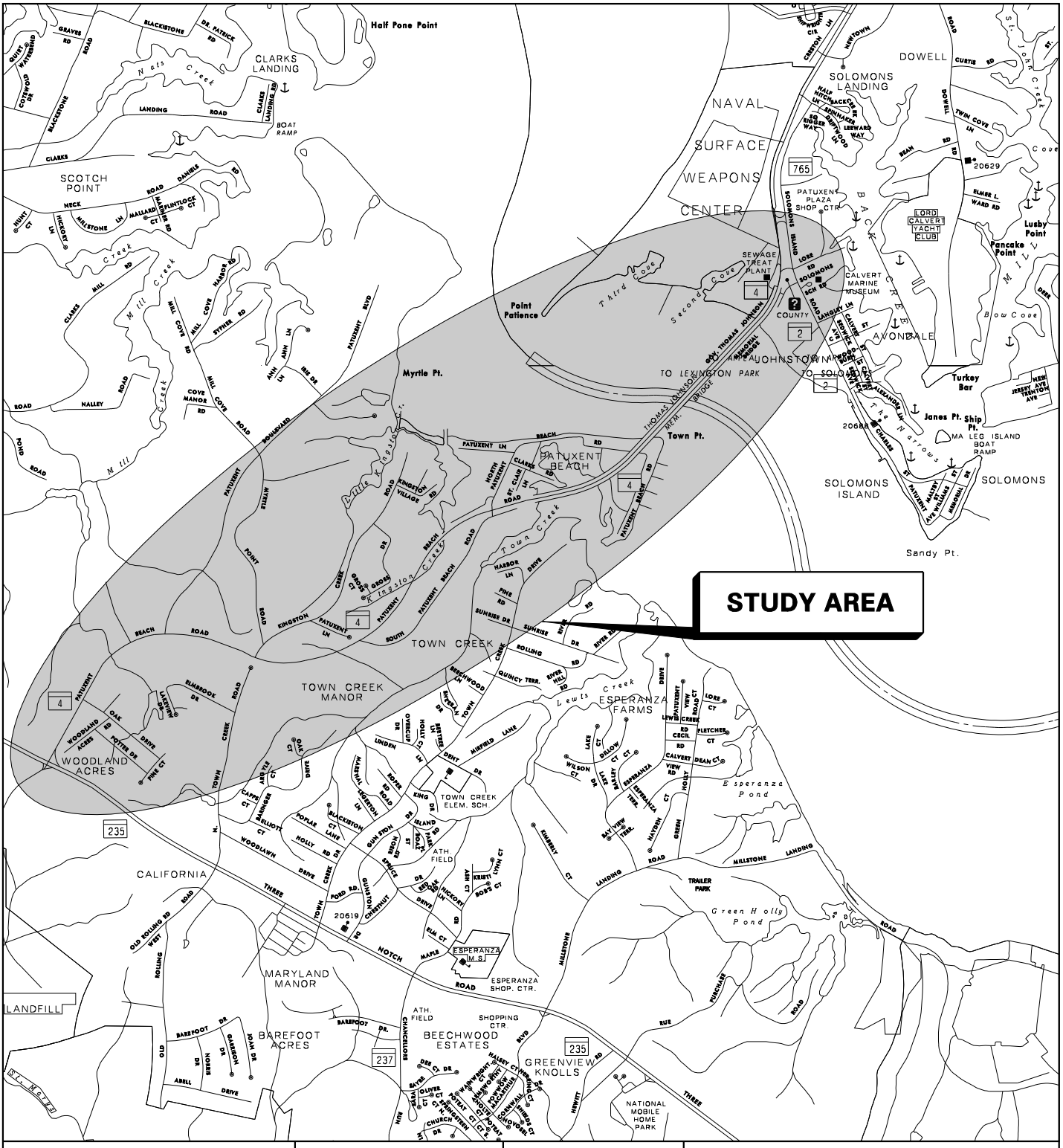
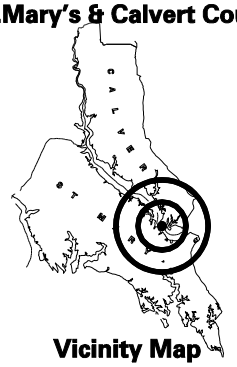


St.Mary's & Calvert County



Vicinity Map

0 1500 3000

Scale in Feet

August 19, 2009

Maryland State Highway Administration

Office of Planning and Preliminary Engineering

Environmental Technical Analysis

MD4 (PATUXENT BEACH RD.)

PROJECT PLANNING STUDY

FINAL NOISE ANALYSIS TECHNICAL REPORT

FROM MD 235 TO PATUXENT POINT PARKWAY

STUDY AREA LOCATION MAP

MAP NO. 1

Q:\SMD\010456_029_MD 4 Noise Study\CADD\Map01 Study Area_MD4.dgn
8/18/2009

MATCHLINE SEE MAP NO. 2

MATCHLINE SEE MAP NO. 2b

MYRTLE POINT RD.

KINGSTON LN.

KINGSTON CREEK RD.

CLEMENTS LN.

ELMBROOK DR.

SHADY MILE DR.

PLAYGROUND

CHURCH

BARNS

OUT BUILDINGS, GARAGE

PATUXENT BEACH RD.

MD 4

SEVEN GABLES LN.

GROSS DR.

S. PATUXENT BEACH RD.

NSA-04

NSA-05

NSA-06

NSA-07

NSA-09

TMS04

M–23 +1 63/62

M–02

M–21 +3 60/57

M–20 57/58 −1

M–19 58/58

M–22 51/53 −2

St.Mary's & Calvert County

Vicinity Map

0 150 300

Scale in Feet

Legend

M-01 Short-term Noise Measurement Site and Model Receptor

M-01 24-hour Noise Measurement Site and Model Receptor

67/65 Modeled Noise Level (dB[A]) Measured Noise Level (dB[A])

+3 −3 TNM Over Predicting Noise Level

TNM Under Predicting Noise Level

TMS01 Traffic Monitoring Session

NSA-01 Noise Study Area

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TNM MODEL CALIBRATION MAP

Map No. 2a

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8/18/2009

MATCHLINE SEE MAP NO. 2a

KINGSTON CREEK ROAD
GROSS DR.
KINGSTON SHORES LANE
PATUXENT BEACH ROAD
MD 4
S. PATUXENT BEACH RD.
N. PATUXENT BEACH RD.
WILD ROSE LN.
ST. CLAIR RD.
CLARKS RD.
TOWN CREEK
TOWN CREEK DRIVE

NSA-09
NSA-07
NSA-08
NSA-10

TMS02
TMS03
TMS06

M-11: 52/55, −3; TMS06: 55/55
M-12: 57/59, −2; TMS06: +1, 61/60
M-13: 56/57, −1; 59/60, −1
M-14: 55/56, −1
M-15: +1, 61/60
M-16: +2, 56/54
M-17: 58/58
M-18: 64/65, −1 ✳; TMS06: +4, 66/62

✳ M-18 MODELED LEVEL INCLUDES AN ADJUSTMENT FACTOR OF +3 dB(A)

MATCHLINE SEE MAP NO. 2c

St.Mary's & Calvert County

Vicinity Map

0 150 300
Scale in Feet

Legend

M-01 Short-term Noise Measurement Site and Model Receptor

M-01 24-hour Noise Measurement Site and Model Receptor

67/65 Modeled Noise Level (dB[A]) / Measured Noise Level (dB[A])

+3/−3 TNM Over Predicting Noise Level / TNM Under Predicting Noise Level

TMS01 Traffic Monitoring Session

NSA-01 Noise Study Area

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TNM MODEL CALIBRATION MAP

Map No. 2b

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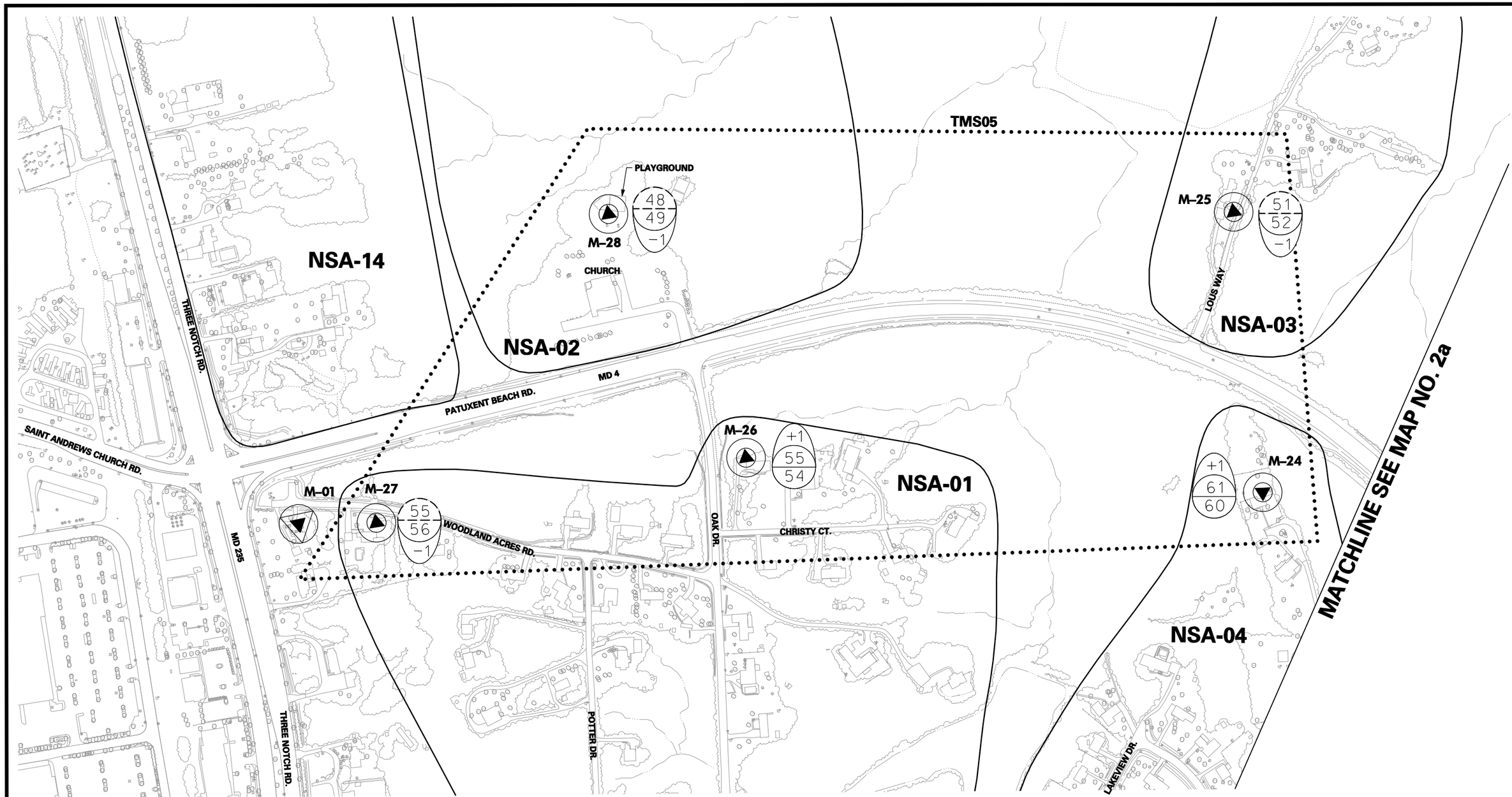

St.Mary's & Calvert County

Vicinity Map

0 150 300
Scale in Feet

Legend

M-01 Short-term Noise Measurement Site and Model Receptor

M-01 24-hour Noise Measurement Site and Model Receptor

67 / 65 Modeled Noise Level (dB[A]) / Measured Noise Level (dB[A])

+3 / −3 TNM Over Predicting Noise Level / TNM Under Predicting Noise Level

TMS01 Traffic Monitoring Session

NSA-01 Noise Study Area

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FROM MD 235 TO
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TNM MODEL CALIBRATION MAP

Map No. 2

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8/18/2009

MAP NO. 2b

MATCHLINE SEE

TMS03

TMS01

TMS06

NSA-11

NSA-12

NSA-13

M–10 53/55 −2

M–08 60/62 −2

M–07 55/55

M–05 54/56 −2

M–06 53/55 −2

M–09 53/53 −

TMS06 +2 56/54

M–03

M–04 57/60 −3

THOMAS JOHNSON BRIDGE

PATUXENT RIVER

BILL DIXON RD.

N. PATUXENT BEACH RD.

THOMAS JOHNSON RD.

USN TESTING CENTER

TREATMENT PLANT

SOLOMONS FISHING PIER & BOAT RAMP

CALVERT COUNTY INFORMATION CENTER

MD 4

LORE RD.

MARITIME MUSEUM PARKING LOT

MARITIME MUSEUM

SOLOMONS ISLAND RD. S.

LANGLEY LN.

STRATHMORE LN.

SEDWICK AVE.

CALVERT ST.

* M–08 MODELED LEVEL INCLUDES AN ADJUSTMENT FACTOR OF +4 dB(A)

St.Mary's & Calvert County

Vicinity Map

0 150 300

Scale in Feet

Legend

M-01 Short-term Noise Measurement Site and Model Receptor

M-01 24-hour Noise Measurement Site and Model Receptor

67/65 Modeled Noise Level (dB[A]) / Measured Noise Level (dB[A])

+3/−3 TNM Over Predicting Noise Level / TNM Under Predicting Noise Level

TMS01 Traffic Monitoring Session

NSA-01 Noise Study Area

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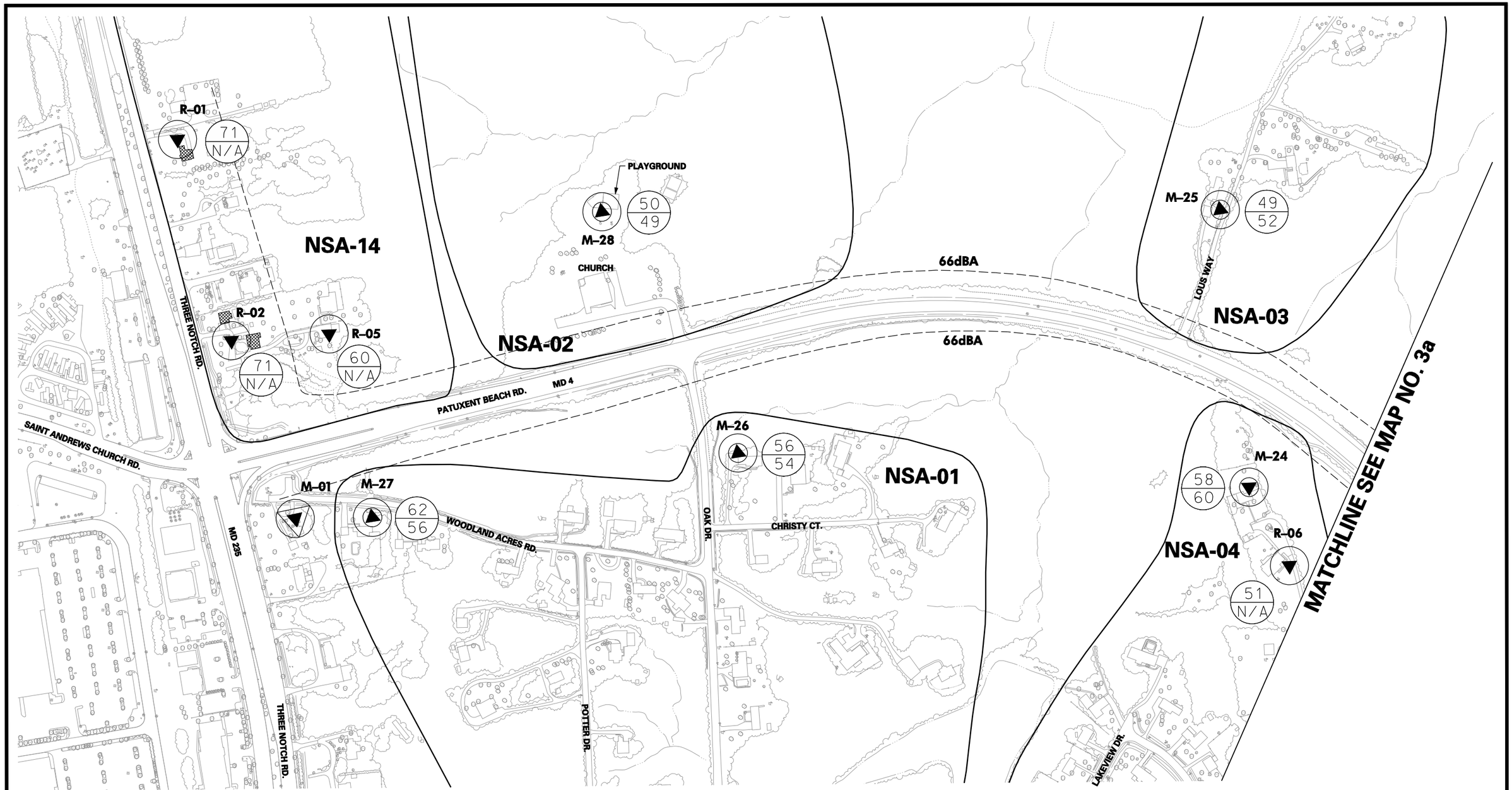
FROM MD 235 TO PATUXENT POINT PARKWAY

TNM MODEL CALIBRATION MAP

Map No. 2c

c:\arms\010456_029_MD 4 Noise Study\CADD\MAP02c-CAL_MD4.dgn
8/18/2009



St.Mary's & Calvert County

Vicinity Map

0 150 300
Scale in Feet

Legend

M-01 Short-term Noise Measurement Site and Model Receptor

M-01 24-hour Noise Measurement Site and Model Receptor

R-01 Modeled Receptor

Impacted Residence, Existing Worst Case Noise Level ≥ 66 dB(A)

67/65 2008 EWC Noise Level (dB[A]) Measured Noise Level (dB[A])

66 dB(A) Contour Line, Existing Worst Case Noise Level

NSA-01 Noise Study Area

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FROM MD 235 TO
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EXISTING WORST CASE CONDITIONS MAP

Map No. 3

q:\amd\010458_028_MD 4 Noise Study\CADD\MAP03-EWC_MD4.dgn
8/18/2009

MATCHLINE SEE MAP NO. 3

MATCHLINE SEE MAP NO. 3b

R–07 51 N/A

CLEMENTS LN.

ELMBROOK DR.

SHADY MILE DR.

NSA-04

M–23 61 62

CHURCH

PLAYGROUND

M–02

NSA-05

BARNS

M–22 50 53

OUT BUILDINGS, GARAGE

MYRTLE POINT RD.

KINGSTON LN.

KINGSTON CREEK RD.

R–09 55 N/A

61 N/A R–08

M–21 58 57

PATUXENT BEACH RD.

66dBA

MD 4

66dBA

NSA-06

R–11 61 N/A

SEVEN GABLES LN.

R–12 55 N/A

49 N/A R–10

M–20 56 58

GROSS DR.

NSA-09

NSA-07

M–19 56 58

S. PATUXENT BEACH RD.

St.Mary's & Calvert County

Vicinity Map

0 150 300

Scale in Feet

Legend

M-01 Short-term Noise Measurement Site and Model Receptor

M-01 24-hour Noise Measurement Site and Model Receptor

R-01 Modeled Receptor

Impacted Residence, Existing Worst Case Noise Level ≥ 66 dB(A)

67 / 65 2008 EWC Noise Level (dB[A]) Measured Noise Level (dB[A])

66 dB(A) Contour Line, Existing Worst Case Noise Level

NSA-01 Noise Study Area

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FROM MD 235 TO PATUXENT POINT PARKWAY

EXISTING WORST CASE CONDITIONS MAP

Map No. 3a

q:\amd\010458_029_MD 4 Noise Study\CADD\MAP03a-EWC_MD4.dgn
8/18/2009

MATCHLINE SEE MAP NO. 3a

KINGSTON CREEK ROAD
GROSS DR.
KINGSTON SHORES LANE
PATUXENT BEACH ROAD
MD 4
66 dBA
66 dBA
W. PATUXENT BEACH RD.
N. PATUXENT BEACH RD.
S. PATUXENT BEACH RD.
WILD ROSE LN.
ST. CLAIR RD.
ST. CLAIR RD.
CLARKS RD.
TOWN CREEK
TOWN CREEK DRIVE

NSA-09
NSA-10
NSA-07
NSA-08

R-03 58/N/A
R-04 60/N/A
R-13 53/N/A
R-14 54/N/A
R-15 58/N/A
R-16 54/N/A
R-17 55/N/A
R-18 57/N/A
M-11 53/55
M-12 59/59
M-13 58/57
M-14 57/56
M-15 64/60
M-16 58/54
M-17 60/58
M-18 67/65

MATCHLINE SEE MAP NO. 3c

St.Mary's & Calvert County

Vicinity Map

0 150 300
Scale in Feet

Legend

M-01 Short-term Noise Measurement Site and Model Receptor

M-01 24-hour Noise Measurement Site and Model Receptor

R-01 Modeled Receptor

Impacted Residence, Existing Worst Case Noise Level ≥ 66 dB(A)

67/65 2008 EWC Noise Level (dB[A]) Measured Noise Level (dB[A])

66 dB(A) Contour Line, Existing Worst Case Noise Level

NSA-01 Noise Study Area

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EXISTING WORST CASE CONDITIONS MAP

Map No. 3b

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8/18/2009

MAP NO. 3b

MATCHLINE SEE

NSA-11

NSA-12

NSA-13

M–10 55/55

M–08 58/62

M–07 54/55

M–09 55/53

M–05 53/56

M–06 53/55

M–03

M–04 57/60

R–19 56/N/A

66dBA

66dBA

BILL DIXON RD.

N. PATUXENT BEACH RD.

N. PATUXENT BEACH RD.

THOMAS JOHNSON BRIDGE

THOMAS JOHNSON RD.

USN TESTING CENTER

TREATMENT PLANT

SOLOMONS FISHING PIER & BOAT RAMP

CALVERT COUNTY INFORMATION CENTER

MD 4

LORE RD.

MARITIME MUSEUM PARKING LOT

MARITIME MUSEUM

SOLOMONS ISLAND RD. S.

LANGLEY LN.

STRATHMORE LN.

SEDWICK AVE.

CALVERT ST.

PATUXENT RIVER

St.Mary's & Calvert County

Vicinity Map

0 150 300

Scale in Feet

Legend

M-01 Short-term Noise Measurement Site and Model Receptor

M-01 24-hour Noise Measurement Site and Model Receptor

R-01 Modeled Receptor

Impacted Residence, Existing Worst Case Noise Level ≥ 66 dB(A)

67/65 2008 EWC Noise Level (dB[A]) Measured Noise Level (dB[A])

66 dB(A) Contour Line, Existing Worst Case Noise Level

NSA-01 Noise Study Area

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MD4 (PATUXENT BEACH RD.)

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FROM MD 235 TO PATUXENT POINT PARKWAY

EXISTING WORST CASE CONDITIONS MAP

Map No. 3c

q:\smd\010468_029_MD 4 Noise Study\CADD\MAP03c-EWC_MD4.dgn
8/18/2009

NSA-14

NSA-02

NSA-01

NSA-03

NSA-04

R–01 72

R–02 72

R–05 61

PLAYGROUND

50 M–28

CHURCH

M–25 49

LOUIS WAY

66dBA

66dBA

THREE NOTCH RD.

PATUXENT BEACH RD.

MD 4

SAINT ANDREWS CHURCH RD.

M–01

M–27 63

WOODLAND ACRES RD.

MD 235

THREE NOTCH RD.

POTTER DR.

OAK DR.

M–26 56

CHRISTY CT.

M–24 58

R–06 51

LAKEVIEW DR.

MATCHLINE SEE MAP NO. 4a

St.Mary's & Calvert County

Vicinity Map

0 150 300

Scale in Feet

Legend

M-01 Short-term Noise Measurement Site and Model Receptor

M-01 24-hour Noise Measurement Site and Model Receptor

R-01 Modeled Receptor

Impacted Residence, 2030 No-Build Noise Level > 66 dB(A)

67 2030 No-Build Noise Level (dB[A])

66 dB(A) Contour Line, 2030 No-Build Noise Level

NSA-01 Noise Study Area

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MD4 (PATUXENT BEACH RD.)

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FINAL NOISE ANALYSIS TECHNICAL REPORT

FROM MD 235 TO PATUXENT POINT PARKWAY

NO BUILD PREDICTED NOISE LEVEL MAP

Map No. 4

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8/18/2009

MATCHLINE SEE MAP NO. 4

MATCHLINE SEE MAP NO. 4b

R–07 51

CLEMENTS LN.

ELMBROOK DR.

SHADY MILE DR.

NSA-04

M–23 61

CHURCH

PLAYGROUND

M–02

NSA-05

BARNS

50 M–22

OUT BUILDINGS, GARAGE

MYRTLE POINT RD.

KINGSTON LN.

KINGSTON CREEK RD.

R–09 55

61 R–08

M–21 58

66dBA

PATUXENT BEACH RD.

MD 4

66dBA

NSA-06

R–11 61

SEVEN GABLES LN.

R–12 55

49 R–10

M–20 56

GROSS DR.

NSA-09

NSA-07

M–19 56

S. PATUXENT BEACH RD.

St.Mary's & Calvert County

Vicinity Map

0 150 300

Scale in Feet

Legend

M-01 Short-term Noise Measurement Site and Model Receptor

M-01 24-hour Noise Measurement Site and Model Receptor

R-01 Modeled Receptor

Impacted Residence, 2030 No-Build Noise Level > 66 dB(A)

67 2030 No-Build Noise Level (dB[A])

66 dB(A) Contour Line, 2030 No-Build Noise Level

NSA-01 Noise Study Area

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FROM MD 235 TO
PATUXENT POINT PARKWAY

NO BUILD PREDICTED NOISE LEVEL MAP

Map No. 4a

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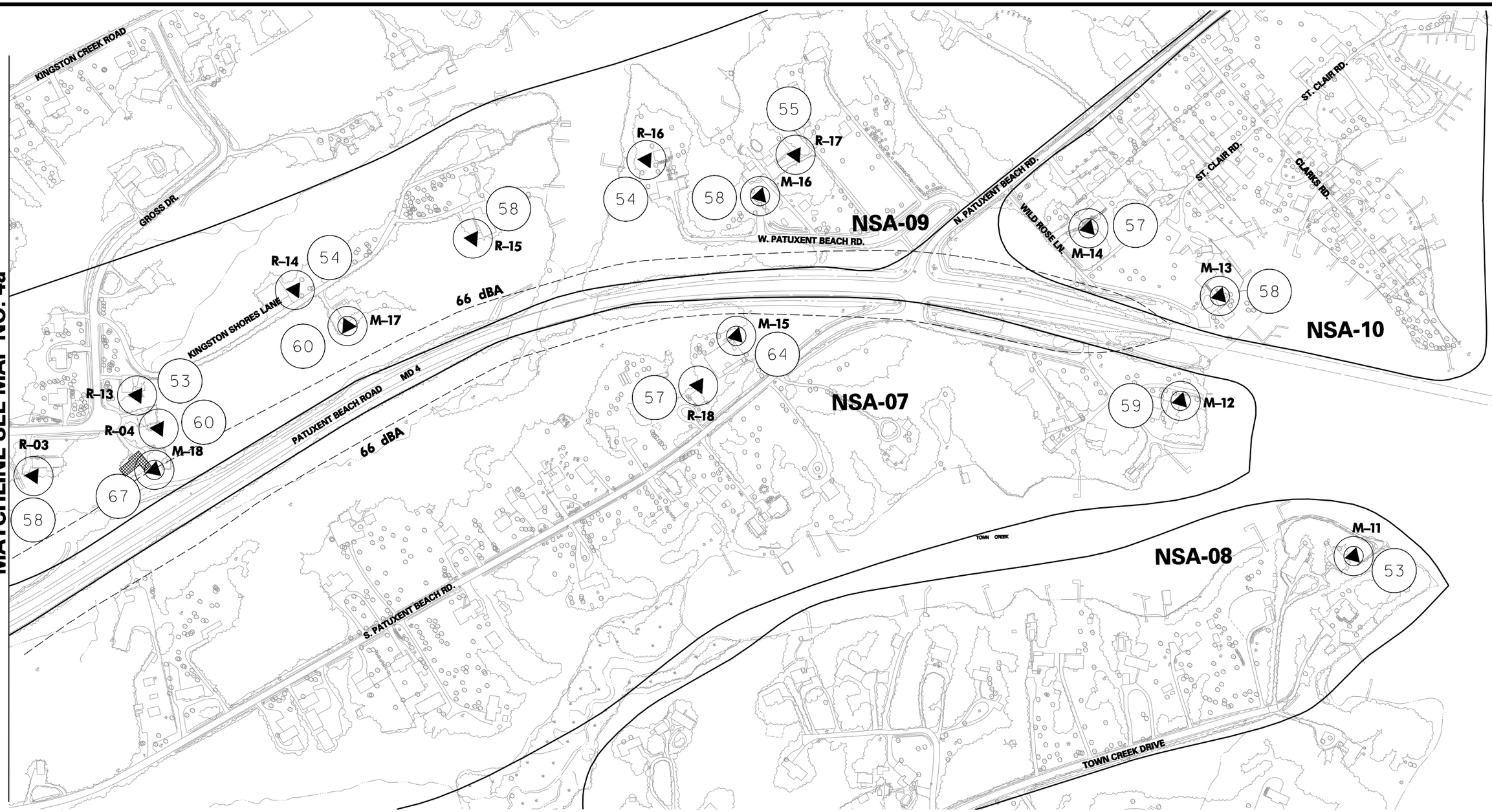
8/18/2009

MATCHLINE SEE MAP NO. 4a



MATCHLINE SEE MAP NO. 4c

St.Mary's & Calvert County

Vicinity Map

0 150 300
Scale in Feet

Legend

M-01 Short-term Noise Measurement Site and Model Receptor

M-01 24-hour Noise Measurement Site and Model Receptor

R-01 Modeled Receptor

Impacted Residence, 2030 No-Build Noise Level > 66 dB(A)

67 2030 No-Build Noise Level (dB[A])

66 dB(A) Contour Line, 2030 No-Build Noise Level

NSA-01 Noise Study Area

August 19, 2009

Maryland
State Highway Administration

Office of
Planning and Preliminary Engineering

Environmental Technical Analysis

MD4 (PATUXENT BEACH RD.)
PROJECT PLANNING STUDY

FINAL NOISE ANALYSIS
TECHNICAL REPORT

FROM MD 235 TO
PATUXENT POINT PARKWAY

NO BUILD PREDICTED NOISE LEVEL MAP

Map No. 4b

q:\sma\010456_029_MD 4 Noise Study\CADD\MAP04b-NB_MD4.dgn
8/18/2009

MAP NO. 4b

MATCHLINE SEE

M–10
55
BILL DIXON RD.
N. PATUXENT BEACH RD.
54
M–07
M–08
58
NSA-11
THOMAS JOHNSON BRIDGE
M–05
53
M–09
55
NSA-12
53
M–06
N. PATUXENT BEACH RD.
PATUXENT RIVER
USN TESTING CENTER
MD 4
THOMAS JOHNSON RD.
TREATMENT PLANT
M–03
66dBA
57
M–04
LORE RD.
SOLOMONS FISHING PIER & BOAT RAMP
CALVERT COUNTY INFORMATION CENTER
66dBA
R–19
NSA-13
56
MARITIME MUSEUM PARKING LOT
MARITIME MUSEUM
SOLOMONS ISLAND RD. S.
LANGLEY LN.
STRATHMORE LN.
SEDWICK AVE.
CALVERT ST.

St.Mary's & Calvert County

Vicinity Map

0 150 300
Scale in Feet

Legend

M-01 Short-term Noise Measurement Site and Model Receptor

M-01 24-hour Noise Measurement Site and Model Receptor

R-01 Modeled Receptor

Impacted Residence, 2030 No-Build Noise Level > 66 dB(A)

67 2030 No-Build Noise Level (dB[A])

66 dB(A) Contour Line, 2030 No-Build Noise Level

NSA-01 Noise Study Area

August 19, 2009

Maryland State Highway Administration

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MD4 (PATUXENT BEACH RD.)
PROJECT PLANNING STUDY

FINAL NOISE ANALYSIS TECHNICAL REPORT

FROM MD 235 TO PATUXENT POINT PARKWAY

NO BUILD PREDICTED NOISE LEVEL MAP

Map No. 4c

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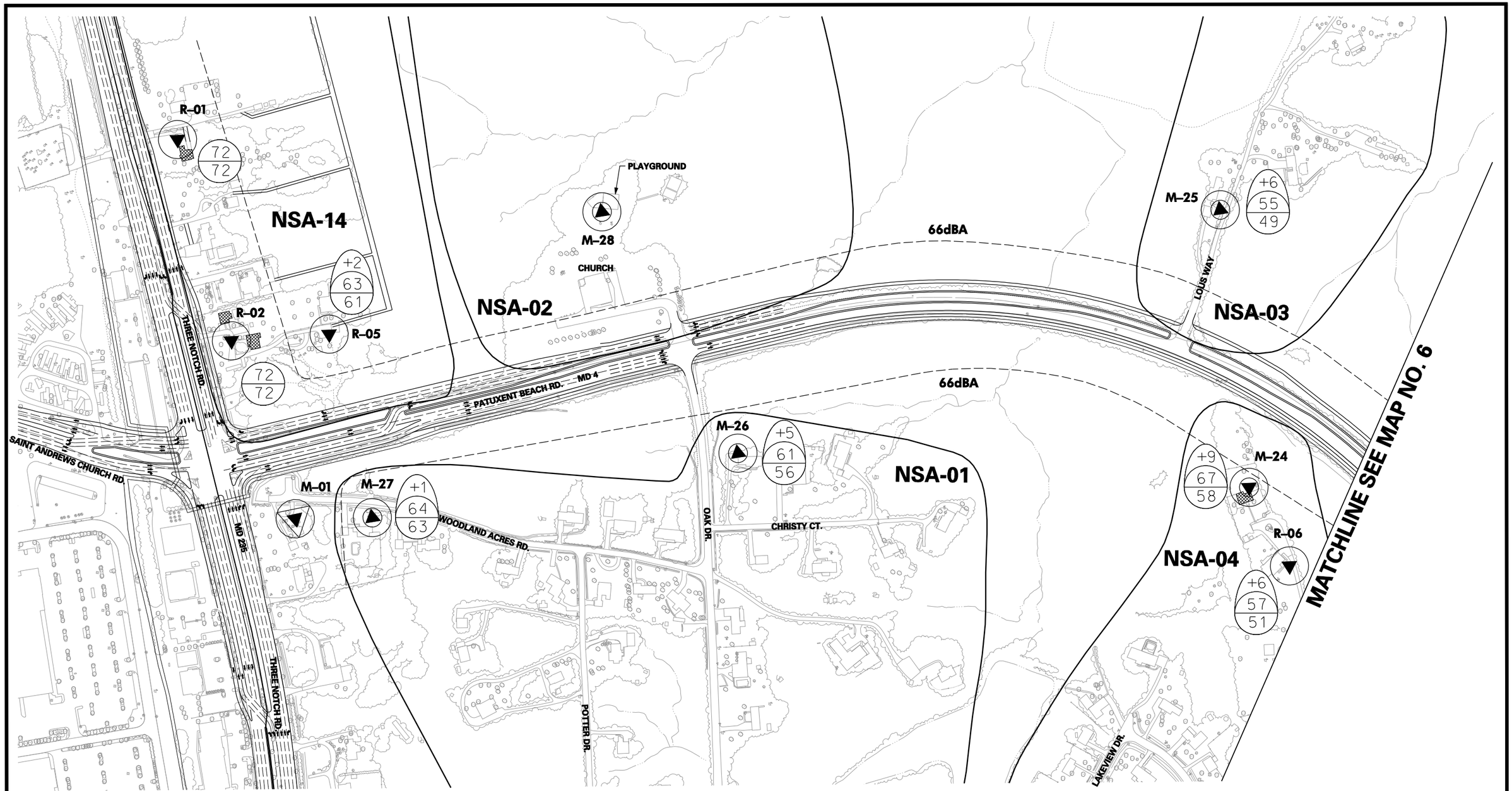
8/18/2009



St.Mary's & Calvert County

Vicinity Map

0 150 300
Scale in Feet

Legend

M-01 Short-term Noise Measurement Site and Model Receptor

M-01 24-hour Noise Measurement Site and Model Receptor

R-01 Modeled Receptor

67/65 Build MD 235 Option A Level (dB[A]) / 2030 No-Build Level (dB[A])

+3/-3 Build MD 235 Option A (dB[A]) Over No-Build Noise Level / Build MD 235 Option A Noise Level Decrease Below No-Build Noise Level

Impacted Residence, 2030 Build MD 235 Option A Level > 66 dB(A)

– – – 66 dB(A) Contour Line, 2030 Build MD 235 Option A Level

NSA-01 Noise Study Area

August 19, 2009

Maryland
State Highway Administration

Office of
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Environmental Technical Analysis

MD4 (PATUXENT BEACH RD.)
PROJECT PLANNING STUDY

FINAL NOISE ANALYSIS
TECHNICAL REPORT

FROM MD 235 TO
PATUXENT POINT PARKWAY

MD 235 OPTION A PREDICTED NOISE LEVELS MAP

q:\amd\010456_029_MD 4 Noise Study\CADD\MAP05-BUILD_MD4.dgn
8/18/2009

NSA-14

NSA-02

NSA-01

NSA-03

NSA-04

R–01 72/72

R–02 72/72

R–05 +1 62/61

M–28 PLAYGROUND +4 54/50

CHURCH

M–25 +6 55/49

M–26 +6 62/56

M–24 +9 67/58

R–06 +6 57/51

M–01

M–27 62/63 −1

66dBA

MD 4

PATUXENT BEACH RD.

SAINT ANDREWS CHURCH RD.

THREE NOTCH RD.

MD 235

WOODLAND ACRES RD.

OAK DR.

CHRISTY CT.

POTTER DR.

LOUIS WAY

LAKEVIEW DR.

MATCHLINE SEE MAP NO. 6

St.Mary's & Calvert County

Vicinity Map

0 150 300

Scale in Feet

Legend

M-01 Short-term Noise Measurement Site and Model Receptor

M-01 24-hour Noise Measurement Site and Model Receptor

R-01 Modeled Receptor

67/65 Build MD 235 Option B Level (dB[A]) / 2030 No-Build Level (dB[A])

+3/−3 Build MD 235 Option B (dB[A]) Over No-Build Noise Level / Build MD 235 Option B Noise Level Decrease Below No-Build Noise Level

Impacted Residence, 2030 Build MD 235 Option B Level > 66dB(A)

66 dB(A) Contour Line, 2030 Build MD 235 Option B Level

NSA-01 Noise Study Area

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MD4 (PATUXENT BEACH RD.)

PROJECT PLANNING STUDY

FINAL NOISE ANALYSIS TECHNICAL REPORT

FROM MD 235 TO PATUXENT POINT PARKWAY

MD 235 OPTION B PREDICTED NOISE LEVELS MAP

Map No. 5a

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8/18/2009

NSA-14

R–01
72
72

DISPLACED BY THIS OPTION

R–05
61
61

THREE NOTCH RD.

PLAYGROUND

M–28
+3
53
50

CHURCH

NSA-02

66dBA

M–25
+6
55
49

LOUIS WAY

NSA-03

MD 4

PATUXENT BEACH RD.

66dBA

SAINT ANDREWS CHURCH RD.

M–26
+6
62
56

NSA-01

M–01

M–27
+2
65
63

WOODLAND ACRES RD.

OAK DR.

CHRISTY CT.

+9
67
58

M–24

R–06

NSA-04

+6
57
51

MATCHLINE SEE MAP NO. 6

MD 235

THREE NOTCH RD.

FUTURE COMMERCIAL ACCESS ROAD

POTTER DR.

THREE NOTCH TRAIL TO BE BUILT BY OTHERS

LAKEVIEW DR.

St.Mary's & Calvert County

Vicinity Map

0 150 300
Scale in Feet

Legend

M-01 Short-term Noise Measurement Site and Model Receptor

M-01 24-hour Noise Measurement Site and Model Receptor

R-01 Modeled Receptor

67/65 Build MD 235 Option D Level (dB[A]) / 2030 No-Build Level (dB[A])

+3/−3 Build MD 235 Option D (dB[A]) Over No-Build Noise Level / Build MD 235 Option D Noise Level Decrease Below No-Build Noise Level

Impacted Residence, 2030 Build MD 235 Option D Level > 66dB(A)

66 dB(A) Contour Line, 2030 Build MD 235 Option D Level

NSA-01 Noise Study Area

August 19, 2009

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MD4 (PATUXENT BEACH RD.)
PROJECT PLANNING STUDY

FINAL NOISE ANALYSIS TECHNICAL REPORT

FROM MD 235 TO PATUXENT POINT PARKWAY

MD 235 OPTION D PREDICTED NOISE LEVELS MAP

Map No. 5b

q:\smd\010456_029_MD 4 Noise Study\CADD\MAPS\5b-BUILD_MD4.dgn
8/18/2009

MATCHLINE SEE MAP NO. 5, 5a, OR 5b

MATCHLINE SEE MAP NO. 7 OR 8

R–07 +7 58 51

CLEMENTS LN.

ELMBROOK DR.

SHADY MILE DR.

NSA-04

M–23 +9 70 61

CHURCH

PLAYGROUND

M–02

NSA-05

BARNS

M–22 +7 57 50

OUT BUILDINGS, GARAGE

MYRTLE POINT RD.

KINGSTON LN.

KINGSTON CREEK RD.

R–08 +10 71 61

M–21 +12 70 58

R–09 +7 62 55

66dBA

NSA-06

PATUXENT BEACH RD.

MD 4

66dBA

SEVEN GABLES LN.

R–11 +9 70 61

R–12 +8 63 55

R–10 +7 56 49

M–20 +15 71 56

GROSS DR.

NSA-09

NSA-07

M–19 +8 64 56

St.Mary's & Calvert County

Vicinity Map

0 150 300

Scale in Feet

Legend

M-01	Short-term Noise Measurement Site and Model Receptor
M-01	24-hour Noise Measurement Site and Model Receptor
R-01	Modeled Receptor
67 / 65	Build Mainline Widening Level (dB[A]) 2030 No-Build Level (dB[A])
+3 / -3	Build Mainline Widening (dB[A]) Over No-Build Noise Level; Build MD 235 Mainline Widening Noise Level Decrease Below No-Build Noise Level
	Impacted Residence, 2030 Build Mainline Widening Level > 66db(a)
— — —	66 dB(A) Contour Line, 2030 Build MD 235 Mainline Widening Level
NSA-01	Noise Study Area

August 19, 2009

Maryland State Highway Administration

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MD4 (PATUXENT BEACH RD.)

PROJECT PLANNING STUDY

FINAL NOISE ANALYSIS TECHNICAL REPORT

FROM MD 235 TO PATUXENT POINT PARKWAY

MAINLINE PREDICTED NOISE LEVELS MAP

Map No. 6

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8/18/2009

MATCHLINE SEE MAP NO. 6

KINGSTON CREEK ROAD
GROSS DR.
KINGSTON SHORES LANE
PATUXENT BEACH ROAD
MD 4
66dBA
W. PATUXENT BEACH RD.
N. PATUXENT BEACH RD.
WILD ROSE LN.
ST. CLAIR RD.
CLARKS RD.
S. PATUXENT BEACH RD.
TOWN CREEK
TOWN CREEK DRIVE

NSA-09
NSA-10
NSA-07
NSA-08

R-03 (+7 / 65 / 58)
R-04 (+9 / 76 / 67)
R-13 (+8 / 68 / 60)
R-14 (+7 / 61 / 54)
R-15 (+7 / 65 / 58)
R-16 (+6 / 60 / 54)
R-17 (+8 / 63 / 55)
R-18 (+8 / 65 / 57)
M-11 (+5 / 58 / 53)
M-12 (+3 / 62 / 59)
M-13 (+7 / 65 / 58)
M-14 (+7 / 64 / 57)
M-15 (+5 / 69 / 64)
M-16 (+9 / 67 / 58)
M-17 (+8 / 68 / 60)
M-18 (+7 / 60 / 53)

MATCHLINE SEE MAP NO. 7A

St.Mary's & Calvert County

Vicinity Map

0 150 300
Scale in Feet

Legend

M-01 Short-term Noise Measurement Site and Model Receptor

M-01 24-hour Noise Measurement Site and Model Receptor

R-01 Modeled Receptor

67/65 Build 2-Lane Parallel Bridge Level (dB[A]) / 2030 No-Build Level (dB[A])

+3/−3 Build 2-Lane Parallel Bridge (dB[A]) Over No-Build Noise Level

Build 2-Lane Parallel Bridge Noise Level Decrease Below No-Build Noise Level

Impacted Residence, 2030 Build 2-Lane Parallel Bridge Level > 66dB(A)

66 dB(A) Contour Line, 2030 Build 2-Lane Parallel Bridge

NSA-01 Noise Study Area

August 19, 2009

Maryland State Highway Administration

Office of Planning and Preliminary Engineering

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MD4 (PATUXENT BEACH RD.)
PROJECT PLANNING STUDY

FINAL NOISE ANALYSIS TECHNICAL REPORT

FROM MD 235 TO PATUXENT POINT PARKWAY

PATUXENT RIVER CROSSING 2 LANE PARALLEL BRIDGE PREDICTED NOISE LEVELS MAP

Map No. 7

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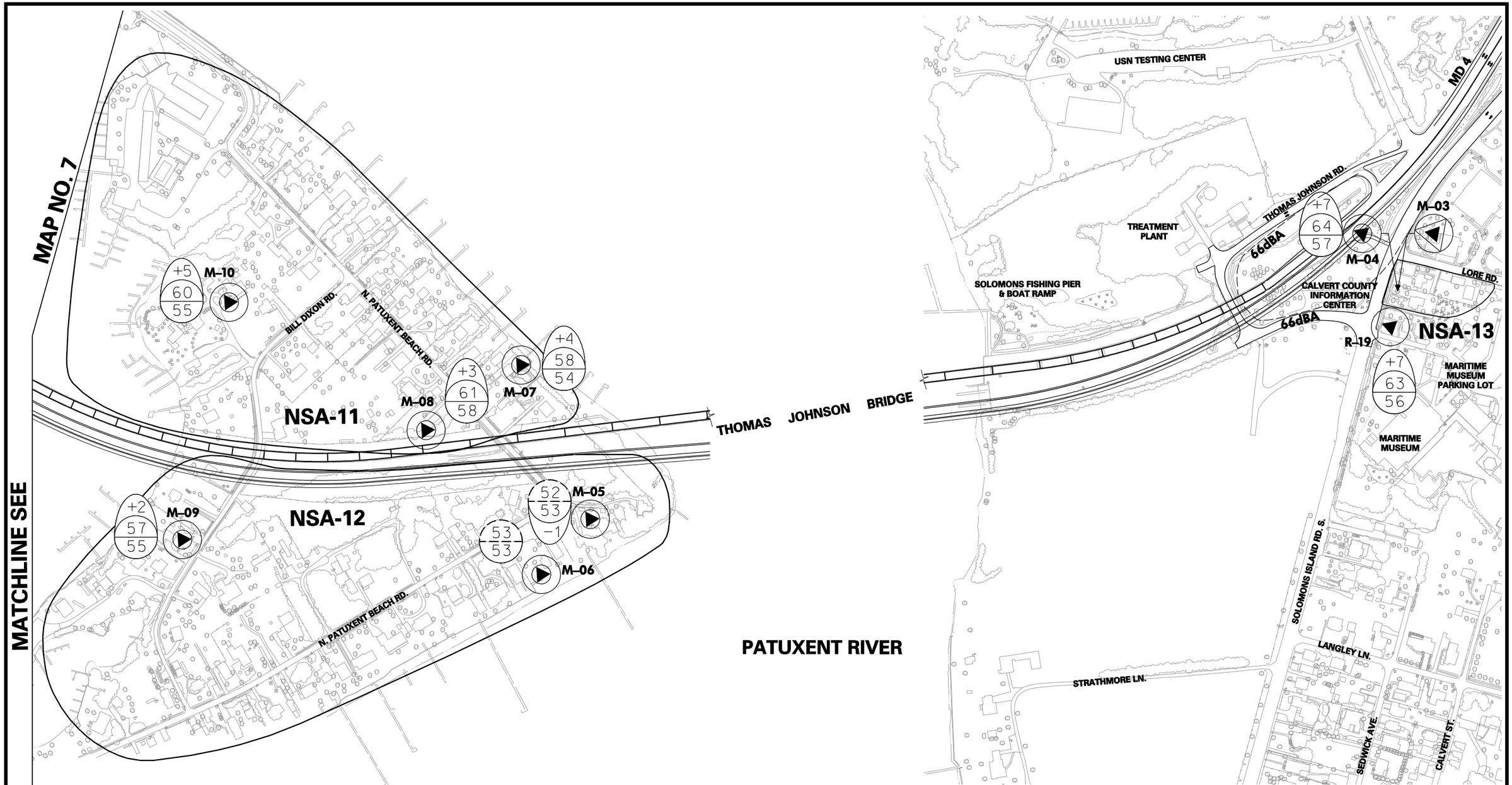

St.Mary's & Calvert County

Vicinity Map

0 150 300
Scale in Feet

Legend

M-01	Short-term Noise Measurement Site and Model Receptor
M-01	24-hour Noise Measurement Site and Model Receptor
R-01	Modeled Receptor
67/65	Build 2-Lane Parallel Bridge Level (dB[A]) / 2030 No-Build Level (dB[A])
+3/−3	Build 2-Lane Parallel Bridge (dB[A]) Over No-Build Noise Level
	Build 2-Lane Parallel Bridge Noise Level Decrease Below No-Build Noise Level
	Impacted Residence, 2030 Build 2-Lane Parallel Bridge Level > 66dB(A)
— — —	66 dB(A) Contour Line, 2030 Build 2-Lane Parallel Bridge
NSA-01	Noise Study Area

August 19, 2009

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MD4 (PATUXENT BEACH RD.)
PROJECT PLANNING STUDY

FINAL NOISE ANALYSIS
TECHNICAL REPORT

FROM MD 235 TO
PATUXENT POINT PARKWAY

PATUXENT RIVER CROSSING 2 LANE PARALLEL BRIDGE PREDICTED NOISE LEVELS MAP

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8/18/2009

Map No. 7a

MATCHLINE SEE MAP NO. 6

KINGSTON CREEK ROAD
GROSS DR.
KINGSTON SHORES LANE
PATUXENT BEACH ROAD
MB3
S. PATUXENT BEACH RD.
W. PATUXENT BEACH RD.
N. PATUXENT BEACH RD.
WILD ROSE LN.
ST. CLAIR RD.
CLARKS RD.
TOWN CREEK
TOWN CREEK DRIVE

66dBA

NSA-07
NSA-08
NSA-09
NSA-10

R-03: +7 / 65 / 58
R-04: +9 / 76 / 67
R-13: +7 / 60 / 53
R-14: +7 / 61 / 54
R-15: +7 / 65 / 58
R-16: +7 / 61 / 54
R-17: +7 / 62 / 55
R-18: +8 / 65 / 57

M-11: +7 / 60 / 53
M-12: +5 / 64 / 59
M-13: +2 / 60 / 58
M-14: +5 / 62 / 57
M-15: +5 / 69 / 64
M-16: +9 / 67 / 58
M-17: +8 / 68 / 60
M-18: +8 / 68 / 60

MATCHLINE SEE MAP NO. 8a

St.Mary's & Calvert County

Vicinity Map

0 150 300
Scale in Feet

Legend

M-01 Short-term Noise Measurement Site and Model Receptor

M-01 24-hour Noise Measurement Site and Model Receptor

R-01 Modeled Receptor

67 / 65 Build 4-Lane Parallel Bridge Level (dB[A]) / 2030 No-Build Level (dB[A])

+3 / -3 Build 4-Lane Parallel Bridge (dB[A]) Over No-Build Noise Level / Build 4-Lane Parallel Bridge Noise Level Decrease Below No-Build Noise Level

Impacted Residence, 2030 Build 4-Lane Parallel Bridge Level > 66dB(A)

66 dB(A) Contour Line, 2030 Build 4-Lane Parallel Bridge

NSA-01 Noise Study Area

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MD4 (PATUXENT BEACH RD.)
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FROM MD 235 TO PATUXENT POINT PARKWAY

PATUXENT RIVER CROSSING 4 LANE PARALLEL BRIDGE PREDICTED NOISE LEVELS MAP

Map No. 8

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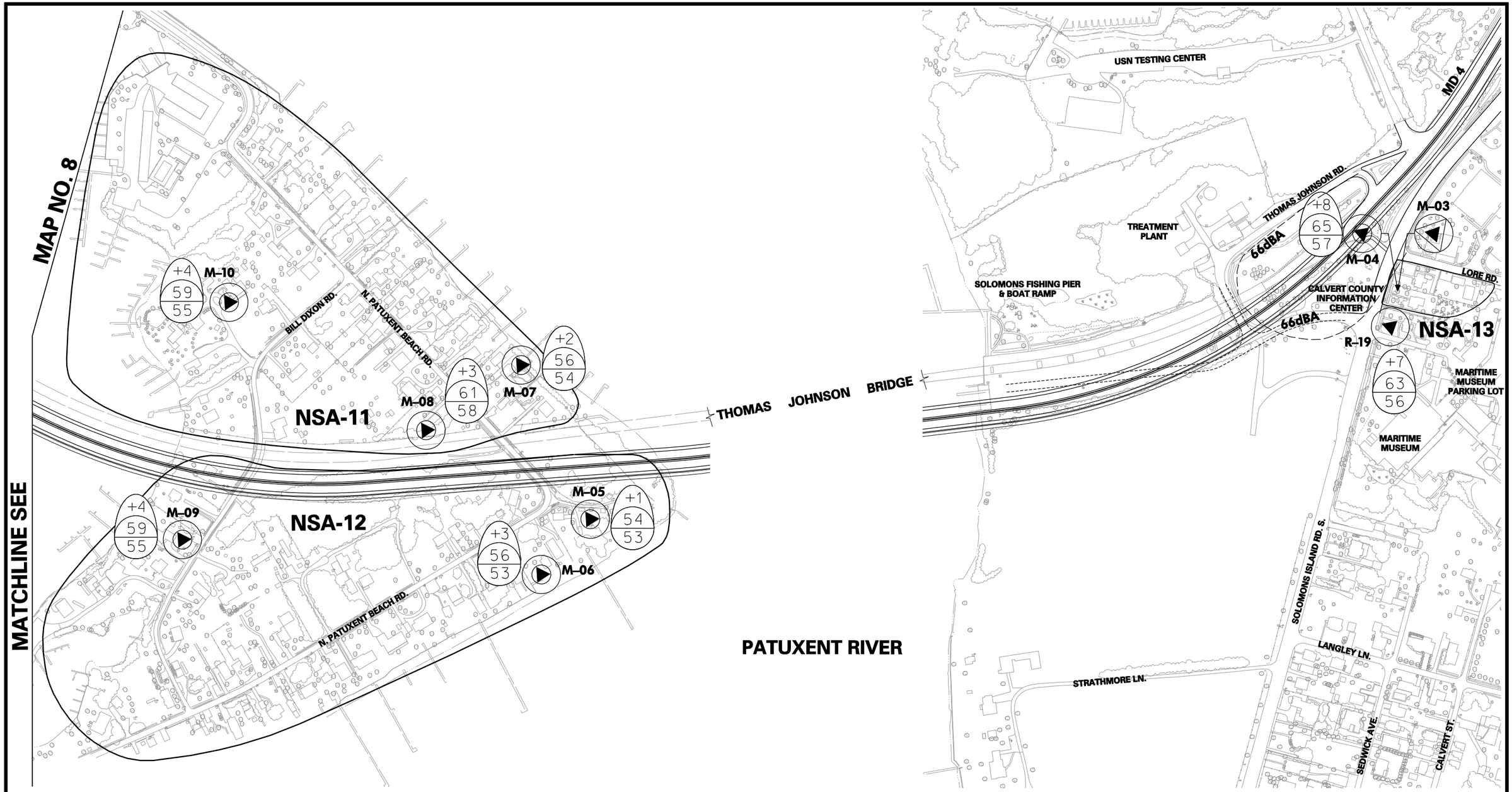
8/18/2009



St.Mary's & Calvert County

Vicinity Map

0 150 300
Scale in Feet

Legend

M-01	Short-term Noise Measurement Site and Model Receptor
M-01	24-hour Noise Measurement Site and Model Receptor
R-01	Modeled Receptor
67 / 65	Build 4-Lane Parallel Bridge Level (dB[A]) / 2030 No-Build Level (dB[A])
+3 / −3	Build 4-Lane Parallel Bridge (dB[A]) Over No-Build Noise Level / Build 4-Lane Parallel Bridge Noise Level Decrease Below No-Build Noise Level
	Impacted Residence, 2030 Build 4-Lane Parallel Bridge Level > 66dB(A)
— — —	66 dB(A) Contour Line, 2030 Build 4-Lane Parallel Bridge
NSA-01	Noise Study Area

August 19, 2009

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MD4 (PATUXENT BEACH RD.)
PROJECT PLANNING STUDY

FINAL NOISE ANALYSIS
TECHNICAL REPORT

FROM MD 235 TO
PATUXENT POINT PARKWAY

PATUXENT RIVER CROSSING 4 LANE PARALLEL BRIDGE PREDICTED NOISE LEVELS MAP

Map No. 8a

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8/18/2009

NSA-14

R–01

72
62
–10

63
61
–2

R–02

R–05

72
62
–10

THREE NOTCH RD.

PLAYGROUND

M–28

54
–

CHURCH

NSA-02

M–25

55
–

LOUS WAY

NSA-03

PATUXENT BEACH RD. MD 4

SAINT ANDREWS CHURCH RD.

M–26

61
–

NSA-01

M–01

M–27

64
–

WOODLAND ACRES RD.

MD 235

OAK DR.

CHRISTY CT.

M–24

67
57
–10

R–06

NSA-04

57
55
–2

MATCHLINE SEE MAP NO. 9c

THREE NOTCH RD.

POTTER DR.

LAKEVIEW DR.

St.Mary's & Calvert County

Vicinity Map

0 150 300
Scale in Feet

Legend

M-01 Short-term Noise Measurement Site and Model Receptor

M-01 24-hour Noise Measurement Site and Model Receptor

R-01 Modeled Receptor

Impacted Residence, Benefited by 3-dBA

Non-Impacted Residence, benefited by 5-dBA

10'-12' Proposed Sound Barrier & Height From TNM

66 / 57 / 9 Modeled Noise Level, No Barrier (dB[A]) / Modeled Noise Level, With Barrier (dB[A]) / Insertion Loss (dB[A])

NSA-1 Noise Study Area

August 19, 2009

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MD4 (PATUXENT BEACH RD.)
PROJECT PLANNING STUDY

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TECHNICAL REPORT

FROM MD 235 TO
PATUXENT POINT PARKWAY

NSA-04 & 14 MD 235 OPTION A SOUND BARRIER ANALYSIS MAP

Map No. 9

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8/18/2009

NSA-14

R–01

72
62
–10

72
62
–10

R–02

62
59
–3

R–05

THREE NOTCH RD.

PLAYGROUND

M–28

54
–

CHURCH

NSA-02

MD 4

PATUXENT BEACH RD.

SAINT ANDREWS CHURCH RD.

M–01

M–27

62
–

WOODLAND ACRES RD.

MD 235

THREE NOTCH RD.

M–26

62
–

NSA-01

OAK DR.

CHRISTY CT.

POTTER DR.

M–25

55
–

LOUS WAY

NSA-03

M–24

67
57
–10

R–06

NSA-04

57
55
–2

MATCHLINE SEE MAP NO. 9c

LAKEVIEW DR.

St.Mary's & Calvert County

Vicinity Map

0 150 300

Scale in Feet

Legend

M-01 Short-term Noise Measurement Site and Model Receptor

M-01 24-hour Noise Measurement Site and Model Receptor

R-01 Modeled Receptor

Impacted Residence, Benefited by 3-dBA

Non-Impacted Residence, benefited by 5-dBA

10'-12' Proposed Sound Barrier & Height From TNM

66 / 57 / 9 Modeled Noise Level, No Barrier (dB[A]) / Modeled Noise Level, With Barrier (dB[A]) / Insertion Loss (dB[A])

NSA-1 Noise Study Area

August 19, 2009

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FROM MD 235 TO
PATUXENT POINT PARKWAY

NSA-04 & 14 MD 235 OPTION B SOUND BARRIER ANALYSIS MAP

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8/18/2009

Map No. 9a

NSA-14

R–01

72
62
–10

DISPLACED BY THIS OPTION

R–05

61
60
–1

THREE NOTCH RD.

PLAYGROUND

M–28

53
–

CHURCH

NSA-02

MD 4

PATUXENT BEACH RD.

SAINT ANDREWS CHURCH RD.

M–01

M–27

65
–

WOODLAND ACRES RD.

MD 235

THREE NOTCH RD.

FUTURE COMMERCIAL ACCESS ROAD

THREE NOTCH TRAIL TO BE BUILT BY OTHERS

M–26

62
–

NSA-01

OAK DR.

CHRISTY CT.

POTTER DR.

M–25

55
–

LOUIS WAY

NSA-03

M–24

67
57
–10

R–06

NSA-04

57
55
–2

LAKEVIEW DR.

MATCHLINE SEE MAP NO. 6

St.Mary's & Calvert County

Vicinity Map

0 150 300
Scale in Feet

Legend

M-01 Short-term Noise Measurement Site and Model Receptor

M-01 24-hour Noise Measurement Site and Model Receptor

R-01 Modeled Receptor

Impacted Residence, Benefited by 3-dBA

Non-Impacted Residence, benefited by 5-dBA

10'-12' Proposed Sound Barrier & Height From TNM

66 / 57 / 9 Modeled Noise Level, No Barrier (dB[A]) / Modeled Noise Level, With Barrier (dB[A]) / Insertion Loss (dB[A])

NSA-1 Noise Study Area

August 19, 2009

Maryland
State Highway Administration

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MD4 (PATUXENT BEACH RD.)
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FROM MD 235 TO
PATUXENT POINT PARKWAY

NSA-04 & 14 MD 235 OPTION D SOUND BARRIER ANALYSIS MAP

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8/18/2009

Map No. 9b

MATCHLINE SEE MAP NO. 9, 9a, OR 9b

MATCHLINE SEE MAP NO.9d

R–07

58
–

CLEMENTS LN.

ELMBRROK DR.

NSA-04

SHADY MILE DR.

70
60
–10

M–23

CHURCH

PLAYGROUND

M–02

NSA-05

BARNS

57
–

M–22

OUT BUILDINGS, GARAGE

MYRTLE POINT RD.

KINGSTON LN.

KINGSTON CREEK RD.

71
61
–10

R–08

M–21

70
60
–10

R–09

62
58
–4

SEVEN GABLES LN.

NSA-06

70
60
–10

R–11

63
59
–4

R–12

56
53
–3

R–10

M–20

71
61
–10

NSA-09

GROSS DR.

NSA-07

M–19

64
–

S. PATUXENT BEACH RD.

PATUXENT BEACH RD.

MD 4

St.Mary's & Calvert County

Vicinity Map

0 150 300

Scale in Feet

Legend

M-01 Short-term Noise Measurement Site and Model Receptor

M-01 24-hour Noise Measurement Site and Model Receptor

R-01 Modeled Receptor

Impacted Residence, Benefited by 3-dBA

Non-Impacted Residence, benefited by 5-dBA

10'-12' Proposed Sound Barrier & Height From TNM

66 / 57 / 9 Modeled Noise Level, No Barrier (dB[A]) / Modeled Noise Level, With Barrier (dB[A]) / Insertion Loss (dB[A])

NSA-1 Noise Study Area

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MD4 (PATUXENT BEACH RD.)

PROJECT PLANNING STUDY

FINAL NOISE ANALYSIS TECHNICAL REPORT

FROM MD 235 TO PATUXENT POINT PARKWAY

NSA-04 & 06 SOUND BARRIER ANALYSIS MAP

Map No. 9c

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8/18/2009

MATCHLINE SEE MAP NO. 9c

KINGSTON CREEK ROAD
GROSS DR.
KINGSTON SHORES LANE
PATUXENT BEACH ROAD
MD 4
W. PATUXENT BEACH RD.
N. PATUXENT BEACH RD.
ST. CLAIR RD.
CLARKS RD.
WILD ROSE LN.
S. PATUXENT BEACH RD.
TOWN CREEK
TOWN CREEK DRIVE

NSA-09
NSA-07
NSA-10
NSA-08

R-03 (65/57/-8)
R-04 (76/63/-13)
R-13 (68/58/-10)
R-14 (61/56/-5)
R-15 (65/63/-2)
R-16 (60/56/-4)
R-17 (63/58/-5)
R-18 (65/–)
M-11 (58/–)
M-12 (62/–)
M-13 (65/–)
M-14 (64/–)
M-15 (69/–)
M-16 (67/57/-10)
M-17 (68/58/-10)
M-18 (60/54/-6)

St.Mary's & Calvert County

Vicinity Map

0 150 300
Scale in Feet

Legend

M-01 Short-term Noise Measurement Site and Model Receptor

M-01 24-hour Noise Measurement Site and Model Receptor

R-01 Modeled Receptor

Impacted Residence, Benefited by 3-dBA

Non-Impacted Residence, benefited by 5-dBA

10'-12' Proposed Sound Barrier & Height From TNM

66 / 57 / 9 Modeled Noise Level, No Barrier (dB[A]) / Modeled Noise Level, With Barrier (dB[A]) / Insertion Loss (dB[A])

NSA-1 Noise Study Area

August 19, 2009

Maryland State Highway Administration

Office of Planning and Preliminary Engineering

Environmental Technical Analysis

MD4 (PATUXENT BEACH RD.)
PROJECT PLANNING STUDY

FINAL NOISE ANALYSIS TECHNICAL REPORT

FROM MD 235 TO PATUXENT POINT PARKWAY

NSA-09 PATUXENT RIVER CROSSING 2-LANE AM PARALLEL BRIDGE SOUND BARRIER ANALYSIS MAP

Map No. 9d

g:\amd\010458_029_md 4 noise study\cadd\MAP09d-BUILD-B_MD4.dgn
8/18/2009

MATCHLINE SEE MAP NO. 9c

KINGSTON CREEK ROAD
GROSS DR.
KINGSTON SHORES LANE
MD 4
W. PATUXENT BEACH RD.
N. PATUXENT BEACH RD.
S. PATUXENT BEACH RD.
WILD ROSE LN.
ST. CLAIR RD.
CLARKS RD.
TOWN CREEK
TOWN CREEK DRIVE

NSA-09
NSA-10
NSA-07
NSA-08

R-03 65
R-04 76 M-18 68
R-13 60
R-14 61 68 M-17
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M-15 65/58 -7 R-18 69/59 -10
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St.Mary's & Calvert County

Vicinity Map

0 150 300
Scale in Feet

Legend

M-01 Short-term Noise Measurement Site and Model Receptor

M-01 24-hour Noise Measurement Site and Model Receptor

R-01 Modeled Receptor

Impacted Residence, Benefited by 3-dBA

Non-Impacted Residence, benefited by 5-dBA

10'-12' Proposed Sound Barrier & Height From TNM

66 / 57 / 9 Modeled Noise Level, No Barrier (dB[A]) / Modeled Noise Level, With Barrier (dB[A]) / Insertion Loss (dB[A])

NSA-1 Noise Study Area

August 19, 2009

Maryland
State Highway Administration

Office of
Planning and Preliminary
Engineering

Environmental Technical
Analysis

MD4 (PATUXENT BEACH RD.)
PROJECT PLANNING STUDY

FINAL NOISE ANALYSIS
TECHNICAL REPORT

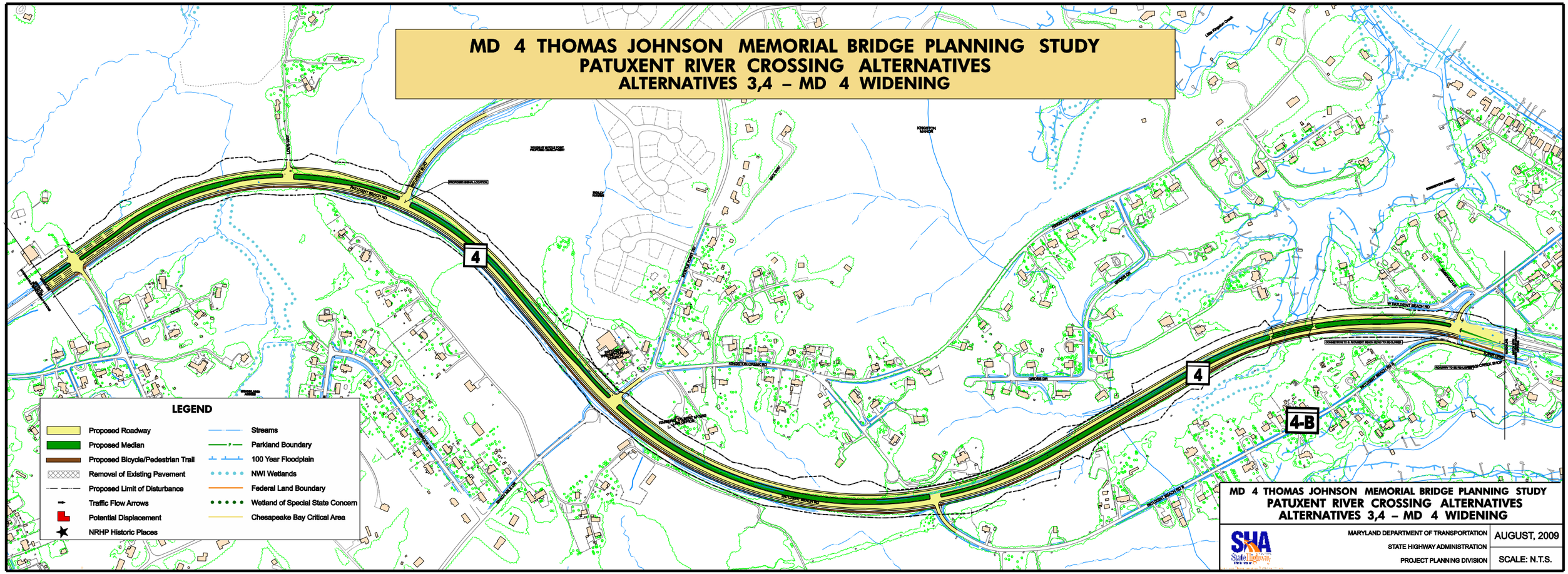
FROM MD 235 TO
PATUXENT POINT PARKWAY

NSA-07 PATUXENT RIVER CROSSING 4-LANE PARALLEL BRIDGE SOUND BARRIER ANALYSIS MAP

g:\amd\010458_029_md 4 noise study\cadd\MAP09e-BUILD-B_MD4.dgn
8/18/2009

Map No. 9e

MD 4 THOMAS JOHNSON MEMORIAL BRIDGE PLANNING STUDY
PATUXENT RIVER CROSSING ALTERNATIVES
ALTERNATIVES 3,4 – MD 4 WIDENING



MD 4 THOMAS JOHNSON MEMORIAL BRIDGE PLANNING STUDY
PATUXENT RIVER CROSSING ALTERNATIVES
ALTERNATIVES 3,4 – MD 4 WIDENING

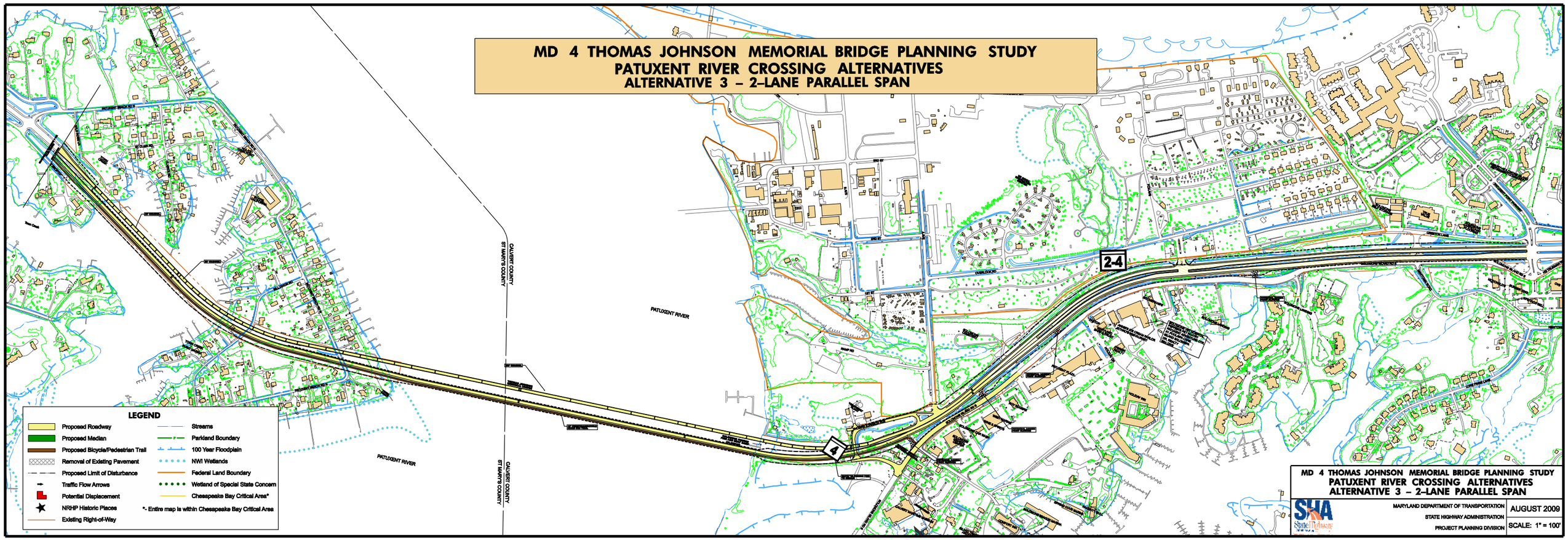
MARYLAND DEPARTMENT OF TRANSPORTATION
STATE HIGHWAY ADMINISTRATION
PROJECT PLANNING DIVISION

AUGUST, 2009

SCALE: N.T.S.

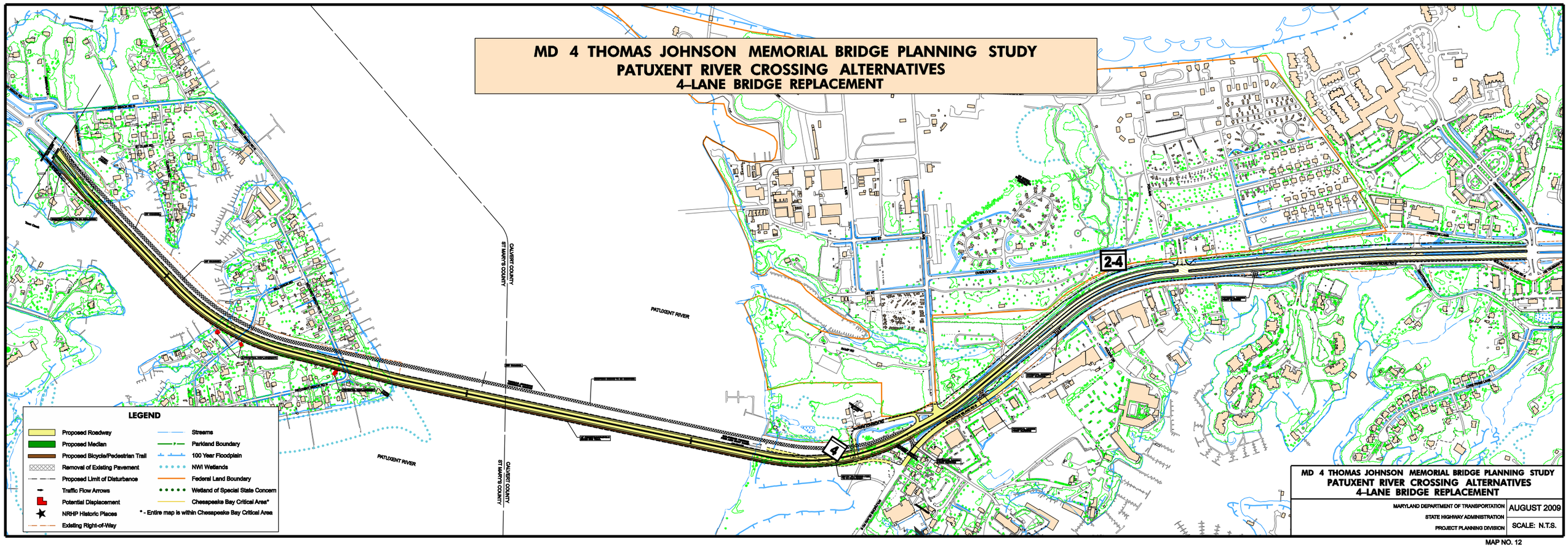
MAP NO. 10

MD 4 THOMAS JOHNSON MEMORIAL BRIDGE PLANNING STUDY
PATUXENT RIVER CROSSING ALTERNATIVES
ALTERNATIVE 3 – 2–LANE PARALLEL SPAN



MAP NO. 11

MD 4 THOMAS JOHNSON MEMORIAL BRIDGE PLANNING STUDY
PATUXENT RIVER CROSSING ALTERNATIVES
4–LANE BRIDGE REPLACEMENT



MD 4 THOMAS JOHNSON MEMORIAL BRIDGE PLANNING STUDY
PATUXENT RIVER CROSSING ALTERNATIVES
4–LANE BRIDGE REPLACEMENT

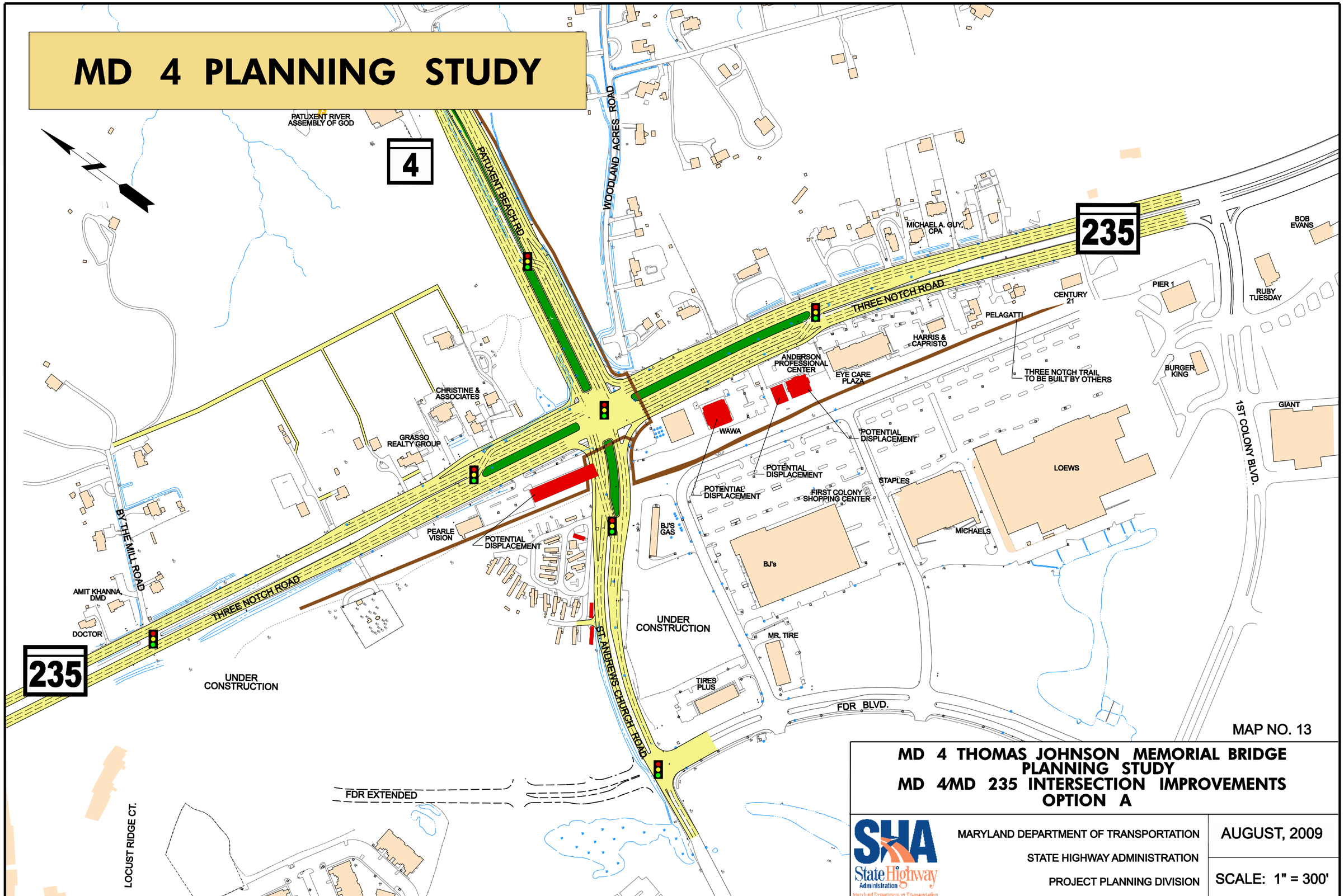
MARYLAND DEPARTMENT OF TRANSPORTATION
STATE HIGHWAY ADMINISTRATION
PROJECT PLANNING DIVISION

AUGUST 2009

SCALE: N.T.S.

MAP NO. 12

MD 4 PLANNING STUDY



MAP NO. 13

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MD 4/MD 235 INTERSECTION IMPROVEMENTS
OPTION A

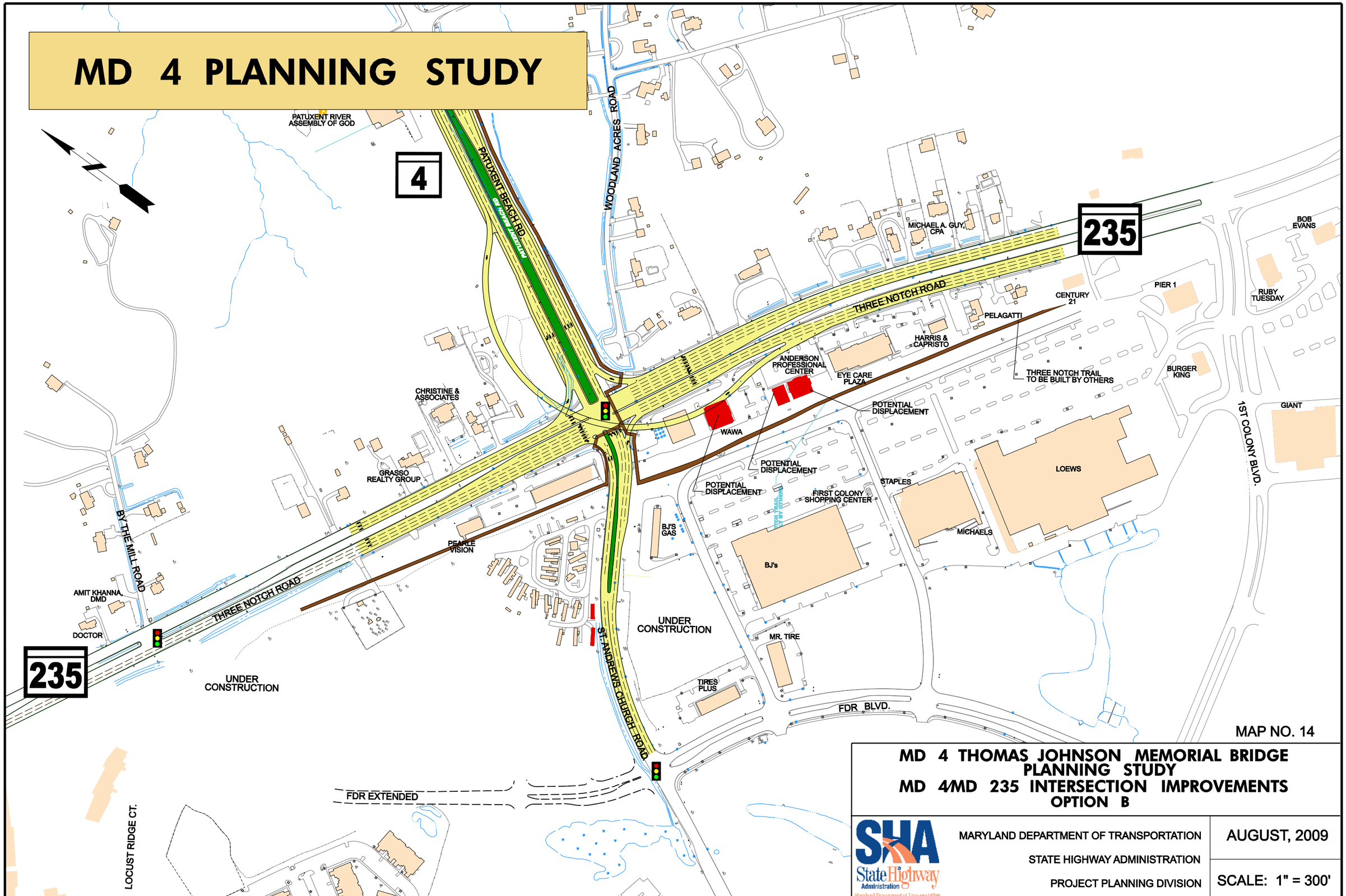
SHA State Highway Administration Maryland Department of Transportation

MARYLAND DEPARTMENT OF TRANSPORTATION
STATE HIGHWAY ADMINISTRATION
PROJECT PLANNING DIVISION

AUGUST, 2009

SCALE: 1" = 300'

MD 4 PLANNING STUDY



MAP NO. 14

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OPTION B

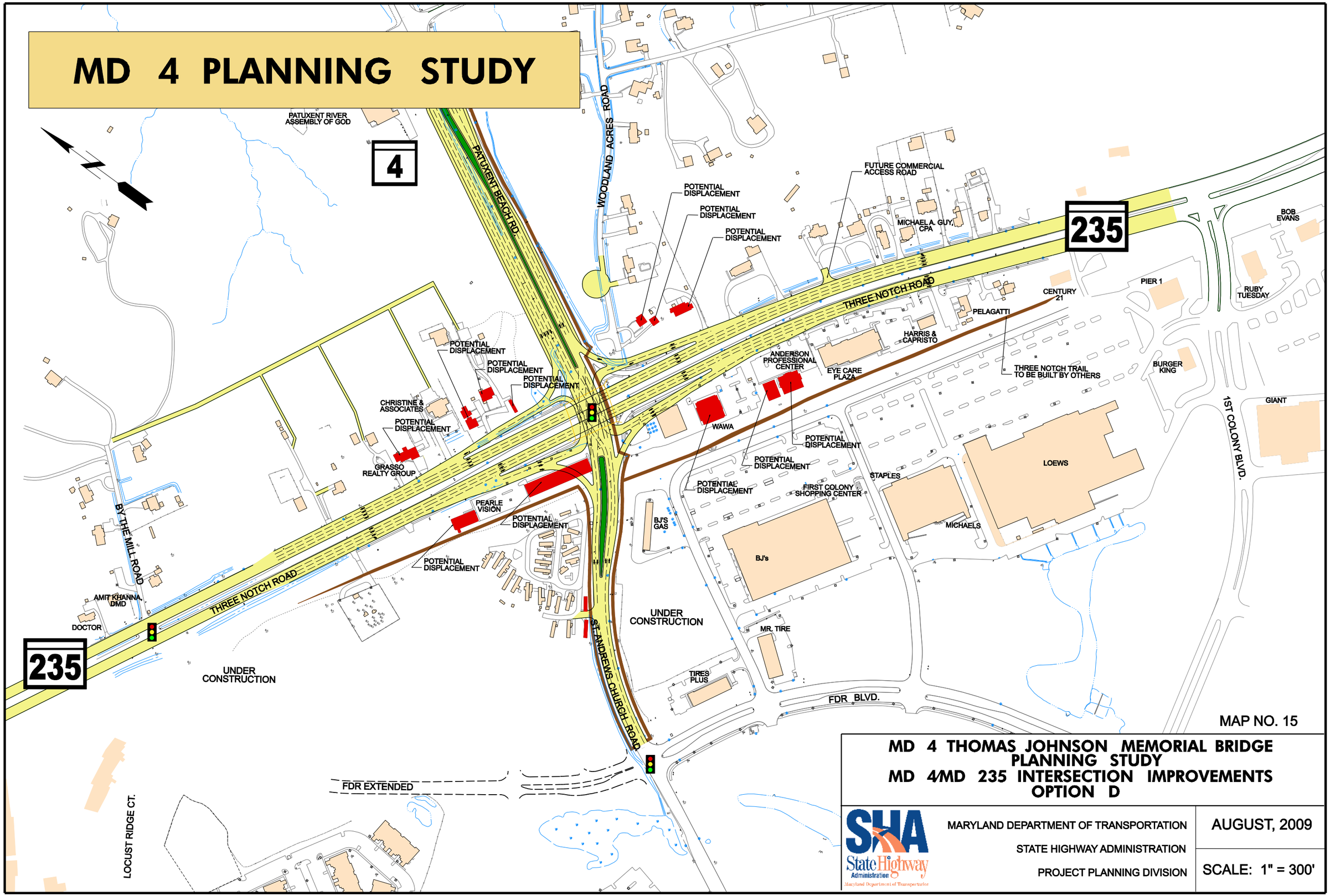
SHA State Highway Administration
Maryland Department of Transportation

MARYLAND DEPARTMENT OF TRANSPORTATION
STATE HIGHWAY ADMINISTRATION
PROJECT PLANNING DIVISION

AUGUST, 2009

SCALE: 1" = 300'

MD 4 PLANNING STUDY



MAP NO. 15

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MD 4/MD 235 INTERSECTION IMPROVEMENTS
OPTION D

SHA State Highway Administration
Maryland Department of Transportation

MARYLAND DEPARTMENT OF TRANSPORTATION
STATE HIGHWAY ADMINISTRATION
PROJECT PLANNING DIVISION

AUGUST, 2009

SCALE: 1" = 300'

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MD 4 (PATUXENT BEACH ROAD)
PROJECT PLANNING STUDY

Calvert County and St. Mary's County, Maryland

NOISE ANALYSIS
TECHNICAL REPORT

FINAL
August 19, 2009

Appendix A
NOISE MEASUREMENT DATA

Submitted To

MARYLAND STATE HIGHWAY ADMINISTRATION

OFFICE OF PLANNING AND PRELIMINARY ENGINEERING

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Appendix A – NOISE MEASUREMENT DATA

MD 4 (PATUXENT BEACH ROAD)

PROJECT PLANNING STUDY

FINAL REPORT – August 19, 2009

INTRODUCTION

This appendix documents the noise measurements collected during field monitoring for the MD 4 Planning study area. Also included are graphics illustrating where each of the noise measurements were recorded. The illustrations include both photographs and drawn sketches of the noise measurement sites.

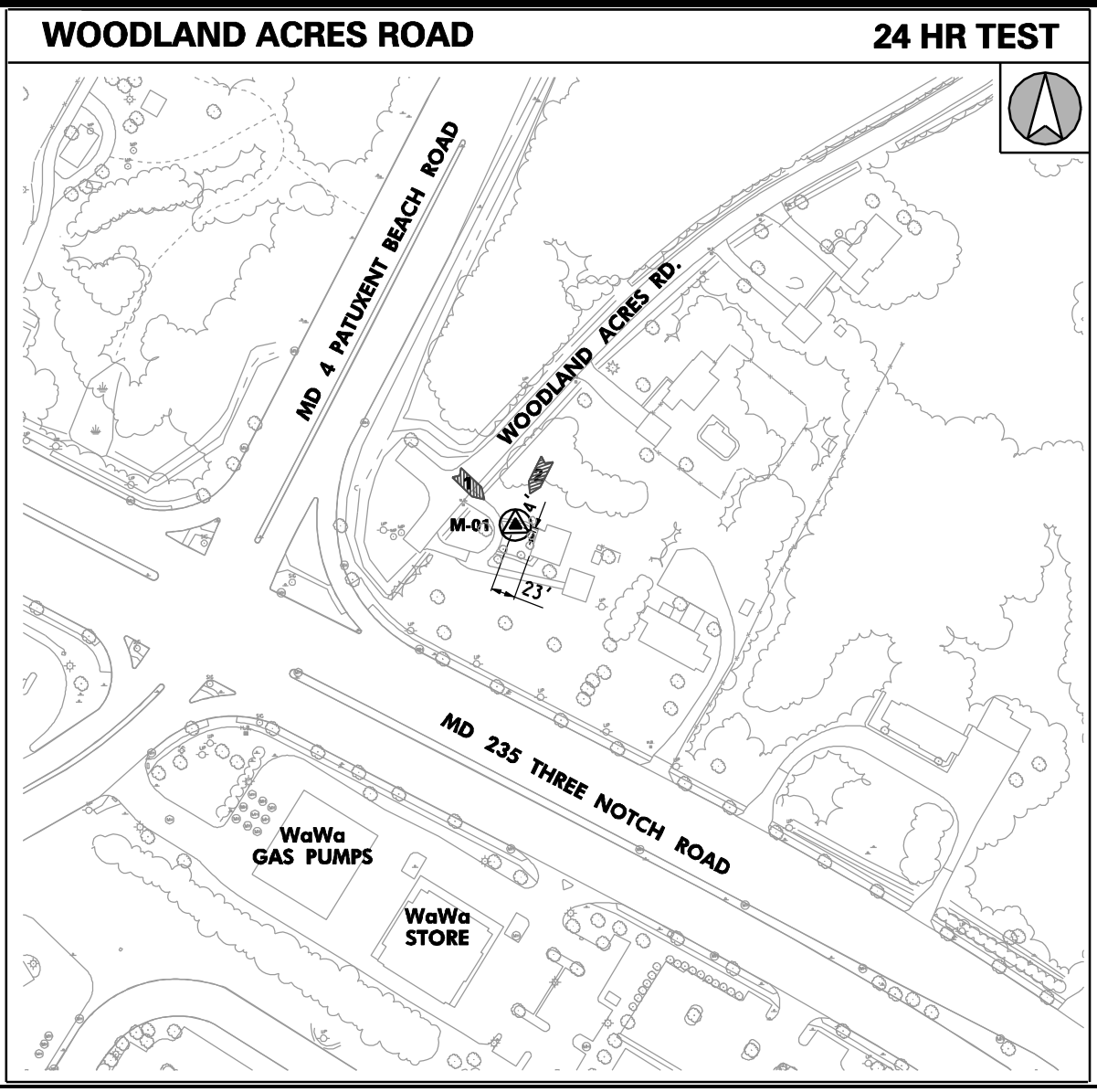
RECEPTOR M-01 – WOODLAND ACRES ROAD

General

One 24-hour noise measurement was taken at this location from 1200 Hrs. on 2009 April 16 to 1200 Hrs. on 2009 April 17.

Receptor Site Sketch

FIGURE A.1 Receptor M-01 Site Sketch



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04-16-2009

24-hour noise measurement

Photograph A.1b Receptor M-01 – Woodland Acres Road (View 2 of 2)

04-16-2009

24-hour noise measurement

April 16, 2009 1200 Hrs. to April 17, 2009 1200 Hrs.

TABLE A.1a Receptor M-01 – 20-Minute Equivalent Sound Level (20-min Leq) Calculation 04-16-2009 1200-1200 Hrs.

	Noise Measurement Data					Calc.
TIME	5-min Leq dB(A)	Lmax dB(A)	Lpk dB(C)	L(10.0) dB(A)	L(90.0) dB(A)	20-min Leq dB(A)
12:00	71.4	80.7	<109.9	80.0	80.0	**70.7**
12:05	70.2	78.7	<109.9	78.0	78.0	
12:10	70.7	77.7	<109.9	77.0	77.0	
12:15	70.6	75.9	<109.9	75.0	75.0	
12:20	70.5	76.6	109.9	76.0	76.0	**70.4**
12:25	70.9	77.1	<109.9	77.0	77.0	
12:30	69.6	75.0	<109.9	75.0	75.0	
12:35	70.5	77.1	110.2	77.0	77.0	
12:40	71.1	76.2	<109.9	76.0	76.0	**70.5**
12:45	70.4	76.4	<109.9	76.0	76.0	
12:50	70.9	77.9	<109.9	77.0	77.0	
12:55	69.6	78.3	<109.9	78.0	78.0	
13:00	70.5	75.4	<109.9	75.0	75.0	**70.7**
13:05	70.4	78.3	<109.9	78.0	78.0	
13:10	69.8	77.9	<109.9	77.0	77.0	
13:15	71.7	80.4	<109.9	80.0	80.0	
13:20	70.5	77.0	<109.9	77.0	77.0	**70.7**
13:25	70.9	78.7	<109.9	78.0	78.0	
13:30	70.5	77.8	<109.9	77.0	77.0	
13:35	70.8	77.5	<109.9	77.0	77.0	
13:40	70.1	78.7	<109.9	78.0	78.0	**70.7**
13:45	70.3	78.6	<109.9	78.0	78.0	
13:50	70.9	79.6	<109.9	79.0	79.0	
13:55	71.4	79.9	<109.9	79.0	79.0	
14:00	70.2	77.8	<109.9	77.0	77.0	**70.5**
14:05	70.1	76.2	<109.9	76.0	76.0	
14:10	70.8	77.1	<109.9	77.0	77.0	
14:15	70.7	77.5	<109.9	77.0	77.0	
14:20	70.9	77.2	<109.9	77.0	77.0	**70.9**
14:25	70.7	77.5	<109.9	77.0	77.0	
14:30	70.7	77.5	<109.9	77.0	77.0	
14:35	71.4	76.7	<109.9	76.0	76.0	
14:40	70.3	75.1	<109.9	75.0	75.0	**70.6**
14:45	70.3	75.4	<109.9	75.0	75.0	
14:50	70.8	77.4	<109.9	77.0	77.0	
14:55	71.1	77.0	<109.9	77.0	77.0	
15:00	70.5	75.7	<109.9	75.0	75.0	**71.3**
15:05	70.7	78.6	<109.9	78.0	78.0	
15:10	72.2	82.7	110.6	82.0	82.0	
15:15	71.6	77.9	<109.9	77.0	77.0	
15:20	71.4	77.5	<109.9	77.0	77.0	**71.9**
15:25	71.9	77.8	<109.9	77.0	77.0	
15:30	71.8	78.7	<109.9	78.0	78.0	
15:35	72.6	76.3	<109.9	76.0	76.0	

TABLE A.1a Receptor M-01 – 20-Minute Equivalent Sound Level (20-min Leq) Calculation 04-16-2009 1200-1200 Hrs.

	Noise Measurement Data					Calc.
TIME	5-min Leq dB(A)	Lmax dB(A)	Lpk dB(C)	L(10.0) dB(A)	L(90.0) dB(A)	20-min Leq dB(A)
15:40	72.8	77.9	<109.9	77.0	77.0	**72.5**
15:45	72.4	77.9	<109.9	77.0	77.0	
15:50	72.4	78.6	<109.9	78.0	78.0	
15:55	72.3	80.7	<109.9	80.0	80.0	
16:00	73.9	86.3	109.9	86.0	86.0	**72.3**
16:05	72.0	76.2	<109.9	76.0	76.0	
16:10	71.4	75.5	<109.9	75.0	75.0	
16:15	71.5	80.0	<109.9	80.0	80.0	
16:20	69.1	76.7	<109.9	76.0	76.0	**69.0**
16:25	69.3	75.9	<109.9	75.0	75.0	
16:30	68.0	75.0	<109.9	75.0	75.0	
16:35	69.3	73.5	<109.9	73.0	73.0	
16:40	67.9	76.3	<109.9	76.0	76.0	**69.6**
16:45	71.0	75.9	<109.9	75.0	75.0	
16:50	70.9	75.9	<109.9	75.0	75.0	
16:55	67.3	74.3	<109.9	74.0	74.0	
17:00	66.8	74.6	<109.9	74.0	74.0	**67.6**
17:05	68.6	75.3	<109.9	75.0	75.0	
17:10	67.1	74.7	<109.9	74.0	74.0	
17:15	67.5	75.1	<109.9	75.0	75.0	
17:20	66.7	72.7	<109.9	72.0	72.0	**70.2**
17:25	67.0	72.2	<109.9	72.0	72.0	
17:30	73.0	81.8	<109.9	81.0	81.0	
17:35	70.8	76.9	<109.9	76.0	76.0	
17:40	68.9	75.9	<109.9	75.0	75.0	**69.6**
17:45	68.6	75.1	<109.9	75.0	75.0	
17:50	70.2	74.2	<109.9	74.0	74.0	
17:55	70.4	78.0	<109.9	78.0	78.0	
18:00	71.4	76.2	<109.9	76.0	76.0	**71.1**
18:05	68.6	75.4	<109.9	75.0	75.0	
18:10	71.8	79.0	<109.9	79.0	79.0	
18:15	71.8	76.7	<109.9	76.0	76.0	
18:20	71.4	75.8	<109.9	75.0	75.0	**72.2**
18:25	71.5	75.9	<109.9	75.0	75.0	
18:30	73.9	91.8	110.2	91.0	91.0	
18:35	71.3	77.8	<109.9	77.0	77.0	
18:40	71.2	76.6	<109.9	76.0	76.0	**71.3**
18:45	71.0	77.4	<109.9	77.0	77.0	
18:50	71.4	79.1	<109.9	79.0	79.0	
18:55	71.4	82.2	<109.9	82.0	82.0	
19:00	70.2	75.9	<109.9	75.0	75.0	**70.2**
19:05	70.9	80.6	<109.9	80.0	80.0	
19:10	70.0	76.7	<109.9	76.0	76.0	
19:15	69.5	76.0	<109.9	76.0	76.0	

TABLE A.1a Receptor M-01 – 20-Minute Equivalent Sound Level (20-min Leq) Calculation 04-16-2009 1200-1200 Hrs.

	Noise Measurement Data					Calc.
TIME	5-min Leq dB(A)	Lmax dB(A)	Lpk dB(C)	L(10.0) dB(A)	L(90.0) dB(A)	20-min Leq dB(A)
19:20	71.0	76.3	<109.9	76.0	76.0	**70.9**
19:25	70.6	74.7	<109.9	74.0	74.0	
19:30	71.2	82.7	<109.9	82.0	82.0	
19:35	70.6	76.6	<109.9	76.0	76.0	
19:40	71.4	77.9	<109.9	77.0	77.0	**71.2**
19:45	70.7	76.6	<109.9	76.0	76.0	
19:50	71.6	75.4	<109.9	75.0	75.0	
19:55	71.1	75.8	<109.9	75.0	75.0	
20:00	70.7	76.2	<109.9	76.0	76.0	**70.1**
20:05	69.8	76.2	<109.9	76.0	76.0	
20:10	70.2	74.7	<109.9	74.0	74.0	
20:15	69.7	75.4	<109.9	75.0	75.0	
20:20	69.5	75.3	<109.9	75.0	75.0	**70.0**
20:25	70.3	75.7	<109.9	75.0	75.0	
20:30	70.1	75.4	<109.9	75.0	75.0	
20:35	70.2	76.7	<109.9	76.0	76.0	
20:40	70.6	76.7	<109.9	76.0	76.0	**70.5**
20:45	70.4	77.4	<109.9	77.0	77.0	
20:50	71.0	82.5	<109.9	82.0	82.0	
20:55	70.1	75.4	<109.9	75.0	75.0	
21:00	69.2	76.2	<109.9	76.0	76.0	**69.3**
21:05	69.6	75.1	<109.9	75.0	75.0	
21:10	68.7	75.9	<109.9	75.0	75.0	
21:15	69.5	82.2	<109.9	82.0	82.0	
21:20	67.2	77.4	<109.9	77.0	77.0	**68.7**
21:25	69.6	78.6	<109.9	78.0	78.0	
21:30	69.3	77.5	<109.9	77.0	77.0	
21:35	68.3	74.7	<109.9	74.0	74.0	
21:40	68.2	75.2	<109.9	75.0	75.0	**68.1**
21:45	69.1	74.5	<109.9	74.0	74.0	
21:50	67.2	73.9	<109.9	73.0	73.0	
21:55	67.5	73.6	<109.9	73.0	73.0	
22:00	67.9	75.5	<109.9	75.0	75.0	**67.9**
22:05	67.3	76.7	<109.9	76.0	76.0	
22:10	68.2	75.8	<109.9	75.0	75.0	
22:15	68.1	76.3	<109.9	76.0	76.0	
22:20	66.8	75.8	<109.9	75.0	75.0	**66.2**
22:25	66.4	74.1	<109.9	74.0	74.0	
22:30	65.8	74.6	<109.9	74.0	74.0	
22:35	65.9	75.1	<109.9	75.0	75.0	
22:40	66.0	75.8	<109.9	75.0	75.0	**66.4**
22:45	66.1	72.8	<109.9	72.0	72.0	
22:50	66.7	75.6	<109.9	75.0	75.0	
22:55	66.6	74.7	<109.9	74.0	74.0	

TABLE A.1a Receptor M-01 – 20-Minute Equivalent Sound Level (20-min Leq) Calculation 04-16-2009 1200-1200 Hrs.

	Noise Measurement Data					Calc.
TIME	5-min Leq dB(A)	Lmax dB(A)	Lpk dB(C)	L(10.0) dB(A)	L(90.0) dB(A)	20-min Leq dB(A)
23:00	65.3	71.9	<109.9	71.0	71.0	**65.7**
23:05	65.0	73.6	<109.9	73.0	73.0	
23:10	66.1	73.9	<109.9	73.0	73.0	
23:15	66.4	74.3	<109.9	74.0	74.0	
23:20	66.7	73.3	<109.9	73.0	73.0	**65.6**
23:25	64.6	74.3	<109.9	74.0	74.0	
23:30	65.3	72.2	<109.9	72.0	72.0	
23:35	65.7	73.6	<109.9	73.0	73.0	
23:40	66.2	74.2	<109.9	74.0	74.0	**64.7**
23:45	65.8	78.3	<109.9	78.0	78.0	
23:50	62.9	72.4	<109.9	72.0	72.0	
23:55	62.8	72.6	<109.9	72.0	72.0	
0:00	63.1	75.5	<109.9	75.0	75.0	**62.8**
0:05	63.9	71.9	<109.9	71.0	71.0	
0:10	62.4	71.1	<109.9	71.0	71.0	
0:15	61.5	71.1	<109.9	71.0	71.0	
0:20	61.9	71.1	<109.9	71.0	71.0	**61.3**
0:25	61.4	73.4	<109.9	73.0	73.0	
0:30	62.6	74.6	<109.9	74.0	74.0	
0:35	58.2	70.6	<109.9	70.0	70.0	
0:40	62.1	74.1	<109.9	74.0	74.0	**60.7**
0:45	56.0	69.1	<109.9	69.0	69.0	
0:50	62.2	71.4	<109.9	71.0	71.0	
0:55	60.3	73.0	<109.9	73.0	73.0	
1:00	62.6	73.5	<109.9	73.0	73.0	**61.5**
1:05	62.2	74.6	<109.9	74.0	74.0	
1:10	60.3	73.2	<109.9	73.0	73.0	
1:15	60.3	71.5	<109.9	71.0	71.0	
1:20	60.5	70.4	<109.9	70.0	70.0	**60.1**
1:25	59.4	70.3	<109.9	70.0	70.0	
1:30	61.4	73.7	<109.9	73.0	73.0	
1:35	58.6	72.5	<109.9	72.0	72.0	
1:40	57.2	70.2	<109.9	70.0	70.0	**61.0**
1:45	60.4	70.4	<109.9	70.0	70.0	
1:50	63.6	71.5	<109.9	71.0	71.0	
1:55	60.6	71.9	<109.9	71.0	71.0	
2:00	62.5	77.1	<109.9	77.0	77.0	**60.6**
2:05	62.1	75.1	<109.9	75.0	75.0	
2:10	57.5	69.5	<109.9	69.0	69.0	
2:15	58.2	67.5	<109.9	67.0	67.0	
2:20	61.9	73.9	<109.9	73.0	73.0	**61.0**
2:25	59.3	73.8	<109.9	73.0	73.0	
2:30	60.8	73.5	<109.9	73.0	73.0	
2:35	61.7	73.3	<109.9	73.0	73.0	

TABLE A.1a Receptor M-01 – 20-Minute Equivalent Sound Level (20-min Leq) Calculation 04-16-2009 1200-1200 Hrs.

Noise Measurement Data						Calc.
TIME	5-min Leq dB(A)	Lmax dB(A)	Lpk dB(C)	L(10.0) dB(A)	L(90.0) dB(A)	20-min Leq dB(A)
2:40	59.0	73.8	<109.9	73.0	73.0	60.8
2:45	62.2	77.8	<109.9	77.0	77.0	
2:50	61.8	72.7	<109.9	72.0	72.0	
2:55	59.1	71.0	<109.9	71.0	71.0	
3:00	60.9	75.6	<109.9	75.0	75.0	61.3
3:05	60.0	73.9	<109.9	73.0	73.0	
3:10	61.3	75.5	<109.9	75.0	75.0	
3:15	62.6	72.9	<109.9	72.0	72.0	
3:20	59.7	72.3	<109.9	72.0	72.0	59.7
3:25	59.7	70.4	<109.9	70.0	70.0	
3:30	62.2	75.4	<109.9	75.0	75.0	
3:35	52.2	66.3	<109.9	66.0	66.0	
3:40	59.5	71.1	<109.9	71.0	71.0	61.3
3:45	61.7	73.8	<109.9	73.0	73.0	
3:50	58.5	70.6	<109.9	70.0	70.0	
3:55	63.6	75.8	<109.9	75.0	75.0	
4:00	61.8	73.1	<109.9	73.0	73.0	62.2
4:05	61.9	76.4	<109.9	76.0	76.0	
4:10	62.2	73.8	<109.9	73.0	73.0	
4:15	62.8	76.2	<109.9	76.0	76.0	
4:20	62.6	76.2	<109.9	76.0	76.0	63.9
4:25	65.4	77.6	<109.9	77.0	77.0	
4:30	62.3	73.8	<109.9	73.0	73.0	
4:35	64.5	76.3	<109.9	76.0	76.0	
4:40	65.9	81.0	<109.9	81.0	81.0	65.4
4:45	62.8	72.3	<109.9	72.0	72.0	
4:50	66.8	74.3	<109.9	74.0	74.0	
4:55	65.2	75.5	<109.9	75.0	75.0	
5:00	66.1	73.5	<109.9	73.0	73.0	66.7
5:05	65.9	74.7	<109.9	74.0	74.0	
5:10	66.4	75.4	<109.9	75.0	75.0	
5:15	68.1	75.1	<109.9	75.0	75.0	
5:20	68.7	76.6	<109.9	76.0	76.0	68.5
5:25	69.3	75.8	<109.9	75.0	75.0	
5:30	67.0	73.8	<109.9	73.0	73.0	
5:35	68.7	74.7	<109.9	74.0	74.0	
5:40	69.8	75.9	<109.9	75.0	75.0	70.0
5:45	69.2	77.0	<109.9	77.0	77.0	
5:50	70.3	80.3	<109.9	80.0	80.0	
5:55	70.7	80.7	<109.9	80.0	80.0	
6:00	70.8	79.1	<109.9	79.0	79.0	71.0
6:05	71.0	79.9	<109.9	79.0	79.0	
6:10	71.7	77.4	<109.9	77.0	77.0	
6:15	70.5	77.0	<109.9	77.0	77.0	
6:20	72.2	79.1	<109.9	79.0	79.0	72.1
6:25	71.6	78.7	<109.9	78.0	78.0	

TABLE A.1a Receptor M-01 – 20-Minute Equivalent Sound Level (20-min Leq) Calculation 04-16-2009 1200-1200 Hrs.

Noise Measurement Data						Calc.
TIME	5-min Leq dB(A)	Lmax dB(A)	Lpk dB(C)	L(10.0) dB(A)	L(90.0) dB(A)	20-min Leq dB(A)
6:30	72.1	78.4	<109.9	78.0	78.0	
6:35	72.3	77.9	<109.9	77.0	77.0	
6:40	72.8	77.9	<109.9	77.0	77.0	72.9
6:45	73.5	85.9	<109.9	85.0	85.0	
6:50	72.6	79.9	<109.9	79.0	79.0	
6:55	72.7	78.5	<109.9	78.0	78.0	
7:00	73.1	84.2	<109.9	84.0	84.0	72.3
7:05	71.5	77.2	<109.9	77.0	77.0	
7:10	71.7	78.3	<109.9	78.0	78.0	
7:15	72.8	78.9	<109.9	78.0	78.0	
7:20	72.6	85.0	120.1	85.0	85.0	72.5
7:25	72.1	79.5	<109.9	79.0	79.0	
7:30	72.9	78.3	<109.9	78.0	78.0	
7:35	72.5	78.2	<109.9	78.0	78.0	
7:40	72.3	77.4	<109.9	77.0	77.0	71.7
7:45	71.6	77.9	<109.9	77.0	77.0	
7:50	70.2	77.1	<109.9	77.0	77.0	
7:55	72.3	83.0	<109.9	83.0	83.0	
8:00	71.0	77.8	<109.9	77.0	77.0	70.6
8:05	71.0	78.2	<109.9	78.0	78.0	
8:10	70.2	79.9	<109.9	79.0	79.0	
8:15	69.9	81.0	<109.9	81.0	81.0	
8:20	69.7	76.3	<109.9	76.0	76.0	70.1
8:25	69.1	78.2	<109.9	78.0	78.0	
8:30	71.3	79.1	<109.9	79.0	79.0	
8:35	70.0	77.1	<109.9	77.0	77.0	
8:40	70.2	77.5	<109.9	77.0	77.0	70.4
8:45	70.4	77.0	<109.9	77.0	77.0	
8:50	70.5	78.9	<109.9	78.0	78.0	
8:55	70.5	80.3	<109.9	80.0	80.0	
9:00	70.3	78.3	<109.9	78.0	78.0	70.2
9:05	69.6	77.2	<109.9	77.0	77.0	
9:10	69.3	75.2	<109.9	75.0	75.0	
9:15	71.3	77.0	<109.9	77.0	77.0	
9:20	69.0	78.6	<109.9	78.0	78.0	69.6
9:25	69.9	76.3	<109.9	76.0	76.0	
9:30	69.4	76.3	<109.9	76.0	76.0	
9:35	70.0	76.2	<109.9	76.0	76.0	
9:40	70.6	81.7	<109.9	81.0	81.0	70.2
9:45	70.3	77.6	<109.9	77.0	77.0	
9:50	69.9	79.1	<109.9	79.0	79.0	
9:55	70.0	76.7	<109.9	76.0	76.0	
10:00	69.9	76.2	<109.9	76.0	76.0	69.9
10:05	70.9	78.3	<109.9	78.0	78.0	
10:10	68.2	76.6	<109.9	76.0	76.0	
10:15	70.3	81.0	<109.9	81.0	81.0	

TABLE A.1a Receptor M-01 – 20-Minute Equivalent Sound Level (20-min Leq) Calculation 04-16-2009 1200-1200 Hrs.

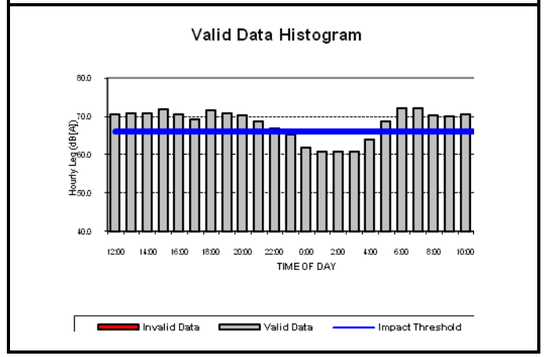
Noise Measurement Data						Calc.
TIME	5-min Leq dB(A)	Lmax dB(A)	Lpk dB(C)	L(10.0) dB(A)	L(90.0) dB(A)	20-min Leq dB(A)
10:20	71.5	78.2	<109.9	78.0	78.0	70.5
10:25	71.5	77.2	<109.9	77.0	77.0	
10:30	69.2	75.4	<109.9	75.0	75.0	
10:35	69.4	76.3	<109.9	76.0	76.0	
10:40	70.5	82.6	<109.9	82.0	82.0	70.7
10:45	70.6	77.9	<109.9	77.0	77.0	
10:50	71.3	79.1	<109.9	79.0	79.0	
10:55	70.3	78.6	<109.9	78.0	78.0	
11:00	70.1	78.6	<109.9	78.0	78.0	71.7
11:05	70.9	76.6	<109.9	76.0	76.0	
11:10	71.4	77.5	<109.9	77.0	77.0	
11:15	73.5	91.8	114.7	91.0	91.0	
11:20	70.8	77.8	<109.9	77.0	77.0	70.9
11:25	71.3	76.3	<109.9	76.0	76.0	
11:30	70.7	79.4	<109.9	79.0	79.0	
11:35	70.9	79.8	<109.9	79.0	79.0	
11:40	70.5	75.0	<109.9	75.0	75.0	71.6
11:45	71.7	79.8	<109.9	79.0	79.0	
11:50	71.9	83.4	<109.9	83.0	83.0	
11:55	72.0	78.6	<109.9	78.0	78.0	

TABLE A.1b Receptor M-01 – Hourly Equivalent Sound Level (Leq[h]) Calculation – 04-16-2009 1200-1200 Hrs.

Hour	20-min Leq Sub-intervals :00	:20	:40	Hourly Leq dB(A)	Loudest Hour Level dB(A)
12:00	70.7	70.4	70.5	70.6	
13:00	70.7	70.7	70.7	70.7	
14:00	70.5	70.9	70.6	70.7	
15:00	71.3	71.9	72.5	**71.9**	
16:00	72.3	69.0	69.6	70.6	
17:00	67.6	70.2	69.6	69.2	
18:00	71.1	72.2	71.3	**71.5**	
19:00	70.2	70.9	71.2	70.8	
20:00	70.1	70.0	70.5	70.2	
21:00	69.3	68.7	68.1	68.7	
22:00	67.9	66.2	66.4	66.9	
23:00	65.7	65.6	64.7	65.4	
0:00	62.8	61.3	60.7	61.7	
1:00	61.5	60.1	61.0	60.9	
2:00	60.6	61.0	60.8	60.8	
3:00	61.3	59.7	61.3	60.8	
4:00	62.2	63.9	65.4	64.0	
5:00	66.7	68.5	70.0	68.6	
6:00	71.0	72.1	72.9	**72.1**	
7:00	72.3	72.5	71.7	**72.2**	**72**
8:00	70.6	70.1	70.4	70.4	
9:00	70.2	69.6	70.2	70.0	
10:00	69.9	70.5	70.7	70.4	
11:00	71.7	70.9	71.6	**71.4**	

LEGEND

- Loudest Hour
- Narrow Range Noise Hour
- Wide Range Noise Hour



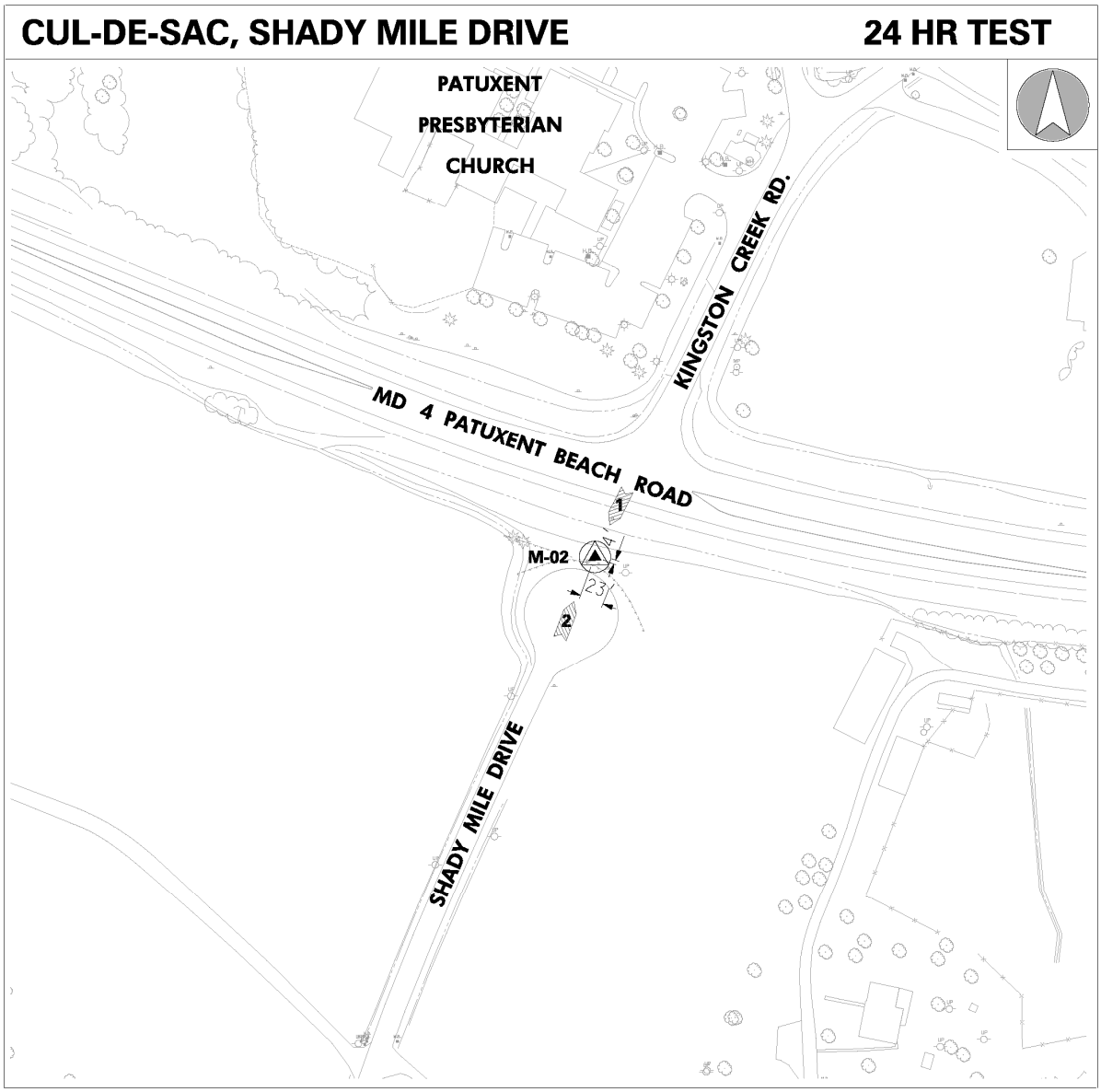
RECEPTOR M-02 – CUL-DE-SAC, SHADY MILE DRIVE

General

One 24-hour noise measurement was taken at this location from 1200 Hrs. on 2009 April 16 to 1200 Hrs. on 2009 April 17.

Receptor Site Sketch

FIGURE A.2 Receptor M-02 Site Sketch



Receptor Site Photographs

Photograph A.2a Receptor M-02 – Cul-De-Dac, Shady Mile Drive (View 1 of 2)

04-16-2009

24-hour noise measurement

Photograph A.2b Receptor M-02 – Cul-De-Sac, Shady Mile Drive (View 2 of 2)

04-16-2009

24-hour noise measurement

April 16, 2009 1200 Hrs. to April 17, 2009 1200 Hrs.

TABLE A.2a Receptor M-02 – 20-Minute Equivalent Sound Level (20-min Leq) Calculation 04-16-2009 1200-1200 Hrs.

	Noise Measurement Data					Calc.
TIME	5-min Leq dB(A)	Lmax dB(A)	Lpk dB(C)	L(10.0) dB(A)	L(90.0) dB(A)	20-min Leq dB(A)
12:00	65.8	77.6	<112.1	77.0	77.0	63.8
12:05	64.3	74.8	<112.1	74.0	74.0	
12:10	61.8	67.4	<112.1	67.0	67.0	
12:15	61.7	68.3	<112.1	68.0	68.0	
12:20	62.8	72.8	<112.1	72.0	72.0	63.6
12:25	62.4	69.7	<112.1	69.0	69.0	
12:30	64.5	71.8	<112.1	71.0	71.0	
12:35	64.3	70.9	<112.1	70.0	70.0	
12:40	64.9	74.4	<112.1	74.0	74.0	68.9
12:45	71.9	77.9	<112.1	77.0	77.0	
12:50	~~80.8~~	~~94.8~~	~~123.3~~	~~94.0~~	~~94.0~~	
12:55	66.6	74.4	<112.1	74.0	74.0	
13:00	62.6	68.1	<112.1	68.0	68.0	63.6
13:05	64.0	75.3	<112.1	75.0	75.0	
13:10	62.7	68.1	<112.1	68.0	68.0	
13:15	64.6	76.4	<112.1	76.0	76.0	
13:20	67.3	76.2	<112.1	76.0	76.0	66.8
13:25	68.4	79.4	<112.1	79.0	79.0	
13:30	66.8	79.2	<112.1	79.0	79.0	
13:35	63.5	74.5	<112.1	74.0	74.0	
13:40	67.2	86.0	<112.1	86.0	86.0	64.4
13:45	62.8	72.0	<112.1	72.0	72.0	
13:50	63.9	74.1	<112.1	74.0	74.0	
13:55	61.7	71.4	<112.1	71.0	71.0	
14:00	64.8	78.8	<112.1	78.0	78.0	67.9
14:05	71.2	82.4	<112.1	82.0	82.0	
14:10	64.5	72.8	<112.1	72.0	72.0	
14:15	67.5	79.2	<112.1	79.0	79.0	
14:20	67.4	78.0	<112.1	78.0	78.0	69.1
14:25	73.3	86.0	<112.1	86.0	86.0	
14:30	65.7	78.9	<112.1	78.0	78.0	
14:35	62.3	70.0	<112.1	70.0	70.0	
14:40	75.2	92.9	<112.1	92.0	92.0	69.9
14:45	62.2	70.9	<112.1	70.0	70.0	
14:50	63.6	72.9	<112.1	72.0	72.0	
14:55	63.8	75.7	<112.1	75.0	75.0	
15:00	61.6	69.9	<112.1	69.0	69.0	62.7
15:05	62.2	71.3	<112.1	71.0	71.0	
15:10	63.6	75.6	<112.1	75.0	75.0	
15:15	63.0	72.8	<112.1	72.0	72.0	
15:20	63.0	72.4	<112.1	72.0	72.0	70.5
15:25	62.5	70.0	<112.1	70.0	70.0	
15:30	64.3	76.8	<112.1	76.0	76.0	
15:35	75.9	91.9	113.8	91.0	91.0	

TABLE A.2a Receptor M-02 – 20-Minute Equivalent Sound Level (20-min Leq) Calculation 04-16-2009 1200-1200 Hrs.

	Noise Measurement Data					Calc.
TIME	5-min Leq dB(A)	Lmax dB(A)	Lpk dB(C)	L(10.0) dB(A)	L(90.0) dB(A)	20-min Leq dB(A)
15:40	~~83.1~~	~~95.3~~	~~117.5~~	~~95.0~~	~~95.0~~	75.3
15:45	~~79.2~~	~~92.1~~	~~116.7~~	~~92.0~~	~~92.0~~	
15:50	76.9	90.0	112.4	90.0	90.0	
15:55	72.8	87.7	<112.1	87.0	87.0	
16:00	76.9	90.1	114.1	90.0	90.0	73.0
16:05	70.8	89.2	116.9	89.0	89.0	
16:10	72.3	81.8	<112.1	81.0	81.0	
16:15	62.9	70.5	<112.1	70.0	70.0	
16:20	63.3	75.6	<112.1	75.0	75.0	63.8
16:25	65.3	76.0	<112.1	76.0	76.0	
16:30	63.8	72.8	<112.1	72.0	72.0	
16:35	62.5	69.3	<112.1	69.0	69.0	
16:40	62.2	70.9	<112.1	70.0	70.0	61.5
16:45	60.5	69.3	<112.1	69.0	69.0	
16:50	61.3	66.6	<112.1	66.0	66.0	
16:55	61.8	75.7	<112.1	75.0	75.0	
17:00	59.6	65.6	<112.1	65.0	65.0	61.6
17:05	62.7	75.6	<112.1	75.0	75.0	
17:10	62.7	70.8	<112.1	70.0	70.0	
17:15	60.6	69.1	<112.1	69.0	69.0	
17:20	62.1	72.1	<112.1	72.0	72.0	63.0
17:25	61.5	68.5	<112.1	68.0	68.0	
17:30	64.4	76.5	<112.1	76.0	76.0	
17:35	63.4	74.1	<112.1	74.0	74.0	
17:40	61.8	71.5	<112.1	71.0	71.0	61.5
17:45	60.6	67.6	<112.1	67.0	67.0	
17:50	61.5	73.3	<112.1	73.0	73.0	
17:55	62.0	68.0	<112.1	68.0	68.0	
18:00	61.5	70.5	<112.1	70.0	70.0	63.2
18:05	62.5	70.5	<112.1	70.0	70.0	
18:10	65.4	78.8	<112.1	78.0	78.0	
18:15	62.5	73.3	<112.1	73.0	73.0	
18:20	62.4	72.8	<112.1	72.0	72.0	66.3
18:25	63.0	69.3	<112.1	69.0	69.0	
18:30	70.2	88.9	<112.1	88.0	88.0	
18:35	64.6	77.7	<112.1	77.0	77.0	
18:40	62.1	68.8	<112.1	68.0	68.0	63.2
18:45	64.1	76.8	<112.1	76.0	76.0	
18:50	63.6	74.4	<112.1	74.0	74.0	
18:55	62.9	74.9	<112.1	74.0	74.0	
19:00	63.9	74.9	<112.1	74.0	74.0	64.1
19:05	66.0	80.0	<112.1	80.0	80.0	
19:10	62.9	70.9	<112.1	70.0	70.0	
19:15	62.8	74.4	<112.1	74.0	74.0	

TABLE A.2a Receptor M-02 – 20-Minute Equivalent Sound Level (20-min Leq) Calculation 04-16-2009 1200-1200 Hrs.

	Noise Measurement Data					Calc.
TIME	5-min Leq dB(A)	Lmax dB(A)	Lpk dB(C)	L(10.0) dB(A)	L(90.0) dB(A)	20-min Leq dB(A)
19:20	62.3	69.4	<112.1	69.0	69.0	64.0
19:25	63.2	72.9	<112.1	72.0	72.0	
19:30	63.5	72.2	<112.1	72.0	72.0	
19:35	66.0	80.4	<112.1	80.0	80.0	
19:40	63.7	69.8	<112.1	69.0	69.0	64.4
19:45	64.9	74.0	<112.1	74.0	74.0	
19:50	65.0	74.1	<112.1	74.0	74.0	
19:55	63.8	70.8	<112.1	70.0	70.0	
20:00	62.7	71.9	<112.1	71.0	71.0	64.0
20:05	62.6	67.6	<112.1	67.0	67.0	
20:10	65.0	79.8	<112.1	79.0	79.0	
20:15	65.2	76.5	<112.1	76.0	76.0	
20:20	63.1	70.5	<112.1	70.0	70.0	64.6
20:25	62.9	69.6	<112.1	69.0	69.0	
20:30	66.8	83.1	<112.1	83.0	83.0	
20:35	64.6	77.7	<112.1	77.0	77.0	
20:40	63.0	69.8	<112.1	69.0	69.0	65.6
20:45	68.2	82.8	<112.1	82.0	82.0	
20:50	65.9	77.3	<112.1	77.0	77.0	
20:55	62.8	70.5	<112.1	70.0	70.0	
21:00	62.8	68.9	<112.1	68.0	68.0	63.3
21:05	63.7	73.2	<112.1	73.0	73.0	
21:10	63.0	73.3	<112.1	73.0	73.0	
21:15	63.6	76.3	<112.1	76.0	76.0	
21:20	64.4	77.7	<112.1	77.0	77.0	66.9
21:25	71.4	90.5	<112.1	90.0	90.0	
21:30	62.7	75.7	<112.1	75.0	75.0	
21:35	60.5	67.3	<112.1	67.0	67.0	
21:40	60.9	72.5	<112.1	72.0	72.0	61.6
21:45	63.4	78.0	<112.1	78.0	78.0	
21:50	60.2	66.5	<112.1	66.0	66.0	
21:55	61.4	67.3	<112.1	67.0	67.0	
22:00	59.9	68.9	<112.1	68.0	68.0	60.8
22:05	60.1	68.5	<112.1	68.0	68.0	
22:10	62.2	74.5	<112.1	74.0	74.0	
22:15	60.4	69.8	<112.1	69.0	69.0	
22:20	59.8	69.3	<112.1	69.0	69.0	60.8
22:25	59.4	69.7	<112.1	69.0	69.0	
22:30	59.5	72.1	<112.1	72.0	72.0	
22:35	63.2	78.4	<112.1	78.0	78.0	
22:40	59.3	67.7	<112.1	67.0	67.0	64.6
22:45	61.2	73.0	<112.1	73.0	73.0	
22:50	69.3	87.2	<112.1	87.0	87.0	
22:55	59.3	68.0	<112.1	68.0	68.0	

TABLE A.2a Receptor M-02 – 20-Minute Equivalent Sound Level (20-min Leq) Calculation 04-16-2009 1200-1200 Hrs.

	Noise Measurement Data					Calc.
TIME	5-min Leq dB(A)	Lmax dB(A)	Lpk dB(C)	L(10.0) dB(A)	L(90.0) dB(A)	20-min Leq dB(A)
23:00	58.0	67.7	<112.1	67.0	67.0	60.6
23:05	58.2	65.6	<112.1	65.0	65.0	
23:10	64.3	79.2	<112.1	79.0	79.0	
23:15	57.6	65.5	<112.1	65.0	65.0	
23:20	59.4	68.7	<112.1	68.0	68.0	58.9
23:25	58.3	65.7	<112.1	65.0	65.0	
23:30	57.8	69.2	<112.1	69.0	69.0	
23:35	59.9	68.9	<112.1	68.0	68.0	
23:40	58.4	63.6	<112.1	63.0	63.0	59.3
23:45	58.3	65.5	<112.1	65.0	65.0	
23:50	61.6	77.6	<112.1	77.0	77.0	
23:55	57.8	66.2	<112.1	66.0	66.0	
0:00	58.8	68.9	<112.1	68.0	68.0	56.5
0:05	56.3	66.9	<112.1	66.0	66.0	
0:10	54.5	61.5	<112.1	61.0	61.0	
0:15	55.1	62.9	<112.1	62.0	62.0	
0:20	53.7	59.6	<112.1	59.0	59.0	55.2
0:25	57.6	70.9	<112.1	70.0	70.0	
0:30	54.1	60.9	<112.1	60.0	60.0	
0:35	54.3	62.4	<112.1	62.0	62.0	
0:40	53.3	60.5	<112.1	60.0	60.0	54.8
0:45	55.7	62.6	<112.1	62.0	62.0	
0:50	54.9	65.2	<112.1	65.0	65.0	
0:55	54.9	62.1	<112.1	62.0	62.0	
1:00	52.8	62.5	<112.1	62.0	62.0	53.2
1:05	55.4	67.6	<112.1	67.0	67.0	
1:10	51.8	59.3	<112.1	59.0	59.0	
1:15	51.8	59.7	<112.1	59.0	59.0	
1:20	52.8	64.5	<112.1	64.0	64.0	52.9
1:25	53.2	64.5	<112.1	64.0	64.0	
1:30	52.2	59.2	<112.1	59.0	59.0	
1:35	53.2	63.2	<112.1	63.0	63.0	
1:40	50.6	58.4	<112.1	58.0	58.0	54.4
1:45	54.4	66.8	<112.1	66.0	66.0	
1:50	56.4	70.9	<112.1	70.0	70.0	
1:55	54.4	63.2	<112.1	63.0	63.0	
2:00	55.2	65.3	<112.1	65.0	65.0	55.7
2:05	56.3	65.6	<112.1	65.0	65.0	
2:10	54.4	65.3	<112.1	65.0	65.0	
2:15	56.6	62.4	<112.1	62.0	62.0	
2:20	55.5	64.1	<112.1	64.0	64.0	54.3
2:25	55.9	67.4	<112.1	67.0	67.0	
2:30	51.3	60.0	<112.1	60.0	60.0	
2:35	52.9	61.3	<112.1	61.0	61.0	

TABLE A.2a Receptor M-02 – 20-Minute Equivalent Sound Level (20-min Leq) Calculation 04-16-2009 1200-1200 Hrs.

Noise Measurement Data						Calc.
TIME	5-min Leq dB(A)	Lmax dB(A)	Lpk dB(C)	L(10.0) dB(A)	L(90.0) dB(A)	20-min Leq dB(A)
2:40	51.4	60.5	<112.1	60.0	60.0	54.4
2:45	56.7	67.3	<112.1	67.0	67.0	
2:50	54.6	67.1	<112.1	67.0	67.0	
2:55	53.1	68.1	<112.1	68.0	68.0	
3:00	55.1	64.0	<112.1	64.0	64.0	54.3
3:05	54.8	67.3	<112.1	67.0	67.0	
3:10	53.0	62.4	<112.1	62.0	62.0	
3:15	53.9	63.7	<112.1	63.0	63.0	
3:20	52.4	59.3	<112.1	59.0	59.0	55.2
3:25	57.1	68.4	<112.1	68.0	68.0	
3:30	55.8	66.0	<112.1	66.0	66.0	
3:35	53.9	64.4	<112.1	64.0	64.0	
3:40	55.8	64.0	<112.1	64.0	64.0	55.8
3:45	56.0	64.1	<112.1	64.0	64.0	
3:50	55.0	68.4	<112.1	68.0	68.0	
3:55	56.4	64.4	<112.1	64.0	64.0	
4:00	57.9	66.5	<112.1	66.0	66.0	56.9
4:05	56.2	64.1	<112.1	64.0	64.0	
4:10	55.3	62.0	<112.1	62.0	62.0	
4:15	57.6	67.2	<112.1	67.0	67.0	
4:20	58.9	73.2	<112.1	73.0	73.0	57.2
4:25	56.5	64.2	<112.1	64.0	64.0	
4:30	55.6	61.7	<112.1	61.0	61.0	
4:35	57.1	65.6	<112.1	65.0	65.0	
4:40	58.8	65.0	<112.1	65.0	65.0	59.6
4:45	58.4	67.7	<112.1	67.0	67.0	
4:50	59.3	66.4	<112.1	66.0	66.0	
4:55	61.3	72.8	<112.1	72.0	72.0	
5:00	58.8	66.8	<112.1	66.0	66.0	62.4
5:05	60.5	69.6	<112.1	69.0	69.0	
5:10	62.9	78.9	<112.1	78.0	78.0	
5:15	64.9	77.6	<112.1	77.0	77.0	
5:20	60.6	69.7	<112.1	69.0	69.0	61.5
5:25	62.2	73.2	<112.1	73.0	73.0	
5:30	60.6	66.4	<112.1	66.0	66.0	
5:35	62.3	68.9	<112.1	68.0	68.0	
5:40	62.2	69.0	<112.1	69.0	69.0	63.8
5:45	62.8	68.7	<112.1	68.0	68.0	
5:50	64.9	76.1	<112.1	76.0	76.0	
5:55	64.8	70.4	<112.1	70.0	70.0	
6:00	64.5	72.5	<112.1	72.0	72.0	64.8
6:05	64.3	70.8	<112.1	70.0	70.0	
6:10	65.4	70.5	<112.1	70.0	70.0	
6:15	64.8	72.3	<112.1	72.0	72.0	
6:20	68.4	81.3	<112.1	81.0	81.0	66.6
6:25	65.4	70.8	<112.1	70.0	70.0	

TABLE A.2a Receptor M-02 – 20-Minute Equivalent Sound Level (20-min Leq) Calculation 04-16-2009 1200-1200 Hrs.

Noise Measurement Data						Calc.
TIME	5-min Leq dB(A)	Lmax dB(A)	Lpk dB(C)	L(10.0) dB(A)	L(90.0) dB(A)	20-min Leq dB(A)
6:30	65.9	77.1	<112.1	77.0	77.0	
6:35	66.1	71.2	<112.1	71.0	71.0	
6:40	67.0	78.5	<112.1	78.0	78.0	67.4
6:45	67.6	80.9	<112.1	80.0	80.0	
6:50	67.2	78.6	<112.1	78.0	78.0	
6:55	67.7	81.6	<112.1	81.0	81.0	
7:00	65.9	74.4	<112.1	74.0	74.0	67.1
7:05	66.3	73.7	<112.1	73.0	73.0	
7:10	66.1	75.5	<112.1	75.0	75.0	
7:15	69.2	84.5	<112.1	84.0	84.0	
7:20	65.5	71.2	<112.1	71.0	71.0	66.3
7:25	67.7	81.6	<112.1	81.0	81.0	
7:30	65.2	70.0	<112.1	70.0	70.0	
7:35	66.3	74.7	<112.1	74.0	74.0	
7:40	65.5	73.6	<112.1	73.0	73.0	65.9
7:45	65.9	73.5	<112.1	73.0	73.0	
7:50	66.4	74.5	<112.1	74.0	74.0	
7:55	65.7	71.4	<112.1	71.0	71.0	
8:00	65.9	73.7	<112.1	73.0	73.0	65.9
8:05	66.0	73.2	<112.1	73.0	73.0	
8:10	65.8	73.3	<112.1	73.0	73.0	
8:15	66.0	76.0	<112.1	76.0	76.0	
8:20	65.5	74.8	<112.1	74.0	74.0	65.2
8:25	65.0	73.2	<112.1	73.0	73.0	
8:30	65.0	71.0	<112.1	71.0	71.0	
8:35	65.4	71.1	<112.1	71.0	71.0	
8:40	64.5	74.5	<112.1	74.0	74.0	65.7
8:45	65.9	73.6	<112.1	73.0	73.0	
8:50	66.0	73.3	<112.1	73.0	73.0	
8:55	66.1	76.9	<112.1	76.0	76.0	
9:00	65.3	72.9	<112.1	72.0	72.0	66.7
9:05	69.2	83.8	<112.1	83.0	83.0	
9:10	65.3	73.3	<112.1	73.0	73.0	
9:15	65.5	71.2	<112.1	71.0	71.0	
9:20	65.8	83.2	121.0	83.0	83.0	66.6
9:25	65.5	73.4	<112.1	73.0	73.0	
9:30	65.9	76.8	<112.1	76.0	76.0	
9:35	68.6	86.1	<112.1	86.0	86.0	
9:40	65.4	74.9	<112.1	74.0	74.0	64.9
9:45	65.0	69.9	<112.1	69.0	69.0	
9:50	65.3	71.7	<112.1	71.0	71.0	
9:55	63.9	69.7	<112.1	69.0	69.0	
10:00	65.2	74.5	<112.1	74.0	74.0	64.7
10:05	65.3	73.2	<112.1	73.0	73.0	
10:10	63.7	72.9	<112.1	72.0	72.0	
10:15	64.3	73.3	<112.1	73.0	73.0	

TABLE A.2a Receptor M-02 – 20-Minute Equivalent Sound Level (20-min Leq) Calculation 04-16-2009 1200-1200 Hrs.

Noise Measurement Data						Calc.
TIME	5-min Leq dB(A)	Lmax dB(A)	Lpk dB(C)	L(10.0) dB(A)	L(90.0) dB(A)	20-min Leq dB(A)
10:20	64.5	71.6	<112.1	71.0	71.0	66.2
10:25	68.3	85.2	<112.1	85.0	85.0	
10:30	66.5	81.7	<112.1	81.0	81.0	
10:35	64.1	75.2	<112.1	75.0	75.0	
10:40	68.5	87.7	<112.1	87.0	87.0	66.2
10:45	65.0	75.7	<112.1	75.0	75.0	
10:50	65.0	76.4	<112.1	76.0	76.0	
10:55	65.3	79.6	<112.1	79.0	79.0	
11:00	66.1	78.0	<112.1	78.0	78.0	66.1
11:05	66.2	75.3	<112.1	75.0	75.0	
11:10	63.9	72.1	<112.1	72.0	72.0	
11:15	67.6	85.8	<112.1	85.0	85.0	
11:20	64.5	74.9	<112.1	74.0	74.0	64.3
11:25	64.7	73.3	<112.1	73.0	73.0	
11:30	64.2	74.4	<112.1	74.0	74.0	
11:35	63.8	72.7	<112.1	72.0	72.0	
11:40	65.4	74.1	<112.1	74.0	74.0	66.0
11:45	66.2	80.5	<112.1	80.0	80.0	
11:50	67.1	82.4	<112.1	82.0	82.0	
11:55	65.1	73.2	<112.1	73.0	73.0	

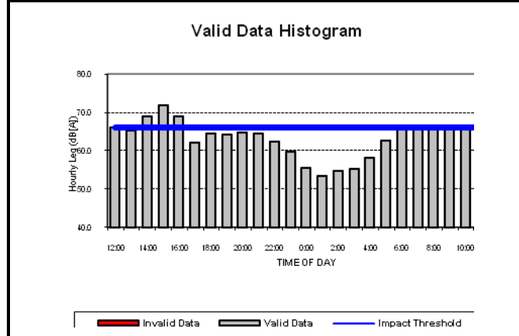
12:50 - 5-min Leq despiked for unusually high level. These levels are characteristic of jet or helicopter flyover.
15:40 - 5-min Leq despiked for unusually high level. These levels are characteristic of jet or helicopter flyover.
15:45 - 5-min Leq despiked for unusually high level. These levels are characteristic of jet or helicopter flyover..

TABLE A.2b Receptor M-02 – Hourly Equivalent Sound Level (Leq[h]) Calculation – 04-16-2009 1200-1200 Hrs.

Hour	20-min Leq Sub-intervals :00	:20	:40	Hourly Leq dB(A)	Loudest Hour Level dB(A)
12:00	63.8	63.6	68.9	66.2	
13:00	63.6	66.8	64.4	65.2	
14:00	67.9	69.1	69.9	69.0	
15:00	62.7	70.5	75.3	72.0	72
16:00	73.0	63.8	61.5	69.0	
17:00	61.6	63.0	61.5	62.1	
18:00	63.2	66.3	63.2	64.5	
19:00	64.1	64.0	64.4	64.2	
20:00	64.0	64.6	65.6	64.8	
21:00	63.3	66.9	61.6	64.5	
22:00	60.8	60.8	64.6	62.4	
23:00	60.6	58.9	59.3	59.7	
0:00	56.5	55.2	54.8	55.6	
1:00	53.2	52.9	54.4	53.5	
2:00	55.7	54.3	54.4	54.8	
3:00	54.3	55.2	55.8	55.1	
4:00	56.9	57.2	59.6	58.1	
5:00	62.4	61.5	63.8	62.7	
6:00	64.8	66.6	67.4	66.4	
7:00	67.1	66.3	65.9	66.5	
8:00	65.9	65.2	65.7	65.6	
9:00	66.7	66.6	64.9	66.2	
10:00	64.7	66.2	66.2	65.8	
11:00	66.1	64.3	66.0	65.6	

LEGEND

- Loudest Hour
- Narrow Range Noise Hour
- Wide Range Noise Hour



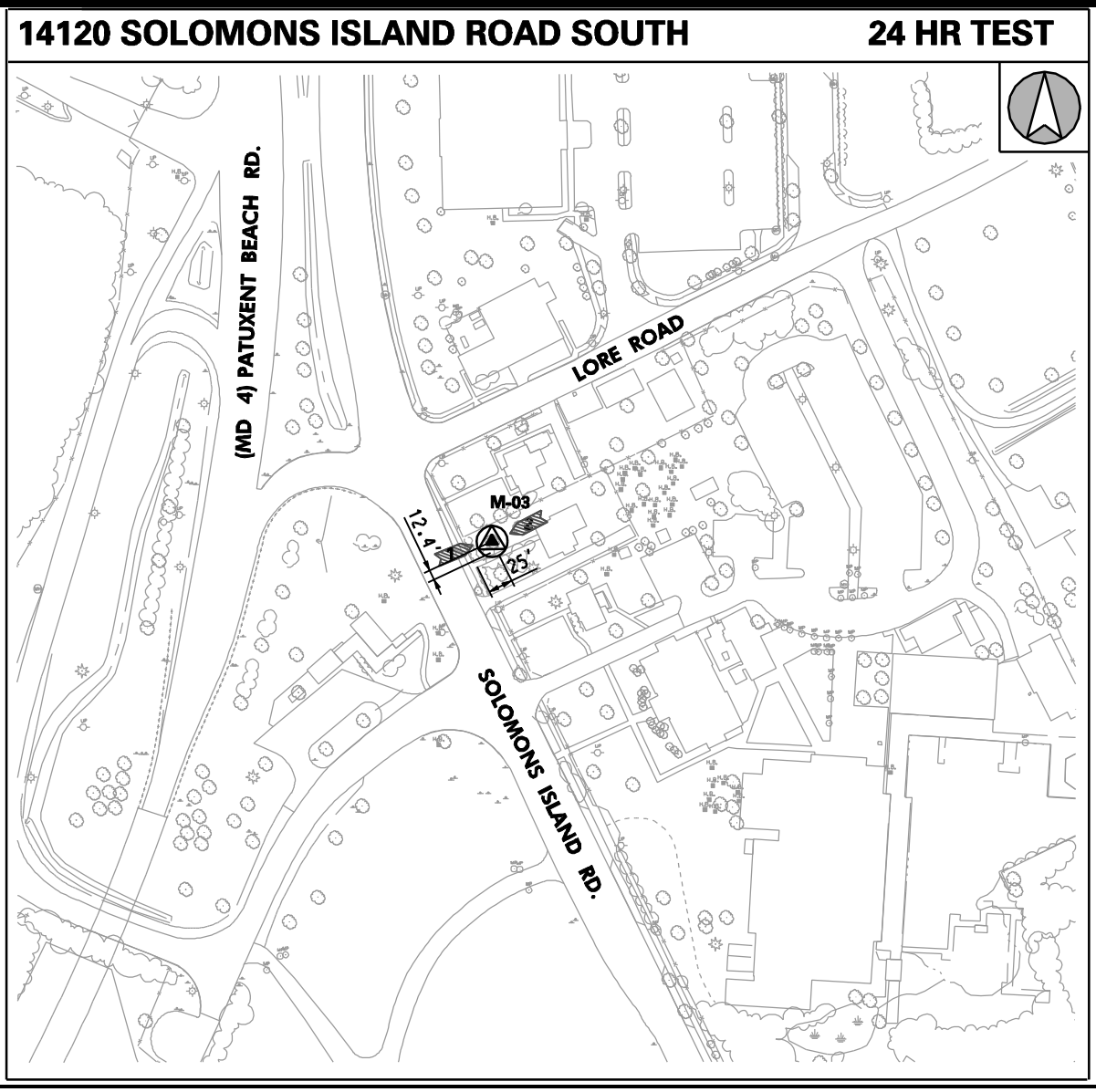
RECEPTOR M-03 – 14120 SOLOMONS ISLAND ROAD SOUTH

General

One 24-hour noise measurement was taken at this location from 1100 Hrs. on 2009 May 12 to 1100 Hrs. on 2009 May 13.

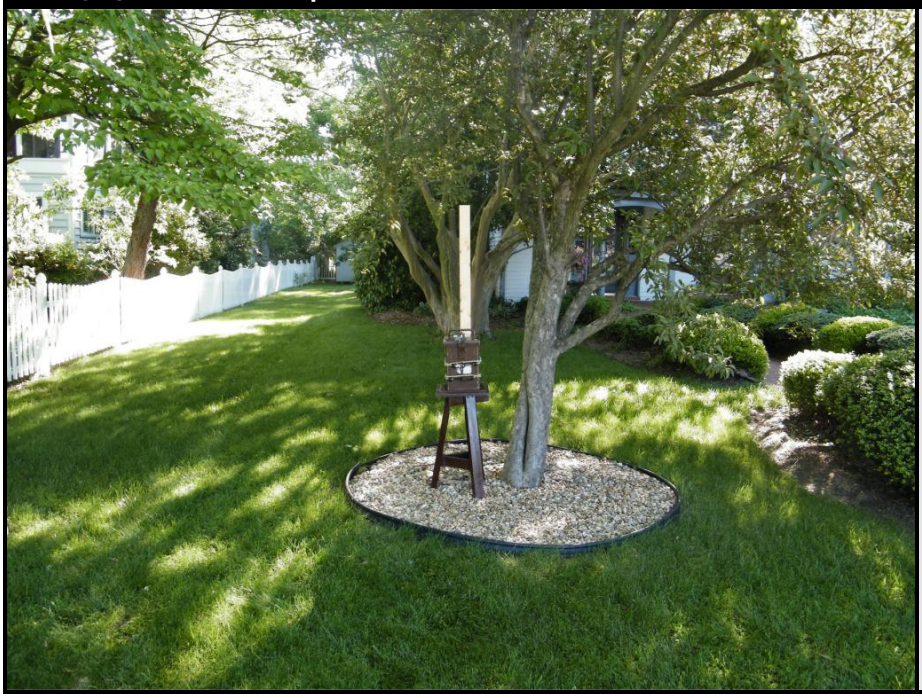
Receptor Site Sketch

FIGURE A.3 Receptor M-03 Site Sketch



Receptor Site Photographs

Photograph A.3a Receptor M-03 – 14120 Solomons Island Road South (View 1 of 2)



05-12-2009

24-hour noise measurement

Photograph A.3b Receptor M-03 – 14120 Solomons Island Road South (View 2 of 2)

05-12-2009

24-hour noise measurement

May 12, 2009 1100 Hrs. to May 13, 2009 1100 Hrs.

TABLE A.3a Receptor M-03 – 20-Minute Equivalent Sound Level (20-min Leq) Calculation 05-12-2009 1100-1100 Hrs.

Noise Measurement Data						Calc.
TIME	5-min Leq dB(A)	Lmax dB(A)	Lpk dB(C)	L(10.0) dB(A)	L(90.0) dB(A)	20-min Leq dB(A)
11:00	63.9	81.6	<112.4	81.0	81.0	62.6
11:05	62.3	75.9	<112.4	75.0	75.0	
11:10	62.4	70.0	<112.4	70.0	70.0	
11:15	61.6	69.1	<112.4	69.0	69.0	
11:20	62.4	70.0	<112.4	70.0	70.0	61.9
11:25	61.7	69.2	<112.4	69.0	69.0	
11:30	62.0	71.5	<112.4	71.0	71.0	
11:35	61.6	69.4	<112.4	69.0	69.0	
11:40	62.4	70.8	<112.4	70.0	70.0	63.0
11:45	61.6	70.8	<112.4	70.0	70.0	
11:50	63.9	76.8	<112.4	76.0	76.0	
11:55	63.6	73.3	<112.4	73.0	73.0	
12:00	63.5	74.8	<112.4	74.0	74.0	64.2
12:05	65.0	80.3	<112.4	80.0	80.0	
12:10	65.5	76.3	<112.4	76.0	76.0	
12:15	62.1	67.1	<112.4	67.0	67.0	
12:20	65.0	78.8	<112.4	78.0	78.0	63.5
12:25	61.5	70.4	<112.4	70.0	70.0	
12:30	61.9	77.1	<112.4	77.0	77.0	
12:35	64.4	76.9	<112.4	76.0	76.0	
12:40	62.6	70.7	<112.4	70.0	70.0	64.1
12:45	63.8	77.2	<112.4	77.0	77.0	
12:50	63.5	82.3	<112.4	82.0	82.0	
12:55	65.7	78.0	<112.4	78.0	78.0	
13:00	64.5	80.3	<112.4	80.0	80.0	63.6
13:05	63.3	71.6	<112.4	71.0	71.0	
13:10	64.2	79.1	<112.4	79.0	79.0	
13:15	61.9	72.0	<112.4	72.0	72.0	
13:20	60.9	72.0	<112.4	72.0	72.0	63.1
13:25	62.5	71.6	<112.4	71.0	71.0	
13:30	64.8	78.4	<112.4	78.0	78.0	
13:35	63.4	74.7	<112.4	74.0	74.0	
13:40	64.4	72.8	<112.4	72.0	72.0	65.4
13:45	64.4	72.8	<112.4	72.0	72.0	
13:50	67.9	86.9	<112.4	86.0	86.0	
13:55	63.4	76.7	<112.4	76.0	76.0	
14:00	64.6	79.6	<112.4	79.0	79.0	64.0
14:05	61.4	71.7	<112.4	71.0	71.0	
14:10	66.2	77.6	<112.4	77.0	77.0	
14:15	62.1	72.4	<112.4	72.0	72.0	
14:20	61.5	70.0	<112.4	70.0	70.0	62.1
14:25	62.5	71.6	<112.4	71.0	71.0	
14:30	62.9	78.0	<112.4	78.0	78.0	
14:35	61.3	71.2	<112.4	71.0	71.0	

TABLE A.3a Receptor M-03 – 20-Minute Equivalent Sound Level (20-min Leq) Calculation 05-12-2009 1100-1100 Hrs.

Noise Measurement Data						Calc.
TIME	5-min Leq dB(A)	Lmax dB(A)	Lpk dB(C)	L(10.0) dB(A)	L(90.0) dB(A)	20-min Leq dB(A)
14:40	65.5	72.0	<112.4	72.0	72.0	64.8
14:45	66.9	74.3	<112.4	74.0	74.0	
14:50	62.2	68.4	<112.4	68.0	68.0	
14:55	63.1	76.3	<112.4	76.0	76.0	
15:00	61.4	67.9	<112.4	67.0	67.0	69.2
15:05	72.1	79.6	<112.4	79.0	79.0	
15:10	71.1	80.0	<112.4	80.0	80.0	
15:15	64.7	78.7	<112.4	78.0	78.0	
15:20	64.8	71.1	<112.4	71.0	71.0	66.1
15:25	67.8	75.6	<112.4	75.0	75.0	
15:30	62.8	73.1	<112.4	73.0	73.0	
15:35	67.4	74.3	<112.4	74.0	74.0	
15:40	63.8	75.6	<112.4	75.0	75.0	64.2
15:45	63.7	71.5	<112.4	71.0	71.0	
15:50	62.4	69.2	<112.4	69.0	69.0	
15:55	66.0	75.2	<112.4	75.0	75.0	
16:00	64.0	70.7	<112.4	70.0	70.0	65.4
16:05	65.7	70.6	<112.4	70.0	70.0	
16:10	66.2	77.2	<112.4	77.0	77.0	
16:15	~~77.3~~	~~96.8~~	~~116.0~~	~~96.0~~	~~96.0~~	
16:20	68.3	76.3	<112.4	76.0	76.0	67.3
16:25	68.7	79.5	<112.4	79.0	79.0	
16:30	66.6	72.7	<112.4	72.0	72.0	
16:35	64.6	77.2	<112.4	77.0	77.0	
16:40	66.9	74.7	<112.4	74.0	74.0	66.2
16:45	67.3	85.9	112.4	85.0	85.0	
16:50	62.5	73.5	<112.4	73.0	73.0	
16:55	66.7	75.2	<112.4	75.0	75.0	
17:00	61.8	69.9	<112.4	69.0	69.0	62.8
17:05	64.2	75.6	<112.4	75.0	75.0	
17:10	62.3	68.4	<112.4	68.0	68.0	
17:15	62.4	71.6	<112.4	71.0	71.0	
17:20	61.7	71.1	<112.4	71.0	71.0	61.8
17:25	62.0	70.3	<112.4	70.0	70.0	
17:30	62.0	71.2	<112.4	71.0	71.0	
17:35	61.4	72.7	<112.4	72.0	72.0	
17:40	63.9	74.0	<112.4	74.0	74.0	63.3
17:45	62.5	75.5	<112.4	75.0	75.0	
17:50	64.3	76.7	<112.4	76.0	76.0	
17:55	62.0	71.1	<112.4	71.0	71.0	
18:00	61.8	68.0	<112.4	68.0	68.0	62.3
18:05	62.7	76.0	<112.4	76.0	76.0	
18:10	62.0	70.3	<112.4	70.0	70.0	
18:15	62.7	70.4	<112.4	70.0	70.0	

TABLE A.3a Receptor M-03 – 20-Minute Equivalent Sound Level (20-min Leq) Calculation 05-12-2009 1100-1100 Hrs.

Noise Measurement Data						Calc.
TIME	5-min Leq dB(A)	Lmax dB(A)	Lpk dB(C)	L(10.0) dB(A)	L(90.0) dB(A)	20-min Leq dB(A)
18:20	65.8	84.3	<112.4	84.0	84.0	63.3
18:25	62.0	68.4	<112.4	68.0	68.0	
18:30	62.2	75.6	<112.4	75.0	75.0	
18:35	61.6	68.6	<112.4	68.0	68.0	
18:40	63.0	72.3	<112.4	72.0	72.0	62.6
18:45	63.2	74.0	<112.4	74.0	74.0	
18:50	61.4	68.3	<112.4	68.0	68.0	
18:55	62.6	70.7	<112.4	70.0	70.0	
19:00	65.9	78.8	<112.4	78.0	78.0	63.3
19:05	62.6	75.9	<112.4	75.0	75.0	
19:10	61.1	68.7	<112.4	68.0	68.0	
19:15	61.7	69.9	<112.4	69.0	69.0	
19:20	61.2	70.8	<112.4	70.0	70.0	65.6
19:25	61.6	71.5	<112.4	71.0	71.0	
19:30	62.7	76.0	<112.4	76.0	76.0	
19:35	70.0	88.0	<112.4	88.0	88.0	
19:40	62.3	73.9	<112.4	73.0	73.0	62.4
19:45	62.5	71.2	<112.4	71.0	71.0	
19:50	63.1	73.5	<112.4	73.0	73.0	
19:55	61.4	69.2	<112.4	69.0	69.0	
20:00	66.2	80.7	<112.4	80.0	80.0	63.1
20:05	60.6	69.2	<112.4	69.0	69.0	
20:10	61.3	71.2	<112.4	71.0	71.0	
20:15	61.5	73.2	<112.4	73.0	73.0	
20:20	59.3	67.1	<112.4	67.0	67.0	60.5
20:25	60.9	69.6	<112.4	69.0	69.0	
20:30	61.1	72.6	<112.4	72.0	72.0	
20:35	60.3	69.5	<112.4	69.0	69.0	
20:40	60.4	70.7	<112.4	70.0	70.0	60.8
20:45	61.9	74.7	<112.4	74.0	74.0	
20:50	60.1	71.6	<112.4	71.0	71.0	
20:55	60.5	68.8	<112.4	68.0	68.0	
21:00	59.9	68.7	<112.4	68.0	68.0	60.3
21:05	60.9	74.3	<112.4	74.0	74.0	
21:10	60.9	73.8	<112.4	73.0	73.0	
21:15	59.3	68.3	<112.4	68.0	68.0	
21:20	59.6	67.4	<112.4	67.0	67.0	64.4
21:25	61.9	72.4	<112.4	72.0	72.0	
21:30	60.1	73.6	<112.4	73.0	73.0	
21:35	68.7	85.9	<112.4	85.0	85.0	
21:40	59.1	69.8	<112.4	69.0	69.0	63.5
21:45	66.9	82.3	<112.4	82.0	82.0	
21:50	59.8	71.5	<112.4	71.0	71.0	
21:55	~~80.1~~	~~95.5~~	~~114.1~~	~~95.0~~	~~95.0~~	

TABLE A.3a Receptor M-03 – 20-Minute Equivalent Sound Level (20-min Leq) Calculation 05-12-2009 1100-1100 Hrs.

Noise Measurement Data						Calc.
TIME	5-min Leq dB(A)	Lmax dB(A)	Lpk dB(C)	L(10.0) dB(A)	L(90.0) dB(A)	20-min Leq dB(A)
22:00	60.8	72.7	<112.4	72.0	72.0	59.7
22:05	58.1	67.6	<112.4	67.0	67.0	
22:10	59.2	67.5	<112.4	67.0	67.0	
22:15	60.1	68.8	<112.4	68.0	68.0	
22:20	56.6	65.6	<112.4	65.0	65.0	58.5
22:25	58.7	72.8	<112.4	72.0	72.0	
22:30	58.7	67.2	<112.4	67.0	67.0	
22:35	59.5	70.3	<112.4	70.0	70.0	
22:40	57.6	65.9	<112.4	65.0	65.0	58.1
22:45	60.6	76.7	<112.4	76.0	76.0	
22:50	56.5	67.6	<112.4	67.0	67.0	
22:55	56.4	65.1	<112.4	65.0	65.0	
23:00	58.0	67.2	<112.4	67.0	67.0	58.0
23:05	57.7	67.2	<112.4	67.0	67.0	
23:10	58.3	69.6	<112.4	69.0	69.0	
23:15	57.8	69.1	<112.4	69.0	69.0	
23:20	57.7	68.7	<112.4	68.0	68.0	57.1
23:25	55.8	66.5	<112.4	66.0	66.0	
23:30	57.2	65.9	<112.4	65.0	65.0	
23:35	57.3	67.2	<112.4	67.0	67.0	
23:40	56.6	66.3	<112.4	66.0	66.0	55.6
23:45	56.6	68.8	<112.4	68.0	68.0	
23:50	53.6	68.4	<112.4	68.0	68.0	
23:55	54.9	68.3	<112.4	68.0	68.0	
0:00	55.0	67.0	<112.4	67.0	67.0	56.2
0:05	56.9	67.5	<112.4	67.0	67.0	
0:10	57.4	69.9	<112.4	69.0	69.0	
0:15	54.8	62.3	<112.4	62.0	62.0	
0:20	55.3	67.6	<112.4	67.0	67.0	55.2
0:25	55.4	69.2	<112.4	69.0	69.0	
0:30	55.8	70.8	<112.4	70.0	70.0	
0:35	54.1	65.5	<112.4	65.0	65.0	
0:40	55.4	68.8	<112.4	68.0	68.0	54.2
0:45	53.9	65.4	<112.4	65.0	65.0	
0:50	52.9	60.4	<112.4	60.0	60.0	
0:55	54.1	68.0	<112.4	68.0	68.0	
1:00	53.2	64.3	<112.4	64.0	64.0	52.7
1:05	54.6	66.2	<112.4	66.0	66.0	
1:10	52.0	62.3	<112.4	62.0	62.0	
1:15	49.6	62.0	<112.4	62.0	62.0	
1:20	56.8	70.8	<112.4	70.0	70.0	53.9
1:25	53.2	66.7	<112.4	66.0	66.0	
1:30	53.9	66.2	<112.4	66.0	66.0	
1:35	47.4	59.9	<112.4	59.0	59.0	

TABLE A.3a Receptor M-03 – 20-Minute Equivalent Sound Level (20-min Leq) Calculation 05-12-2009 1100-1100 Hrs.

Noise Measurement Data						Calc.
TIME	5-min Leq dB(A)	Lmax dB(A)	Lpk dB(C)	L(10.0) dB(A)	L(90.0) dB(A)	20-min Leq dB(A)
1:40	46.4	53.5	<112.4	53.0	53.0	48.4
1:45	48.4	56.8	<112.4	56.0	56.0	
1:50	50.7	62.5	<112.4	62.0	62.0	
1:55	46.9	57.5	<112.4	57.0	57.0	
2:00	47.7	56.7	<112.4	56.0	56.0	49.5
2:05	50.3	59.9	<112.4	59.0	59.0	
2:10	51.8	67.6	<112.4	67.0	67.0	
2:15	45.5	55.9	<112.4	55.0	55.0	
2:20	53.5	70.2	<112.4	70.0	70.0	52.1
2:25	50.6	64.4	<112.4	64.0	64.0	
2:30	51.6	65.1	<112.4	65.0	65.0	
2:35	52.3	65.2	<112.4	65.0	65.0	
2:40	48.6	57.4	<112.4	57.0	57.0	47.9
2:45	46.3	55.5	<112.4	55.0	55.0	
2:50	49.0	63.6	<112.4	63.0	63.0	
2:55	47.3	61.0	<112.4	61.0	61.0	
3:00	49.1	64.7	<112.4	64.0	64.0	50.8
3:05	51.4	58.2	<112.4	58.0	58.0	
3:10	53.0	63.1	<112.4	63.0	63.0	
3:15	47.6	61.1	<112.4	61.0	61.0	
3:20	52.7	64.3	<112.4	64.0	64.0	51.3
3:25	50.9	64.7	<112.4	64.0	64.0	
3:30	50.2	68.4	<112.4	68.0	68.0	
3:35	51.1	62.8	<112.4	62.0	62.0	
3:40	55.5	64.3	<112.4	64.0	64.0	54.2
3:45	52.0	60.3	<112.4	60.0	60.0	
3:50	50.7	57.5	<112.4	57.0	57.0	
3:55	56.2	65.8	<112.4	65.0	65.0	
4:00	53.0	61.6	<112.4	61.0	61.0	55.4
4:05	55.1	69.5	<112.4	69.0	69.0	
4:10	55.8	62.7	<112.4	62.0	62.0	
4:15	56.8	68.7	<112.4	68.0	68.0	
4:20	55.0	67.4	<112.4	67.0	67.0	55.4
4:25	54.2	62.7	<112.4	62.0	62.0	
4:30	54.7	63.1	<112.4	63.0	63.0	
4:35	57.0	69.3	<112.4	69.0	69.0	
4:40	55.2	65.7	<112.4	65.0	65.0	56.5
4:45	55.5	65.9	<112.4	65.0	65.0	
4:50	57.7	70.7	<112.4	70.0	70.0	
4:55	57.1	64.4	<112.4	64.0	64.0	
5:00	58.3	69.9	<112.4	69.0	69.0	59.7
5:05	58.7	68.5	<112.4	68.0	68.0	
5:10	59.4	68.3	<112.4	68.0	68.0	
5:15	61.7	66.0	<112.4	66.0	66.0	
5:20	61.2	69.2	<112.4	69.0	69.0	61.8
5:25	61.4	69.2	<112.4	69.0	69.0	

TABLE A.3a Receptor M-03 – 20-Minute Equivalent Sound Level (20-min Leq) Calculation 05-12-2009 1100-1100 Hrs.

Noise Measurement Data						Calc.
TIME	5-min Leq dB(A)	Lmax dB(A)	Lpk dB(C)	L(10.0) dB(A)	L(90.0) dB(A)	20-min Leq dB(A)
5:30	62.3	70.1	<112.4	70.0	70.0	
5:35	62.2	67.5	<112.4	67.0	67.0	
5:40	61.9	68.6	<112.4	68.0	68.0	61.3
5:45	61.0	66.2	<112.4	66.0	66.0	
5:50	60.4	66.7	<112.4	66.0	66.0	
5:55	61.7	69.6	<112.4	69.0	69.0	
6:00	61.0	73.3	<112.4	73.0	73.0	60.7
6:05	60.8	66.4	<112.4	66.0	66.0	
6:10	60.6	67.5	<112.4	67.0	67.0	
6:15	60.3	65.5	<112.4	65.0	65.0	
6:20	61.3	69.9	<112.4	69.0	69.0	61.5
6:25	61.9	69.6	<112.4	69.0	69.0	
6:30	61.6	69.2	<112.4	69.0	69.0	
6:35	61.3	68.5	<112.4	68.0	68.0	
6:40	61.4	69.5	<112.4	69.0	69.0	61.7
6:45	61.8	69.8	<112.4	69.0	69.0	
6:50	62.4	74.5	<112.4	74.0	74.0	
6:55	60.9	70.4	<112.4	70.0	70.0	
7:00	60.8	69.7	<112.4	69.0	69.0	61.5
7:05	61.0	69.1	<112.4	69.0	69.0	
7:10	63.2	72.0	<112.4	72.0	72.0	
7:15	60.6	68.8	<112.4	68.0	68.0	
7:20	63.8	77.7	<112.4	77.0	77.0	63.8
7:25	62.5	76.4	<112.4	76.0	76.0	
7:30	64.9	78.7	<112.4	78.0	78.0	
7:35	63.5	73.2	<112.4	73.0	73.0	
7:40	63.0	71.2	<112.4	71.0	71.0	63.7
7:45	62.8	71.6	<112.4	71.0	71.0	
7:50	64.5	76.8	<112.4	76.0	76.0	
7:55	64.3	75.2	<112.4	75.0	75.0	
8:00	64.2	74.8	<112.4	74.0	74.0	62.8
8:05	63.3	72.8	<112.4	72.0	72.0	
8:10	60.9	72.4	<112.4	72.0	72.0	
8:15	62.3	68.7	<112.4	68.0	68.0	
8:20	63.1	79.3	<112.4	79.0	79.0	62.2
8:25	61.3	72.8	<112.4	72.0	72.0	
8:30	62.0	71.6	<112.4	71.0	71.0	
8:35	62.2	70.4	<112.4	70.0	70.0	
8:40	62.2	68.8	<112.4	68.0	68.0	63.7
8:45	62.4	68.4	<112.4	68.0	68.0	
8:50	63.3	71.1	<112.4	71.0	71.0	
8:55	65.8	74.8	<112.4	74.0	74.0	
9:00	63.9	72.8	<112.4	72.0	72.0	63.0
9:05	64.0	77.2	<112.4	77.0	77.0	
9:10	61.7	73.6	<112.4	73.0	73.0	
9:15	61.6	71.6	<112.4	71.0	71.0	

TABLE A.3a Receptor M-03 – 20-Minute Equivalent Sound Level (20-min Leq) Calculation 05-12-2009 1100-1100 Hrs.

Noise Measurement Data						Calc.
TIME	5-min Leq dB(A)	Lmax dB(A)	Lpk dB(C)	L(10.0) dB(A)	L(90.0) dB(A)	20-min Leq dB(A)
9:20	63.8	77.1	<112.4	77.0	77.0	62.5
9:25	62.3	75.1	<112.4	75.0	75.0	
9:30	61.6	73.9	<112.4	73.0	73.0	
9:35	61.8	70.8	<112.4	70.0	70.0	
9:40	60.4	68.3	<112.4	68.0	68.0	62.7
9:45	61.6	70.1	<112.4	70.0	70.0	
9:50	64.8	77.1	<112.4	77.0	77.0	
9:55	62.6	79.2	<112.4	79.0	79.0	
10:00	60.6	69.5	<112.4	69.0	69.0	61.7
10:05	63.2	75.2	<112.4	75.0	75.0	
10:10	61.2	72.4	<112.4	72.0	72.0	
10:15	61.4	73.6	<112.4	73.0	73.0	
10:20	60.8	69.2	<112.4	69.0	69.0	61.2
10:25	59.7	67.9	<112.4	67.0	67.0	
10:30	63.2	75.2	<112.4	75.0	75.0	
10:35	60.1	69.1	<112.4	69.0	69.0	
10:40	57.8	64.8	<112.4	64.0	64.0	64.1
10:45	66.6	80.7	<112.4	80.0	80.0	
10:50	~~71.9~~	~~80.8~~	~~<112.4~~	~~80.0~~	~~80.0~~	
10:55	~~73.1~~	~~82.7~~	~~<112.4~~	~~82.0~~	~~82.0~~	

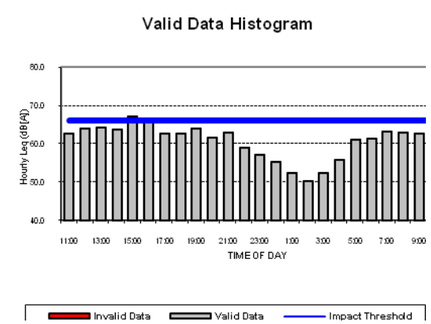
16:15 - 5-min Leq despiked for unusually high level. This is characteristic of flyover.
21:55 - 5-min Leq despiked for unusually high level. This is characteristic of jet flyover.
10:50 - 5-min Leq despiked for Helicopter.
10:55 - 5-min Leq despiked for Helicopter.
.

TABLE A.3b Receptor M-03 – Hourly Equivalent Sound Level (Leq[h]) Calculation – 05-12-2009 1100-1100 Hrs.

Hour	20-min Leq Sub-intervals :00	:20	:40	Hourly Leq dB(A)	Loudest Hour Level dB(A)
11:00	62.6	61.9	63.0	62.5	
12:00	64.2	63.5	64.1	63.9	
13:00	63.6	63.1	65.4	64.2	
14:00	64.0	62.1	64.8	63.8	
15:00	69.2	66.1	64.2	67.0	67
16:00	65.4	67.3	66.2	66.4	
17:00	62.8	61.8	63.3	62.7	
18:00	62.3	63.3	62.6	62.7	
19:00	63.3	65.6	62.4	64.0	
20:00	63.1	60.5	60.8	61.6	
21:00	60.3	64.4	63.5	63.0	
22:00	59.7	58.5	58.1	58.8	
23:00	58.0	57.1	55.6	57.0	
0:00	56.2	55.2	54.2	55.3	
1:00	52.7	53.9	48.4	52.2	
2:00	49.5	52.1	47.9	50.2	
3:00	50.8	51.3	54.2	52.4	
4:00	55.4	55.4	56.5	55.8	
5:00	59.7	61.8	61.3	61.0	
6:00	60.7	61.5	61.7	61.3	
7:00	61.5	63.8	63.7	63.1	
8:00	62.8	62.2	63.7	63.0	
9:00	63.0	62.5	62.7	62.7	
10:00	61.7	61.2	64.1	62.5	

LEGEND

- Loudest Hour
- Narrow Range Noise Hour
- Wide Range Noise Hour



RECEPTOR M-04 – 14120 SOLOMONS ISLAND ROAD

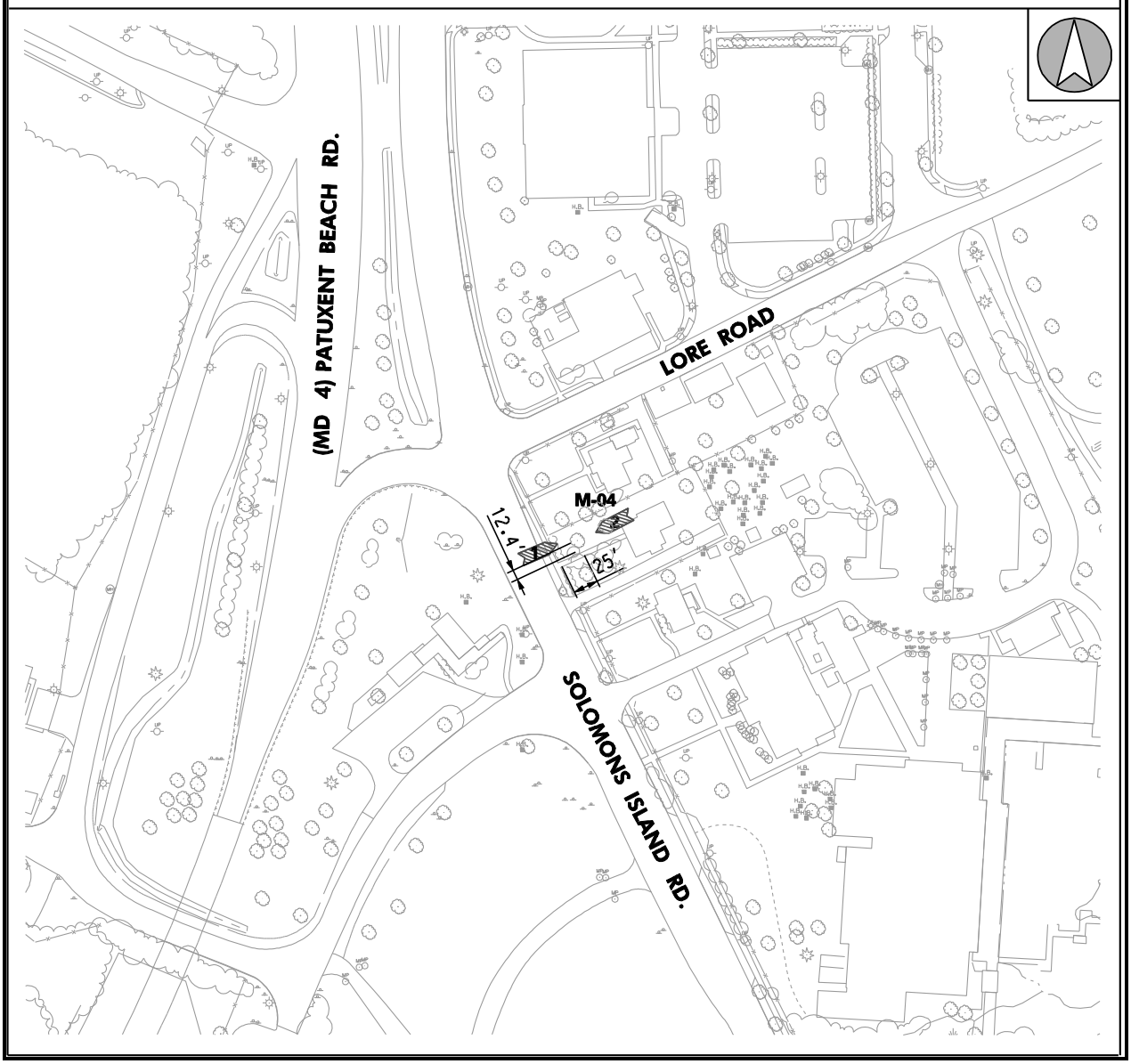
General

One short-term noise measurement was taken at this location from 1000 Hrs. to 1020 Hrs. on 2009 May 20.

Receptor Site Sketch

FIGURE A.4 Receptor M-04 Site Sketch

14120 SOLOMONS ISLAND RD.



Receptor Site Photographs

Photograph A.4a **Receptor M-04 – 14120 Solomons Island Road (View 1 of 2)**

05-20-2009

Short Term Test

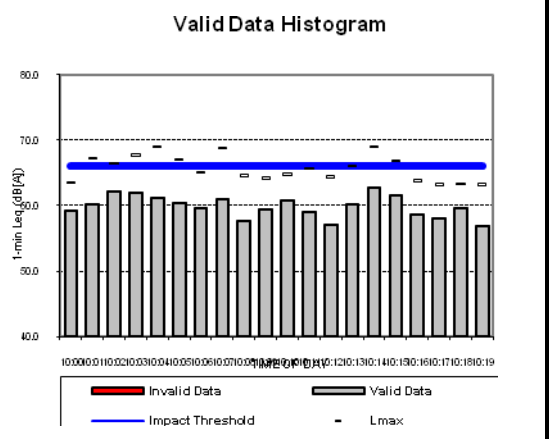
Photograph A.4b **Receptor M-04 – 14120 Solomons Island Road (View 2 of 2)**

05-20-2009

Short Term Test

TABLE A.4 Receptor M-04 – 20-Minute Equivalent Sound Level (20-min Leq) Calculation – TMS01: 05-20-2009 1000-1020 Hrs.

Noise Measurement Data						Calculated Data		Traffic Volume Noise Level
TIME	1-min Leq	Lmax	Lpk	L(10.0)	L(90.0)	5-min Leq	20-min Leq	
	dB(A)	dB(A)	dB(C)	dB(A)	dB(A)	dB(A)	dB(A)	
10:00	59.3	63.5	<109.9	61.0	63.0	61.0	60.1	**60**
10:01	60.2	67.2	<109.9	62.0	67.0			
10:02	62.1	66.4	<109.9	64.0	66.0			
10:03	61.9	67.7	<109.9	64.0	67.0			
10:04	61.1	69.0	<109.9	65.0	69.0			
10:05	60.4	67.0	<109.9	64.0	67.0	59.7		
10:06	59.6	65.1	<109.9	63.0	65.0			
10:07	60.9	68.8	<109.9	62.0	68.0			
10:08	57.6	64.6	<109.9	62.0	64.0			
10:09	59.4	64.2	<109.9	62.0	64.0			
10:10	60.7	64.8	<109.9	63.0	64.0	60.3		
10:11	59.0	65.7	<109.9	62.0	65.0			
10:12	57.0	64.4	<109.9	59.0	64.0			
10:13	60.1	66.0	<109.9	63.0	66.0			
10:14	62.8	69.0	<109.9	65.0	69.0			
10:15	61.5	66.9	<109.9	63.0	66.0	59.3		
10:16	58.7	63.8	<109.9	60.0	63.0			
10:17	58.1	63.2	<109.9	61.0	63.0			
10:18	59.7	63.3	<109.9	62.0	63.0			
10:19	56.9	63.2	<109.9	60.0	63.0			



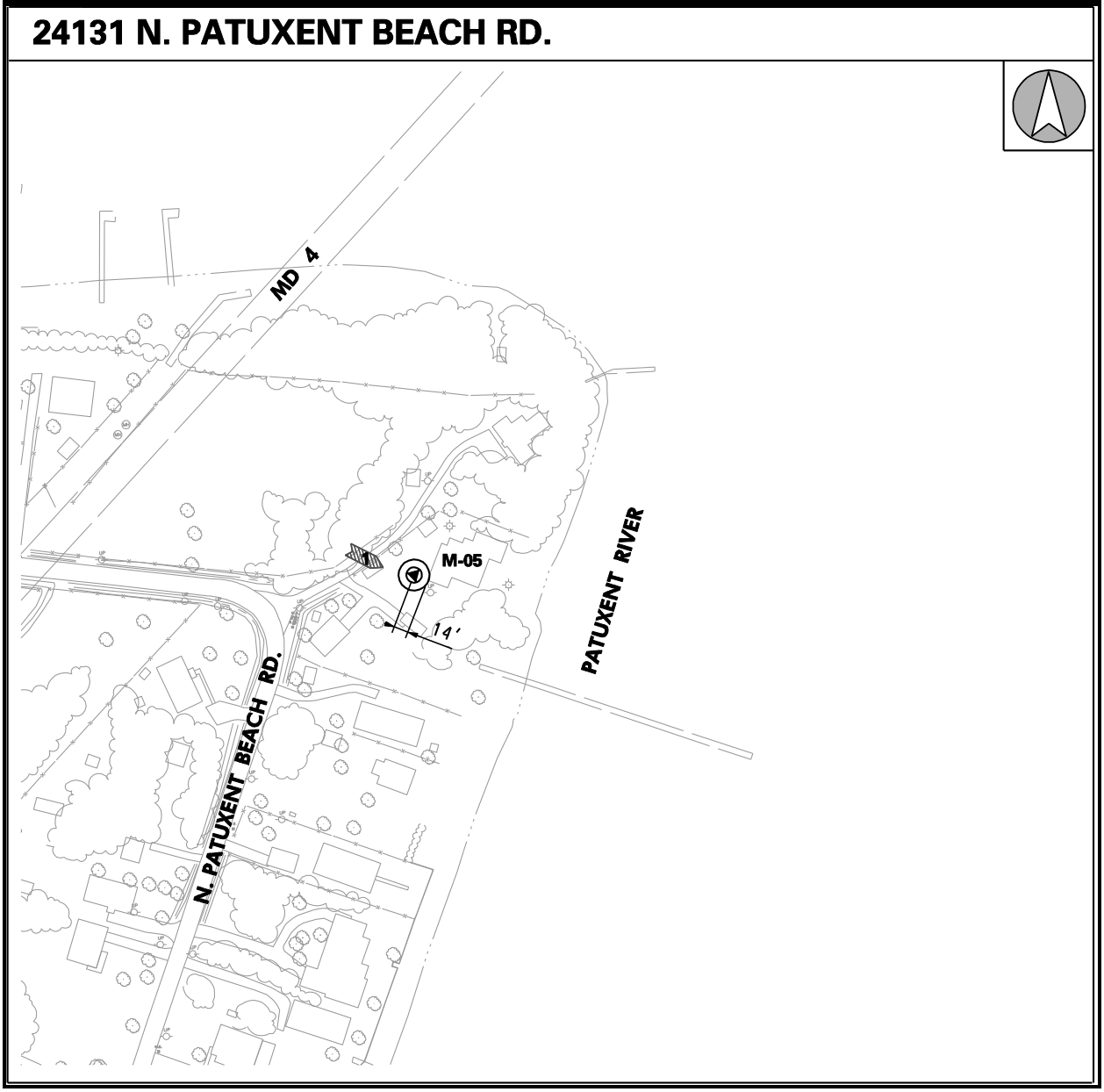
RECEPTOR M-05 – 24131 NORTH PATUXENT BEACH ROAD

General

One short-term noise measurement was taken at this location from 1002 Hrs. to 1022 Hrs. on 2009 May 20.

Receptor Site Sketch

FIGURE A.5 Receptor M-05 Site Sketch



Receptor Site Photographs

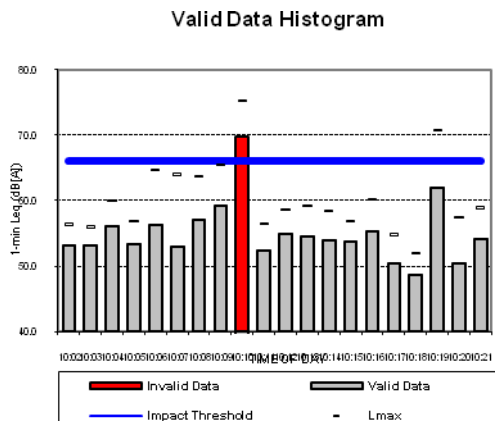
Photograph A.5a **Receptor M-05 – 24131 North Patuxent Beach Road (View 1 of 1)**

05-20-2009

Short Term Test

TABLE A.5 Receptor M-05 – 20-Minute Equivalent Sound Level (20-min Leq) Calculation – TMS01: 05-20-2009 1002-1022 Hrs.

Noise Measurement Data						Calculated Data		Traffic Volume Noise Level
TIME	1-min Leq	Lmax	Lpk	L(10.0)	L(99.9)	5-min Leq	20-min Leq	
	dB(A)	dB(A)	dB(C)	dB(A)	dB(A)	dB(A)	dB(A)	
10:02	53.1	56.4	"UNR"	54.0	50.0	54.7	55.5	**56**
10:03	53.1	56.0	"UNR"	54.0	51.0			
10:04	56.1	60.0	"UNR"	58.0	42.0			
10:05	53.4	56.9	"UNR"	56.0	46.0			
10:06	56.3	64.7	"UNR"	59.0	49.0			
10:07	52.9	64.0	"UNR"	54.0	43.0	56.3		
10:08	57.1	63.7	"UNR"	61.0	50.0			
10:09	59.2	65.4	"UNR"	63.0	51.0			
10:10	~~69.7~~	~~75.2~~	~~"UNR"~~	~~74.0~~	~~49.0~~			
10:11	52.4	56.5	"UNR"	55.0	45.0			
10:12	54.9	58.6	"UNR"	57.0	50.0	54.5		
10:13	54.6	59.2	"UNR"	57.0	47.0			
10:14	53.9	58.5	"UNR"	56.0	48.0			
10:15	53.7	56.9	"UNR"	55.0	50.0			
10:16	55.3	60.2	"UNR"	58.0	50.0			
10:17	50.4	54.8	"UNR"	53.0	43.0	56.3		
10:18	48.7	52.0	"UNR"	51.0	43.0			
10:19	62.0	70.7	"UNR"	67.0	48.0			
10:20	50.4	57.4	"UNR"	51.0	46.0			
10:21	54.1	58.9	"UNR"	56.0	49.0			



10:10 – 1-min.Leq despiked for helicopter.

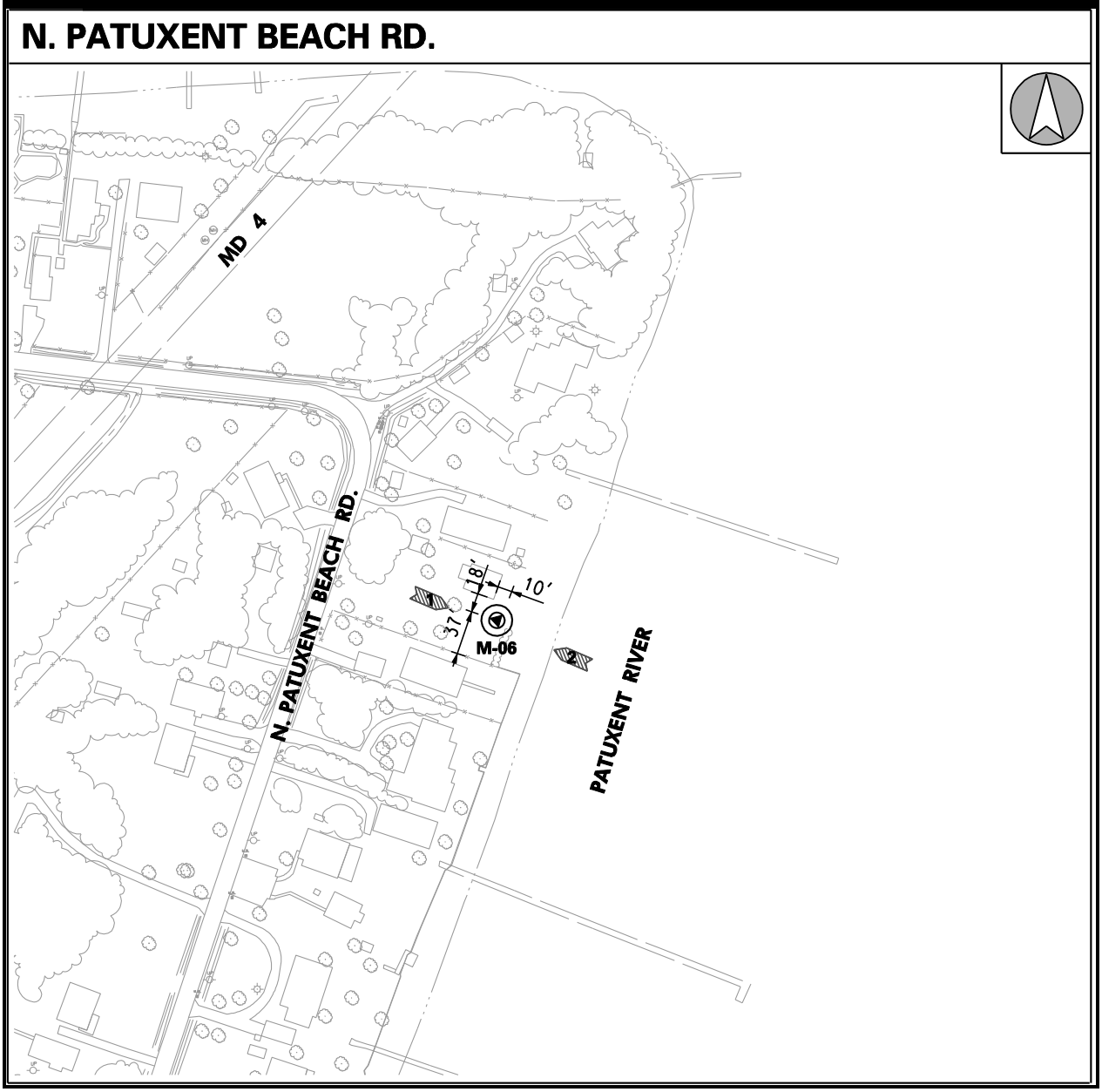
RECEPTOR M-06 – NORTH PATUXENT BEACH ROAD

General

One short-term noise measurement was taken at this location from 1000 Hrs. to 1020 Hrs. on 2009 May 20.

Receptor Site Sketch

FIGURE A.6 Receptor M-06 Site Sketch



Receptor Site Photographs

Photograph A.6a **Receptor M-06 – North Patuxent Beach Road** **(View 1 of 2)**

05-20-2009

Short Term Test

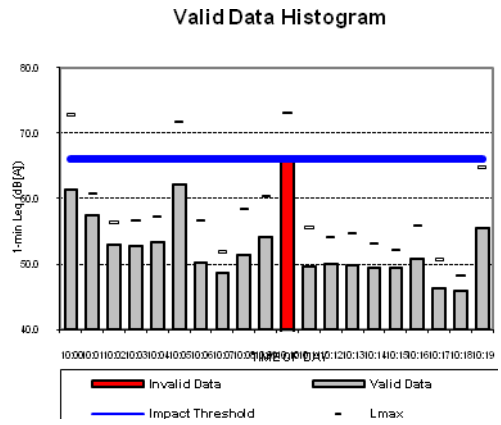
Photograph A.6b **Receptor M-06 – North Patuxent Beach Road** **(View 2 of 2)**

05-20-2009

Short Term Test

TABLE A.6 Receptor M-06 – 20-Minute Equivalent Sound Level (20-min Leq) Calculation – TMS01: 05-20-2009 1000-1020 Hrs.

Noise Measurement Data						Calculated Data		Traffic Volume Noise Level
TIME	1-min Leq	Lmax	Lpk	L(10.0)	L(90.0)	5-min Leq	20-min Leq	
	dB(A)	dB(A)	dB(C)	dB(A)	dB(A)	dB(A)	dB(A)	
10:00	61.3	72.8	<109.6	72.0	72.0	57.0	54.7	55
10:01	57.4	60.8	<109.6	60.0	60.0			
10:02	53.0	56.4	<109.6	56.0	56.0			
10:03	52.7	56.7	<109.6	56.0	56.0			
10:04	53.3	57.2	<109.6	57.0	57.0			
10:05	62.2	71.7	<109.6	71.0	71.0	56.5		
10:06	50.2	56.7	<109.6	56.0	56.0			
10:07	48.7	51.9	<109.6	51.0	51.0			
10:08	51.3	58.4	<109.6	58.0	58.0			
10:09	54.1	60.4	<109.6	60.0	60.0			
10:10	~~65.9~~	~~73.1~~	~~<109.6~~	~~73.0~~	~~73.0~~	49.8		
10:11	49.7	55.6	<109.6	55.0	55.0			
10:12	50.0	54.2	<109.6	54.0	54.0			
10:13	49.9	54.7	<109.6	54.0	54.0			
10:14	49.5	53.1	<109.6	53.0	53.0			
10:15	49.5	52.2	<109.6	52.0	52.0	51.1		
10:16	50.9	55.9	<109.6	55.0	55.0			
10:17	46.3	50.7	<109.6	50.0	50.0			
10:18	46.0	48.3	<109.6	48.0	48.0			
10:19	55.5	64.8	<109.6	64.0	64.0			



10:10 - 1-min Leq despiked for bird (crow).

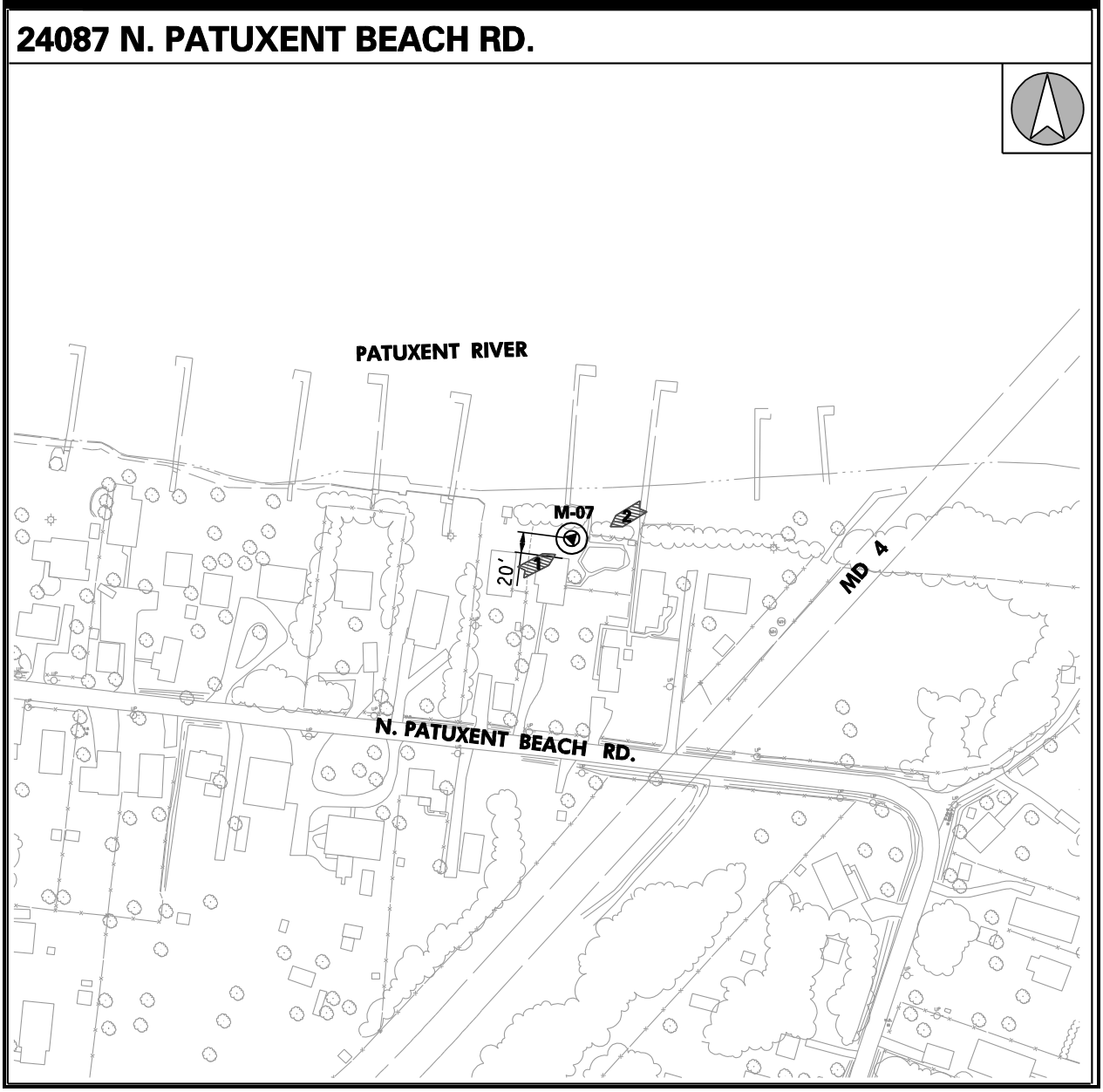
RECEPTOR M-07 – 24087 NORTH PATUXENT BEACH ROAD

General

One short-term noise measurement was taken at this location from 1000 Hrs. to 1020 Hrs. on 2009 May 20.

Receptor Site Sketch

FIGURE A.7 Receptor M-07 Site Sketch



Receptor Site Photographs

Photograph A.7a **Receptor M-07 – 24087 North Patuxent Beach Road (View 1 of 2)**

05-20-2009

Short Term Test

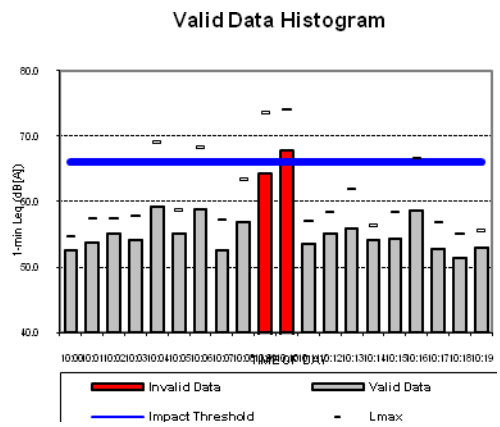
Photograph A.7b **Receptor M-07 – 24087 North Patuxent Beach Road (View 2 of 2)**

05-20-2009

Short Term Test

TABLE A.7 Receptor M-07 – 20-Minute Equivalent Sound Level (20-min Leq) Calculation – TMS01: 05-20-2009 1000-1020 Hrs.

Noise Measurement Data						Calculated Data		Traffic Volume Noise Level
TIME	1-min Leq	Lmax	Lpk	L(10.0)	L(90.0)	5-min Leq	20-min Leq	
	dB(A)	dB(A)	dB(C)	dB(A)	dB(A)	dB(A)	dB(A)	
10:00	52.6	54.7	<112.0	54.0	54.0	55.7	55.5	**55**
10:01	53.7	57.5	<112.0	57.0	57.0			
10:02	55.1	57.5	<112.0	57.0	57.0			
10:03	54.2	57.9	<112.0	57.0	57.0			
10:04	59.3	69.1	<112.0	69.0	69.0			
10:05	55.1	58.7	<112.0	58.0	58.0	56.4		
10:06	58.8	68.3	<112.0	68.0	68.0			
10:07	52.5	57.2	<112.0	57.0	57.0			
10:08	56.8	63.4	<112.0	63.0	63.0			
10:09	~~64.2~~	~~73.6~~	~~<112.0~~	~~73.0~~	~~73.0~~			
10:10	~~67.8~~	~~74.0~~	~~<112.0~~	~~74.0~~	~~74.0~~	54.8		
10:11	53.5	57.1	<112.0	57.0	57.0			
10:12	55.1	58.4	<112.0	58.0	58.0			
10:13	55.9	62.0	<112.0	62.0	62.0			
10:14	54.2	56.4	<112.0	56.0	56.0			
10:15	54.4	58.4	<112.0	58.0	58.0	54.9		
10:16	58.7	66.7	<112.0	66.0	66.0			
10:17	52.8	56.8	<112.0	56.0	56.0			
10:18	51.3	55.1	<112.0	55.0	55.0			
10:19	52.9	55.6	<112.0	55.0	55.0			



10:09 - 1-min Leq despiked for helicopter.
10:10 - 1-min Leq despiked for helicopter continued.

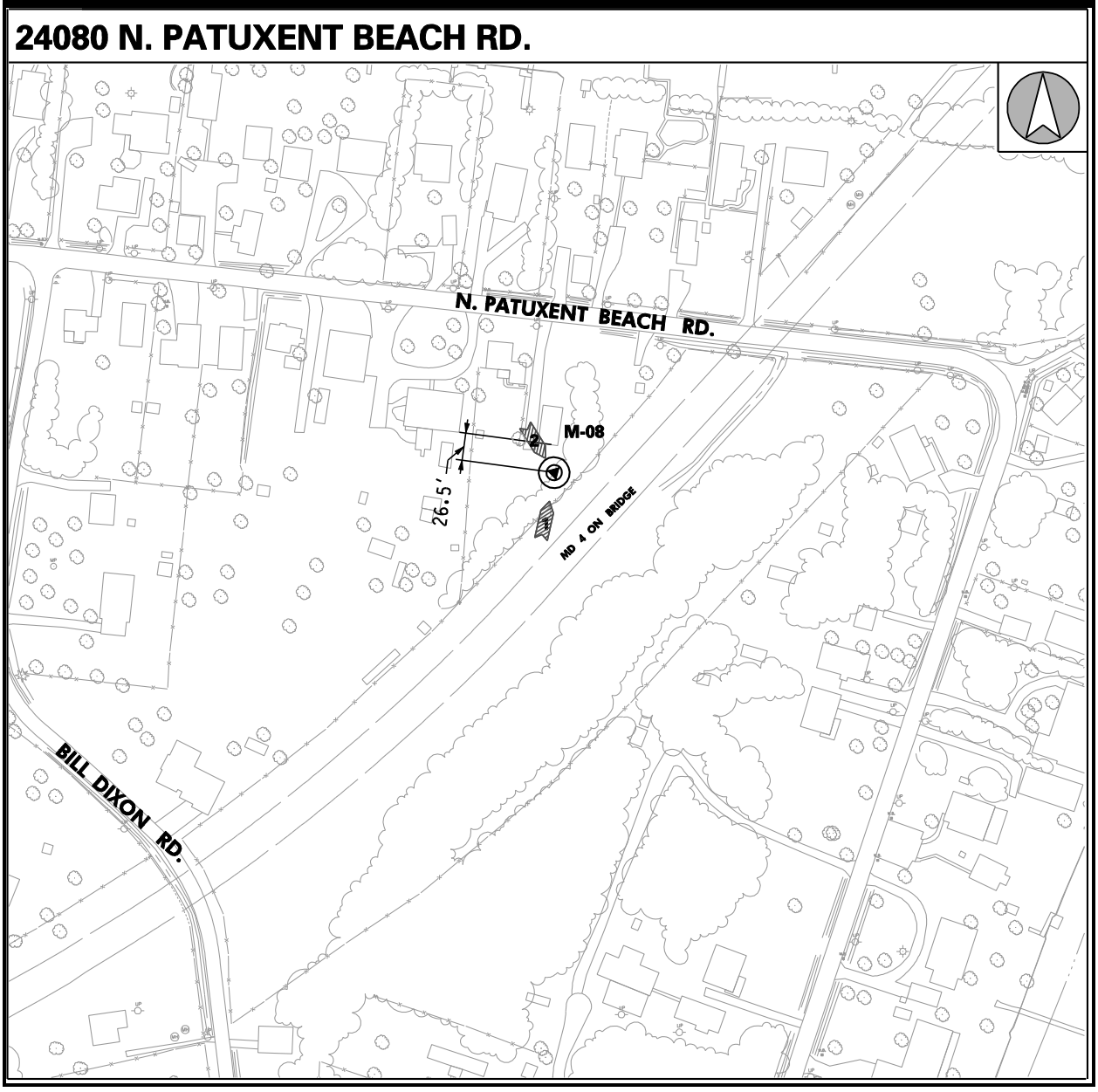
RECEPTOR M-08 – 24080 NORTH PATUXENT BEACH ROAD

General

One short-term noise measurement was taken at this location from 1000 Hrs. to 1020 Hrs. on 2009 May 20.

Receptor Site Sketch

FIGURE A.8 Receptor M-08 Site Sketch



Receptor Site Photographs

Photograph A.8a **Receptor M-08 – 24080 North Patuxent Beach Road (View 1 of 2)**

05-20-2009

Short Term Test

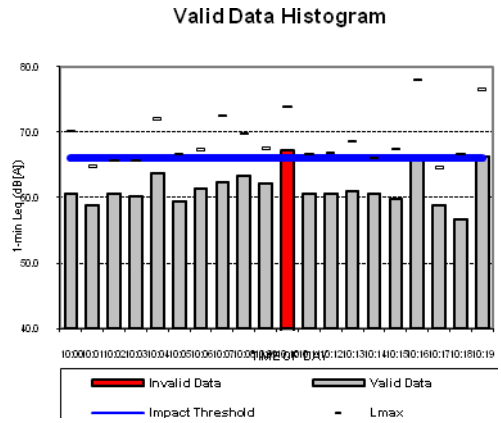
Photograph A.8b **Receptor M-08 – 24080 North Patuxent Beach Road (View 2 of 2)**

05-20-2009

Short Term Test

TABLE A.8 Receptor M-08 – 20-Minute Equivalent Sound Level (20-min Leq) Calculation– TMS01: 05-20-2009 1000-1020 Hrs.

Noise Measurement Data						Calculated Data		Traffic Volume Noise Level
TIME	1-min Leq	Lmax	Lpk	L(10.0)	L(99.9)	5-min Leq	20-min Leq	
	dB(A)	dB(A)	dB(C)	dB(A)	dB(A)	dB(A)	dB(A)	
10:00	60.6	70.1	"UNR"	62.0	50.0	61.1	61.9	**62**
10:01	58.8	64.8	"UNR"	61.0	51.0			
10:02	60.6	65.6	"UNR"	63.0	55.0			
10:03	60.2	65.6	"UNR"	62.0	51.0			
10:04	63.8	72.0	"UNR"	68.0	48.0			
10:05	59.4	66.7	"UNR"	62.0	49.0	61.9		
10:06	61.3	67.3	"UNR"	65.0	52.0			
10:07	62.3	72.5	"UNR"	65.0	50.0			
10:08	63.3	69.7	"UNR"	67.0	53.0			
10:09	62.1	67.5	"UNR"	64.0	54.0			
10:10	~~67.3~~	~~73.9~~	~~"UNR"~~	~~72.0~~	~~54.0~~	60.7		
10:11	60.6	66.7	"UNR"	63.0	50.0			
10:12	60.6	66.9	"UNR"	63.0	48.0			
10:13	61.0	68.6	"UNR"	63.0	56.0			
10:14	60.5	66.0	"UNR"	63.0	53.0			
10:15	59.8	67.4	"UNR"	62.0	52.0	63.4		
10:16	66.5	77.9	"UNR"	70.0	54.0			
10:17	58.9	64.6	"UNR"	62.0	44.0			
10:18	56.6	66.6	"UNR"	60.0	44.0			
10:19	66.3	76.5	"UNR"	72.0	44.0			



10:10 - 1-min Leq despiked for Helicopter.

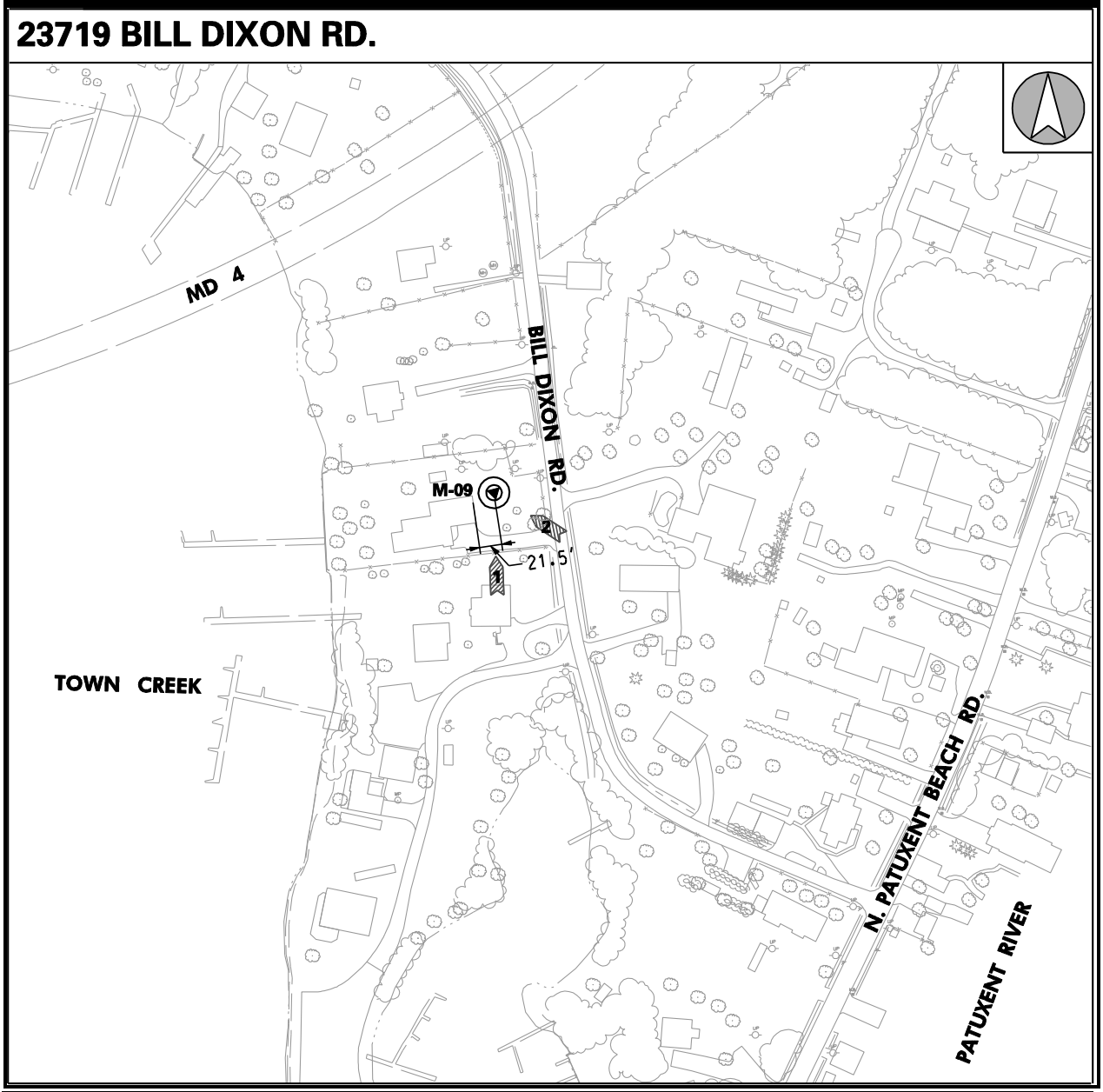
RECEPTOR M-09 – 23719 BILL DIXON ROAD

General

Two short-term noise measurement were taken at this location from 1120 Hrs. to 1140 Hrs. and 1340 Hrs. to 1400 Hrs. on 2009 May 20.

Receptor Site Sketch

FIGURE A.9 Receptor M-09 Site Sketch



Receptor Site Photographs

Photograph A:9a **Receptor M-09 – 23719 Bill Dixon Road (View 1 of 2)**

05-20-2009

Short Term Test

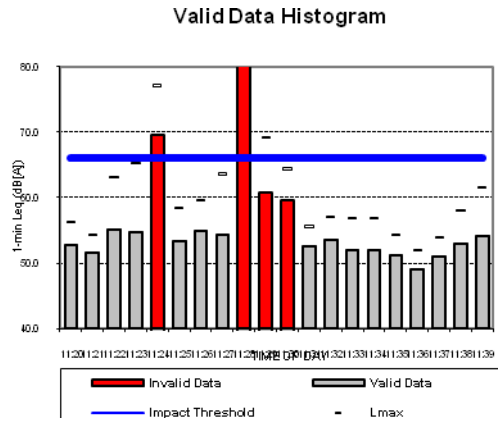
Photograph A.9b **Receptor M-09 – 23719 Bill Dixon Road (View 2 of 2)**

05-20-2009

Short Term Test

TABLE A.9a Receptor M-09 – 20-Minute Equivalent Sound Level (20-min Leq) Calculation – TMS03: 05-20-2009 1120-1140 Hrs.

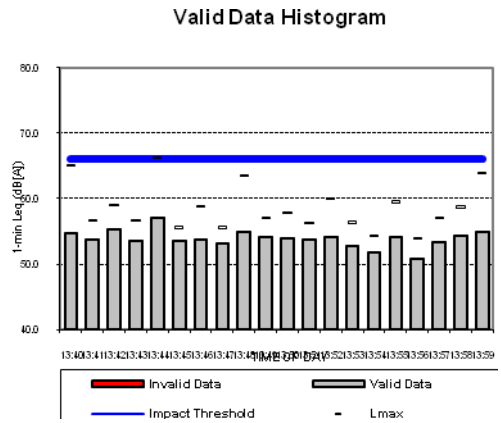
Noise Measurement Data						Calculated Data		Traffic Volume Noise Level
TIME	1-min Leq	Lmax	Lpk	L(10.0)	L(90.0)	5-min Leq	20-min Leq	
	dB(A)	dB(A)	dB(C)	dB(A)	dB(A)	dB(A)	dB(A)	
11:20	52.8	56.3	<112.0	56.0	56.0	53.8	53.2	**53**
11:21	51.5	54.3	<112.0	54.0	54.0			
11:22	55.1	63.1	<112.0	63.0	63.0			
11:23	54.7	65.2	<112.0	65.0	65.0			
11:24	~~69.5~~	~~77.1~~	~~<112.0~~	~~77.0~~	~~77.0~~			
11:25	53.3	58.4	<112.0	58.0	58.0	54.3		
11:26	54.9	59.6	<112.0	59.0	59.0			
11:27	54.4	63.6	<112.0	63.0	63.0			
11:28	~~82.9~~	~~92.0~~	~~112.3~~	~~92.0~~	~~92.0~~			
11:29	~~60.7~~	~~69.2~~	~~<112.0~~	~~69.0~~	~~69.0~~			
11:30	~~59.6~~	~~64.4~~	~~<112.0~~	~~64.0~~	~~64.0~~	52.5		
11:31	52.5	55.6	<112.0	55.0	55.0			
11:32	53.5	57.1	<112.0	57.0	57.0			
11:33	51.9	56.9	<112.0	56.0	56.0			
11:34	51.9	56.8	<112.0	56.0	56.0			
11:35	51.2	54.3	<112.0	54.0	54.0	52.0		
11:36	49.1	52.0	<112.0	52.0	52.0			
11:37	51.1	54.0	<112.0	54.0	54.0			
11:38	52.9	58.1	<112.0	58.0	58.0			
11:39	54.2	61.6	<112.0	61.0	61.0			



11:24 - 1-min Leq despiked for plane.
11:28 - 1-min Leq despiked for plane.
11:29 - 1-min Leq despiked for plane continued.
11:30 - 1-min Leq despiked for plane.

TABLE A.9b Receptor M-09 – 20-Minute Equivalent Sound Level (20-min Leq) Calculation – TMS06: 05-20-2009 1340-1400 Hrs.

Noise Measurement Data						Calculated Data		Traffic Volume Noise Level
TIME	1-min Leq	Lmax	Lpk	L(10.0)	L(90.0)	5-min Leq	20-min Leq	
	dB(A)	dB(A)	dB(C)	dB(A)	dB(A)	dB(A)	dB(A)	
13:40	54.8	65.1	<112.0	65.0	65.0	55.1	54.1	**54**
13:41	53.7	56.7	<112.0	56.0	56.0			
13:42	55.4	59.0	<112.0	59.0	59.0			
13:43	53.6	56.7	<112.0	56.0	56.0			
13:44	57.1	66.3	<112.0	66.0	66.0			
13:45	53.5	55.6	<112.0	55.0	55.0	54.0		
13:46	53.7	58.8	<112.0	58.0	58.0			
13:47	53.1	55.6	<112.0	55.0	55.0			
13:48	55.0	63.5	<112.0	63.0	63.0			
13:49	54.2	57.1	<112.0	57.0	57.0			
13:50	53.9	57.9	<112.0	57.0	57.0	53.3		
13:51	53.7	56.3	<112.0	56.0	56.0			
13:52	54.1	60.0	<112.0	60.0	60.0			
13:53	52.8	56.4	<112.0	56.0	56.0			
13:54	51.8	54.3	<112.0	54.0	54.0			
13:55	54.2	59.5	<112.0	59.0	59.0	53.7		
13:56	50.8	53.9	<112.0	53.0	53.0			
13:57	53.3	57.1	<112.0	57.0	57.0			
13:58	54.3	58.7	<112.0	58.0	58.0			
13:59	55.0	63.9	<112.0	63.0	63.0			



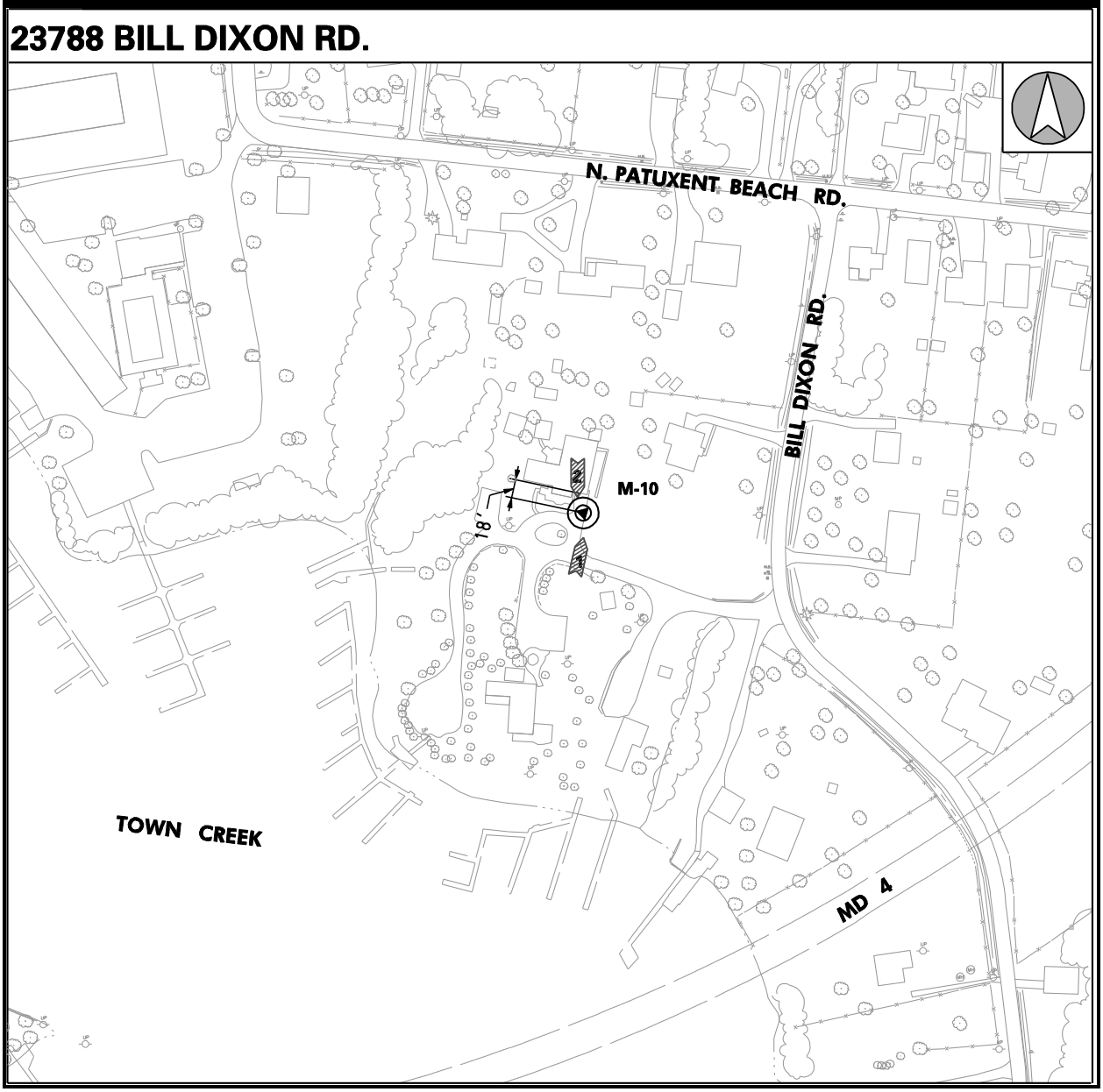
RECEPTOR M-10 – 23788 BILL DIXON ROAD

General

One short-term noise measurement was taken at this location from 1120 Hrs. to 1140 Hrs. on 2009 May 20.

Receptor Site Sketch

FIGURE A.10 Receptor M-10 Site Sketch



Receptor Site Photographs

Photograph A.10a **Receptor M-10 – 23788 Bill Dixon Road (View 1 of 2)**

05-20-2009

Short Term Test

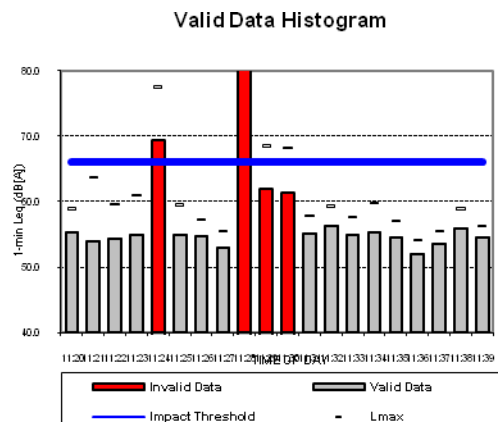
Photograph A.10b **Receptor M-10 – 23788 Bill Dixon Road (View 2 of 2)**

05-20-2009

Short Term Test

TABLE A.10 Receptor M-10 – 20-Minute Equivalent Sound Level (20-min Leq) Calculation – TMS03: 05-20-2009 1120-1140 Hrs.

Noise Measurement Data						Calculated Data		Traffic Volume Noise Level
TIME	1-min Leq	Lmax	Lpk	L(10.0)	L(99.9)	5-min Leq	20-min Leq	
	dB(A)	dB(A)	dB(C)	dB(A)	dB(A)	dB(A)	dB(A)	
11:20	55.4	58.9	"UNR"	57.0	52.0	54.7	54.7	**55**
11:21	54.0	63.7	"UNR"	54.0	51.0			
11:22	54.3	59.6	"UNR"	57.0	51.0			
11:23	55.0	61.0	"UNR"	58.0	51.0			
11:24	~~69.4~~	~~77.5~~	~~"UNR"~~	~~75.0~~	~~52.0~~			
11:25	55.0	59.5	"UNR"	57.0	49.0	54.3		
11:26	54.7	57.3	"UNR"	56.0	50.0			
11:27	53.0	55.5	"UNR"	54.0	50.0			
11:28	~~82.4~~	~~89.5~~	~~110.1~~	~~87.0~~	~~53.0~~			
11:29	~~62.0~~	~~68.5~~	~~"UNR"~~	~~66.0~~	~~52.0~~			
11:30	~~61.4~~	~~68.2~~	~~"UNR"~~	~~66.0~~	~~52.0~~	55.5		
11:31	55.1	57.9	"UNR"	56.0	51.0			
11:32	56.2	59.3	"UNR"	57.0	53.0			
11:33	55.0	57.6	"UNR"	56.0	50.0			
11:34	55.4	59.8	"UNR"	58.0	50.0			
11:35	54.6	57.1	"UNR"	56.0	50.0	54.3		
11:36	51.9	54.2	"UNR"	53.0	49.0			
11:37	53.5	55.5	"UNR"	54.0	51.0			
11:38	55.9	58.9	"UNR"	57.0	52.0			
11:39	54.6	56.3	"UNR"	55.0	52.0			



11:24 - 1-min Leq despiked for Helicopter.
11:28 - 1-min Leq despiked for Military Jet.
11:29 - 1-min Leq despiked for small plane.
11:30 - 1-min Leq despiked for small plane continued.

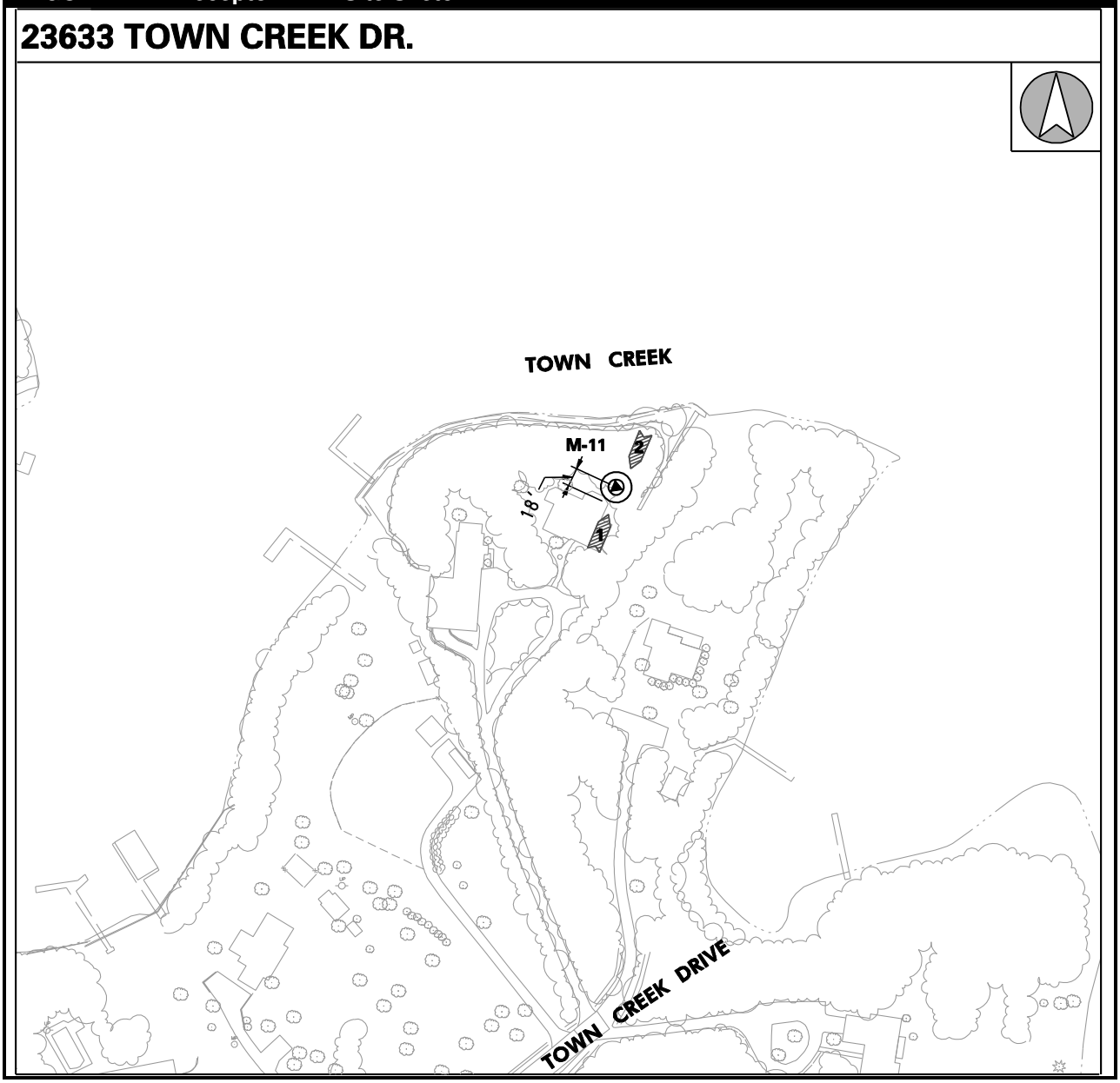
RECEPTOR M-11 – 23633 TOWN CREEK DRIVE

General

Two short-term noise measurement was taken at this location from 1120 Hrs. to 1140 Hrs. and 1340 Hrs. to 1400 Hrs. on 2009 May 20.

RECEPTOR SITE SKETCH

FIGURE A.11 Receptor M-11 Site Sketch



Receptor Site Photographs

Photograph A.11a **Receptor M-11 – 23633 Town Creek Drive (View 1 of 2)**

05-20-2009

Short Term Test

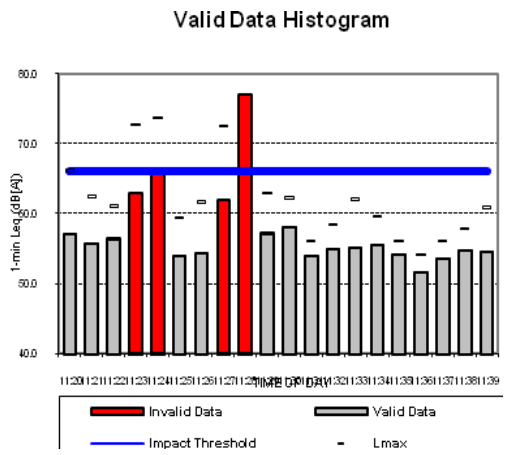
Photograph A.11b **Receptor M-11 – 23633 Town Creek Drive (View 2 of 2)**

05-20-2009

Short Term Test

TABLE A.11a Receptor M-11 – 20-Minute Equivalent Sound Level (20-min Leq) Calculation – TMS03: 05-20-2009 1120-1140 Hrs.

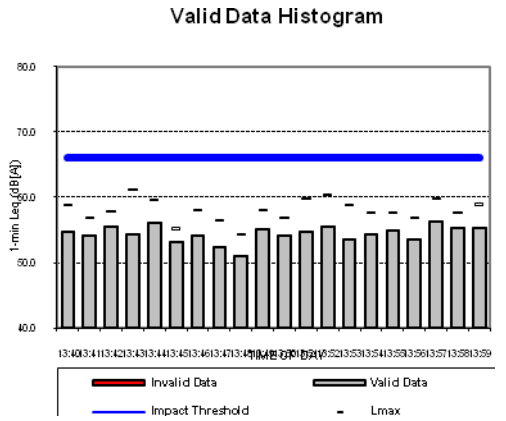
Noise Measurement Data						Calculated Data		Traffic Volume Noise Level
TIME	1-min Leq	Lmax	Lpk	L(10.0)	L(90.0)	5-min Leq	20-min Leq	
	dB(A)	dB(A)	dB(C)	dB(A)	dB(A)	dB(A)	dB(A)	
11:20	57.1	66.1	<109.9	59.0	66.0	56.4	55.5	55
11:21	55.7	62.4	<109.9	59.0	62.0			
11:22	56.4	61.0	<109.9	60.0	61.0			
11:23	~~62.9~~	~~72.6~~	~~<109.9~~	~~68.0~~	~~72.0~~			
11:24	~~66.1~~	~~73.6~~	~~<109.9~~	~~72.0~~	~~73.0~~			
11:25	54.0	59.4	<109.9	56.0	59.0	55.4		
11:26	54.4	61.6	<109.9	56.0	61.0			
11:27	~~61.9~~	~~72.5~~	~~<109.9~~	~~65.0~~	~~72.0~~			
11:28	~~77.1~~	~~83.6~~	~~<109.9~~	~~81.0~~	~~83.0~~			
11:29	57.2	62.9	<109.9	60.0	62.0			
11:30	58.0	62.2	<109.9	60.0	62.0	55.7		
11:31	53.9	56.1	<109.9	55.0	56.0			
11:32	54.9	58.4	<109.9	56.0	58.0			
11:33	55.1	62.0	<109.9	58.0	62.0			
11:34	55.5	59.6	<109.9	58.0	59.0			
11:35	54.1	56.0	<109.9	55.0	56.0	53.9		
11:36	51.6	54.1	<109.9	53.0	54.0			
11:37	53.6	56.0	<109.9	54.0	56.0			
11:38	54.7	57.8	<109.9	56.0	57.0			
11:39	54.6	60.8	<109.9	56.0	60.0			



11:23 - 1-min Leq despiked for helicopter.
11:24 - 1-min Leq despiked for helicopter.
11:27 - 1-min Leq despiked for plane.
11:28 - 1-min Leq despiked for plane.

TABLE A.11b Receptor M-11 – 20-Minute Equivalent Sound Level (20-min Leq) Calculation – TMS03: 05-20-2009 1340-1400 Hrs.

Noise Measurement Data						Calculated Data		Traffic Volume Noise Level
TIME	1-min Leq	Lmax	Lpk	L(10.0)	L(90.0)	5-min Leq	20-min Leq	
	dB(A)	dB(A)	dB(C)	dB(A)	dB(A)	dB(A)	dB(A)	
13:40	54.8	58.8	<109.9	56.0	58.0	55.0	54.6	55
13:41	54.1	56.8	<109.9	55.0	56.0			
13:42	55.5	57.8	<109.9	56.0	57.0			
13:43	54.4	61.1	<109.9	58.0	61.0			
13:44	56.1	59.6	<109.9	58.0	59.0			
13:45	53.1	55.2	<109.9	54.0	55.0	53.4		
13:46	54.2	58.1	<109.9	56.0	58.0			
13:47	52.4	56.5	<109.9	54.0	56.0			
13:48	51.1	54.4	<109.9	52.0	54.0			
13:49	55.1	58.0	<109.9	56.0	58.0			
13:50	54.2	56.9	<109.9	55.0	56.0	54.5		
13:51	54.7	59.8	<109.9	57.0	59.0			
13:52	55.5	60.4	<109.9	59.0	60.0			
13:53	53.6	58.8	<109.9	55.0	58.0			
13:54	54.4	57.6	<109.9	55.0	57.0			
13:55	54.9	57.6	<109.9	56.0	57.0	55.2		
13:56	53.5	56.8	<109.9	54.0	56.0			
13:57	56.3	59.8	<109.9	59.0	59.0			
13:58	55.3	57.7	<109.9	56.0	57.0			
13:59	55.3	58.9	<109.9	57.0	58.0			



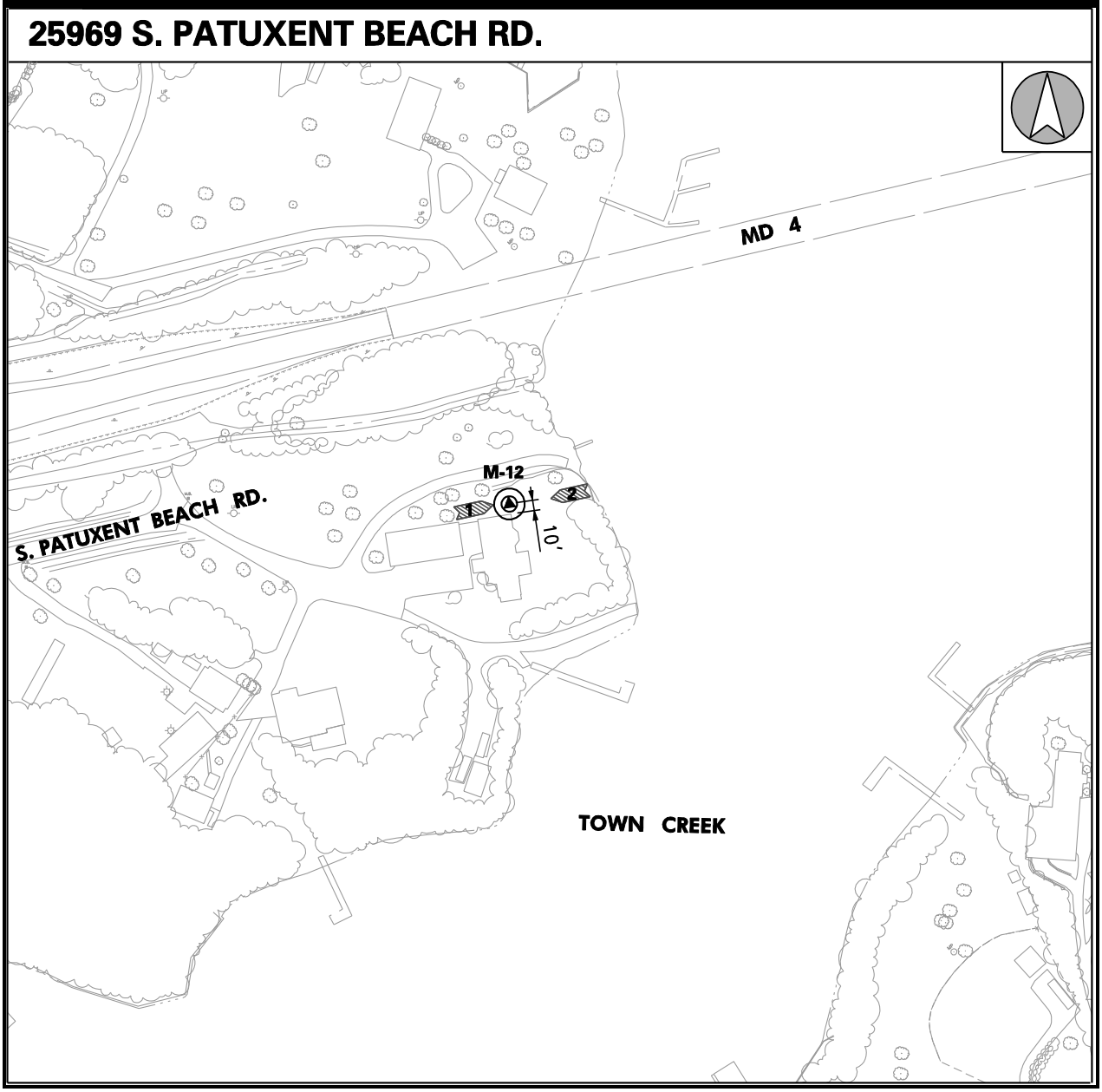
RECEPTOR M-12 – 25969 SOUTH PATUXENT BEACH ROAD

General

Two short-term noise measurement was taken at this location from 1120 Hrs. to 1140 Hrs. and 1340 Hrs. to 1400 Hrs. on 2009 May 20.

Receptor Site Sketch

FIGURE A.12 Receptor M-12 Site Sketch



Receptor Site Photographs

Photograph A.12a Receptor M-12 – 25969 South Patuxent Beach Road (View 1 of 2)

05-20-2009

Short Term Test

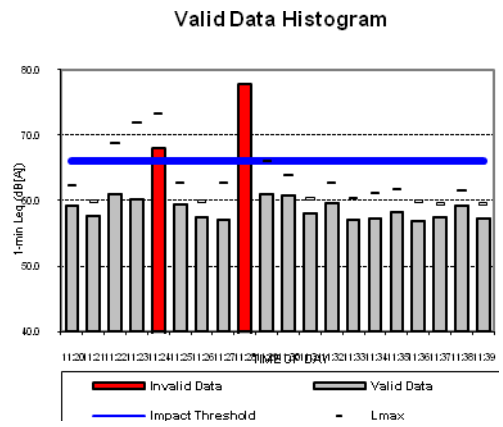
Photograph A.12b Receptor M-12 – 25969 South Patuxent Beach Road (View 2 of 2)

05-20-2009

Short Term Test

TABLE A.12a Receptor M-12 – 20-Minute Equivalent Sound Level (20-min Leq) Calculation – TMS03: 05-20-2009 1120-1140 Hrs.

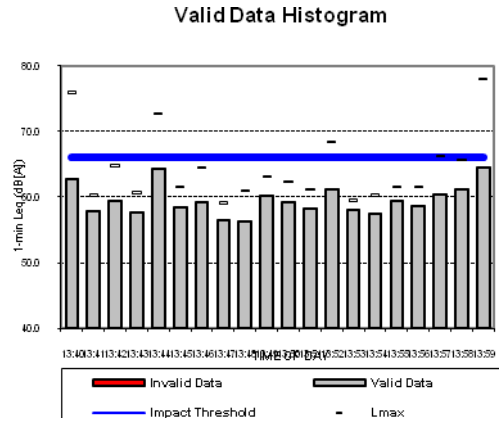
Noise Measurement Data						Calculated Data		Traffic Volume Noise Level
TIME	1-min Leq	Lmax	Lpk	L(10.0)	L(90.0)	5-min Leq	20-min Leq	
	dB(A)	dB(A)	dB(C)	dB(A)	dB(A)	dB(A)	dB(A)	
11:20	59.3	62.4	<109.6	62.0	62.0	59.7	58.9	**59**
11:21	57.7	59.9	<109.6	59.0	59.0			
11:22	60.9	68.8	<109.6	68.0	68.0			
11:23	60.1	71.9	<109.6	71.0	71.0			
11:24	~~68.1~~	~~73.3~~	~~<109.6~~	~~73.0~~	~~73.0~~			
11:25	59.4	62.8	<109.6	62.0	62.0	59.0		
11:26	57.4	59.9	<109.6	59.0	59.0			
11:27	57.1	62.8	<109.6	62.0	62.0			
11:28	~~77.7~~	~~85.9~~	~~<109.6~~	~~85.0~~	~~85.0~~			
11:29	61.0	66.0	<109.6	66.0	66.0			
11:30	60.8	63.9	<109.6	63.0	63.0	58.8		
11:31	58.1	60.3	<109.6	60.0	60.0			
11:32	59.6	62.8	<109.6	62.0	62.0			
11:33	57.1	60.4	<109.6	60.0	60.0			
11:34	57.2	61.2	<109.6	61.0	61.0			
11:35	58.2	61.7	<109.6	61.0	61.0	57.9		
11:36	56.8	59.9	<109.6	59.0	59.0			
11:37	57.5	59.5	<109.6	59.0	59.0			
11:38	59.3	61.5	<109.6	61.0	61.0			
11:39	57.2	59.5	<109.6	59.0	59.0			



11:24 - 1-min Leq despiked for Helicopter.
11:28 - 1-min Leq despiked for plane.

TABLE A.12b Receptor M-12 – 20-Minute Equivalent Sound Level (20-min Leq) Calculation – TMS06: 05-20-2009 1340-1400 Hrs.

Noise Measurement Data						Calculated Data		Traffic Volume Noise Level
TIME	1-min Leq	Lmax	Lpk	L(10.0)	L(90.0)	5-min Leq	20-min Leq	
	dB(A)	dB(A)	dB(C)	dB(A)	dB(A)	dB(A)	dB(A)	
13:40	62.8	75.9	<109.6	75.0	75.0	61.2	60.2	**60**
13:41	57.8	60.3	<109.6	60.0	60.0			
13:42	59.5	64.8	<109.6	64.0	64.0			
13:43	57.6	60.7	<109.6	60.0	60.0			
13:44	64.2	72.7	<109.6	72.0	72.0			
13:45	58.4	61.6	<109.6	61.0	61.0	58.4		
13:46	59.3	64.5	<109.6	64.0	64.0			
13:47	56.4	59.1	<109.6	59.0	59.0			
13:48	56.2	61.0	<109.6	61.0	61.0			
13:49	60.1	63.1	<109.6	63.0	63.0			
13:50	59.3	62.4	<109.6	62.0	62.0	59.0		
13:51	58.2	61.1	<109.6	61.0	61.0			
13:52	61.1	68.4	<109.6	68.0	68.0			
13:53	58.1	59.5	<109.6	59.0	59.0			
13:54	57.4	60.3	<109.6	60.0	60.0			
13:55	59.5	61.5	<109.6	61.0	61.0	61.3		
13:56	58.6	61.6	<109.6	61.0	61.0			
13:57	60.3	66.3	<109.6	66.0	66.0			
13:58	61.1	65.6	<109.6	65.0	65.0			
13:59	64.4	77.9	115.0	77.0	77.0			



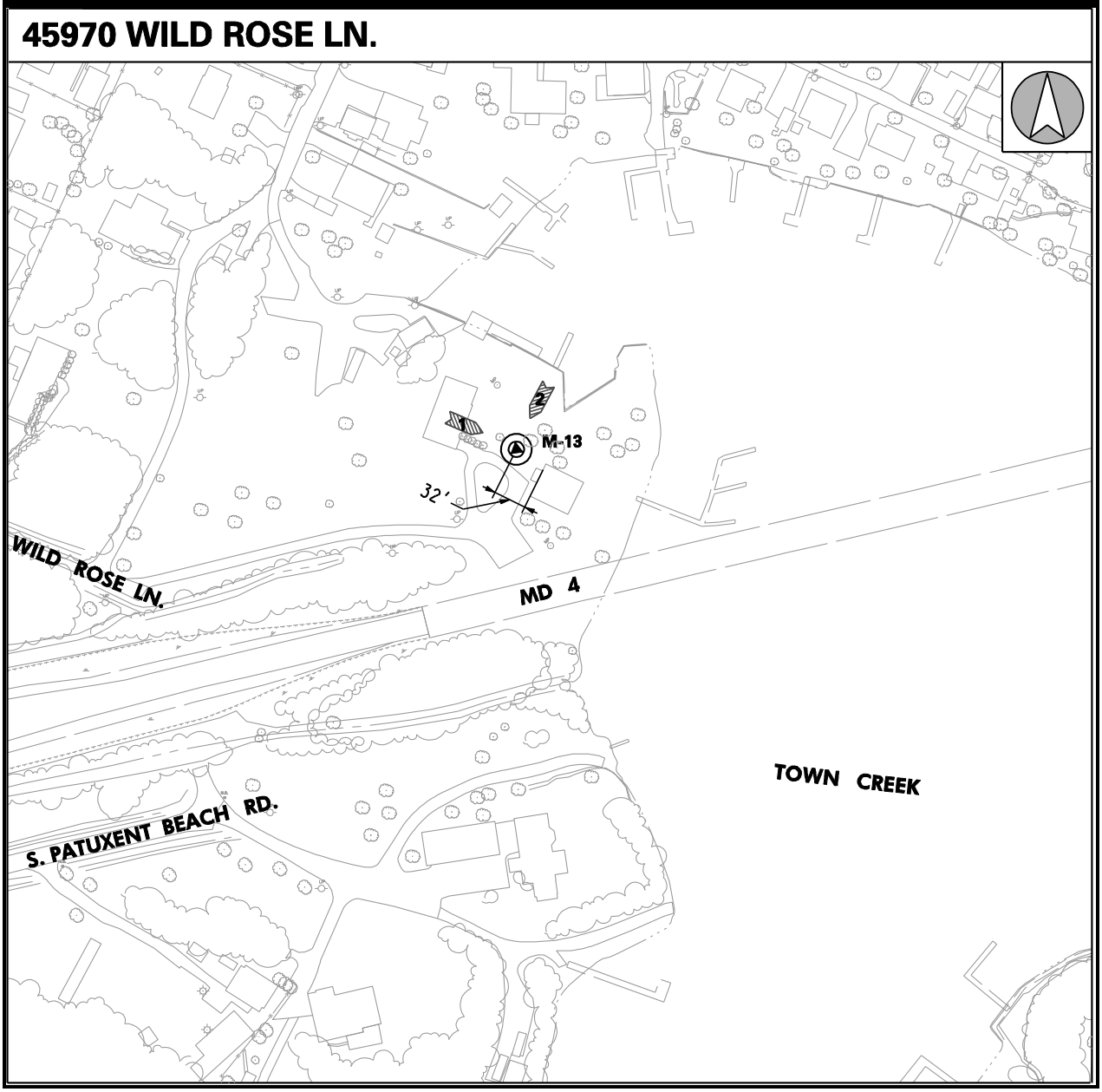
RECEPTOR M-13 – 45970 WILD ROSE LANE

General

Two short-term noise measurement was taken at this location from 1121 Hrs. to 1141 Hrs. and 1341 Hrs. to 1401 Hrs. on 2009 May 20.

Receptor Site Sketch

FIGURE A.13 Receptor M-13 Site Sketch



Receptor Site Photographs

Photograph A.13a Receptor M-1 – 45970 Wild Rose Lane (View 1 of 2)

05-20-2009

Short Term Test

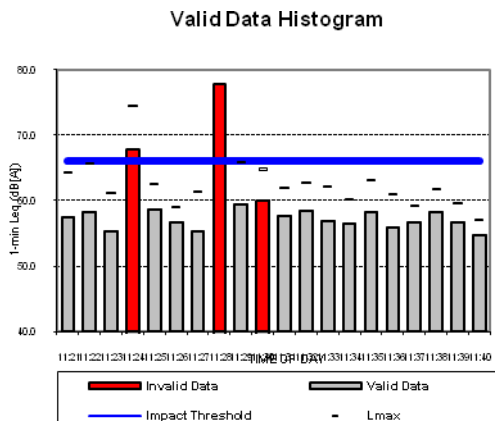
Photograph A.13b Receptor M-13 – 45970 Wild Rose Lane (View 2 of 2)

05-20-2009

Short Term Test

TABLE A.13a Receptor M-13 – 20-Minute Equivalent Sound Level (20-min Leq) Calculation – TMS03: 05-20-2009 1121-1141 Hrs.

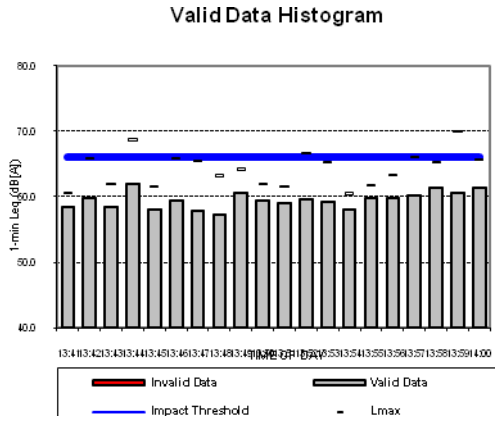
Noise Measurement Data						Calculated Data		Traffic Volume Noise Level
TIME	1-min Leq	Lmax	Lpk	L(10.0)	L(90.0)	5-min Leq	20-min Leq	
	dB(A)	dB(A)	dB(C)	dB(A)	dB(A)	dB(A)	dB(A)	
11:21	57.4	64.3	"UNR"	58.0	53.0	57.6	57.3	**57**
11:22	58.3	65.7	"UNR"	61.0	54.0			
11:23	55.4	61.1	"UNR"	57.0	49.0			
11:24	~~67.8~~	~~74.4~~	~~"UNR"~~	~~73.0~~	~~55.0~~			
11:25	58.6	62.6	"UNR"	60.0	54.0			
11:26	56.6	59.0	"UNR"	58.0	50.0	57.5		
11:27	55.4	61.3	"UNR"	57.0	50.0			
11:28	~~77.7~~	~~85.8~~	~~"UNR"~~	~~82.0~~	~~60.0~~			
11:29	59.4	65.9	"UNR"	63.0	53.0			
11:30	~~59.9~~	~~64.8~~	~~"UNR"~~	~~62.0~~	~~53.0~~			
11:31	57.7	61.9	"UNR"	59.0	55.0	57.6		
11:32	58.5	62.8	"UNR"	61.0	53.0			
11:33	56.8	62.2	"UNR"	59.0	52.0			
11:34	56.4	60.2	"UNR"	58.0	50.0			
11:35	58.3	63.1	"UNR"	61.0	52.0			
11:36	55.9	61.0	"UNR"	57.0	51.0	56.6		
11:37	56.6	59.2	"UNR"	58.0	52.0			
11:38	58.3	61.7	"UNR"	60.0	53.0			
11:39	56.7	59.6	"UNR"	58.0	53.0			
11:40	54.7	57.0	"UNR"	56.0	51.0			



11:24 - 1-min Leq despiked for Helicopter.
11:28 - 1-min Leq despiked for Jet.
11:30 - 1-min Leq despiked for small plane.

TABLE A.13b Receptor M-13 – 20-Minute Equivalent Sound Level (20-min Leq) Calculation – TMS06: 05-20-2009 1341-1401 Hrs.

Noise Measurement Data						Calculated Data		Traffic Volume Noise Level
TIME	1-min Leq	Lmax	Lpk	L(10.0)	L(90.0)	5-min Leq	20-min Leq	
	dB(A)	dB(A)	dB(C)	dB(A)	dB(A)	dB(A)	dB(A)	
13:41	58.4	60.6	UNR	59.0	55.0	59.6	59.7	**60**
13:42	59.8	65.9	UNR	61.0	55.0			
13:43	58.4	62.0	UNR	60.0	53.0			
13:44	62.0	68.7	UNR	65.0	53.0			
13:45	58.1	61.6	UNR	59.0	55.0			
13:46	59.4	65.8	UNR	63.0	52.0	59.0		
13:47	57.9	65.5	UNR	58.0	52.0			
13:48	57.3	63.2	UNR	60.0	53.0			
13:49	60.5	64.2	UNR	63.0	54.0			
13:50	59.4	61.9	UNR	60.0	56.0			
13:51	59.1	61.6	UNR	60.0	53.0	59.2		
13:52	59.7	66.6	UNR	62.0	52.0			
13:53	59.3	65.2	UNR	60.0	55.0			
13:54	58.1	60.5	UNR	59.0	54.0			
13:55	59.8	61.8	UNR	61.0	55.0			
13:56	59.8	63.3	UNR	62.0	54.0	60.7		
13:57	60.1	66.1	UNR	62.0	55.0			
13:58	61.3	65.3	UNR	62.0	58.0			
13:59	60.6	69.9	UNR	63.0	56.0			
14:00	61.4	65.6	UNR	63.0	57.0			



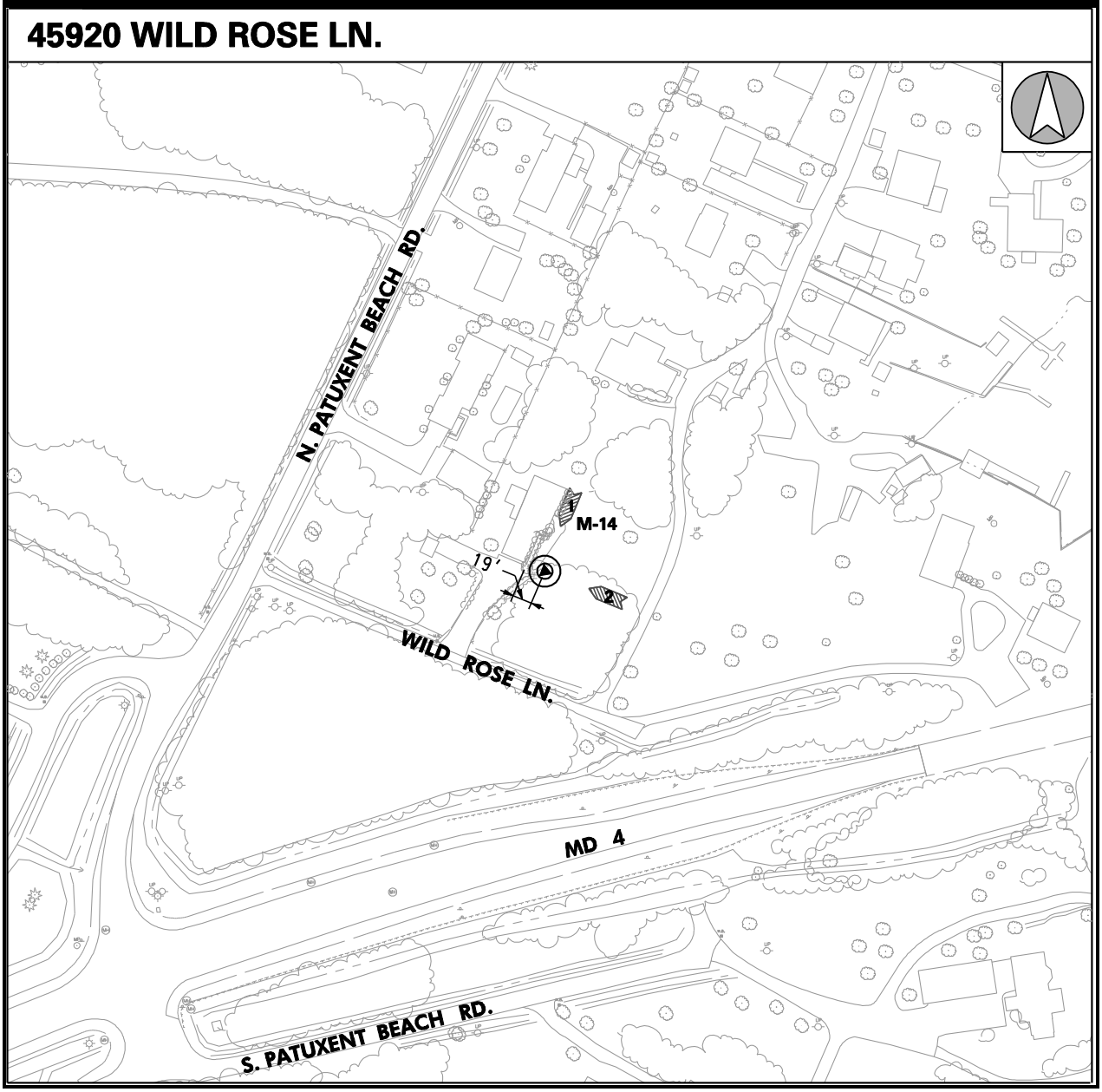
RECEPTOR M-14 – 45920 WILD ROSE LANE

General

One short-term noise measurement was taken at this location from 1040 Hrs. to 1100 Hrs. on 2009 May 20.

Receptor Site Sketch

FIGURE A.14 Receptor M-14 Site Sketch



Receptor Site Photographs

Photograph A.14a Receptor M-14 – 45920 Wild Rose Lane (View 1 of 2)

05-20-2009

Short Term Test

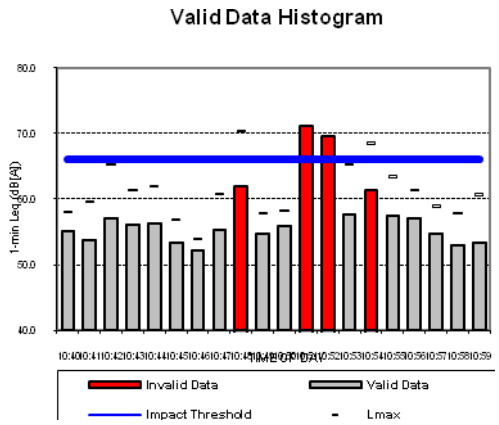
Photograph A.14b Receptor M-14 – 45920 Wild Rose Lane (View 2 of 2)

05-20-2009

Short Term Test

TABLE A.14 Receptor M-14 – 20-Minute Equivalent Sound Level (20-min Leq) Calculation – TMS02: 05-20-2009 1040-1100 Hrs.

Noise Measurement Data						Calculated Data		Traffic Volume Noise Level
TIME	1-min Leq	Lmax	Lpk	L(10.0)	L(99.9)	5-min Leq	20-min Leq	
	dB(A)	dB(A)	dB(C)	dB(A)	dB(A)	dB(A)	dB(A)	
10:40	55.2	58.1	"UNR"	56.0	51.0	55.8	55.7	**56**
10:41	53.7	59.6	"UNR"	56.0	47.0			
10:42	57.1	65.2	"UNR"	58.0	51.0			
10:43	56.0	61.3	"UNR"	59.0	50.0			
10:44	56.2	62.0	"UNR"	60.0	51.0			
10:45	53.4	56.8	"UNR"	55.0	49.0	54.1		
10:46	52.1	54.0	"UNR"	53.0	48.0			
10:47	55.4	60.8	"UNR"	58.0	49.0			
10:48	~~62.0~~	~~70.3~~	~~"UNR"~~	~~66.0~~	~~51.0~~			
10:49	54.7	57.9	"UNR"	56.0	51.0			
10:50	55.9	58.2	"UNR"	57.0	51.0	56.8		
10:51	~~71.2~~	~~80.3~~	~~"UNR"~~	~~76.0~~	~~51.0~~			
10:52	~~69.5~~	~~81.3~~	~~"UNR"~~	~~71.0~~	~~56.0~~			
10:53	57.6	65.3	"UNR"	61.0	49.0			
10:54	~~61.3~~	~~68.5~~	~~"UNR"~~	~~65.0~~	~~50.0~~			
10:55	57.5	63.4	"UNR"	60.0	52.0	55.5		
10:56	57.0	61.3	"UNR"	59.0	51.0			
10:57	54.7	58.9	"UNR"	57.0	47.0			
10:58	53.0	57.8	"UNR"	56.0	45.0			
10:59	53.4	60.7	"UNR"	56.0	42.0			



10:48 - 1-min Leq despiked for Plane.
10:51 - 1-min Leq despiked for Military Jet.
10:52 - 1-min Leq despiked for Military Jet continued.
10:54 - 1-min Leq despiked for Plane.

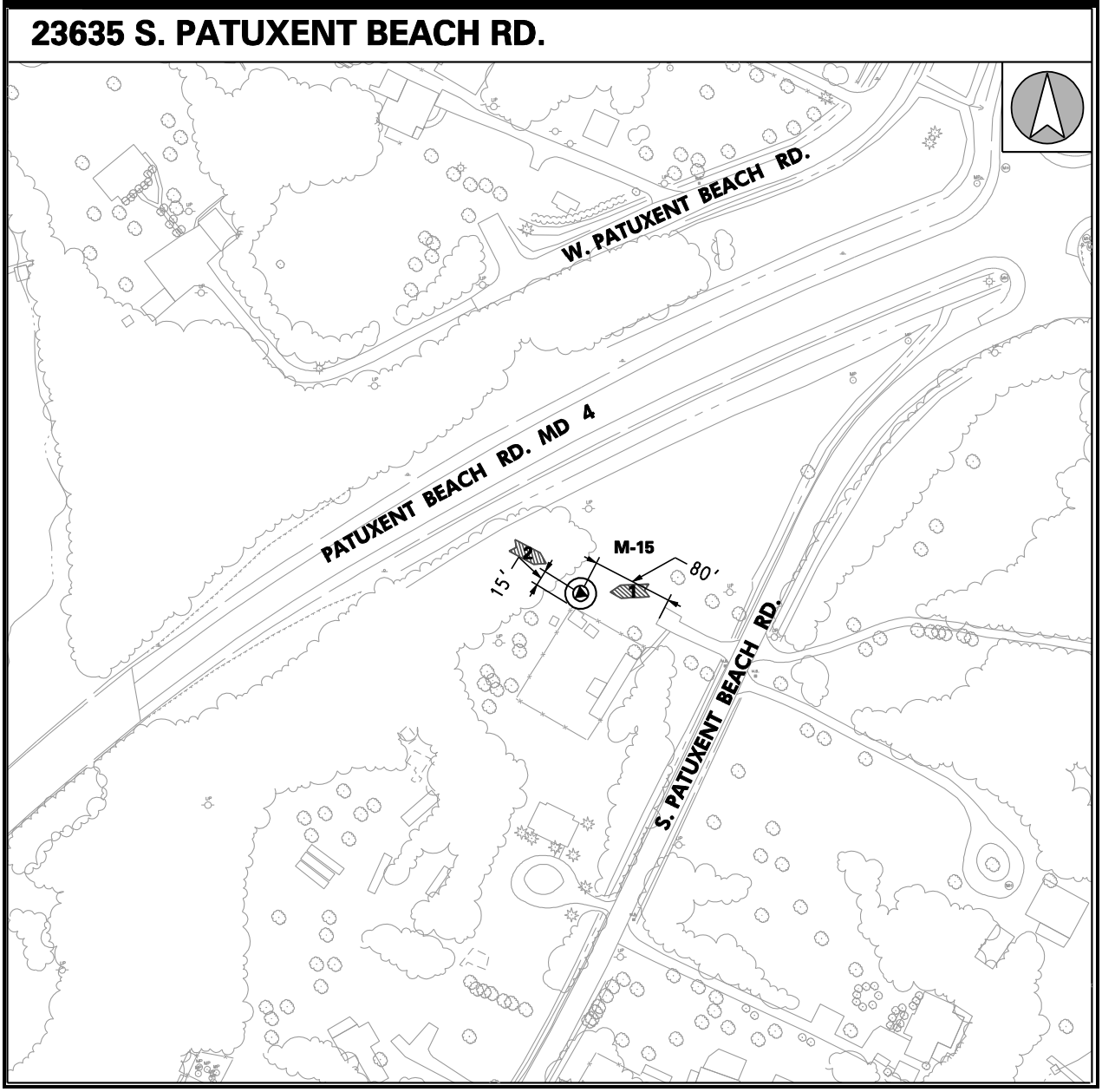
RECEPTOR M-15 – 23635 SOUTH PATUXENT BEACH ROAD

General

Two short-term noise measurement was taken at this location from 1040 Hrs. to 1100 Hrs. and 1340 Hrs. to 1400 Hrs. on 2009 May 20.

Receptor Site Sketch

FIGURE A.15 Receptor M-15 Site Sketch



Receptor Site Photographs

Photograph A.15a Receptor M-15 – 23635 South Patuxent Beach Road (View 1 of 2)

05-20-2009

Short Term Test

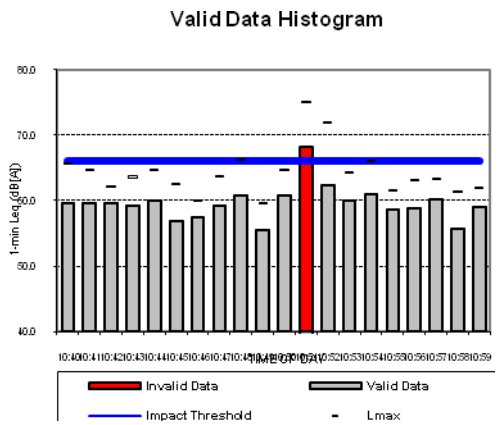
Photograph A.15b Receptor M-15 – 23635 South Patuxent Beach Road (View 2 of 2)

05-20-2009

Short Term Test

TABLE A.15a Receptor M-15 – 20-Minute Equivalent Sound Level (20-min Leq) Calculation – TMS02: 05-20-2009 1040-1100 Hrs.

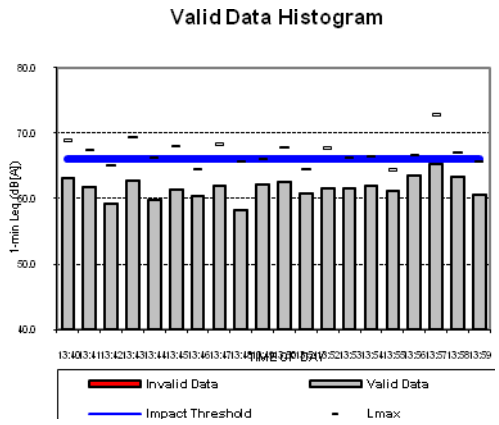
Noise Measurement Data						Calculated Data		Traffic Volume Noise Level
TIME	1-min Leq	Lmax	Lpk	L(10.0)	L(90.0)	5-min Leq	20-min Leq	
	dB(A)	dB(A)	dB(C)	dB(A)	dB(A)	dB(A)	dB(A)	
10:40	59.6	65.6	<109.6	65.0	65.0	59.6	59.6	**60**
10:41	59.7	64.7	<109.6	64.0	64.0			
10:42	59.7	62.1	<109.6	62.0	62.0			
10:43	59.3	63.6	<109.6	63.0	63.0			
10:44	59.9	64.7	<109.6	64.0	64.0			
10:45	56.8	62.6	<109.6	62.0	62.0	58.4		
10:46	57.5	60.0	<109.6	60.0	60.0			
10:47	59.3	63.7	<109.6	63.0	63.0			
10:48	60.8	66.3	<109.6	66.0	66.0			
10:49	55.5	59.6	<109.6	59.0	59.0			
10:50	60.8	64.7	<109.6	64.0	64.0	61.1		
10:51	~~68.2~~	~~75.1~~	~~<109.6~~	~~75.0~~	~~75.0~~			
10:52	62.4	71.9	<109.6	71.0	71.0			
10:53	60.0	64.3	<109.6	64.0	64.0			
10:54	60.9	66.0	<109.6	66.0	66.0			
10:55	58.7	61.5	<109.6	61.0	61.0	58.7		
10:56	58.8	63.1	<109.6	63.0	63.0			
10:57	60.1	63.3	<109.6	63.0	63.0			
10:58	55.6	61.3	<109.6	61.0	61.0			
10:59	59.1	62.0	<109.6	62.0	62.0			



10:51 - 1-min Leq despiked for plane.

TABLE A.15b Receptor M-15 – 20-Minute Equivalent Sound Level (20-min Leq) Calculation – TMS06: 05-20-2009 1340-1400 Hrs.

Noise Measurement Data						Calculated Data		Traffic Volume Noise Level
TIME	1-min Leq	Lmax	Lpk	L(10.0)	L(99.9)	5-min Leq	20-min Leq	
	dB(A)	dB(A)	dB(C)	dB(A)	dB(A)	dB(A)	dB(A)	
13:40	63.1	68.9	UNR	65.0	56.0	61.6	61.9	**62**
13:41	61.7	67.4	UNR	64.0	53.0			
13:42	59.3	65.1	UNR	61.0	52.0			
13:43	62.8	69.4	UNR	65.0	56.0			
13:44	59.8	66.2	UNR	63.0	52.0			
13:45	61.4	68.0	UNR	64.0	52.0	61.0		
13:46	60.4	64.5	UNR	63.0	54.0			
13:47	62.0	68.3	UNR	66.0	52.0			
13:48	58.3	65.7	UNR	61.0	46.0			
13:49	62.1	66.0	UNR	65.0	53.0			
13:50	62.5	67.8	UNR	65.0	55.0	61.7		
13:51	60.8	64.5	UNR	63.0	52.0			
13:52	61.5	67.7	UNR	64.0	51.0			
13:53	61.5	66.2	UNR	65.0	49.0			
13:54	61.9	66.4	UNR	64.0	56.0			
13:55	61.2	64.4	UNR	63.0	56.0	63.1		
13:56	63.5	66.7	UNR	66.0	56.0			
13:57	65.3	72.8	UNR	68.0	58.0			
13:58	63.4	67.0	UNR	65.0	57.0			
13:59	60.5	65.6	UNR	63.0	54.0			



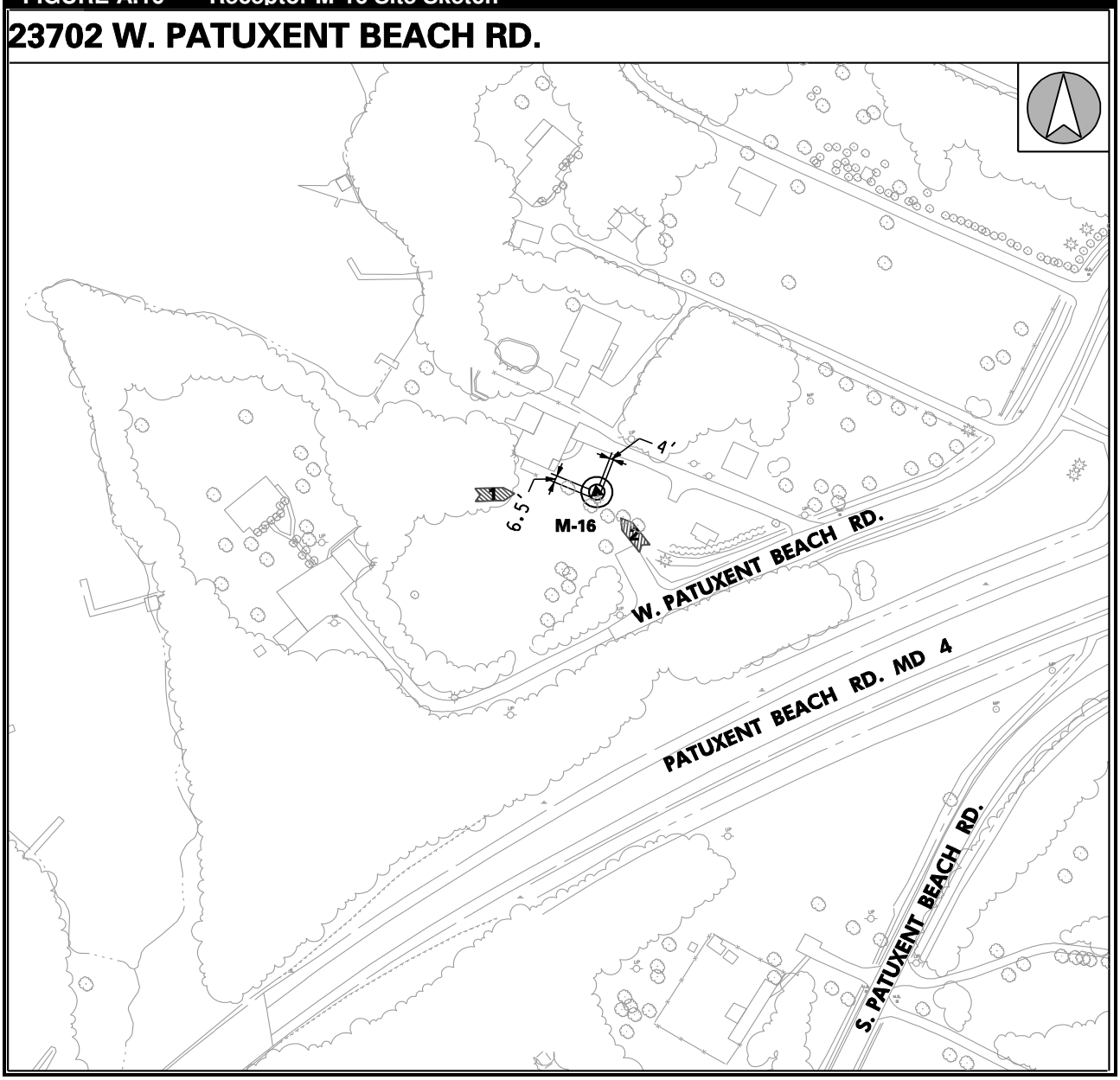
RECEPTOR M-16 – 23702 WEST PATUXENT BEACH ROAD

General

One short-term noise measurement was taken at this location from 1040 Hrs. to 1100 Hrs. on 2009 May 20.

Receptor Site Sketch

FIGURE A.16 Receptor M-16 Site Sketch



Receptor Site Photographs

Photograph A.16a Receptor M-16 – 23702 West Patuxent Beach Road (View 1 of 2)

05-20-2009

Short Term Test

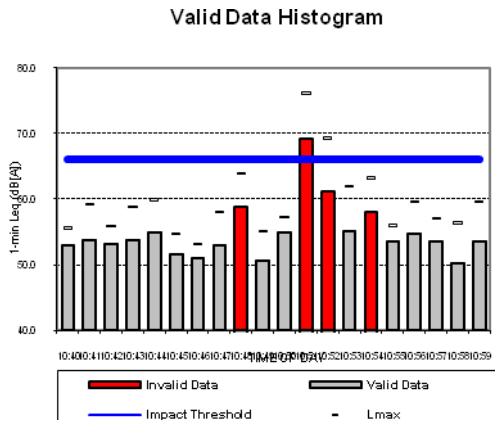
Photograph A.16b Receptor M-16 – 23702 West Patuxent Beach Road (View 2 of 2)

05-20-2009

Short Term Test

TABLE A.16 Receptor M-16 – 20-Minute Equivalent Sound Level (20-min Leq) Calculation – TMS02: 05-20-2009 1040-1100 Hrs.

Noise Measurement Data						Calculated Data		Traffic Volume Noise Level
TIME	1-min Leq	Lmax	Lpk	L(10.0)	L(90.0)	5-min Leq	20-min Leq	
	dB(A)	dB(A)	dB(C)	dB(A)	dB(A)	dB(A)	dB(A)	
10:40	52.9	55.6	<112.0	55.0	55.0	53.8	53.6	**54**
10:41	53.8	59.2	<112.0	59.0	59.0			
10:42	53.2	55.9	<112.0	55.0	55.0			
10:43	53.7	58.8	<112.0	58.0	58.0			
10:44	54.9	59.9	<112.0	59.0	59.0			
10:45	51.5	54.7	<112.0	54.0	54.0	51.6		
10:46	51.1	53.2	<112.0	53.0	53.0			
10:47	53.0	58.0	<112.0	58.0	58.0			
10:48	~~58.8~~	~~63.9~~	~~<112.0~~	~~63.0~~	~~63.0~~			
10:49	50.6	55.1	<112.0	55.0	55.0			
10:50	54.9	57.2	<112.0	57.0	57.0	55.1		
10:51	~~69.2~~	~~76.1~~	~~<112.0~~	~~76.0~~	~~76.0~~			
10:52	~~61.1~~	~~69.3~~	~~<112.0~~	~~69.0~~	~~69.0~~			
10:53	55.2	61.9	<112.0	61.0	61.0			
10:54	~~58.1~~	~~63.2~~	~~<112.0~~	~~63.0~~	~~63.0~~			
10:55	53.5	56.0	<112.0	56.0	56.0	53.3		
10:56	54.7	59.6	<112.0	59.0	59.0			
10:57	53.5	57.1	<112.0	57.0	57.0			
10:58	50.3	56.4	<112.0	56.0	56.0			
10:59	53.6	59.6	<112.0	59.0	59.0			



10:48 - 1-min Leq despiked for plane.
10:51 - 1-min Leq despiked for plane.
10:52 - 1-min Leq despiked for plane continued.
10:54 - 1-min Leq despiked for plane.

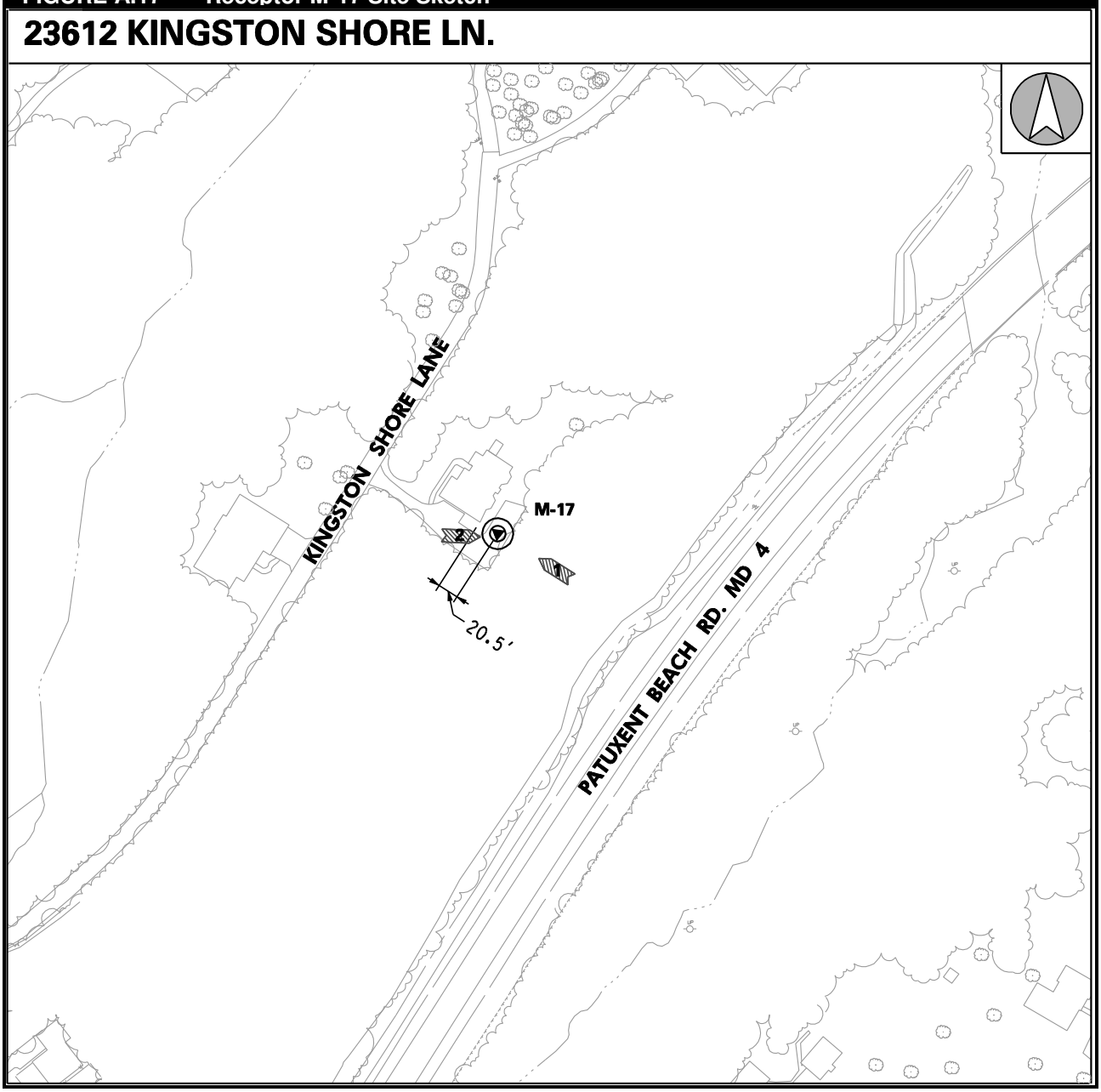
RECEPTOR M-17 – 23612 KINGSTON SHORE LANE

General

One short-term noise measurement was taken at this location from 1040 Hrs. to 1100 Hrs. on 2009 May 20.

Receptor Site Sketch

FIGURE A.17 Receptor M-17 Site Sketch



Receptor Site Photographs

Photograph A.17a Receptor M-17 – 23612 Kingston Shore Lane (View 1 of 2)

05-20-2009

Short Term Test

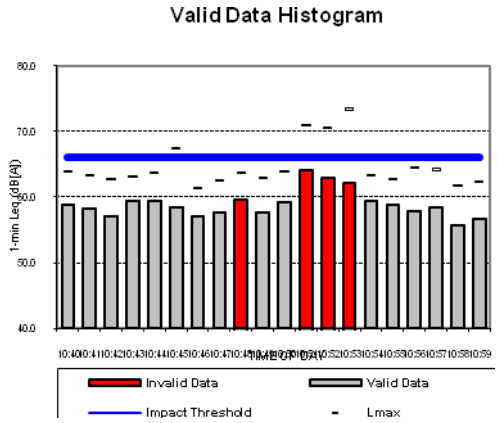
Photograph A.17b Receptor M-17 – 23612 Kingston Shore Lane (View 2 of 2)

05-20-2009

Short Term Test

TABLE A.17 Receptor M-17 – 20-Minute Equivalent Sound Level (20-min Leq) Calculation – TMS02: 05-20-2009 1040-1100 Hrs.

Noise Measurement Data						Calculated Data		Traffic Volume Noise Level
TIME	1-min Leq	Lmax	Lpk	L(10.0)	L(99.9)	5-min Leq	20-min Leq	
	dB(A)	dB(A)	dB(C)	dB(A)	dB(A)	dB(A)	dB(A)	
10:40	58.8	63.9	"UNR"	62.0	48.0	58.7	58.4	58
10:41	58.3	63.3	"UNR"	62.0	53.0			
10:42	57.0	62.8	"UNR"	60.0	46.0			
10:43	59.5	63.1	"UNR"	61.0	56.0			
10:44	59.5	63.7	"UNR"	62.0	51.0			
10:45	58.4	67.4	"UNR"	60.0	52.0	57.7		
10:46	57.0	61.3	"UNR"	60.0	49.0			
10:47	57.7	62.6	"UNR"	60.0	45.0			
10:48	~~59.7~~	~~63.7~~	~~"UNR"~~	~~62.0~~	~~48.0~~			
10:49	57.7	62.9	"UNR"	60.0	50.0			
10:50	59.2	63.9	"UNR"	61.0	49.0	59.3		
10:51	~~64.1~~	~~70.9~~	~~"UNR"~~	~~68.0~~	~~55.0~~			
10:52	~~62.9~~	~~70.6~~	~~"UNR"~~	~~67.0~~	~~54.0~~			
10:53	~~62.2~~	~~73.4~~	~~"UNR"~~	~~66.0~~	~~48.0~~			
10:54	59.4	63.3	"UNR"	61.0	51.0			
10:55	58.9	62.8	"UNR"	60.0	54.0	57.7		
10:56	57.9	64.5	"UNR"	62.0	47.0			
10:57	58.5	64.2	"UNR"	60.0	54.0			
10:58	55.7	61.7	"UNR"	60.0	41.0			
10:59	56.6	62.4	"UNR"	59.0	45.0			



10:48 - 1-min Leq despiked for small plane.
10:51 - 1-min Leq despiked for small plane.
10:52 - 1-min Leq despiked for small plane continued.
10:53 - 1-min Leq despiked for small plane continued.

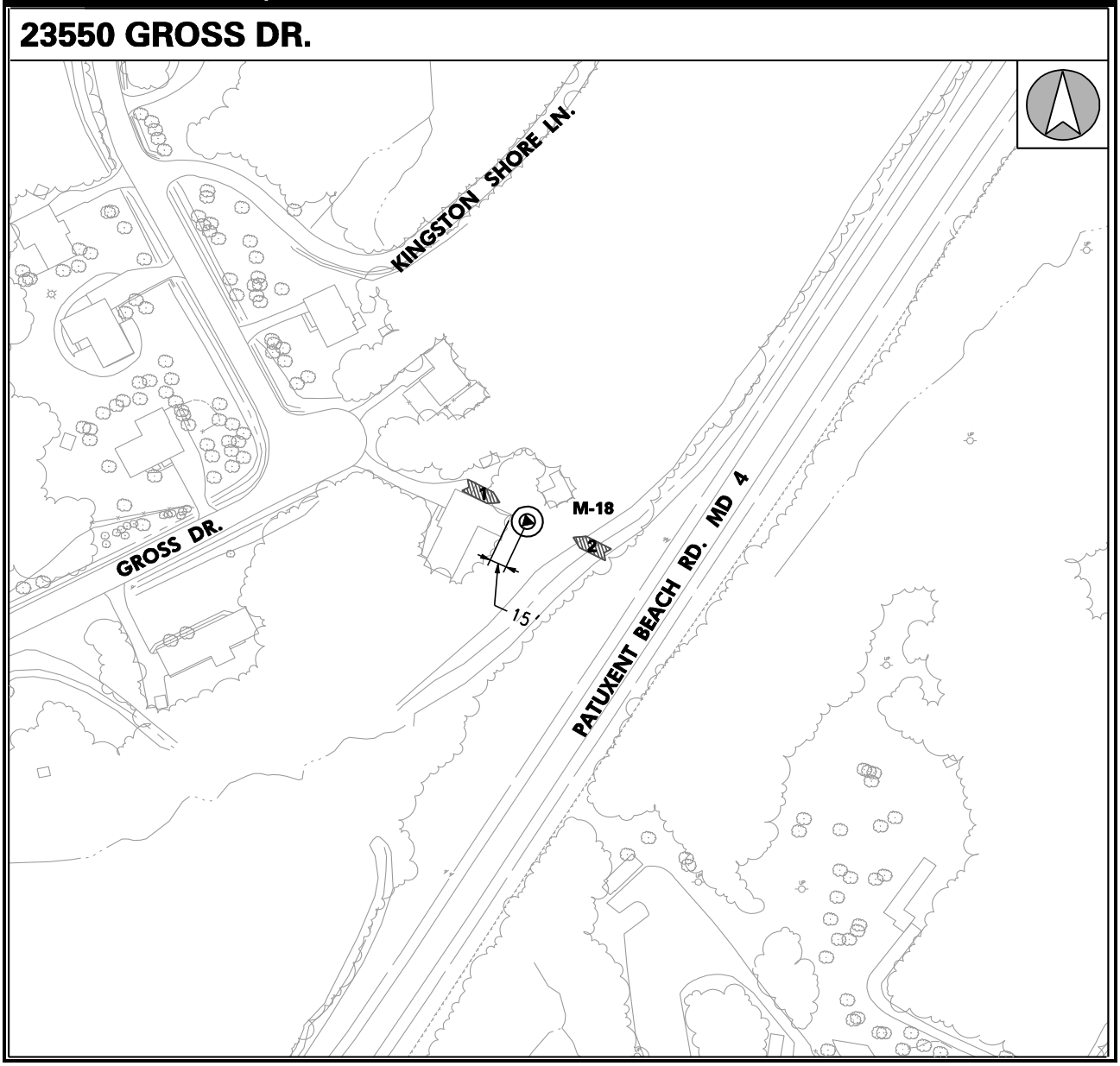
RECEPTOR M-18 – 23550 GROSS DRIVE

General

One short-term noise measurement was taken at this location from 1040 Hrs. to 1100 Hrs. on 2009 May 20.

Receptor Site Sketch

FIGURE A.18 Receptor M-18 Site Sketch



Receptor Site Photographs

Photograph A.18a Receptor M-18 – 23550 Gross Drive (View 1 of 2)

05-20-2009

Short Term Test

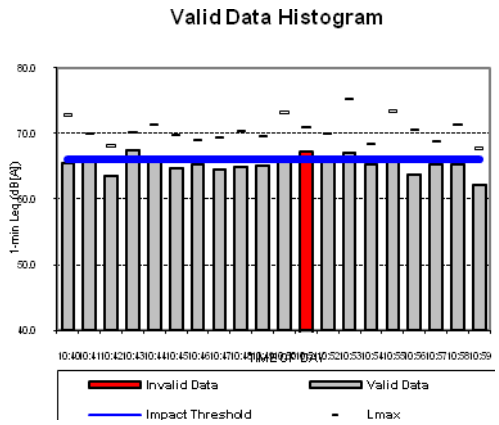
Photograph A.18b Receptor M-18 – 23550 Gross Drive (View 2 of 2)

05-20-2009

Short Term Test

TABLE A.18 Receptor M-18 – 20-Minute Equivalent Sound Level (20-min Leq) Calculation – TMS02: 05-20-2009 1040-1100 Hrs.

Noise Measurement Data						Calculated Data		Traffic Volume Noise Level
TIME	1-min Leq	Lmax	Lpk	L(10.0)	L(90.0)	5-min Leq	20-min Leq	
	dB(A)	dB(A)	dB(C)	dB(A)	dB(A)	dB(A)	dB(A)	
10:40	65.5	72.8	<109.9	68.0	72.0	65.8	65.4	**65**
10:41	65.6	70.0	<109.9	68.0	70.0			
10:42	63.6	68.1	<109.9	67.0	68.0			
10:43	67.5	70.1	<109.9	69.0	70.0			
10:44	65.7	71.3	<109.9	68.0	71.0			
10:45	64.7	69.7	<109.9	67.0	69.0	64.8		
10:46	65.2	69.0	<109.9	68.0	69.0			
10:47	64.4	69.4	<109.9	67.0	69.0			
10:48	64.8	70.4	<109.9	68.0	70.0			
10:49	65.1	69.5	<109.9	68.0	69.0			
10:50	66.3	73.2	<109.9	68.0	73.0	66.2		
10:51	~~67.2~~	~~71.0~~	~~<109.9~~	~~69.0~~	~~71.0~~			
10:52	65.7	70.0	<109.9	69.0	70.0			
10:53	67.1	75.2	<109.9	71.0	75.0			
10:54	65.3	68.4	<109.9	67.0	68.0			
10:55	66.4	73.4	<109.9	70.0	73.0	64.8		
10:56	63.7	70.6	<109.9	67.0	70.0			
10:57	65.2	68.8	<109.9	67.0	68.0			
10:58	65.3	71.4	<109.9	70.0	71.0			
10:59	62.1	67.7	<109.9	66.0	67.0			



10:51 - 1-min Leq despiked for plane.

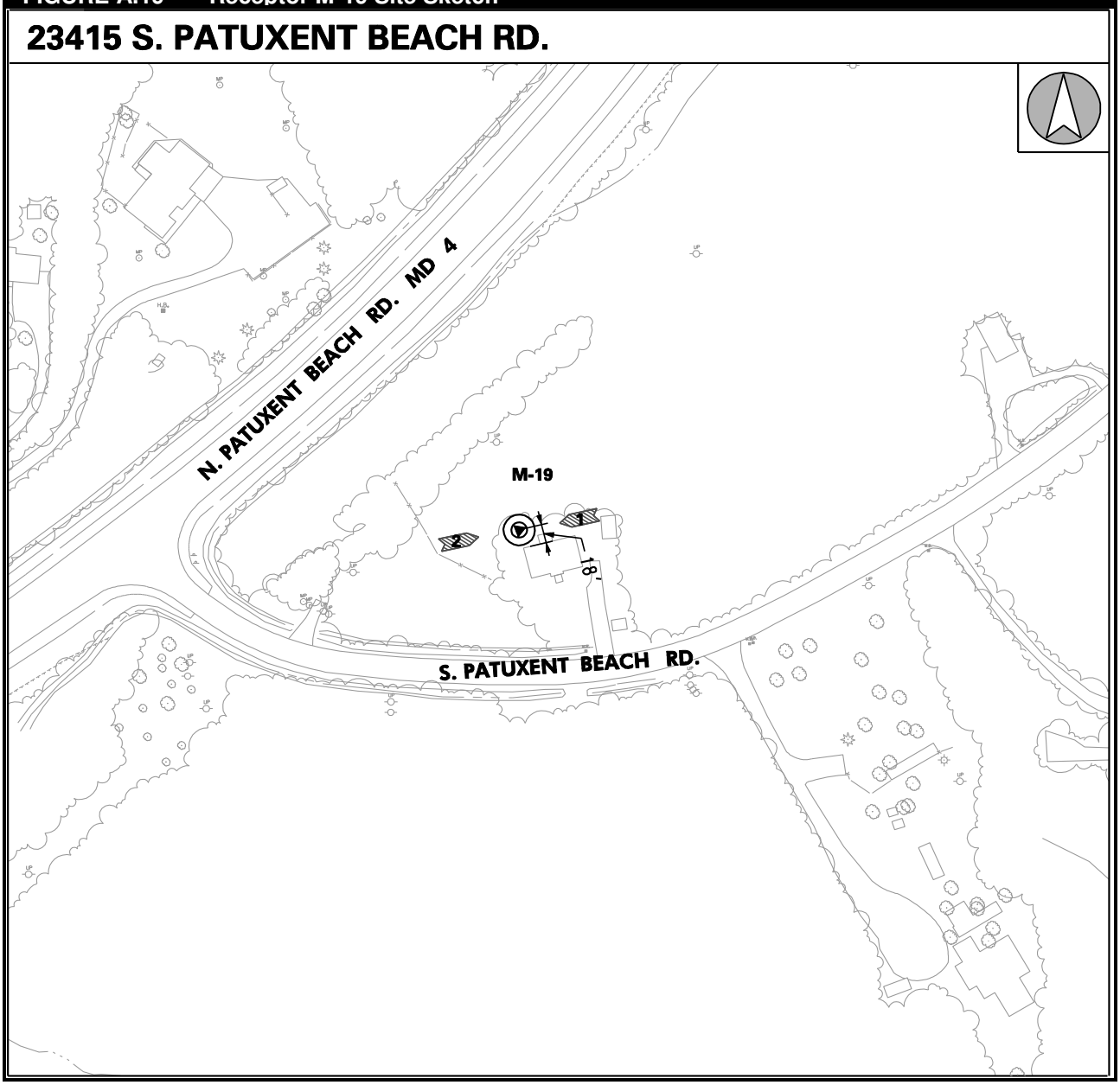
RECEPTOR M-19 – 23415 SOUTH PATUXENT BEACH ROAD

General

One short-term noise measurement was taken at this location from 0900 Hrs. to 0920 Hrs. on 2009 March 25.

Receptor Site Sketch

FIGURE A.19 Receptor M-19 Site Sketch



Receptor Site Photographs

Photograph A.19a Receptor M-19 – 23415 South Patuxent Beach Road (View 1 of 2)

05-20-2009

Short Term Test

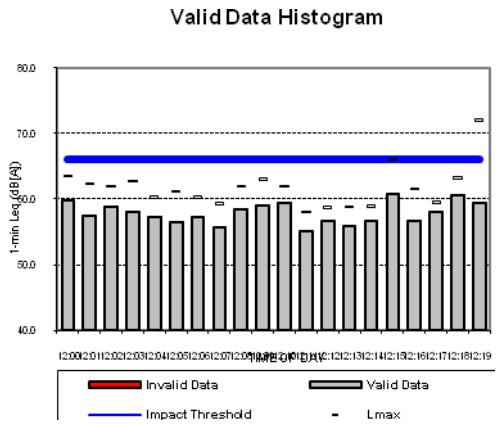
Photograph A.19b Receptor M-19 – 23415 South Patuxent Beach Road (View 2 of 2)

05-20-2009

Short Term Test

TABLE A.19 Receptor M-19 – 20-Minute Equivalent Sound Level (20-min Leq) Calculation – TMS04: 05-20-2009 1200-1220 Hrs.

Noise Measurement Data						Calculated Data		Traffic Volume Noise Level
TIME	1-min Leq	Lmax	Lpk	L(10.0)	L(90.0)	5-min Leq	20-min Leq	
	dB(A)	dB(A)	dB(C)	dB(A)	dB(A)	dB(A)	dB(A)	
12:00	59.8	63.5	<109.6	63.0	63.0	58.4	58.2	**58**
12:01	57.5	62.3	<109.6	62.0	62.0			
12:02	58.8	61.9	<109.6	61.0	61.0			
12:03	58.0	62.7	<109.6	62.0	62.0			
12:04	57.3	60.3	<109.6	60.0	60.0			
12:05	56.4	61.1	<109.6	61.0	61.0	57.6		
12:06	57.3	60.3	<109.6	60.0	60.0			
12:07	55.6	59.3	<109.6	59.0	59.0			
12:08	58.5	61.9	<109.6	61.0	61.0			
12:09	59.1	63.0	<109.6	63.0	63.0			
12:10	59.4	62.0	<109.6	62.0	62.0	57.0		
12:11	55.1	58.0	<109.6	58.0	58.0			
12:12	56.7	58.7	<109.6	58.0	58.0			
12:13	55.9	58.8	<109.6	58.0	58.0			
12:14	56.7	58.9	<109.6	58.0	58.0			
12:15	60.8	66.0	<109.6	66.0	66.0	59.4		
12:16	56.6	61.5	<109.6	61.0	61.0			
12:17	58.1	59.5	<109.6	59.0	59.0			
12:18	60.6	63.2	<109.6	63.0	63.0			
12:19	59.4	72.0	<109.6	72.0	72.0			



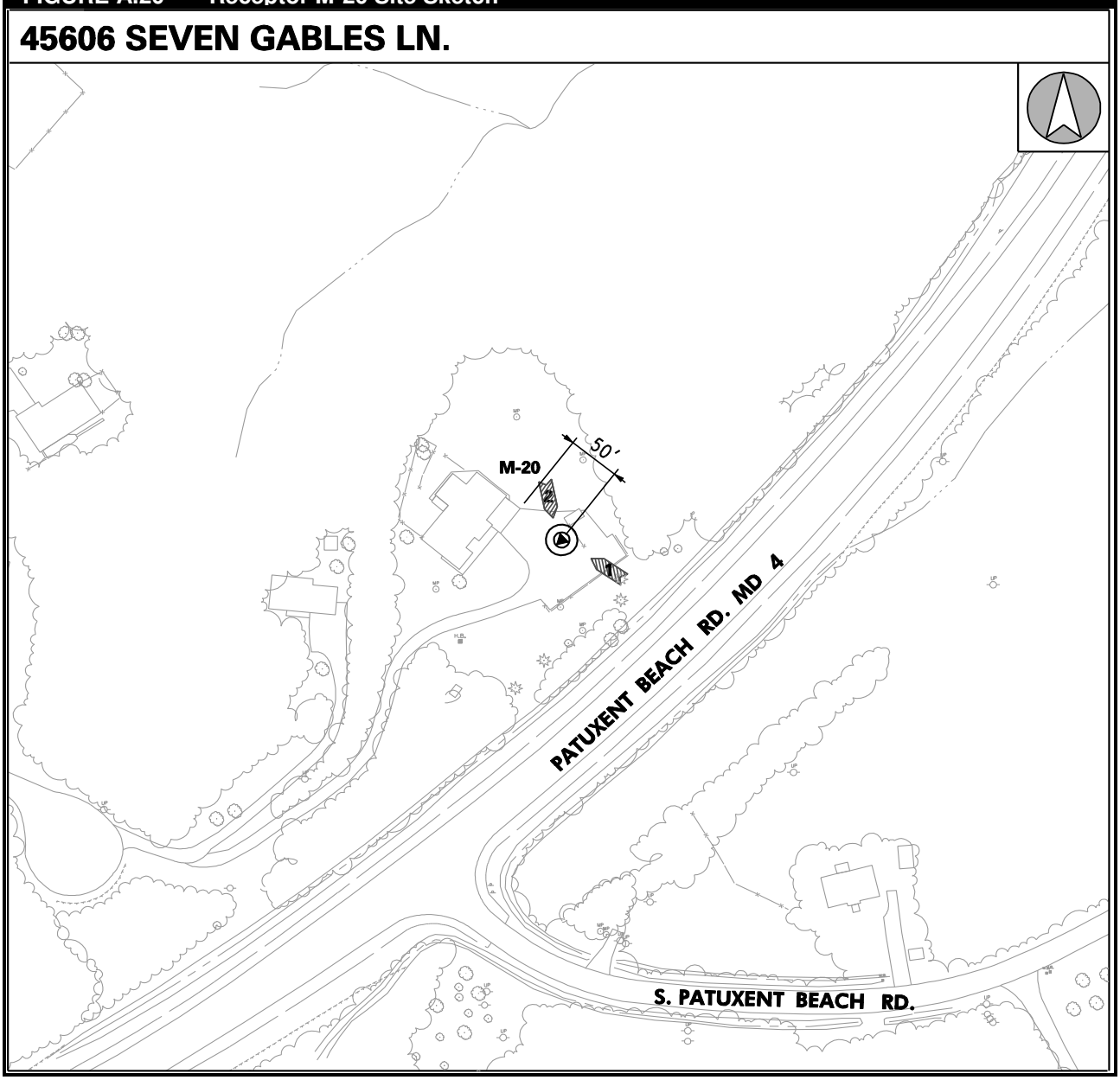
RECEPTOR M-20 – 45606 SEVEN GABLES LANE

General

One short-term noise measurement was taken at this location from 1200 Hrs. to 1220 Hrs. on 2009 May 20.

Receptor Site Sketch

FIGURE A.20 Receptor M-20 Site Sketch



Receptor Site Photographs

Photograph A.20a Receptor M-20 – 45606 Seven Gables Lane (View 1 of 2)

05-20-2009

Short Term Test

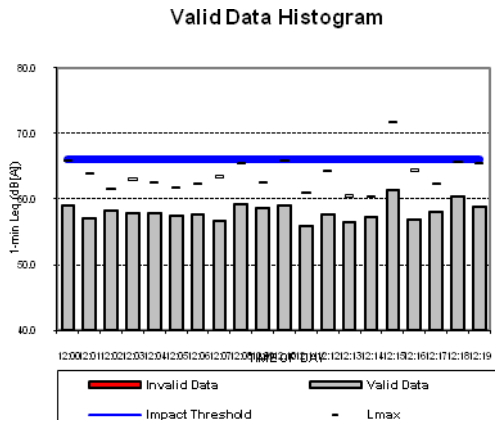
Photograph A.20b Receptor M-20 – 45606 Seven Gables Lane (View 2 of 2)

05-20-2009

Short Term Test

TABLE A.20 Receptor M-20 – 20-Minute Equivalent Sound Level (20-min Leq) Calculation – TMS04: 05-20-2009 1200-1220 Hrs.

Noise Measurement Data						Calculated Data		Traffic Volume Noise Level
TIME	1-min Leq	Lmax	Lpk	L(10.0)	L(99.9)	5-min Leq	20-min Leq	
	dB(A)	dB(A)	dB(C)	dB(A)	dB(A)	dB(A)	dB(A)	
12:00	59.1	65.8	"UNR"	61.0	53.0	58.1	58.3	**58**
12:01	57.0	63.9	"UNR"	60.0	49.0			
12:02	58.2	61.5	"UNR"	60.0	51.0			
12:03	57.9	63.0	"UNR"	60.0	50.0			
12:04	57.9	62.5	"UNR"	60.0	49.0			
12:05	57.4	61.8	"UNR"	60.0	50.0	58.0		
12:06	57.6	62.4	"UNR"	59.0	50.0			
12:07	56.7	63.4	"UNR"	60.0	46.0			
12:08	59.2	65.5	"UNR"	62.0	48.0			
12:09	58.6	62.5	"UNR"	61.0	52.0			
12:10	59.1	65.9	"UNR"	61.0	53.0	57.4		
12:11	55.8	60.9	"UNR"	58.0	46.0			
12:12	57.6	64.3	"UNR"	60.0	51.0			
12:13	56.5	60.5	"UNR"	59.0	50.0			
12:14	57.2	60.4	"UNR"	60.0	52.0			
12:15	61.3	71.7	"UNR"	64.0	50.0	59.4		
12:16	56.8	64.4	"UNR"	60.0	47.0			
12:17	58.0	62.4	"UNR"	60.0	51.0			
12:18	60.4	65.6	"UNR"	62.0	54.0			
12:19	58.8	65.5	"UNR"	60.0	51.0			



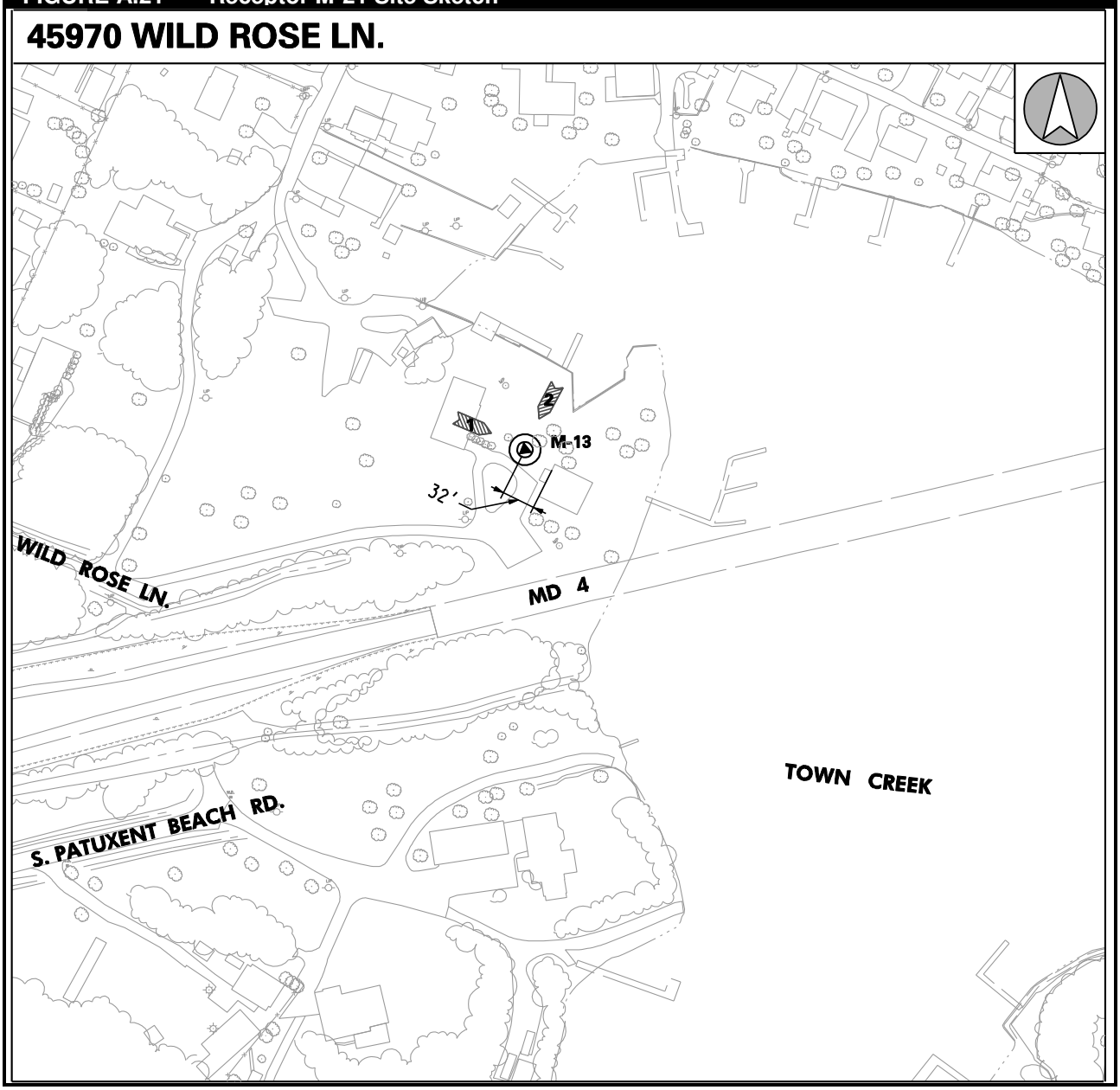
RECEPTOR M-21 – 23338 KINGSTON CREEK ROAD

General

One short-term noise measurement was taken at this location from 1200 Hrs. to 1220 Hrs. on 2009 May 20.

Receptor Site Sketch

FIGURE A.21 Receptor M-21 Site Sketch



Receptor Site Photographs

Photograph A.21a Receptor M-21 – 23338 Kingston Creek Road (View 1 of 2)

05-20-2009

Short Term Test

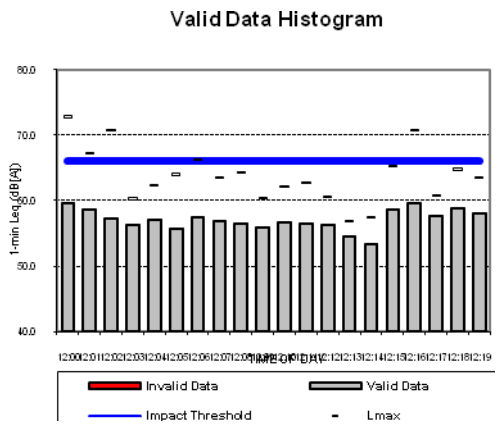
Photograph A.21b Receptor M-21 – 23338 Kingston Creek Road (View 2 of 2)

05-20-2009

Short Term Test

TABLE A.21 Receptor M-21 – 20-Minute Equivalent Sound Level (20-min Leq) Calculation – TMS04: 05-20-2009 1200-1220 Hrs.

Noise Measurement Data						Calculated Data		Traffic Volume Noise Level
TIME	1-min Leq	Lmax	Lpk	L(10.0)	L(90.0)	5-min Leq	20-min Leq	
	dB(A)	dB(A)	dB(C)	dB(A)	dB(A)	dB(A)	dB(A)	
12:00	59.6	72.8	<112.0	72.0	72.0	57.9	57.4	**57**
12:01	58.7	67.2	<112.0	67.0	67.0			
12:02	57.2	70.7	<112.0	70.0	70.0			
12:03	56.3	60.3	<112.0	60.0	60.0			
12:04	57.1	62.3	<112.0	62.0	62.0			
12:05	55.7	64.0	<112.0	64.0	64.0	56.6		
12:06	57.5	66.3	<112.0	66.0	66.0			
12:07	56.9	63.5	<112.0	63.0	63.0			
12:08	56.5	64.3	<112.0	64.0	64.0			
12:09	55.9	60.4	<112.0	60.0	60.0			
12:10	56.7	62.2	<112.0	62.0	62.0	55.7		
12:11	56.5	62.8	<112.0	62.0	62.0			
12:12	56.3	60.6	<112.0	60.0	60.0			
12:13	54.5	56.8	<112.0	56.0	56.0			
12:14	53.4	57.4	<112.0	57.0	57.0			
12:15	58.7	65.3	<112.0	65.0	65.0	58.6		
12:16	59.7	70.7	<112.0	70.0	70.0			
12:17	57.7	60.8	<112.0	60.0	60.0			
12:18	58.8	64.8	<112.0	64.0	64.0			
12:19	58.0	63.5	<112.0	63.0	63.0			



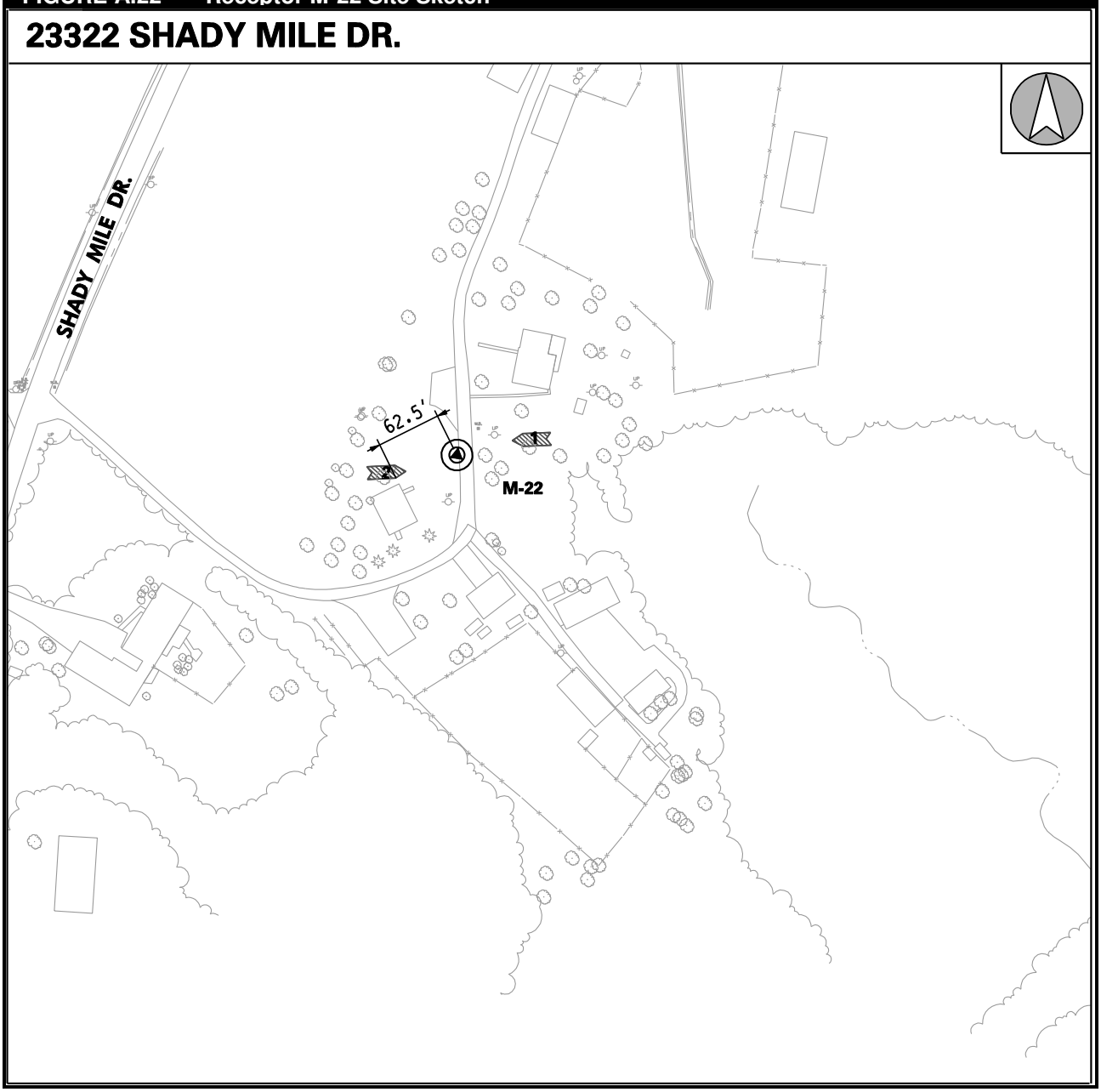
RECEPTOR M-22 – 23322 SHADY MILE DRIVE

General

One short-term noise measurement was taken at this location from 1200 Hrs. to 1220 Hrs. on 2009 May 20.

Receptor Site Sketch

FIGURE A.22 Receptor M-22 Site Sketch



Receptor Site Photographs

Photograph A.22a Receptor M-22 – 23322 Shady Mile Drive (View 1 of 2)

05-20-2009

Short Term Test

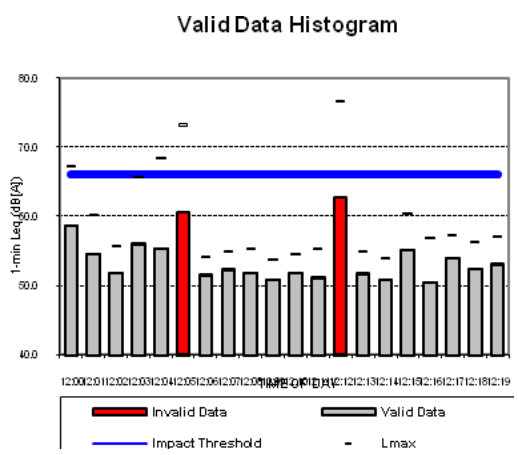
Photograph A.22b Receptor M-22 – 23222 Shady Mile Drive (View 2 of 2)

05-20-2009

Short Term Test

TABLE A.22 Receptor M-22 – 20-Minute Equivalent Sound Level (20-min Leq) Calculation – TMS04: 05-20-2009 1200-1220 Hrs.

Noise Measurement Data						Calculated Data		Traffic Volume Noise Level
TIME	1-min Leq	Lmax	Lpk	L(10.0)	L(90.0)	5-min Leq	20-min Leq	
	dB(A)	dB(A)	dB(C)	dB(A)	dB(A)	dB(A)	dB(A)	
12:00	58.7	67.2	<109.9	62.0	67.0	55.8	53.4	**53**
12:01	54.5	60.1	<109.9	56.0	60.0			
12:02	51.8	55.6	<109.9	53.0	55.0			
12:03	56.0	65.6	<109.9	60.0	65.0			
12:04	55.3	68.4	<109.9	57.0	68.0			
12:05	~~60.6~~	~~73.2~~	~~<109.9~~	~~63.0~~	~~73.0~~	51.6		
12:06	51.5	54.1	<109.9	53.0	54.0			
12:07	52.3	54.8	<109.9	54.0	54.0			
12:08	51.8	55.2	<109.9	54.0	55.0			
12:09	50.8	53.7	<109.9	52.0	53.0			
12:10	51.8	54.4	<109.9	53.0	54.0	51.4		
12:11	51.1	55.2	<109.9	52.0	55.0			
12:12	~~62.7~~	~~76.6~~	~~<109.9~~	~~63.0~~	~~76.0~~			
12:13	51.7	54.8	<109.9	53.0	54.0			
12:14	50.8	53.9	<109.9	53.0	53.0			
12:15	55.1	60.4	<109.9	58.0	60.0	53.3		
12:16	50.4	56.8	<109.9	52.0	56.0			
12:17	54.0	57.2	<109.9	56.0	57.0			
12:18	52.4	56.2	<109.9	53.0	56.0			
12:19	53.1	57.0	<109.9	55.0	57.0			



12:05 - 1-min Leq despiked for car passby.
12:12 - 1-min Leq despiked for car passby.

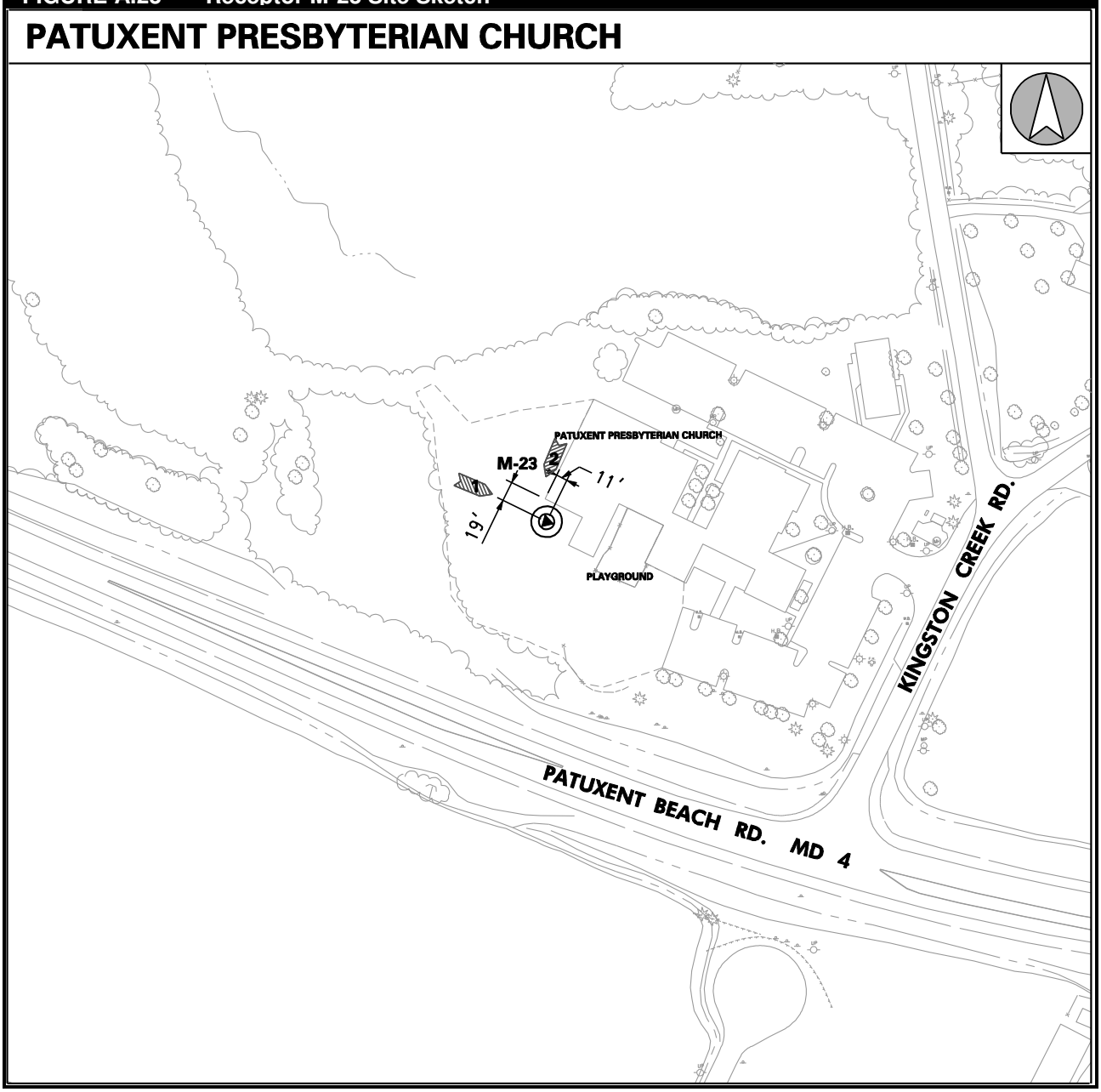
RECEPTOR M-23 – PATUXENT PRESBYTERIAN CHURCH

General

One short-term noise measurement was taken at this location from 1200 Hrs. to 1220 Hrs. on 2009 May 20.

Receptor Site Sketch

FIGURE A.23 Receptor M-23 Site Sketch



Receptor Site Photographs

Photograph A.23a Receptor M-23 – Patuxent Presbyterian Church (View 1 of 2)

05-20-2009

Short Term Test

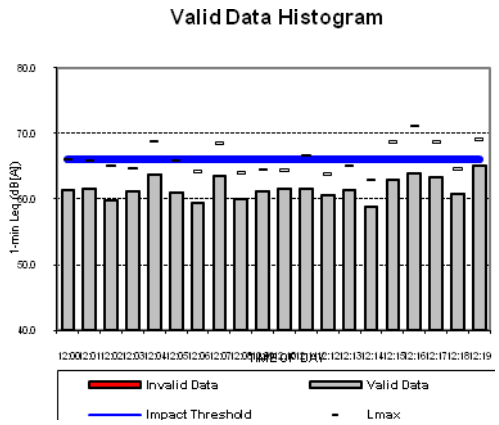
Photograph A.23b Receptor M-23 – Patuxent Presbyterian Church (View 2 of 2)

05-20-2009

Short Term Test

TABLE A.23 Receptor M-23 – 20-Minute Equivalent Sound Level (20-min Leq) Calculation – TMS04: 05-20-2009 1200-1220 Hrs.

Noise Measurement Data						Calculated Data		Traffic Volume Noise Level
TIME	1-min Leq	Lmax	Lpk	L(10.0)	L(99.9)	5-min Leq	20-min Leq	
	dB(A)	dB(A)	dB(C)	dB(A)	dB(A)	dB(A)	dB(A)	
12:00	61.4	66.1	"UNR"	65.0	50.0	61.7	62.0	**62**
12:01	61.5	65.9	"UNR"	64.0	50.0			
12:02	59.8	65.1	"UNR"	63.0	48.0			
12:03	61.1	64.7	"UNR"	63.0	48.0			
12:04	63.8	68.8	"UNR"	67.0	54.0			
12:05	60.9	65.9	"UNR"	63.0	52.0	61.3		
12:06	59.5	64.2	"UNR"	63.0	53.0			
12:07	63.6	68.5	"UNR"	65.0	57.0			
12:08	60.0	64.0	"UNR"	63.0	43.0			
12:09	61.2	64.5	"UNR"	63.0	56.0			
12:10	61.5	64.4	"UNR"	63.0	56.0	60.9		
12:11	61.5	66.7	"UNR"	65.0	53.0			
12:12	60.6	63.8	"UNR"	62.0	52.0			
12:13	61.4	65.1	"UNR"	64.0	47.0			
12:14	58.8	62.9	"UNR"	62.0	45.0			
12:15	63.0	68.7	"UNR"	67.0	50.0	63.5		
12:16	64.0	71.1	"UNR"	67.0	49.0			
12:17	63.4	68.7	"UNR"	65.0	53.0			
12:18	60.8	64.6	"UNR"	63.0	49.0			
12:19	65.1	69.1	"UNR"	67.0	60.0			



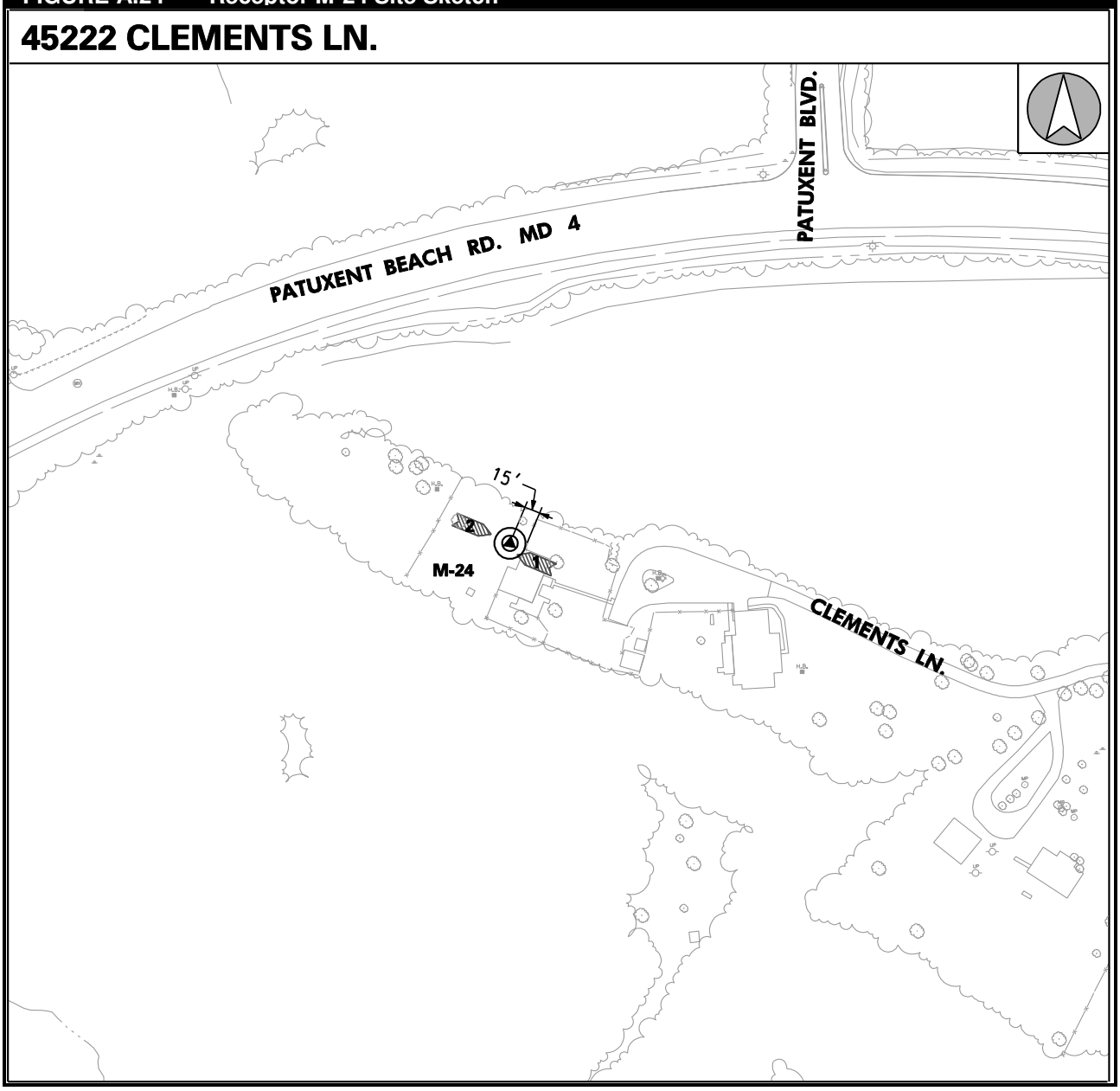
RECEPTOR M-24 – 45222 CLEMENTS LANE

General

One short-term noise measurement was taken at this location from 1240 Hrs. to 1300 Hrs. on 2009 May 20.

Receptor Site Sketch

FIGURE A.24 Receptor M-24 Site Sketch



Receptor Site Photographs

Photograph A.24a Receptor M-24 – 45222 Clements Lane (View 1 of 2)

05-20-2009

Short Term Test

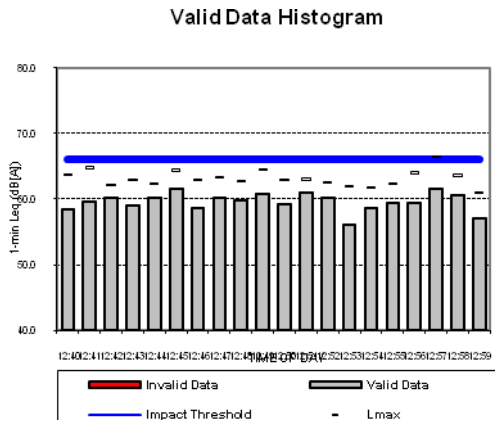
Photograph A.24b Receptor M-24 – 45222 Clements Lane (View 2 of 2)

05-20-2009

Short Term Test

TABLE A.24 Receptor M-24 – 20-Minute Equivalent Sound Level (20-min Leq) Calculation – TMS05: 05-20-2009 1240-1300 Hrs.

Noise Measurement Data						Calculated Data		Traffic Volume Noise Level
TIME	1-min Leq	Lmax	Lpk	L(10.0)	L(90.0)	5-min Leq	20-min Leq	
	dB(A)	dB(A)	dB(C)	dB(A)	dB(A)	dB(A)	dB(A)	
12:40	58.4	63.7	<109.9	62.0	63.0	59.5	59.8	**60**
12:41	59.6	64.8	<109.9	63.0	64.0			
12:42	60.2	62.2	<109.9	61.0	62.0			
12:43	59.0	62.9	<109.9	62.0	62.0			
12:44	60.2	62.3	<109.9	61.0	62.0			
12:45	61.5	64.4	<109.9	63.0	64.0	60.3		
12:46	58.6	62.9	<109.9	62.0	62.0			
12:47	60.2	63.3	<109.9	62.0	63.0			
12:48	59.8	62.7	<109.9	62.0	62.0			
12:49	60.7	64.5	<109.9	63.0	64.0			
12:50	59.2	62.9	<109.9	62.0	62.0	59.3		
12:51	60.9	63.0	<109.9	62.0	63.0			
12:52	60.2	62.5	<109.9	62.0	62.0			
12:53	56.1	62.0	<109.9	59.0	62.0			
12:54	58.6	61.7	<109.9	60.0	61.0			
12:55	59.5	62.3	<109.9	61.0	62.0	59.9		
12:56	59.4	64.0	<109.9	61.0	64.0			
12:57	61.5	66.4	<109.9	64.0	66.0			
12:58	60.6	63.6	<109.9	62.0	63.0			
12:59	57.1	61.0	<109.9	59.0	61.0			



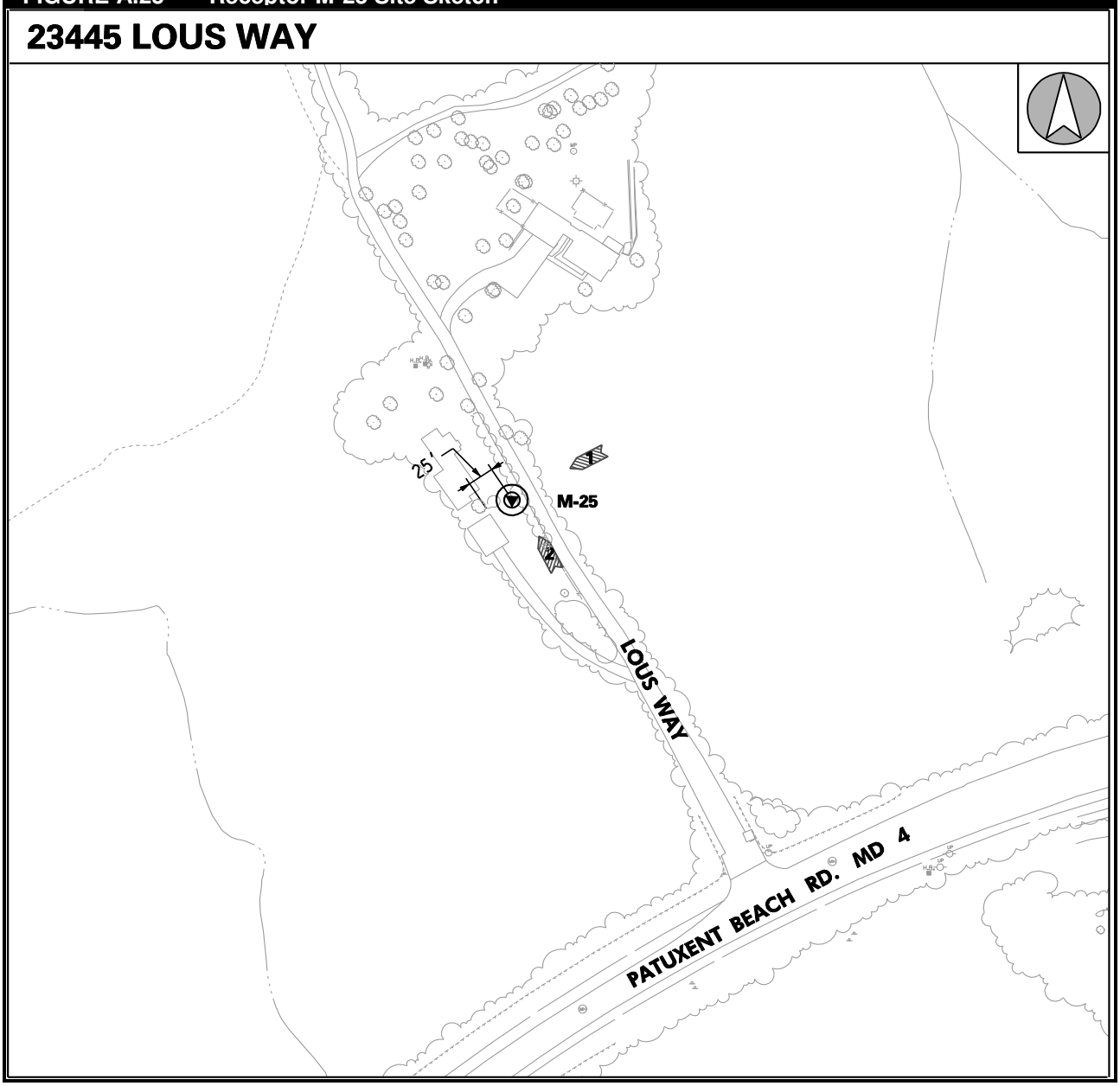
RECEPTOR M-25 – 23445 LOUS WAY

General

One short-term noise measurement was taken at this location from 1240 Hrs. to 1300 Hrs. on 2009 May 20.

Receptor Site Sketch

FIGURE A.25 Receptor M-25 Site Sketch



Receptor Site Photographs

Photograph A.25a Receptor M-25 – 23445 Lous Way (View 1 of 2)

05-20-2009

Short Term Test

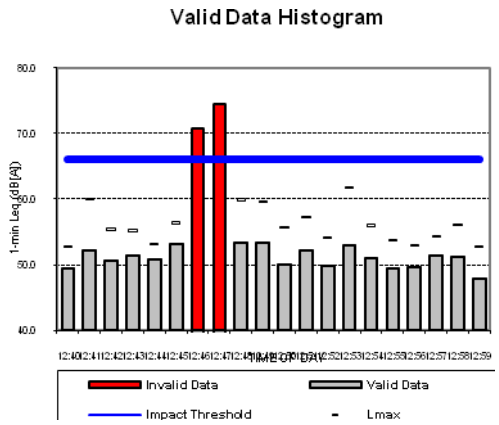
Photograph A.25b Receptor M-25 – 23445 Lous Way (View 2 of 2)

05-20-2009

Short Term Test

TABLE A.25 Receptor M-25 – 20-Minute Equivalent Sound Level (20-min Leq) Calculation – TMS05: 05-20-2009 1240-1300 Hrs.

Noise Measurement Data						Calculated Data		Traffic Volume Noise Level
TIME	1-min Leq	Lmax	Lpk	L(10.0)	L(99.9)	5-min Leq	20-min Leq	
	dB(A)	dB(A)	dB(C)	dB(A)	dB(A)	dB(A)	dB(A)	
12:40	49.4	52.8	"UNR"	51.0	43.0	51.0	51.6	**52**
12:41	52.1	60.0	"UNR"	54.0	44.0			
12:42	50.6	55.4	"UNR"	52.0	46.0			
12:43	51.4	55.2	"UNR"	53.0	45.0			
12:44	50.8	53.1	108.3	52.0	44.0			
12:45	53.1	56.4	108.8	54.0	50.0	53.3		
12:46	~~70.8~~	~~88.9~~	~~143.5~~	~~62.0~~	~~46.0~~			
12:47	~~74.5~~	~~92.7~~	~~"OVR"~~	~~63.0~~	~~46.0~~			
12:48	53.3	59.9	"UNR"	56.0	45.0			
12:49	53.4	59.6	"UNR"	55.0	48.0			
12:50	50.0	55.7	"UNR"	51.0	45.0	51.4		
12:51	52.2	57.2	"UNR"	53.0	49.0			
12:52	49.8	54.2	"UNR"	51.0	44.0			
12:53	52.9	61.7	"UNR"	55.0	43.0			
12:54	51.1	56.0	"UNR"	53.0	46.0			
12:55	49.4	53.7	"UNR"	51.0	45.0	50.0		
12:56	49.6	53.0	"UNR"	51.0	45.0			
12:57	51.3	54.4	"UNR"	53.0	45.0			
12:58	51.2	56.1	"UNR"	53.0	44.0			
12:59	47.8	52.8	"UNR"	50.0	42.0			



12:46 - 1-min Leq despiked. No recorded field observation.
12:47 - 1-min Leq despiked. No recorded field observation.

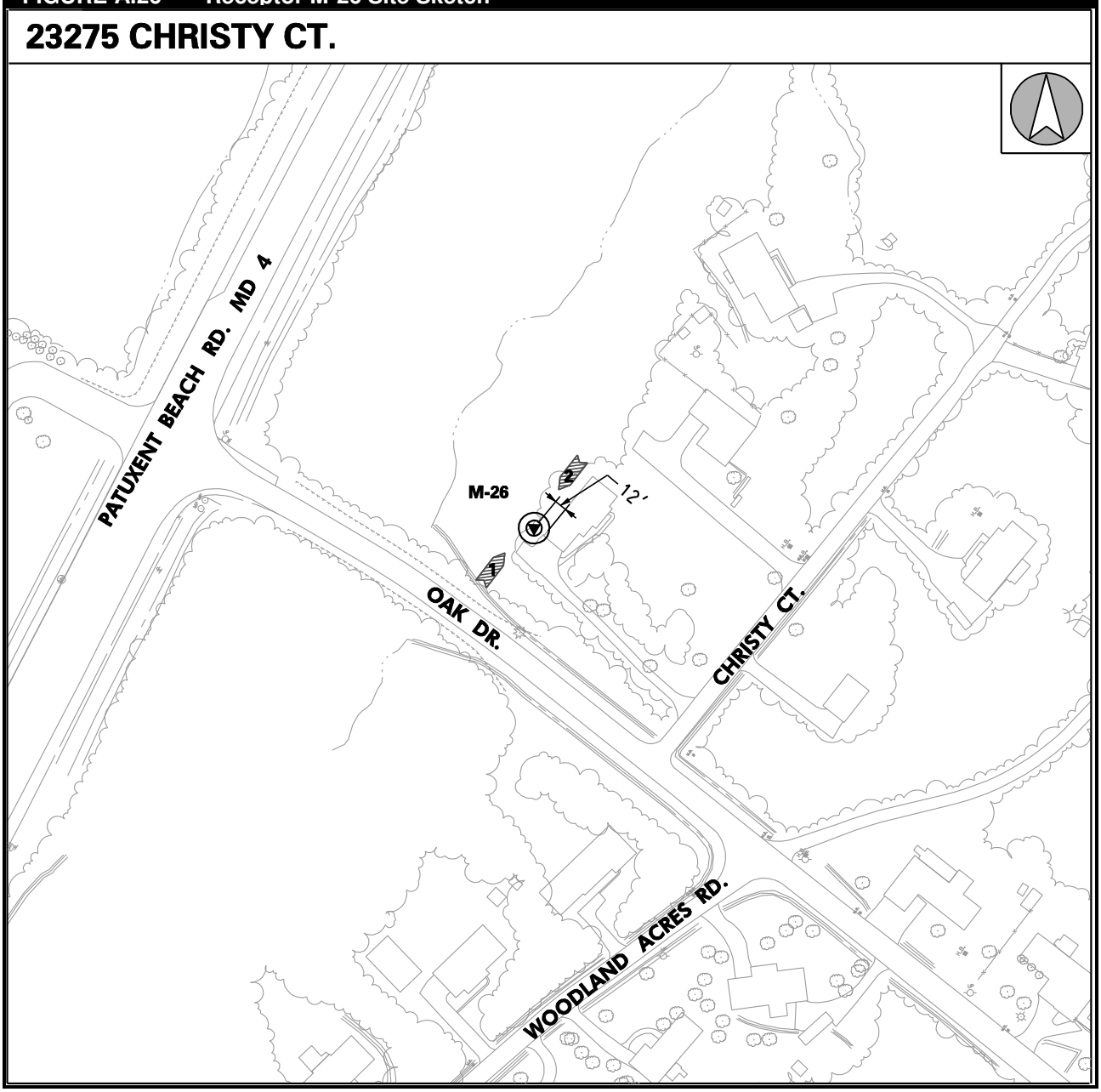
RECEPTOR M-26 – 23275 CHRISTY COURT

General

One short-term noise measurement was taken at this location from 1240 Hrs. to 1300 Hrs. on 2009 May 20.

Receptor Site Sketch

FIGURE A.26 Receptor M-26 Site Sketch



Receptor Site Photographs

Photograph A.26a Receptor M-26 – 23275 Christy Court (View 1 of 2)

05-20-2009

Short Term Test

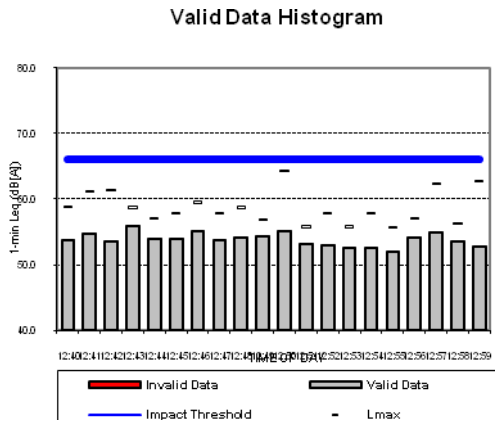
Photograph A.26b Receptor M-26 – 23275 Christy Court (View 2 of 2)

05-20-2009

Short Term Test

TABLE A.26 Receptor M-26 – 20-Minute Equivalent Sound Level (20-min Leq) Calculation – TMS05: 05-20-2009 1240-1300 Hrs.

Noise Measurement Data						Calculated Data		Traffic Volume Noise Level
TIME	1-min Leq	Lmax	Lpk	L(10.0)	L(90.0)	5-min Leq	20-min Leq	
	dB(A)	dB(A)	dB(C)	dB(A)	dB(A)	dB(A)	dB(A)	
12:40	53.7	58.8	<109.6	58.0	58.0	54.4	54.0	**54**
12:41	54.7	61.1	<109.6	61.0	61.0			
12:42	53.5	61.4	<109.6	61.0	61.0			
12:43	55.8	58.7	<109.6	58.0	58.0			
12:44	53.9	57.1	<109.6	57.0	57.0			
12:45	54.0	57.9	<109.6	57.0	57.0	54.3		
12:46	55.1	59.5	<109.6	59.0	59.0			
12:47	53.8	57.9	<109.6	57.0	57.0			
12:48	54.2	58.7	<109.6	58.0	58.0			
12:49	54.3	56.9	<109.6	56.0	56.0			
12:50	55.2	64.3	<109.6	64.0	64.0	53.4		
12:51	53.1	55.8	<109.6	55.0	55.0			
12:52	53.0	57.9	<109.6	57.0	57.0			
12:53	52.6	55.8	<109.6	55.0	55.0			
12:54	52.5	57.9	<109.6	57.0	57.0			
12:55	51.9	55.7	<109.6	55.0	55.0	53.6		
12:56	54.2	57.1	<109.6	57.0	57.0			
12:57	55.0	62.4	<109.6	62.0	62.0			
12:58	53.5	56.3	<109.6	56.0	56.0			
12:59	52.8	62.8	<109.6	62.0	62.0			



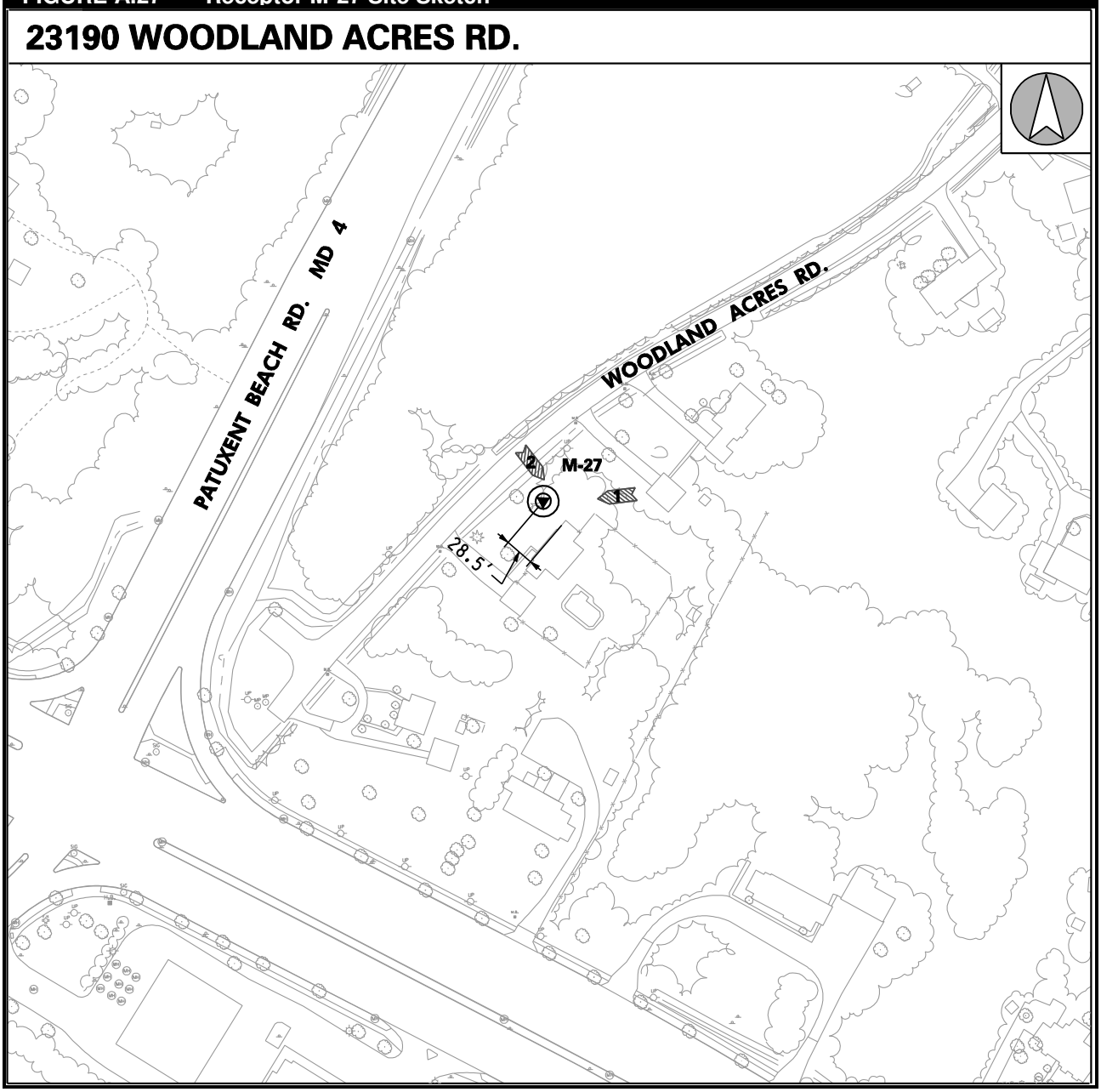
RECEPTOR M-27 – 23190 WOODLAND ACRES ROAD

General

One short-term noise measurement was taken at this location from 1240 Hrs. to 1300 Hrs. on 2009 May 20.

Receptor Site Sketch

FIGURE A.27 Receptor M-27 Site Sketch



Receptor Site Photographs

Photograph A.27a Receptor M-27 – 23190 Woodland Acres Road (View 1 of 2)

05-20-2009

Short Term Test

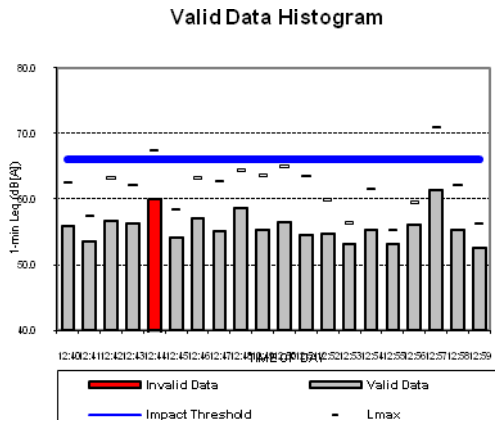
Photograph A.27b Receptor M-27 – 23190 Woodland Acres Road (View 2 of 2)

05-20-2009

Short Term Test

TABLE A.27 Receptor M-27 – 20-Minute Equivalent Sound Level (20-min Leq) Calculation – TMS05: 05-20-2009 1240-1300 Hrs.

Noise Measurement Data						Calculated Data		Traffic Volume Noise Level
TIME	1-min Leq	Lmax	Lpk	L(10.0)	L(99.9)	5-min Leq	20-min Leq	
	dB(A)	dB(A)	dB(C)	dB(A)	dB(A)	dB(A)	dB(A)	
12:40	55.8	62.6	"UNR"	58.0	52.0	55.7	56.1	**56**
12:41	53.6	57.5	"UNR"	55.0	50.0			
12:42	56.6	63.2	"UNR"	59.0	51.0			
12:43	56.2	62.2	"UNR"	58.0	52.0			
12:44	~~60.0~~	~~67.4~~	~~"UNR"~~	~~62.0~~	~~54.0~~			
12:45	54.2	58.5	"UNR"	56.0	50.0	56.4		
12:46	57.1	63.2	"UNR"	60.0	49.0			
12:47	55.2	62.8	"UNR"	58.0	50.0			
12:48	58.6	64.4	"UNR"	62.0	49.0			
12:49	55.3	63.6	"UNR"	58.0	50.0			
12:50	56.4	65.0	"UNR"	58.0	51.0	54.9		
12:51	54.5	63.5	"UNR"	54.0	51.0			
12:52	54.7	59.9	"UNR"	56.0	51.0			
12:53	53.2	56.4	"UNR"	55.0	49.0			
12:54	55.3	61.6	"UNR"	58.0	48.0			
12:55	53.1	55.3	"UNR"	54.0	50.0	57.0		
12:56	56.1	59.5	"UNR"	58.0	51.0			
12:57	61.3	70.9	"UNR"	67.0	52.0			
12:58	55.3	62.1	"UNR"	60.0	48.0			
12:59	52.6	56.3	"UNR"	54.0	49.0			



12:44 - 1-min Leq despiked for ambulance siren.

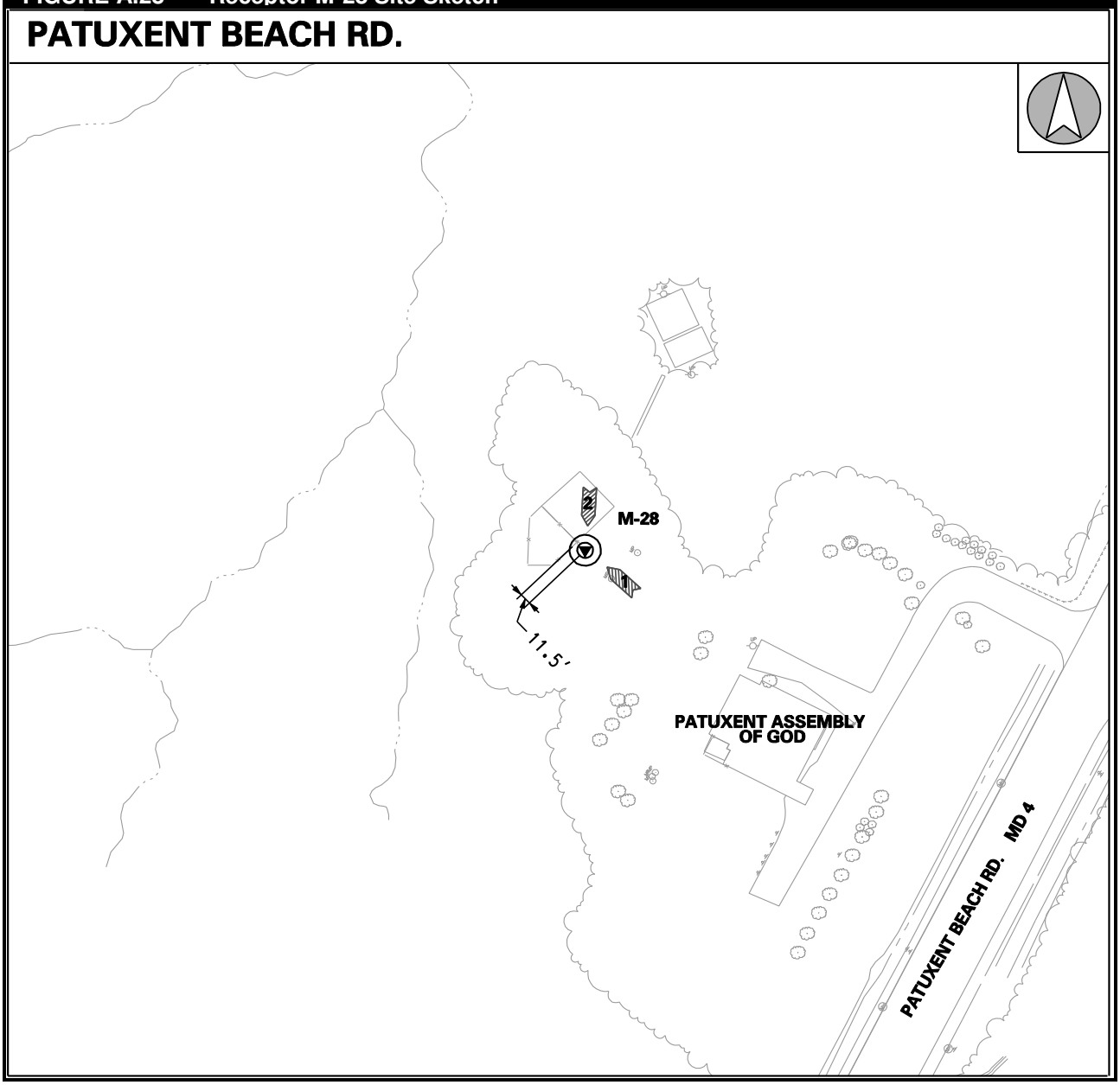
RECEPTOR M-28 – PATUXENT BEACH ROAD

General

One short-term noise measurement was taken at this location from 1240 Hrs. to 1300 Hrs. on 2009 May 20.

Receptor Site Sketch

FIGURE A.28 Receptor M-28 Site Sketch



Receptor Site Photographs

Photograph A.28a Receptor M-28 – Patuxent Beach Road (View 1 of 2)

05-20-2009

Short Term Test

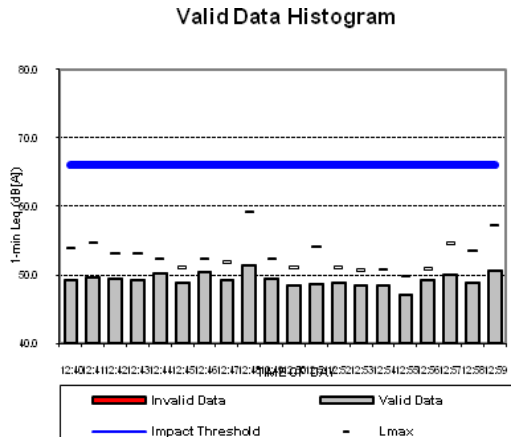
Photograph A.28b Receptor M-28 – Patuxent Beach Road (View 2 of 2)

05-20-2009

Short Term Test

TABLE A.28 Receptor M-28 – 20-Minute Equivalent Sound Level (20-min Leq) Calculation – TMS05: 05-20-2009 1240-1300 Hrs.

Noise Measurement Data						Calculated Data		Traffic Volume Noise Level
TIME	1-min Leq	Lmax	Lpk	L(10.0)	L(90.0)	5-min Leq	20-min Leq	
	dB(A)	dB(A)	dB(C)	dB(A)	dB(A)	dB(A)	dB(A)	
12:40	49.3	53.9	<112.0	53.0	53.0	49.6	49.4	**49**
12:41	49.7	54.7	<112.0	54.0	54.0			
12:42	49.4	53.1	<112.0	53.0	53.0			
12:43	49.3	53.2	<112.0	53.0	53.0			
12:44	50.2	52.3	<112.0	52.0	52.0			
12:45	48.8	51.1	<112.0	51.0	51.0	49.9		
12:46	50.4	52.4	<112.0	52.0	52.0			
12:47	49.2	51.9	<112.0	51.0	51.0			
12:48	51.3	59.2	<112.0	59.0	59.0			
12:49	49.5	52.3	<112.0	52.0	52.0			
12:50	48.4	51.1	<112.0	51.0	51.0	48.6		
12:51	48.6	54.2	<112.0	54.0	54.0			
12:52	48.9	51.1	<112.0	51.0	51.0			
12:53	48.5	50.7	<112.0	50.0	50.0			
12:54	48.5	50.8	<112.0	50.0	50.0			
12:55	47.1	49.8	<112.0	49.0	49.0	49.4		
12:56	49.3	50.9	<112.0	50.0	50.0			
12:57	50.1	54.6	<112.0	54.0	54.0			
12:58	48.9	53.5	<112.0	53.0	53.0			
12:59	50.6	57.2	<112.0	57.0	57.0			



RECEPTOR M-29, M-30, M31 – BACKGROUND TESTS

General

One short-term noise measurement was taken at each of these locations from 1100 Hrs. to 1120 Hrs., 1140 Hrs. to 1140 Hrs., and 1320 Hrs. to 1340 Hrs. on 2009 June 30.

Receptor Site Sketch

FIGURE A.29 Receptor M-29, M-30, M-31 Site Location Map

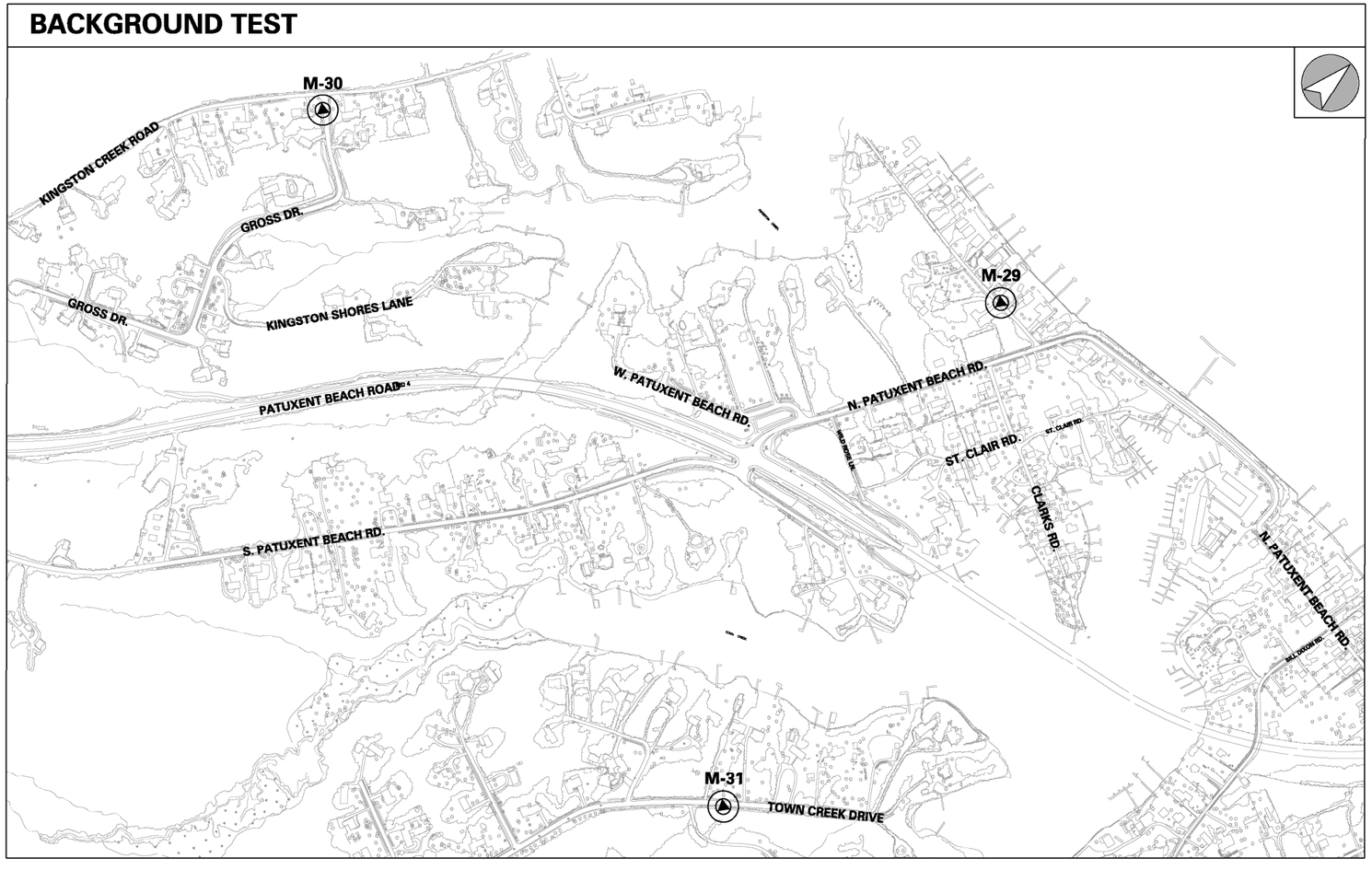
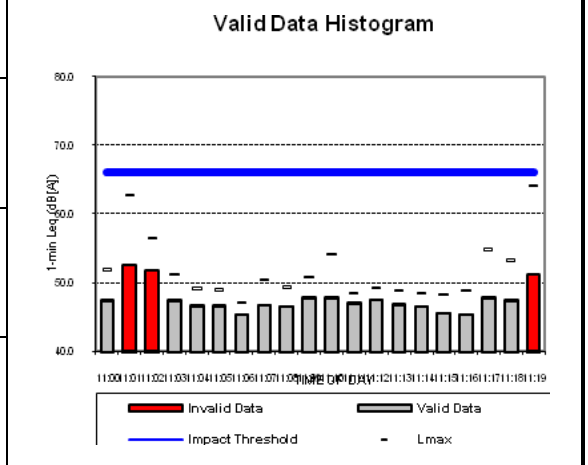


TABLE A.29 Receptor M-29 – 20-Minute Equivalent Sound Level (20-min Leq) Calculation – BACKGROUND: 06-30-2009 1100-1120 Hrs.

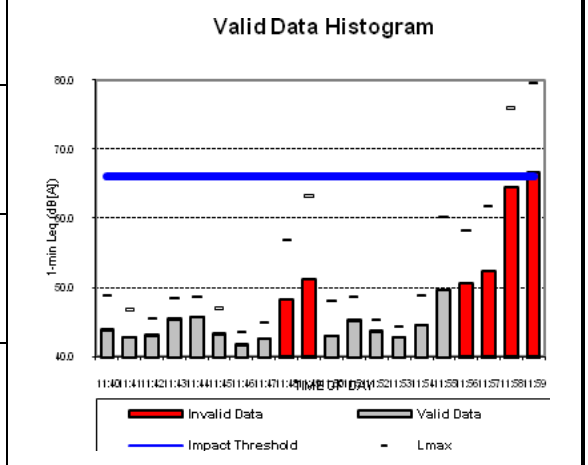
	Noise Measurement Data					Calculated Data		Traffic Volume Noise Level
TIME	1-min Leq	Lmax	Lpk	L(10.0)	L(90.0)	5-min Leq	20-min Leq	
	dB(A)	dB(A)	dB(C)	dB(A)	dB(A)	dB(A)	dB(A)	
11:00	47.4	51.9	"UNR"	49.0	45.0	47.1	46.9	47
11:01	~~52.5~~	~~62.7~~	~~"UNR"~~	~~54.0~~	~~46.0~~			
11:02	~~51.7~~	~~56.5~~	~~"UNR"~~	~~54.0~~	~~48.0~~			
11:03	47.4	51.2	"UNR"	49.0	45.0			
11:04	46.6	49.2	"UNR"	47.0	45.0			
11:05	46.6	49.0	"UNR"	48.0	44.0	46.7		
11:06	45.3	47.2	"UNR"	46.0	44.0			
11:07	46.7	50.4	"UNR"	48.0	45.0			
11:08	46.5	49.4	"UNR"	47.0	45.0			
11:09	47.8	50.8	"UNR"	48.0	46.0			
11:10	47.8	54.1	108.7	49.0	45.0	47.1		
11:11	47.0	48.5	"UNR"	47.0	46.0			
11:12	47.5	49.3	"UNR"	48.0	46.0			
11:13	46.8	48.9	"UNR"	48.0	45.0			
11:14	46.5	48.6	"UNR"	47.0	44.0			
11:15	45.5	48.3	"UNR"	46.0	44.0	46.6		
11:16	45.3	48.9	"UNR"	46.0	44.0			
11:17	47.8	54.8	"UNR"	50.0	45.0			
11:18	47.4	53.3	"UNR"	49.0	45.0			
11:19	~~51.1~~	~~64.0~~	~~"UNR"~~	~~51.0~~	~~47.0~~			



11:01 - 1-min Leq despiked for car passby.
11:02 - 1-min Leq despiked for small plane.
11:19 - 1-min Leq despiked for loud birds.

TABLE A.30 Receptor M-30 – 20-Minute Equivalent Sound Level (20-min Leq) Calculation – BACKGROUND: 06-30-2009 1140-1200 Hrs.

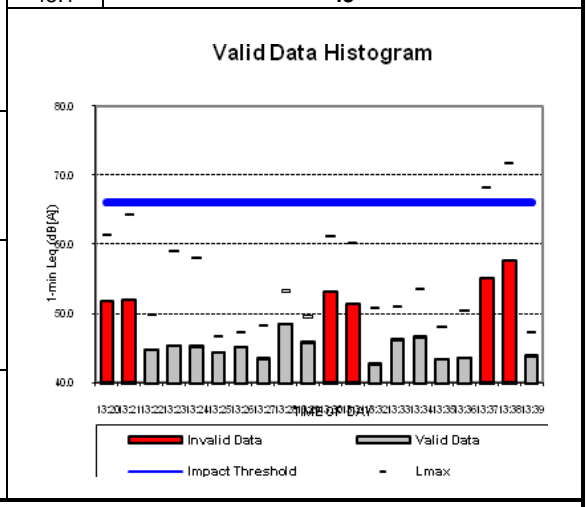
	Noise Measurement Data					Calculated Data		Traffic Volume Noise Level
TIME	1-min Leq	Lmax	Lpk	L(10.0)	L(90.0)	5-min Leq	20-min Leq	
	dB(A)	dB(A)	dB(C)	dB(A)	dB(A)	dB(A)	dB(A)	
11:40	43.9	48.9	"UNR"	45.0	42.0	44.3	46.1	46
11:41	42.8	46.8	"UNR"	43.0	41.0			
11:42	43.1	45.6	"UNR"	43.0	42.0			
11:43	45.4	48.4	"UNR"	47.0	44.0			
11:44	45.7	48.6	"UNR"	47.0	44.0			
11:45	43.3	47.0	"UNR"	45.0	41.0	42.6		
11:46	41.7	43.6	"UNR"	42.0	41.0			
11:47	42.6	45.0	"UNR"	43.0	41.0			
11:48	~~48.3~~	~~56.8~~	~~"UNR"~~	~~52.0~~	~~41.0~~			
11:49	~~51.2~~	~~63.2~~	~~"UNR"~~	~~54.0~~	~~41.0~~			
11:50	43.0	48.0	"UNR"	44.0	41.0	44.0		
11:51	45.2	48.6	"UNR"	46.0	43.0			
11:52	43.7	45.4	"UNR"	44.0	43.0			
11:53	42.8	44.4	"UNR"	43.0	42.0			
11:54	44.6	48.8	"UNR"	46.0	42.0			
11:55	49.7	60.2	"UNR"	52.0	42.0	49.7		
11:56	~~50.5~~	~~58.3~~	~~"UNR"~~	~~53.0~~	~~45.0~~			
11:57	~~52.4~~	~~61.8~~	~~"UNR"~~	~~56.0~~	~~44.0~~			
11:58	~~64.5~~	~~75.9~~	~~"UNR"~~	~~67.0~~	~~50.0~~			
11:59	~~66.6~~	~~79.5~~	~~"UNR"~~	~~69.0~~	~~55.0~~			



11:48 - 1-min Leq despiked for car passby.
11:49 - 1-min Leq despiked for car passby.
11:56 - 1-min Leq despiked for car passby.
11:57 - 1-min Leq despiked for tow truck passby.
11:58 - 1-min Leq despiked for tow truck passby.
11:59 - 1-min Leq despiked for tow truck passby, jet flyover.

TABLE A.31 Receptor M-31 – 20-Minute Equivalent Sound Level (20-min Leq) Calculation – BACKGROUND: 06-30-2009 1320-1340 Hrs.

Noise Measurement Data						Calculated Data		Traffic Volume Noise Level
TIME	1-min Leq	Lmax	Lpk	L(10.0)	L(90.0)	5-min Leq	20-min Leq	
	dB(A)	dB(A)	dB(C)	dB(A)	dB(A)	dB(A)	dB(A)	
13:20	~~51.8~~	~~61.3~~	~~"UNR"~~	~~56.0~~	~~41.0~~	45.1	45.1	**45**
13:21	~~52.0~~	~~64.3~~	~~"UNR"~~	~~53.0~~	~~43.0~~			
13:22	44.7	49.9	"UNR"	46.0	42.0			
13:23	45.3	59.0	"UNR"	45.0	42.0			
13:24	45.2	58.1	"UNR"	44.0	42.0			
13:25	44.4	46.8	"UNR"	45.0	42.0	45.8		
13:26	45.1	47.3	"UNR"	46.0	43.0			
13:27	43.5	48.4	"UNR"	45.0	41.0			
13:28	48.5	53.3	"UNR"	51.0	43.0			
13:29	45.8	49.6	"UNR"	48.0	43.0			
13:30	~~53.2~~	~~61.2~~	~~"UNR"~~	~~58.0~~	~~43.0~~	45.5		
13:31	~~51.3~~	~~60.2~~	~~"UNR"~~	~~56.0~~	~~42.0~~			
13:32	42.7	50.8	"UNR"	43.0	41.0			
13:33	46.2	51.0	"UNR"	48.0	44.0			
13:34	46.6	53.6	"UNR"	49.0	43.0			
13:35	43.4	48.2	"UNR"	44.0	42.0	43.6		
13:36	43.6	50.5	"UNR"	44.0	42.0			
13:37	~~55.1~~	~~68.2~~	~~"UNR"~~	~~56.0~~	~~43.0~~			
13:38	~~57.7~~	~~71.6~~	~~"UNR"~~	~~58.0~~	~~42.0~~			
13:39	43.9	47.4	"UNR"	45.0	41.0			



13:20 - 1-min Leq despiked for car passby.
13:21 - 1-min Leq despiked for car passby.
13:30 - 1-min Leq despiked for plane flyover.
13:31 - 1-min Leq despiked for plane flyover.
13:37 - 1-min Leq despiked for car passby.
13:38 - 1-min Leq despiked for car passby.

MD 4 (PATUXENT BEACH ROAD)
PROJECT PLANNING STUDY

Calvert County and St. Mary's County, Maryland

NOISE ANALYSIS
TECHNICAL REPORT

FINAL
August 19, 2009

Appendix B
TRAFFIC MONITORING SESSIONS

Submitted To

MARYLAND STATE HIGHWAY ADMINISTRATION
OFFICE OF PLANNING AND PRELIMINARY ENGINEERING

Prepared By

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Appendix B – TRAFFIC MONITORING SESSIONS

MD 4 (Patuxent Beach Road)

PROJECT PLANNING STUDY

FINAL REPORT – *August 19, 2009*

INTRODUCTION

General

Concurrent short-term noise measurements were collected during six (6) Traffic Monitoring Sessions (TMSs) in which traffic counts of five classes of vehicles were obtained. TABLE B.1 lists in chronological order the traffic monitoring sessions conducted during this study and describes the interval time and duration of each session and the on-site weather conditions.

TABLE B.1 Traffic Monitoring Session Summary

Traffic Monitoring Session	Date	Interval	Duration	Temp (degree F)	Relative Humidity (%)	Wind Speed (mph)	Wind From Direction[1]
TMS 01	5/20/2009	1000-1020	20-min	64.0	50	Calm	Calm
TMS 02	5/20/2009	1040- 1100	20-min	66.0	48	Calm	Calm
TMS 03	5/20/2009	1120- 1140	20-min	66.9	44	5.8	East
TMS 04	5/20/2009	1200- 1220	20-min	68.0	42	9.2	East-Southeast
TMS 05	5/20/2009	1240- 1300	20-min	69.1	25	9.2	East-Southeast
TMS 06	5/20/2009	1340- 1400	20-min	70.0	28	10.4	East

1. Wind direction is defined as the direction the wind is blowing from. For example, if the Wind Direction is North, then the wind is blowing from the North and to the South.

TRAFFIC MONITORING SESSIONS

Refer to FIGURE B.1, FIGURE B.1a, FIGURE B.1b, FIGURE B.1c, FIGURE B.1d, and FIGURE B.1e for Traffic Monitoring Site Sketches with traffic count locations.

Traffic volumes on MD 4 and MD 235 were counted from the side of the road. Traffic speeds were measured using a radar gun.

TABLES B.2 thru B.7 show the roadway descriptions, counted traffic volume and measured traffic speed. The data is broken down according to vehicle type (autos, medium trucks, heavy trucks, buses, and motorcycles). All traffic volumes are shown in Vehicles per Hour (VPH), which was derived from the raw traffic counts. The specific interval and actual duration of each session is shown in each table. Note that the traffic data is only valid for the particular length of roadway described under “Limits” in each Traffic Volume Summary Table. Refer to Appendix D, TABLE D.1, TABLE D.2, TABLE D.3, TABLE D.4, TABLE D.5 and TABLE D.6 for the simultaneously measured Leq noise levels.

FIGURE B.1 **5-20-2009 Traffic Monitoring Site Sketch – TMS01**

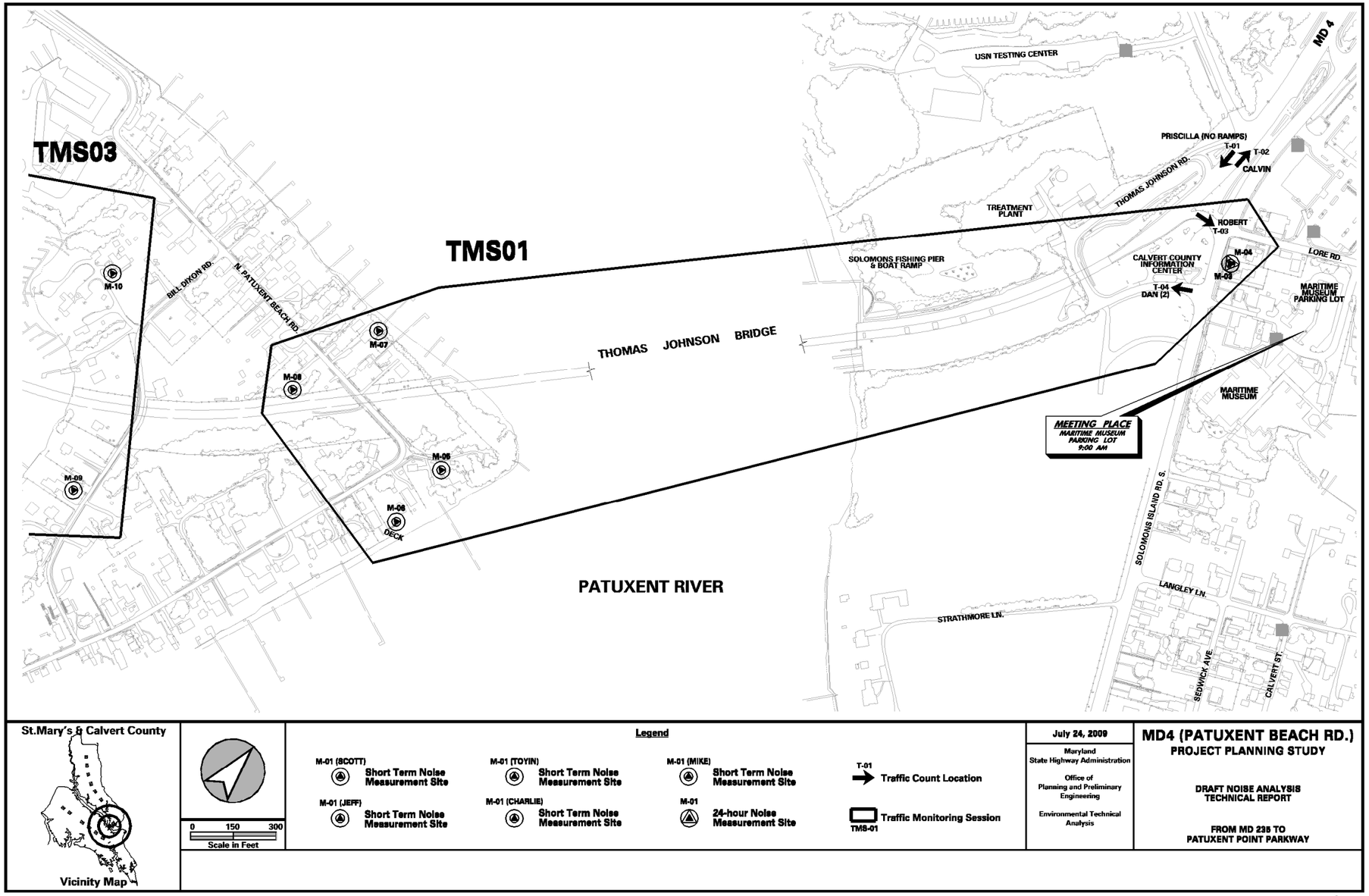


FIGURE B.1a **5-20-2009 Traffic Monitoring Site Sketch – TMS02**

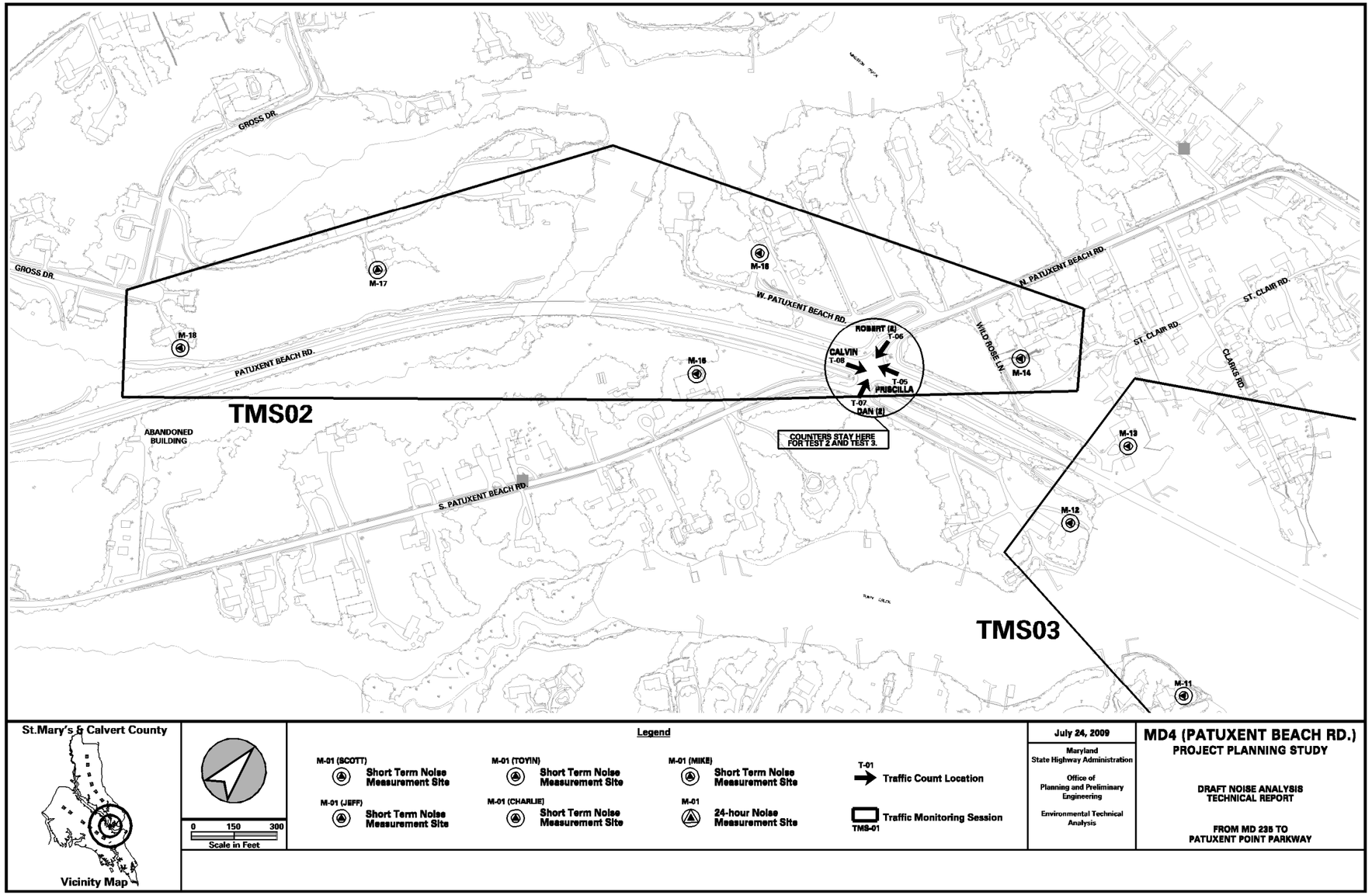


FIGURE B.1b **5-20-2009 Traffic Monitoring Site Sketch – TMS03**

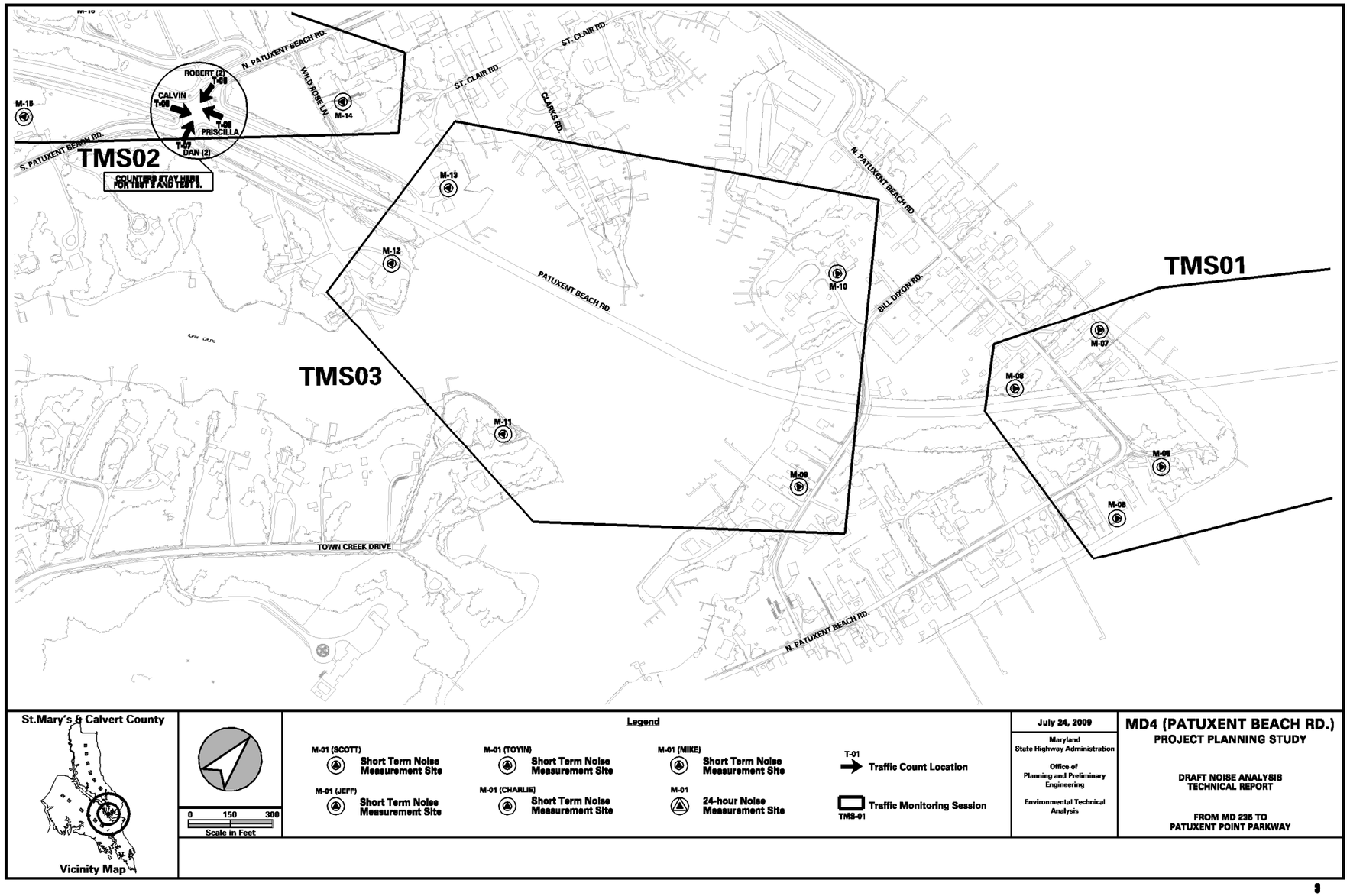


FIGURE B.1c **5-20-2009 Traffic Monitoring Site Sketch – TMS04**

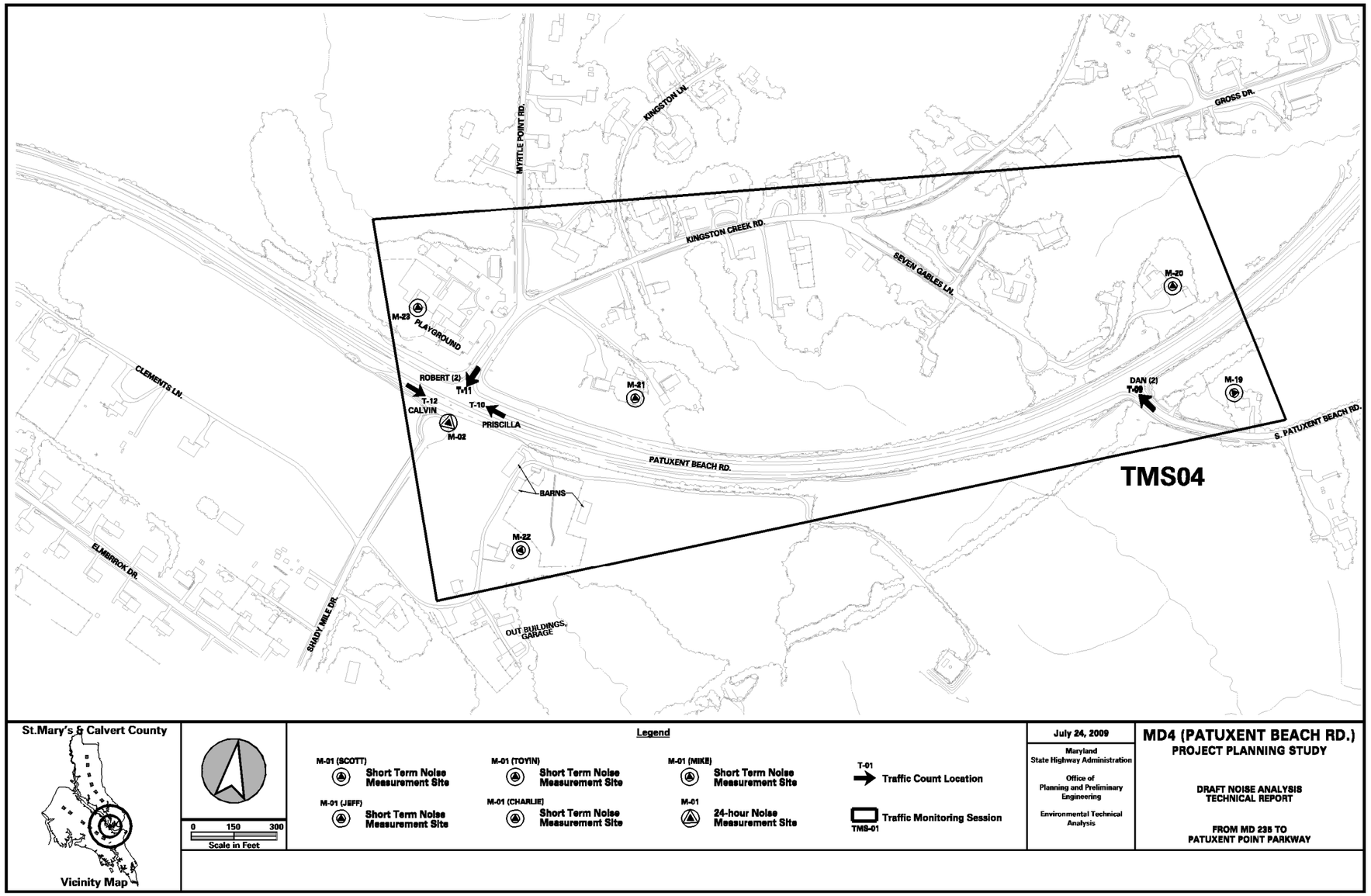


FIGURE B.1d **5-20-2009 Traffic Monitoring Site Sketch – TMS05**

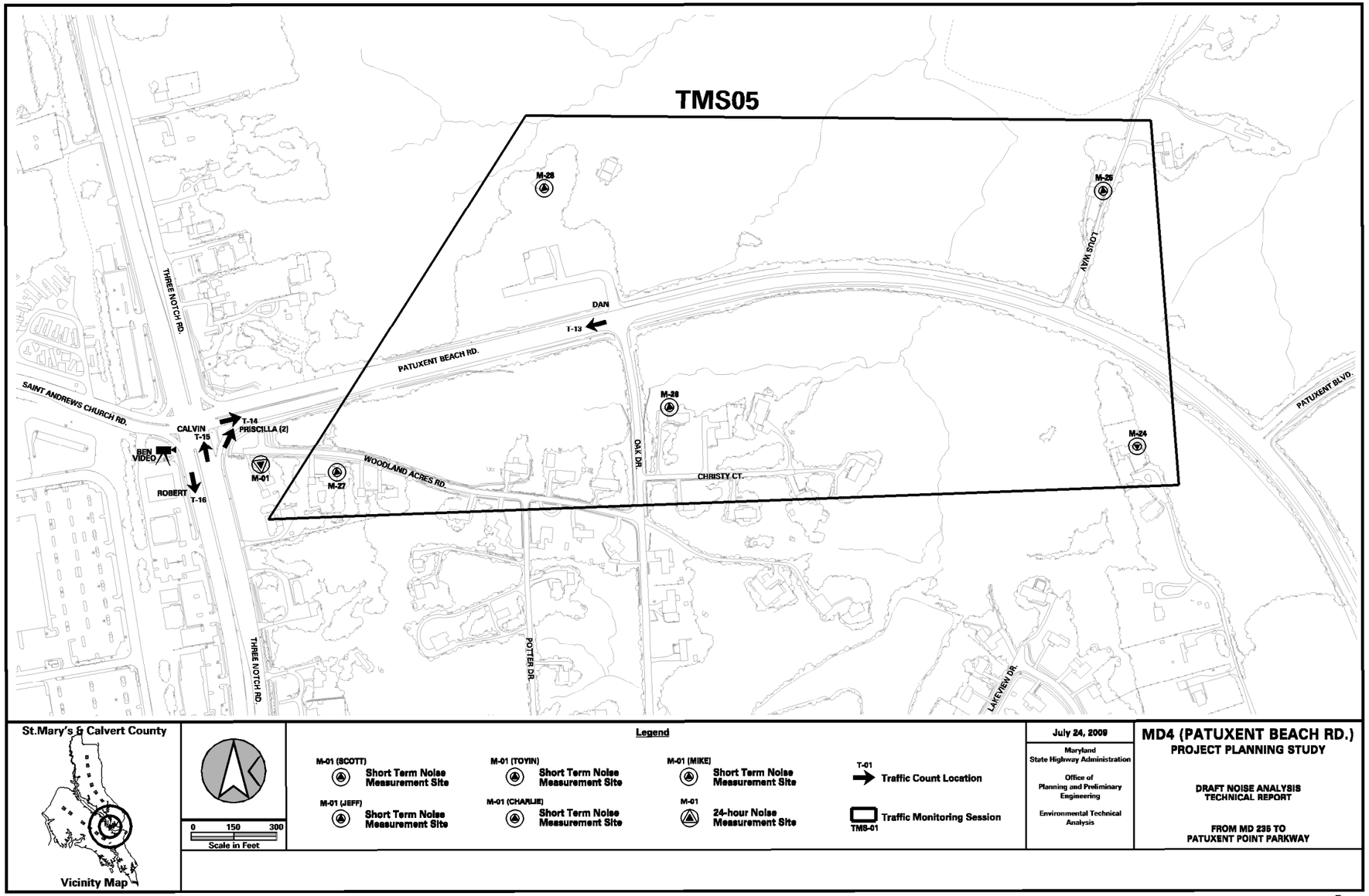
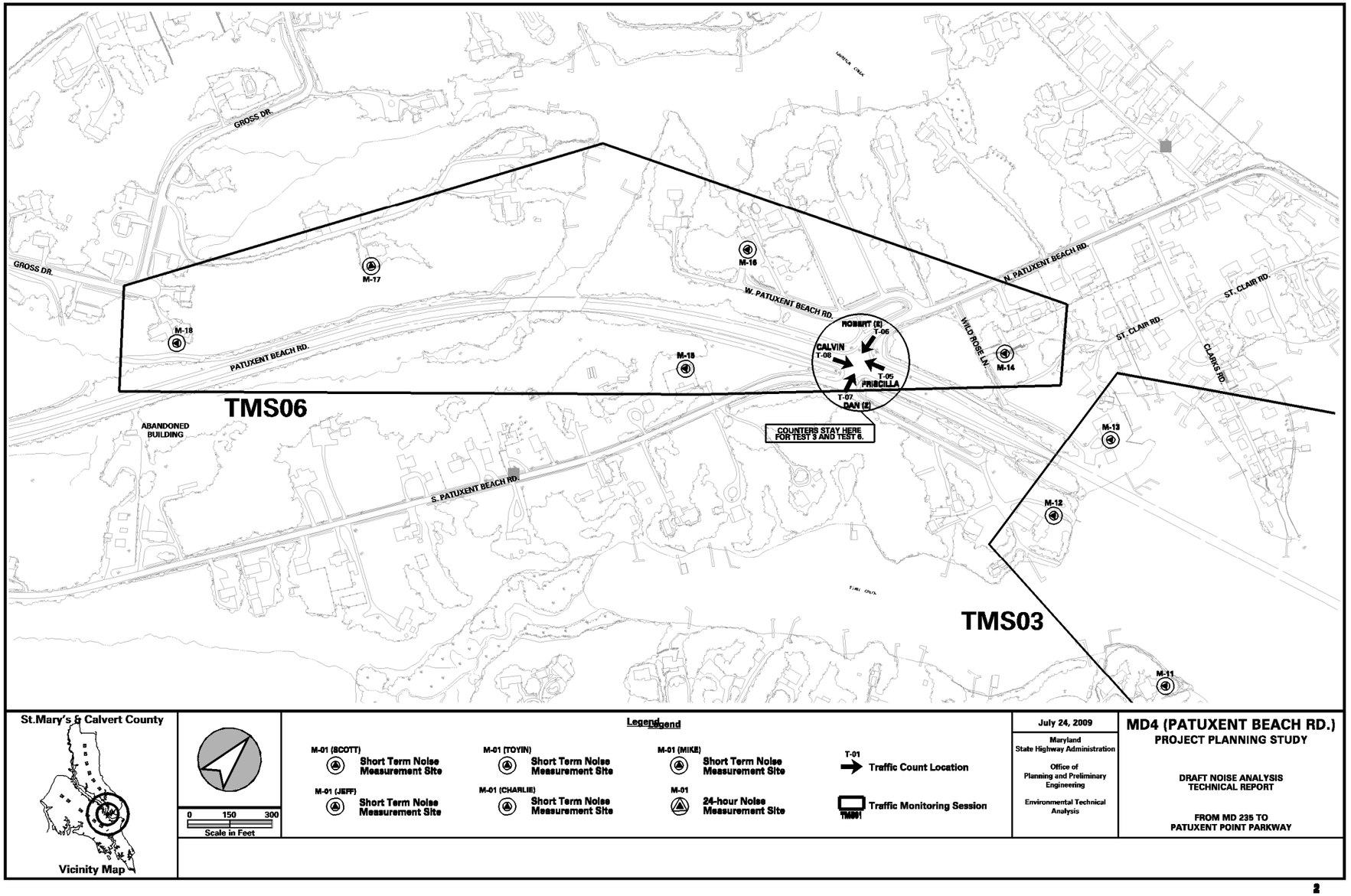


FIGURE B.1e **5-20-2009 Traffic Monitoring Site Sketch – TMS06**



Traffic Monitoring Session 01

TABLE B.2 Volume Summary - Traffic Monitoring Session 1 (TMS 01)

Limits		Date		Interval		Duration	
MD 4 at the Thomas Johnson Bridge		05/20/2009		1000-1020		20-min	
Roadway	**Autos (vph)**	**Medium Trucks (vph)**	**Heavy Trucks (vph)**	**Buses (vph)**	**Motor-Cycles (vph)**	**Total Volume (vph)**	**Speed (mph)**
a. MD 4 Northbound (NB)	438	15	6	12	0	471	43
b. MD 4 Southbound (SB)	570	24	39	6	6	645	40
c. Ramp to MD 4 Southbound	129	3	3	3	0	138	--
d. Ramp from MD 4 Southbound	24	0	0	0	0	24	37 off MD 4 SB
e. MD 4 Northbound Off-ramp	63	6	0	0	0	69	--

Noise measurement meters for this traffic session (TMS 01) were located at residences along North Patuxent Beach Road and Solomons Island Road South.

Traffic Monitoring Session 02

TABLE B.3 Volume Summary - Traffic Monitoring Session 2 (TMS 02)

Limits	Date	Interval	Duration
MD 4 at North & South Patuxent Beach Road	05/20/2009	1040-1100	20-min

Roadway	Autos (vph)	Medium Trucks (vph)	Heavy Trucks (vph)	Buses (vph)	Motor-Cycles (vph)	Total Volume (vph)	Speed (mph)
a. MD 4 Northbound	546	24	12	0	6	588	30
b. MD 4 Southbound	612	15	12	0	0	639	41
c. Northbound N. Patuxent Beach Road	27	6	0	0	0	33	--
d. Southbound N. Patuxent Beach Road	24	6	0	0	0	30	--
e. Northbound S. Patuxent Beach Road	3	0	0	0	0	3	--
f. Southbound S. Patuxent Beach Road	6	0	0	0	0	6	--

Noise measurement meters for this traffic session (TMS 02) were located at residences along Wild Rose Lane, S. Patuxent Beach Road, N. Patuxent Beach Road and Kingston Shores Lane.

Traffic Monitoring Session 03

TABLE B.4 Volume Summary - Traffic Monitoring Session 3 (TMS 03)

Limits		Date		Interval		Duration	
MD 4 from Bill Dixon Road to Thomas Johnson Bridge		05/20/2009		1120-1140		20-min	
Roadway	**Autos (vph)**	**Medium Trucks (vph)**	**Heavy Trucks (vph)**	**Buses (vph)**	**Motor-Cycles (vph)**	**Total Volume (vph)**	**Speed (mph)**
a. MD 4 Northbound	684	18	3	0	0	705	30
b. MD 4 Southbound	666	15	18	0	21	720	40
c. Northbound N. Patuxent Beach Road	36	0	0	0	0	36	--
d. Southbound N. Patuxent Beach Road	12	0	0	0	3	15	--

Noise measurement meters for this traffic session (TMS 03) were located at residences along Bill Dixon Road, Town Creek Drive, S. Patuxent Beach Drive and Wild Rose Lane.

Traffic Monitoring Session 04

TABLE B.5 Volume Summary - Traffic Monitoring Session4 (TMS 04)

Limits		Date		Interval		Duration	
MD 4 from Kingston Creek Road to East of South Patuxent Beach Road		05/20/2009		1200-1220		20-min	
Roadway	**Autos (vph)**	**Medium Trucks (vph)**	**Heavy Trucks (vph)**	**Buses (vph)**	**Motor-Cycles (vph)**	**Total Volume (vph)**	**Speed (mph)**
a. MD 4 Northbound	762	12	9	3	0	786	51
b. MD 4 Southbound	753	15	9	0	3	780	50
c. Northbound S. Patuxent Beach Road	12	0	0	0	0	12	--
d. Southbound S. Patuxent Beach Road	12	0	0	0	0	12	--
e. Northbound Kingston Creek Road	48	0	0	3	0	51	--
f. Southbound Kingston Creek Road	96	0	0	0	0	96	--

Noise measurement meters for this traffic session (TMS 04) were located at residences along Shady Mile Drive, Kingston Creek Road, Patuxent Beach Road, S. Patuxent Beach Drive and Seven Gables Lane.

Traffic Monitoring Session 05

TABLE B.6	Volume Summary - Traffic Monitoring Session 5 (TMS 05)						
Limits		**Date**		**Interval**		**Duration**	
MD 4 from MD 235 to East of Lous Way		05/20/2009		1240-1300		20-min	
Roadway	**Autos (vph)**	**Medium Trucks (vph)**	**Heavy Trucks (vph)**	**Buses (vph)**	**Motor-Cycles (vph)**	**Total Volume (vph)**	**Speed (mph)**
a. MD 4 Northbound	375	6	9	3	6	399	20
b. MD 4 Southbound	897	24	9	3	6	939	21
c. MD 235 NB to MD 4 NB (Rt. Turn)	480	15	12	3	12	522	--
d. MD 235 Northbound	1119	30	3	3	6	1161	37
e. MD 235 Southbound	1839	51	6	12	24	1932	31
f. MD 235 NB to MD 4 SB (Lt. Turn)	285	9	3	--	--	297	--

Noise measurement meters for this traffic session (TMS 05) were located at residences along Christy Court, Lous Way, Clements Lane, Patuxent Beach Road, and Woodland Acres Road.

Traffic Monitoring Session 06

TABLE B.7	Volume Summary - Traffic Monitoring Session 6 (TMS 06)						
Limits		**Date**		**Interval**		**Duration**	
MD 4 at North & South Patuxent Beach Road		05/20/2009		1340-1400		20-min	
Roadway	**Autos (vph)**	**Medium Trucks (vph)**	**Heavy Trucks (vph)**	**Buses (vph)**	**Motor-Cycles (vph)**	**Total Volume (vph)**	**Speed (mph)**
a. MD 4 Northbound	729	30	12	3	3	777	51
b. MD 4 Southbound	636	6	21	0	9	672	50
c. Northbound N. Patuxent Beach Road	42	3	0	0	0	45	--
d. Southbound N. Patuxent Beach Road	45	3	0	0	0	48	--
e. Northbound S. Patuxent Beach Road	3	3	0	0	0	6	--
f. Southbound S. Patuxent Beach Road	0	0	0	0	0	0	--

Noise measurement meters for this traffic session (TMS 06) were located at residences along Bill Dixon Road, Town Creek Drive, S. Patuxent Beach Road and Wild Rose Lane.

REFERENCE FILES

Appendix B

http:\\projectcenter.jmt.com\01\01-0456-029\ProjectFiles\00-JMT\Report\Final\MD4Final_Appendix B 08-19-2009.doc

http:\\projectcenter.jmt.com\01\01-0456-029\ProjectFiles\00-JMT\TNM\ Existing Traffic_Data_MD4.xls

http:\\projectcenter.jmt.com\01\01-0456-029\ProjectFiles\00-JMT\TNM\ Calibration Worksheet_MD4.xls

http://www.wunderground.com/history/airport/KNHK/2009/5/20/DailyHistory.html?req_city=NA&req_state=NA&req_statename=NA

MD 4 (PATUXENT BEACH ROAD)
PROJECT PLANNING STUDY

Calvert County and St. Mary's County, Maryland

NOISE ANALYSIS
TECHNICAL REPORT

FINAL
AUGUST 19, 2009

Appendix C
TNM MODEL INPUT

Submitted To

MARYLAND STATE HIGHWAY ADMINISTRATION
OFFICE OF PLANNING AND PRELIMINARY ENGINEERING

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INTRODUCTION

General

This Appendix documents the TNM Model Input used in both the TNM Model Calibration and the Sound Barrier Design. The TNM Model utilized eight possible TNM Objects to approximate the MD 4 study area:

1. Roadways
2. Receptors (Receivers)
3. Barriers
4. Building Rows
5. Terrain Lines
6. Ground Zones
7. Tree Zones
8. Contour Zones

Coordinate System

Each of the TNM Objects was modeled using the Maryland State Plane Coordinate System, which utilizes the North American Datum of 1983/1991 in Units of Feet (NAD83f) and the North American Vertical Datum of 1988 in Units of Feet (NAVD88f).

TNM Model Runs

The TNM Model Runs are divided into two categories:

1. TNM Model Calibration
2. Sound Barrier Design

The TNM Model Input for categories 1 and 2 is identical, except for the following items:

- Traffic Volumes
- Number of Barrier Segments
- Barrier Input Heights and Perturbations
- Number of Modeled Receptors.

See the TNM Model Objects Discussion below for further information.

TNM Model Calibration

The TNM models used for the model calibration were *TMS01 thru TMS06*. See Appendix D for a complete account of the TNM Model Calibration.

TNM Model Impact Analysis

The TNM models used for the traffic noise impact analysis were *Build_2030-AM and Build_2030-PM.* See Appendix F for further information on the Impact Analysis.

Sound Barrier Design

See Appendix G for further information on the Sound Barrier Design.

1). 2BRIDGE \ SB NSA09
2). MD4 \ SB NSA06
3) 4BRIDGE \ NB NSA07
4) CFI \ CFINSA14
5) FLYOVER \ FLYNSA14
6) MD4 \ NB NSA04
7) SPUI \ SPUI NSA14

TNM MODEL OBJECTS

Roadways

The TNM Models *TMS01 thru TMS06, EWC2009AM, EWC2009PM, NoBuild2030AM, NoBuild2030PM,* contain same number of roadway objects.

The width of each roadway object was input in such a way as to assure that:

(1) the shoulder not represented by a separate roadway object be included in the width of the travel lane, and

(2) overlap occurred between adjacent lanes and between adjacent lanes and shoulders, thereby avoiding pavement gaps within the model where none existed in the field, and

(3) the edge-of-pavement was accurately portrayed in the model for whichever shoulder of each roadway/ramp was closest to the study area residences. This is a critical factor in calculating vehicle tire noise emanating from a roadway.

All roadways were modeled using *Average* Pavement for the TNM Model Calibration, Impact Analysis, and Sound Barrier Design. The different traffic volumes used for the TNM Model Calibration and the Impact Analysis / Sound Barrier Design are discussed in Appendices B and E, respectively.

Receptors (Receivers)

Twenty-five (25) TNM Modeled Receptor Sites were modeled to represent the study area for the TNM calibration runs. They were identified as Receptors M-04 through M-28. Note that the FHWA TNM program refers to receptors as receivers.

Barriers

Barriers were used in the model to represent bridge parapets across Thomas Johnson Bridge to accurately depict field conditions. The average height is 2’ 8”.

Building Rows

No Building Rows were used to approximate the existing ground of the study area.

Terrain Lines

Terrain Lines were modeled to approximate the existing ground of the study area.

Ground Zones

Four (4) Ground Zones were modeled in the TNM Calibration runs, the TNM Impact Analysis runs, and the TNM Sound Barrier Design run.

Tree Zones

No Tree Zones were used to approximate the existing ground of the study area.

Contour Zones

No Contour Zones were used to approximate the existing ground of the study area.

TNM MODEL INPUT *(Existing Worst Case)*

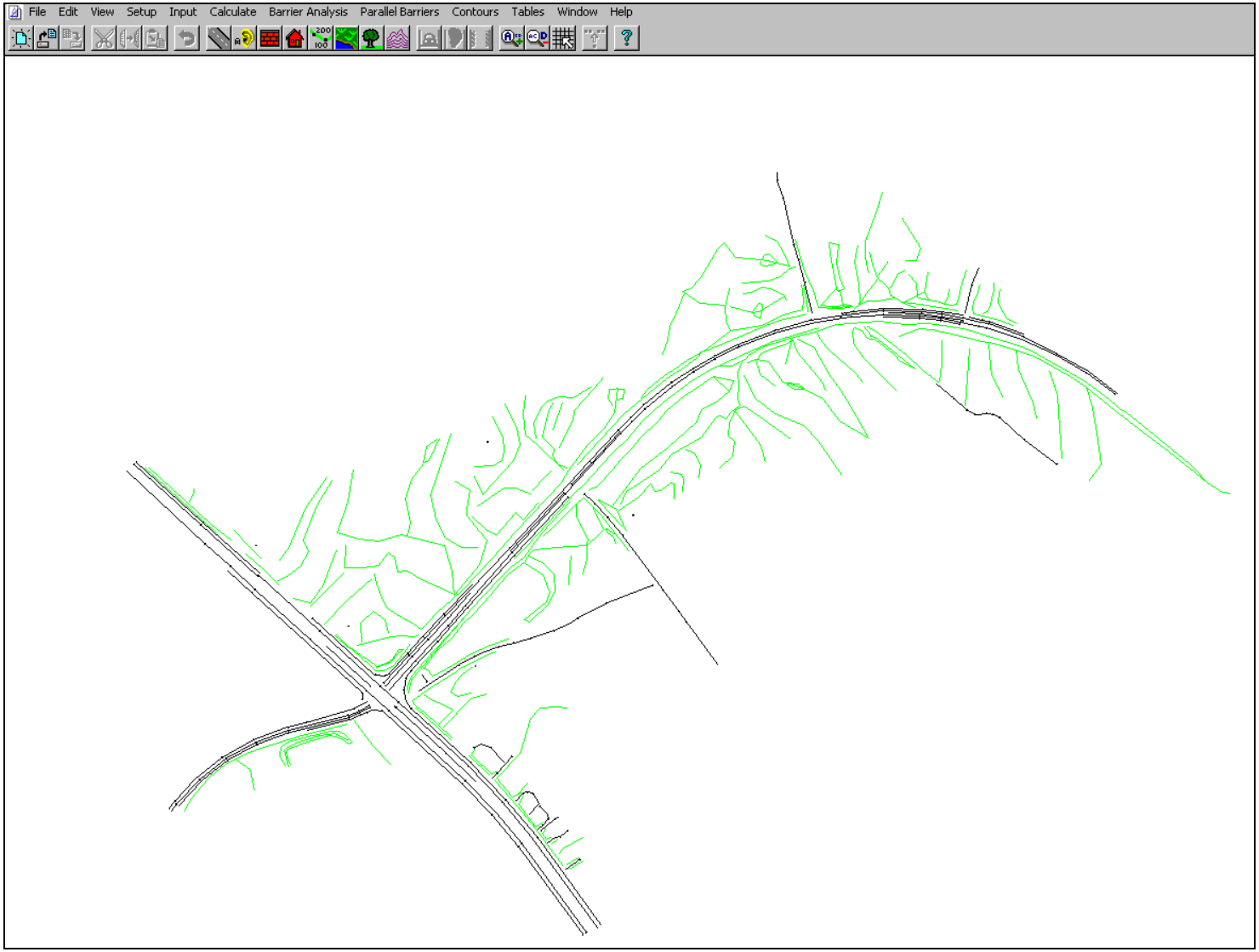
The input tables for TNM EWC are printed beginning on the following pages:

- AM\Area 1- Plan View (Intersctn Segment) C.4
- AM\Area 1- Roadways C.5
- AM\Area 1- Traffic for TNM vehicles No printouts, refer to actual/predicted traffic data from appendix B and E respectively
- PM\Area 1- Receptors (Receivers) C.13
- PM\Area 1- Barriers No printouts, refer to actual TNM run for result
- PM\Area 1- Terrain Lines No printouts, refer to actual TNM run for result

- AM\Area 2- Plan View (Mainline Segment) C.14
- AM\Area 2- Roadways C.15
- AM\Area 2- Traffic for TNM vehicles No printouts, refer to actual/predicted traffic data from appendix B and E respectively
- PM\Area 2- Receptors (Receivers) C.25
- PM\Area 2- Barriers No printouts, refer to actual TNM run for result
- PM\Area 2- Terrain Lines No printouts, refer to actual TNM run for result
- PM\Area 2- Ground Zones C.26

- AM\Area 3- Plan View (Bridge Segment) C.29
- AM\Area 3- Roadways C.30
- AM\Area 3- Traffic for TNM vehicles No printouts, refer to actual/predicted traffic data from appendix B and E respectively
- PM\Area 3- Receptors (Receivers) C.39
- PM\Area 3- Barriers No printouts, refer to actual TNM run for result
- PM\Area 3- Terrain Lines No printouts, refer to actual TNM run for result
- PM\rea 3- Ground Zones C.40

Plan View- Area 1



Roadways- Area 1

INPUT: ROADWAYS **MD4/MD235**

JMT **24 July 2009**
Run Date:7/10/09 **TNM 2.5**

INPUT: ROADWAYS
PROJECT/CONTRACT: **MD4/MD235**
RUN: **EWC 2009AM AREA1**

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

Roadway		Points					Flow Control			Segment	
Name	Width	Name	No.	Coordinates (pavement) X	Y	Z	Control Device	Speed Constraint	Percent Vehicles Affected	Pvmt Type	On Struct?
	ft			ft	ft	ft		mph	%		
EXSBSACR100	26.0	EXSBSAC	1	1,450,018.2	232,319.5	129.00				Average	
		EXSBSAC	2	1,449,960.2	232,263.1	127.60				Average	
		EXSBSAC	3	1,449,730.8	232,127.9	122.80				Average	
		EXSBSAC	4	1,449,646.9	232,077.3	120.90				Average	
		EXSBSAC	5	1,449,483.2	231,966.0	117.30				Average	
		EXSBSAC	6	1,449,345.8	231,830.5	113.60				Average	
		EXSBSAC	7	1,449,240.6	231,684.8	112.10				Average	
		EXSBSAC	9	1,449,165.6	231,537.6	110.40				Average	
		EXSBSAC	8	1,449,145.2	231,493.0	109.80					
EXNBSACR100	12.0	EXNBSAC	10	1,449,161.2	231,485.7	109.70				Average	
		EXNBSAC	11	1,449,181.0	231,530.6	110.20				Average	
		EXNBSAC	12	1,449,266.6	231,690.2	111.30				Average	
		EXNBSAC	13	1,449,376.1	231,834.4	113.00				Average	
		EXNBSAC	14	1,449,506.8	231,959.8	116.70				Average	
		EXNBSAC	15	1,449,655.2	232,063.3	120.30				Average	
		EXNBSAC	16	1,449,740.8	232,111.3	122.30				Average	
		EXNBSAC	17	1,449,943.9	232,225.3	127.20				Average	
		EXNBSAC	18	1,449,994.2	232,262.8	128.40				Average	
		EXNBSAC	19	1,450,039.6	232,306.3	129.20					
EXNBSACR110	12.0	EXNBSAC	20	1,449,191.6	231,524.9	110.10				Average	
		EXNBSAC	21	1,449,276.8	231,683.7	110.90				Average	
		EXNBSAC	22	1,449,385.1	231,826.4	112.40				Average	
		EXNBSAC	23	1,449,514.2	231,950.5	116.20				Average	
		EXNBSAC	24	1,449,661.6	232,053.1	119.90				Average	
		EXNBSAC	25	1,449,746.6	232,100.8	122.00				Average	

G:\Working Data\TNM Runs\EWC\2009AM\AREA1 **1** **24 July 2009**

INPUT: ROADWAYS **MD4/MD235**

		EXNBSAC	26	1,449,950.1	232,215.1	127.30				Average	
		EXNBSAC	27	1,450,001.9	232,253.5	128.60				Average	
		EXNBSAC	28	1,450,048.4	232,298.2	129.30					
EXNBSACR200-A	12.0	EXNBSAC	29	1,449,752.5	232,090.4	121.70				Average	
		EXNBSAC	30	1,449,956.8	232,205.0	127.40				Average	
		EXNBSAC	31	1,450,009.1	232,243.9	128.70				Average	
		EXNBSAC	32	1,450,034.6	232,264.9	128.90					
EXNBSACR200-B	20.0	EXNBSAC	33	1,450,034.6	232,264.9	128.90				Average	
		EXNBSAC	34	1,450,060.0	232,286.0	129.30				Average	
		EXNBSAC	35	1,450,112.8	232,292.7	129.80					
EXNBSACR200-C	16.0	EXNBSAC	36	1,450,112.8	232,292.7	129.80				Average	
		EXNBSAC	37	1,450,629.2	232,025.1	126.70				Average	
		EXNBSAC	38	1,450,823.9	231,906.5	124.80				Average	
		EXNBSAC	39	1,451,003.6	231,779.9	123.10				Average	
		EXNBSAC	40	1,451,459.8	231,410.8	124.00					
EXWBMD235100-A	36.0	EXWBMD	41	1,451,522.9	231,469.2	124.90				Average	
		EXWBMD	42	1,451,059.8	231,844.5	125.00				Average	
		EXWBMD	43	1,450,855.0	231,989.0	127.20				Average	
		EXWBMD	44	1,450,626.2	232,128.6	129.80				Average	
		EXWBMD	45	1,450,178.1	232,361.1	130.40				Average	
		EXWBMD	46	1,450,063.2	232,420.0	129.70				Average	
		EXWBMD	736	1,449,673.2	232,621.0	127.55				Average	
		EXWBMD	47	1,449,283.4	232,821.9	125.40					
EXWBMD235100-B	36.0	EXWBMD	48	1,449,283.4	232,821.9	125.40				Average	
		EXWBMD	49	1,449,280.8	232,816.5	125.50				Average	
		EXWBMD	50	1,448,913.0	233,004.3	123.10				Average	
		EXWBMD	739	1,448,486.0	233,225.2	120.50					
EXWBMD235110	12.0	EXWBMD	51	1,449,288.8	232,832.5	125.20				Average	
		EXWBMD	52	1,448,921.2	233,020.3	123.00				Average	
		EXWBMD	738	1,448,494.0	233,241.0	120.50					
EXWBMD235200-A	14.0	EXWBMD	53	1,451,534.1	231,491.0	124.80				Average	
		EXWBMD	54	1,451,080.5	231,858.6	125.40				Average	
		EXWBMD	55	1,450,868.2	232,008.6	127.60				Average	
		EXWBMD	56	1,450,637.2	232,149.9	130.40				Average	
		EXWBMD	57	1,450,253.5	232,349.1	130.30					
EXWBMD235200-B	20.0	EXWBMD	58	1,450,253.5	232,349.1	130.30				Average	
		EXWBMD	59	1,450,217.0	232,382.3	129.90				Average	
		EXWBMD	60	1,450,191.8	232,437.5	129.60				Average	
		EXWBMD	61	1,450,188.1	232,497.5	129.50					

INPUT: ROADWAYS **MD4/MD235**

EXWBMD235200-C	12.0	EXWBMD	62	1,450,188.1	232,497.5	129.50				Average	
		EXWBMD	63	1,450,207.2	232,543.6	129.50				Average	
		EXWBMD	64	1,450,304.2	232,732.0	129.30					
EXWBMD235300	24.0	EXWBMD	65	1,450,689.5	232,060.0	128.50				Average	
		EXWBMD	66	1,450,495.1	232,163.6	130.40				Average	
		EXWBMD	67	1,450,173.5	232,331.2	130.80				Average	
		EXWBMD	68	1,450,164.0	232,336.1	130.80					
EXEBMD235100	36.0	EXEBMD2	740	1,448,461.6	233,179.0	120.50				Average	
		EXEBMD2	78	1,448,970.4	232,909.8	123.50				Average	
		EXEBMD2	70	1,449,131.0	232,826.1	124.50				Average	
		EXEBMD2	71	1,449,291.5	232,742.4	125.40				Average	
		EXEBMD2	733	1,449,646.8	232,558.8	127.65				Average	
		EXEBMD2	72	1,450,002.1	232,375.3	129.90				Average	
		EXEBMD2	73	1,450,147.8	232,301.4	130.40				Average	
		EXEBMD2	74	1,450,640.5	232,046.3	127.30				Average	
		EXEBMD2	75	1,450,839.2	231,925.2	125.40				Average	
		EXEBMD2	76	1,451,018.6	231,798.7	123.70				Average	
		EXEBMD2	77	1,451,474.9	231,429.4	124.60					
EXEBMD235200-A	14.0	EXEBMD2	79	1,449,121.0	232,804.2	123.80				Average	
		EXEBMD2	80	1,449,280.4	232,721.1	124.60				Average	
		EXEBMD2	81	1,449,983.9	232,357.7	129.40					
EXEBMD235200-B	20.0	EXEBMD2	82	1,449,983.9	232,357.7	129.40				Average	
		EXEBMD2	83	1,449,994.6	232,322.6	128.80				Average	
		EXEBMD2	84	1,449,983.5	232,359.2	129.40					
EXEBMD235300	24.0	EXEBMD2	85	1,449,734.8	232,546.7	128.40				Average	
		EXEBMD2	86	1,450,019.4	232,400.3	130.20					
EXNB4100-A	27.0	EXNB410	87	1,450,118.8	232,411.4	129.70				Average	
		EXNB410	88	1,450,215.5	232,599.1	129.80				Average	
		EXNB410	89	1,450,333.9	232,828.9	129.50				Average	
		EXNB410	90	1,450,394.2	232,953.2	127.80				Average	
		EXNB410	91	1,450,562.2	233,292.3	121.00					
EXNB4100-B	34.0	EXNB410	94	1,450,562.2	233,292.3	121.00				Average	
		EXNB410	92	1,450,758.5	233,666.9	108.10				Average	
		EXNB410	93	1,450,958.9	234,054.9	93.90					
EXNB4100-C	40.0	EXNB410	95	1,450,958.9	234,054.9	93.90				Average	
		EXNB410	96	1,450,999.8	234,132.4	90.90				Average	
		EXNB410	97	1,451,049.5	234,216.8	87.50				Average	
		EXNB410	98	1,451,160.6	234,368.7	80.20				Average	
		EXNB411	99	1,451,251.4	234,475.2	76.40					

INPUT: ROADWAYS **MD4/MD235**

EXNB4100-D	34.0	EXNB411	100	1,451,251.4	234,475.2	76.40				Average	
		EXNB411	101	1,451,344.0	234,569.2	74.00				Average	
		EXNB411	102	1,451,447.1	234,662.5	73.20				Average	
		EXNB411	103	1,451,613.6	234,785.5	74.30				Average	
		EXNB411	104	1,451,787.4	234,886.0	78.30				Average	
		EXNB411	105	1,451,937.8	234,955.9	84.00				Average	
		EXNB411	106	1,451,993.4	234,977.4	86.00				Average	
		EXNB411	107	1,452,150.5	235,030.4	91.60					
EXNB4100-E	12.0	EXNB411	108	1,452,150.5	235,030.4	91.60				Average	
		EXNB411	109	1,452,340.6	235,072.7	97.80				Average	
		EXNB411	110	1,452,452.9	235,090.0	100.70				Average	
		EXNB412	111	1,452,559.8	235,098.8	102.80					
EXNB4100-F	36.0	EXNB412	112	1,452,559.8	235,098.8	102.80				Average	
		EXNB412	113	1,452,662.2	235,102.5	104.60				Average	
		EXNB412	114	1,452,700.4	235,103.5	105.10				Average	
		EXNB412	115	1,452,896.0	235,091.6	107.50				Average	
		EXNB412	116	1,453,085.8	235,060.0	108.00				Average	
		EXNB412	117	1,453,279.6	235,008.9	107.50				Average	
		EXNB412	118	1,453,457.9	234,937.1	106.50					
EXNB4240	16.0	EXNB424	218	1,450,304.2	232,732.0	129.30				Average	
		EXNB424	219	1,450,411.2	232,944.7	127.70				Average	
		EXNB424	220	1,450,580.8	233,282.5	121.10				Average	
		EXNB424	221	1,450,777.1	233,657.2	107.70					
EXNB4250	10.0	EXNB425	222	1,452,152.8	235,019.7	91.20				Average	
		EXNB425	223	1,452,342.8	235,061.9	97.20				Average	
		EXNB425	224	1,452,454.2	235,079.0	100.10				Average	
		EXNB425	225	1,452,560.8	235,087.9	102.30					
EXNB5200	12.0	EXNB520	237	1,452,173.5	235,044.9	92.80				Average	
		EXNB520	238	1,452,337.5	235,084.0	98.40				Average	
		EXNB520	239	1,452,454.6	235,101.5	101.30				Average	
		EXNB520	240	1,452,572.2	235,110.7	103.60					
EXNB5300	12.0	EXNB530	242	1,450,551.6	233,297.8	121.00				Average	
		EXNB530	243	1,450,747.8	233,672.5	108.30					
EXSB4100-U	34.0	EXSB419	349	1,453,462.8	234,948.1	107.00				Average	
		EXSB419	350	1,453,285.4	235,018.9	108.50				Average	
		EXSB419	351	1,453,090.8	235,069.1	108.90				Average	
		EXSB419	352	1,452,896.8	235,110.0	108.20					
EXSB4100-V	14.0	EXSB419	353	1,452,896.8	235,110.0	108.20				Average	
		EXSB419	354	1,452,700.6	235,126.5	106.30				Average	

INPUT: ROADWAYS **MD4/MD235**

		EXSB4195	355	1,452,661.9	235,125.5	105.80				Average	
		EXSB4196	737	1,452,561.2	235,123.0	104.10					
EXSB4100-X	12.0	EXSB4196	357	1,452,561.2	235,123.0	104.10				Average	
		EXSB4197	358	1,452,446.1	235,111.8	101.60				Average	
		EXSB4198	359	1,452,338.1	235,096.6	99.00				Average	
		EXSB4199	360	1,452,139.6	235,046.8	92.20				Average	
		EXSB4200	361	1,451,953.4	234,978.1	85.40					
EXSB4100-Y	34.0	EXSB4200	362	1,451,953.4	234,978.1	85.40				Average	
		EXSB4201	363	1,451,777.5	234,901.7	79.00				Average	
		EXSB4202	364	1,451,608.2	234,796.6	75.10				Average	
		EXSB4203	365	1,451,441.5	234,672.0	73.80				Average	
		EXSB4204	366	1,451,331.9	234,579.5	75.10					
EXSB4100-Z	34.0	EXSB4204	367	1,451,331.9	234,579.5	75.10				Average	
		EXSB4205	368	1,451,237.8	234,487.4	77.60				Average	
		EXSB4206	369	1,451,145.2	234,382.5	81.70					
EXSB4100-AA	34.0	EXSB4206	370	1,451,145.2	234,382.5	81.70				Average	
		EXSB4207	371	1,451,032.2	234,229.6	88.50				Average	
		EXSB4208	372	1,450,983.9	234,146.1	91.40				Average	
		EXSB4209	373	1,450,939.2	234,065.0	94.90				Average	
		EXSB4210	374	1,450,835.0	233,864.6	101.50					
EXSB4100-BB	34.0	EXSB4214	375	1,450,835.0	233,864.6	101.50				Average	
		EXSB4215	376	1,450,762.4	233,726.0	106.20				Average	
		EXSB4216	377	1,450,540.0	233,306.3	120.90				Average	
		EXSB4217	378	1,450,390.8	233,026.2	126.70					
EXSB4100-CC	12.0	EXSB4217	379	1,450,390.8	233,026.2	126.70				Average	
		EXSB4218	380	1,450,302.8	232,868.2	128.70				Average	
		EXSB4219	381	1,450,228.2	232,724.4	129.50				Average	
		EXSB4220	382	1,450,171.2	232,614.4	129.60				Average	
		EXSB4221	383	1,450,077.0	232,433.0	129.50					
EXSB4700	10.0	EXSB4700	406	1,452,897.2	235,122.5	108.70				Average	
		EXSB4701	407	1,452,702.6	235,139.3	106.90				Average	
		EXSB4702	408	1,452,661.2	235,137.9	106.30				Average	
		EXSB4703	409	1,452,590.2	235,136.1	104.90					
EXSB4710-A	16.0	EXSB4710	410	1,452,559.8	235,137.0	104.70				Average	
		EXSB4711	411	1,452,439.2	235,122.9	102.00				Average	
		EXSB4712	412	1,452,337.1	235,109.8	99.60					
EXSB4710-B	24.0	EXSB4712	413	1,452,337.1	235,109.8	99.60				Average	
		EXSB4713	414	1,452,137.4	235,059.3	92.70				Average	
		EXSB4714	415	1,451,984.6	235,002.1	87.10				Average	

INPUT: ROADWAYS **MD4/MD235**

		EXSB471	416	1,451,926.2	234,977.3	84.90					
EXSB4800-A	24.0	EXSB480	422	1,450,401.6	233,022.8	126.80				Average	
		EXSB480	423	1,450,318.9	232,860.2	128.90				Average	
		EXSB480	424	1,450,245.9	232,719.5	130.00				Average	
		EXSB480	425	1,450,189.5	232,610.7	130.00				Average	
		EXSB480	426	1,450,093.0	232,424.7	129.50					
EXSB4900-A	12.0	EXSB490	428	1,450,400.0	233,067.6	126.00				Average	
		EXSB490	726	1,450,292.2	232,874.0	128.50				Average	
		EXSB490	728	1,450,217.6	232,729.9	129.20				Average	
		EXSB490	727	1,450,160.5	232,619.9	129.40				Average	
		EXSB490	429	1,450,093.8	232,491.1	129.20					
EXSB4900-B	20.0	EXSB490	431	1,450,093.8	232,491.1	129.20				Average	
		EXSB490	432	1,450,074.8	232,476.7	129.20				Average	
		EXSB490	433	1,450,020.8	232,468.9	129.10					
EXSB4900-C	12.0	EXSB490	435	1,450,020.8	232,468.9	129.10				Average	
		EXSB490	436	1,449,617.4	232,676.7	126.10					
EXSB5200	12.0	EXSB520	444	1,450,949.1	234,059.9	94.40				Average	
		EXSB520	445	1,450,845.1	233,859.4	101.80				Average	
		EXSB520	446	1,450,773.0	233,720.5	106.20					
EXDRIVE1	12.0	EXDRIVE	447	1,451,273.6	231,728.7	124.80				Average	
		EXDRIVE	448	1,451,339.2	231,802.2	123.20					
EXDRIVE10	18.0	EXDRIVE	449	1,451,147.8	231,841.9	125.70				Average	
		EXDRIVE	450	1,451,176.6	231,875.3	123.10				Average	
		EXDRIVE	451	1,451,204.5	231,891.8	123.10				Average	
		EXDRIVE	452	1,451,237.2	231,933.8	123.50					
EXDRIVE20	12.0	EXDRIVE	453	1,451,164.8	231,988.9	126.50				Average	
		EXDRIVE	455	1,451,146.8	231,968.1	125.80				Average	
		EXDRIVE	454	1,451,091.8	231,888.3	126.00					
EXDRIVE30-A	10.0	EXDRIVE	456	1,451,079.2	231,900.0	125.60				Average	
		EXDRIVE	457	1,451,098.4	231,929.7	123.60					
EXDRIVE30-B	16.0	EXDRIVE	461	1,451,098.4	231,929.7	123.60				Average	
		EXDRIVE	462	1,451,117.8	231,967.3	124.70				Average	
		EXDRIVE	463	1,451,105.8	231,989.5	125.00				Average	
		EXDRIVE	464	1,451,049.2	232,020.1	123.30					
EXDRIVE40-A	10.0	EXDRIVE	465	1,451,012.2	231,964.0	122.30				Average	
		EXDRIVE	466	1,451,046.2	232,029.3	123.10					
EXDRIVE40-B	16.0	EXDRIVE	467	1,451,046.2	232,029.3	123.10				Average	
		EXDRIVE	468	1,451,003.8	232,076.6	122.60				Average	
		EXDRIVE	469	1,450,967.8	232,074.1	122.10				Average	

INPUT: ROADWAYS **MD4/MD235**

		EXDRIVE	470	1,450,948.2	232,057.5	121.90				Average	
		EXDRIVE	471	1,450,922.8	232,009.2	128.00					
EXDRIVE50	12.0	EXDRIVE	472	1,450,769.8	232,098.3	129.60				Average	
		EXDRIVE	473	1,450,791.1	232,131.6	128.10				Average	
		EXDRIVE	474	1,450,845.9	232,241.8	129.30					
EXDRIVE60-A	22.0	EXDRIVE	475	1,450,812.8	232,198.1	128.70				Average	
		EXDRIVE	476	1,450,721.2	232,254.1	130.30					
EXDRIVE60-B	26.0	EXDRIVE	477	1,450,721.2	232,254.1	130.30				Average	
		EXDRIVE	478	1,450,666.1	232,259.7	131.00				Average	
		EXDRIVE	479	1,450,631.2	232,227.7	131.00					
EXCLEM100-A	11.0	EXCLEM1	500	1,452,518.6	234,745.8	109.50				Average	
		EXCLEM1	501	1,452,629.4	234,693.3	104.00				Average	
		EXCLEM1	502	1,452,713.2	234,652.6	103.70				Average	
		EXCLEM1	503	1,452,762.2	234,643.3	103.90				Average	
		EXCLEM1	504	1,452,819.1	234,664.4	104.20				Average	
		EXCLEM1	505	1,452,854.2	234,668.2	104.70				Average	
		EXCLEM1	506	1,452,894.6	234,657.4	104.90				Average	
		EXCLEM1	507	1,453,051.4	234,579.7	108.00				Average	
		EXCLEM1	508	1,453,253.8	234,495.3	114.00					
EXLOUS100-A	12.0	EXLOUS1	531	1,451,403.9	235,615.2	74.00				Average	
		EXLOUS1	532	1,451,415.9	235,575.0	72.00				Average	
		EXLOUS1	533	1,451,470.2	235,490.2	70.00				Average	
		EXLOUS1	534	1,451,534.2	235,374.7	70.00				Average	
		EXLOUS1	535	1,451,592.1	235,263.9	72.00				Average	
		EXLOUS1	536	1,451,636.5	235,193.8	74.00					
EXLOUS100-B	26.0	EXLOUS1	537	1,451,636.5	235,193.8	74.00				Average	
		EXLOUS1	538	1,451,701.6	235,083.7	76.00				Average	
		EXLOUS1	539	1,451,780.8	234,934.9	80.20					
EXOAK100	23.0	EXOAK10	570	1,451,775.8	232,996.3	94.00				Average	
		EXOAK10	571	1,451,554.8	233,175.2	110.00				Average	
		EXOAK10	572	1,451,499.8	233,220.6	112.00				Average	
		EXOAK10	573	1,451,388.5	233,307.9	114.00				Average	
		EXOAK10	574	1,451,105.4	233,535.3	106.00				Average	
		EXOAK10	575	1,451,003.5	233,606.7	104.00				Average	
		EXOAK10	576	1,450,915.2	233,659.5	103.80				Average	
		EXOAK10	577	1,450,848.9	233,693.7	104.70					
EXPAT01-A	30.0	EXPAT01	578	1,452,568.2	235,150.8	105.30				Average	
		EXPAT02	579	1,452,563.2	235,306.0	99.80					
EXPAT01-B	45.0	EXPAT02	580	1,452,563.2	235,306.0	99.80				Average	

INPUT: ROADWAYS **MD4/MD235**

		EXPAT03	581	1,452,577.0	235,409.3	95.40					
EXWOOD100	18.0	EXWOOD	647	1,450,273.9	232,445.7	130.00				Average	
		EXWOOD	648	1,450,447.2	232,640.2	133.00				Average	
		EXWOOD	649	1,450,513.2	232,703.6	133.60				Average	
		EXWOOD	650	1,450,560.8	232,742.3	134.30				Average	
		EXWOOD	651	1,450,626.2	232,788.3	136.00				Average	
		EXWOOD	652	1,450,697.8	232,827.4	137.60				Average	
		EXWOOD	653	1,450,781.0	232,873.7	136.00				Average	
		EXWOOD	654	1,450,888.1	232,944.5	128.00				Average	
		EXWOOD	655	1,450,951.1	233,000.1	124.00				Average	
		EXWOOD	656	1,450,995.5	233,042.5	122.00				Average	
		EXWOOD	657	1,451,119.4	233,158.8	118.00				Average	
		EXWOOD	658	1,451,336.0	233,316.7	114.70					
EXWOOD120	24.0	EXWOOD	659	1,450,265.1	232,534.7	129.50				Average	
		EXWOOD	660	1,450,305.2	232,500.6	129.80					

Receptors- Area 1

INPUT: RECEIVERS MD4/MD235

JMT 24 July 2009
Run Date:7/10/09 TNM 2.5

INPUT: RECEIVERS
PROJECT/CONTRACT: MD4/MD235
RUN: EWC 2009AM AREA1

Receiver Name	No.	#DUs	Coordinates (ground) X	Y	Z	Height above Ground	Input Sound Levels and Criteria Existing LAeq1h	Impact Criteria LAeq1h	Impact Criteria Sub'l	NR Goal	Active in Calc.
			ft	ft	ft	ft	dBA	dBA	dB	dB	
M26	26	1	1,451,133.8	233,650.0	107.47	4.92	54.00	66	10.0	8.0	Y
M27	27	1	1,450,529.9	232,651.7	134.83	4.92	56.00	66	10.0	8.0	Y
M28	28	1	1,450,281.5	233,827.0	102.07	4.92	49.00	66	10.0	8.0	Y
R01	31	1	1,449,232.6	232,972.3	129.00	4.92	0.00	66	10.0	8.0	Y
R02	32	1	1,449,820.0	232,683.6	125.00	4.92	0.00	66	10.0	8.0	Y

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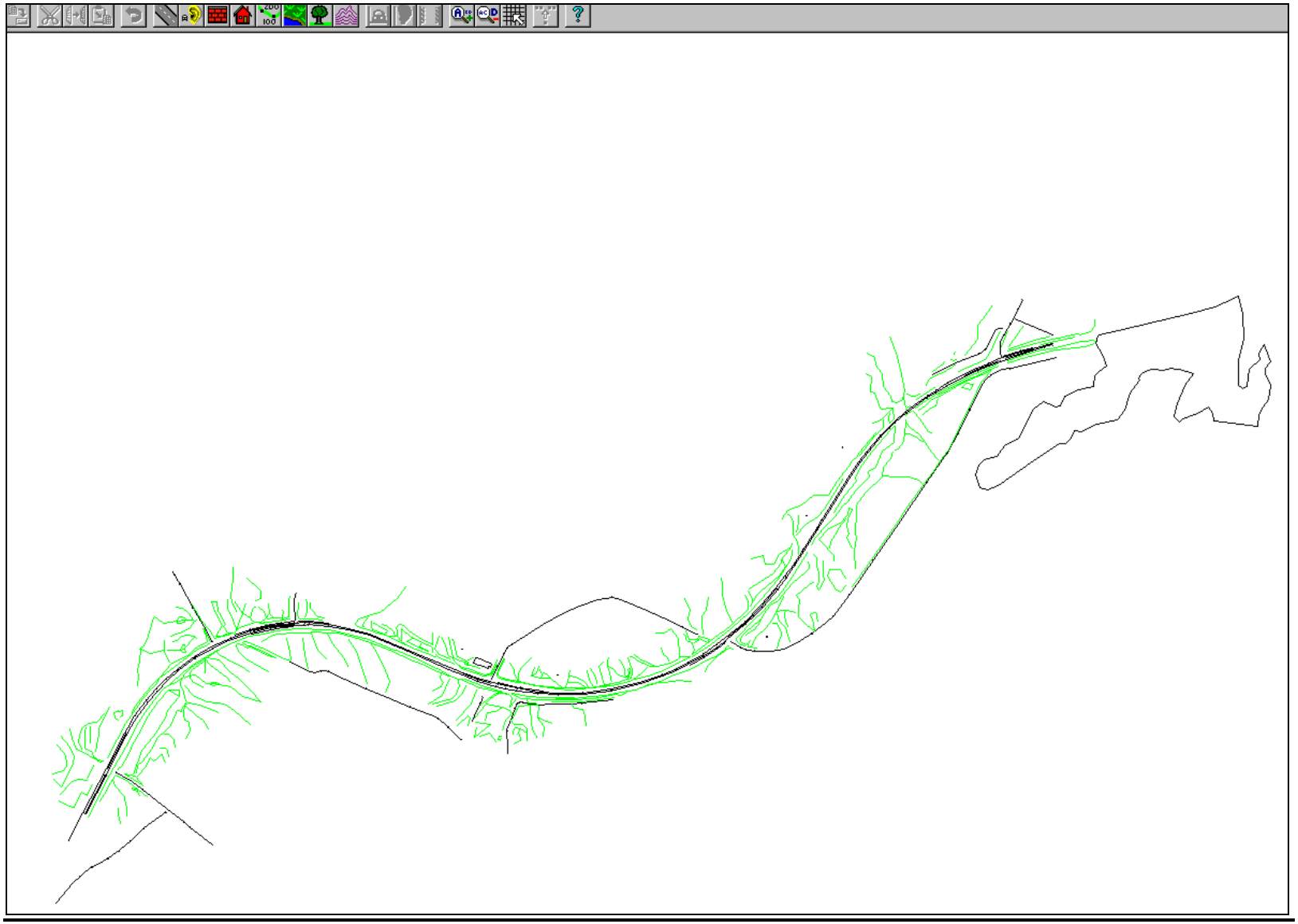
Plan View- Area2



Roadway- Area2

INPUT: ROADWAYS **MD4/MD235**

JMT **24 July 2009**
Run Date:7/10/09 **TNM 2.5**

INPUT: ROADWAYS
PROJECT/CONTRACT: **MD4/MD235**
RUN: **EWC 2009AM AREA2**

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

Roadway		Points					Flow Control			Segment	
Name	Width	Name	No.	Coordinates (pavement) X	Y	Z	Control Device	Speed Constraint	Percent Vehicles Affected	Pvmt Type	On Struct?
	ft			ft	ft	ft		mph	%		
EXNB4100-B	34.0	EXNB410	94	1,450,562.2	233,292.3	121.00				Average	
		EXNB410	92	1,450,758.5	233,666.9	108.10				Average	
		EXNB410	93	1,450,958.9	234,054.9	93.90					
EXNB4100-C	40.0	EXNB410	95	1,450,958.9	234,054.9	93.90				Average	
		EXNB410	96	1,450,999.8	234,132.4	90.90				Average	
		EXNB410	97	1,451,049.5	234,216.8	87.50				Average	
		EXNB410	98	1,451,160.6	234,368.7	80.20				Average	
		EXNB411	99	1,451,251.4	234,475.2	76.40					
EXNB4100-D	34.0	EXNB411	100	1,451,251.4	234,475.2	76.40				Average	
		EXNB411	101	1,451,344.0	234,569.2	74.00				Average	
		EXNB411	102	1,451,447.1	234,662.5	73.20				Average	
		EXNB411	103	1,451,613.6	234,785.5	74.30				Average	
		EXNB411	104	1,451,787.4	234,886.0	78.30				Average	
		EXNB411	105	1,451,937.8	234,955.9	84.00				Average	
		EXNB411	106	1,451,993.4	234,977.4	86.00				Average	
		EXNB411	107	1,452,150.5	235,030.4	91.60					
EXNB4100-E	12.0	EXNB411	108	1,452,150.5	235,030.4	91.60				Average	
		EXNB411	109	1,452,340.6	235,072.7	97.80				Average	
		EXNB411	110	1,452,452.9	235,090.0	100.70				Average	
		EXNB412	111	1,452,559.8	235,098.8	102.80					
EXNB4100-F	36.0	EXNB412	112	1,452,559.8	235,098.8	102.80				Average	
		EXNB412	113	1,452,662.2	235,102.5	104.60				Average	
		EXNB412	114	1,452,700.4	235,103.5	105.10				Average	
		EXNB412	115	1,452,896.0	235,091.6	107.50				Average	
		EXNB412	116	1,453,085.8	235,060.0	108.00				Average	

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INPUT: ROADWAYS **MD4/MD235**

		EXNB412	117	1,453,279.6	235,008.9	107.50				Average	
		EXNB412	118	1,453,457.9	234,937.1	106.50					
EXNB4100-G	34.0	EXNB412	119	1,453,457.9	234,937.1	106.50				Average	
		EXNB412	120	1,453,651.2	234,851.9	106.00				Average	
		EXNB412	121	1,454,048.5	234,676.6	104.80				Average	
		EXNB412	122	1,454,182.0	234,620.1	105.40				Average	
		EXNB413	123	1,454,324.4	234,565.7	106.40				Average	
		EXNB413	124	1,454,502.6	234,514.1	107.70				Average	
		EXNB413	125	1,454,590.9	234,495.4	107.80				Average	
		EXNB413	126	1,454,700.6	234,473.1	108.40				Average	
		EXNB413	127	1,454,899.1	234,445.1	109.10				Average	
		EXNB413	128	1,455,099.4	234,435.4	107.90				Average	
		EXNB413	129	1,455,331.6	234,440.7	106.70				Average	
		EXNB413	130	1,455,600.2	234,473.7	104.50				Average	
		EXNB413	131	1,455,884.1	234,541.6	101.50				Average	
		EXNB413	132	1,456,094.2	234,614.2	98.80				Average	
		EXNB414	133	1,456,224.4	234,668.9	97.50				Average	
		EXNB414	134	1,456,340.2	234,726.8	96.40					
EXNB4100-H	12.0	EXNB414	135	1,456,340.2	234,726.8	96.40				Average	
		EXNB414	136	1,456,493.1	234,811.2	94.70				Average	
		EXNB414	137	1,456,623.5	234,895.1	92.70				Average	
		EXNB414	138	1,456,701.1	234,951.1	90.70					
EXNB4100-I	34.0	EXNB414	139	1,456,701.1	234,951.1	90.70				Average	
		EXNB414	144	1,456,897.2	235,115.6	84.20				Average	
		EXNB414	140	1,456,973.6	235,188.6	80.70				Average	
		EXNB414	141	1,457,057.0	235,274.9	76.30				Average	
		EXNB414	142	1,457,201.8	235,447.4	67.50				Average	
		EXNB414	143	1,457,284.9	235,559.7	61.60					
EXNB4100-J	30.0	EXNB414	145	1,457,284.9	235,559.7	61.60				Average	
		EXNB415	146	1,457,366.2	235,680.8	55.30				Average	
		EXNB415	147	1,457,450.4	235,812.8	48.40				Average	
		EXNB415	148	1,457,583.2	236,021.5	40.30				Average	
		EXNB415	149	1,457,626.8	236,089.9	38.70					
EXNB4100-K	34.0	EXNB415	150	1,457,626.8	236,089.9	38.70				Average	
		EXNB415	151	1,457,905.2	236,528.9	34.60				Average	
		EXNB415	152	1,457,988.8	236,652.2	33.20				Average	
		EXNB415	153	1,458,066.5	236,757.8	32.20				Average	
		EXNB415	154	1,458,196.2	236,906.1	31.40				Average	
		EXNB415	155	1,458,277.6	236,989.8	30.50				Average	

INPUT: ROADWAYS **MD4/MD235**

		EXNB415	156	1,458,331.0	237,040.3	30.10				Average	
		EXNB416	157	1,458,437.9	237,131.5	29.50					
EXNB4100-L	30.0	EXNB416	158	1,458,437.9	237,131.5	29.50				Average	
		EXNB416	159	1,458,514.8	237,192.7	29.00				Average	
		EXNB416	160	1,458,639.5	237,279.3	28.20				Average	
		EXNB416	161	1,458,724.8	237,330.5	27.70					
EXNB4100-M	36.0	EXNB416	162	1,458,724.8	237,330.5	27.70				Average	
		EXNB416	163	1,458,829.9	237,393.2	27.40				Average	
		EXNB416	164	1,458,973.9	237,466.0	26.40				Average	
		EXNB416	165	1,459,122.6	237,534.9	25.70				Average	
		EXNB416	166	1,459,224.1	237,578.4	25.20				Average	
		EXNB416	167	1,459,338.8	237,624.6	24.20				Average	
		EXNB416	168	1,459,539.9	237,693.8	24.60				Average	
		EXNB417	169	1,459,759.4	237,760.3	27.20				Average	
		EXNB417	170	1,459,840.1	237,781.0	28.20					
EXNB4250	10.0	EXNB425	222	1,452,152.8	235,019.7	91.20				Average	
		EXNB425	223	1,452,342.8	235,061.9	97.20				Average	
		EXNB425	224	1,452,454.2	235,079.0	100.10				Average	
		EXNB425	225	1,452,560.8	235,087.9	102.30					
EXNB5000	12.0	EXNB500	230	1,458,994.0	237,489.4	27.10				Average	
		EXNB500	231	1,459,121.5	237,549.1	25.90				Average	
		EXNB500	232	1,459,222.0	237,591.7	25.60				Average	
		EXNB500	233	1,459,321.6	237,630.0	24.30					
EXNB5100	12.0	EXNB510	234	1,454,185.5	234,630.8	104.80				Average	
		EXNB510	235	1,454,318.8	234,582.1	105.50				Average	
		EXNB510	236	1,454,455.9	234,541.1	106.70					
EXNB5200	12.0	EXNB520	237	1,452,173.5	235,044.9	92.80				Average	
		EXNB520	238	1,452,337.5	235,084.0	98.40				Average	
		EXNB520	239	1,452,454.6	235,101.5	101.30				Average	
		EXNB520	240	1,452,572.2	235,110.7	103.60					
EXNB5300	12.0	EXNB530	242	1,450,551.6	233,297.8	121.00				Average	
		EXNB530	243	1,450,747.8	233,672.5	108.30					
EXNB5600	35.0	EXNB560	244	1,456,356.2	234,721.6	97.00				Average	
		EXNB560	245	1,456,501.8	234,803.9	95.10				Average	
		EXNB560	246	1,456,627.9	234,886.1	93.20				Average	
		EXNB560	247	1,456,696.9	234,935.7	91.50					
EXSB4100-M	60.0	EXSB414	297	1,459,838.2	237,795.7	28.30				Average	
		EXSB414	298	1,459,756.0	237,775.8	27.40				Average	
		EXSB414	299	1,459,643.0	237,745.2	26.10					

INPUT: ROADWAYS **MD4/MD235**

EXSB4100-N	12.0	EXSB4147	300	1,459,643.0	237,745.2	26.10				Average	
		EXSB4148	301	1,459,532.1	237,715.3	25.30				Average	
		EXSB4149	302	1,459,329.4	237,646.9	24.50					
EXSB4100-O	34.0	EXSB4149	303	1,459,329.4	237,646.9	24.50				Average	
		EXSB4150	735	1,459,218.4	237,602.3	26.00				Average	
		EXSB4151	304	1,459,112.2	237,558.4	26.30				Average	
		EXSB4152	305	1,458,965.2	237,485.4	27.90				Average	
		EXSB4153	306	1,458,822.4	237,410.5	28.50				Average	
		EXSB4154	307	1,458,715.5	237,345.1	28.20				Average	
		EXSB4155	308	1,458,633.4	237,293.6	29.20				Average	
		EXSB4156	309	1,458,507.4	237,204.5	29.60				Average	
		EXSB4157	310	1,458,423.1	237,135.9	1.00				Average	
		EXSB4158	311	1,458,325.5	237,051.2	1.70				Average	
		EXSB4159	312	1,458,271.0	237,000.2	31.20				Average	
		EXSB4160	313	1,458,186.8	236,913.8	32.20				Average	
		EXSB4161	314	1,458,056.8	236,765.0	33.00				Average	
		EXSB4162	315	1,457,979.1	236,658.0	33.80				Average	
		EXSB4163	316	1,457,895.0	236,535.4	34.90				Average	
		EXSB4164	317	1,457,618.8	236,101.4	38.60				Average	
		EXSB4165	318	1,457,572.2	236,027.6	40.20				Average	
		EXSB4166	319	1,457,439.5	235,818.9	48.20				Average	
		EXSB4167	320	1,457,356.0	235,687.1	54.80					
EXSB4100-P	32.0	EXSB4167	321	1,457,356.0	235,687.1	54.80				Average	
		EXSB4168	322	1,457,270.6	235,569.3	60.80				Average	
		EXSB4169	323	1,457,189.0	235,463.1	66.30				Average	
		EXSB4170	324	1,457,029.0	235,281.0	75.50				Average	
		EXSB4171	325	1,456,881.6	235,133.1	82.80					
EXSB4100-Q	40.0	EXSB4171	326	1,456,881.6	235,133.1	82.80				Average	
		EXSB4172	327	1,456,689.0	234,974.5	89.20				Average	
		EXSB4173	328	1,456,612.2	234,912.4	91.60					
EXSB4100-R	34.0	EXSB4173	329	1,456,612.2	234,912.4	91.60				Average	
		EXSB4174	330	1,456,481.5	234,822.9	94.10				Average	
		EXSB4175	331	1,456,335.0	234,737.6	95.80				Average	
		EXSB4176	332	1,456,220.1	234,680.1	97.00				Average	
		EXSB4177	333	1,456,090.9	234,626.2	98.10					
EXSB4100-S	34.0	EXSB4177	334	1,456,090.9	234,626.2	98.10				Average	
		EXSB4178	335	1,455,876.5	234,551.2	100.80				Average	
		EXSB4179	336	1,455,601.0	234,486.1	103.80				Average	
		EXSB4180	337	1,455,328.4	234,453.5	106.20				Average	

INPUT: ROADWAYS **MD4/MD235**

		EXSB418	338	1,455,100.8	234,446.2	107.50					
EXSB4100-T	12.0	EXSB418	339	1,455,100.8	234,446.2	107.50				Average	
		EXSB418	340	1,454,899.5	234,460.4	108.40				Average	
		EXSB418	341	1,454,701.0	234,496.8	107.30				Average	
		EXSB418	342	1,454,596.9	234,520.4	106.80				Average	
		EXSB418	343	1,454,510.1	234,538.5	106.30					
EXSB4100-U	34.0	EXSB418	344	1,454,510.1	234,538.5	106.30				Average	
		EXSB418	345	1,454,325.6	234,593.3	104.70				Average	
		EXSB418	346	1,454,182.8	234,647.2	104.10				Average	
		EXSB418	347	1,454,058.8	234,697.8	104.10				Average	
		EXSB418	348	1,453,655.9	234,862.9	106.10				Average	
		EXSB419	349	1,453,462.8	234,948.1	107.00				Average	
		EXSB419	350	1,453,285.4	235,018.9	108.50				Average	
		EXSB419	351	1,453,090.8	235,069.1	108.90				Average	
		EXSB419	352	1,452,896.8	235,110.0	108.20					
EXSB4100-V	14.0	EXSB419	353	1,452,896.8	235,110.0	108.20				Average	
		EXSB419	354	1,452,700.6	235,126.5	106.30				Average	
		EXSB419	355	1,452,661.9	235,125.5	105.80				Average	
		EXSB419	751	1,452,561.2	235,123.0	104.10					
EXSB4100-X	12.0	EXSB419	357	1,452,561.2	235,123.0	104.10				Average	
		EXSB419	358	1,452,446.1	235,111.8	101.60				Average	
		EXSB419	359	1,452,338.1	235,096.6	99.00				Average	
		EXSB419	360	1,452,139.6	235,046.8	92.20				Average	
		EXSB420	361	1,451,953.4	234,978.1	85.40					
EXSB4100-Y	34.0	EXSB420	362	1,451,953.4	234,978.1	85.40				Average	
		EXSB420	363	1,451,777.5	234,901.7	79.00				Average	
		EXSB420	364	1,451,608.2	234,796.6	75.10				Average	
		EXSB420	365	1,451,441.5	234,672.0	73.80				Average	
		EXSB420	366	1,451,331.9	234,579.5	75.10					
EXSB4100-Z	34.0	EXSB420	367	1,451,331.9	234,579.5	75.10				Average	
		EXSB420	368	1,451,237.8	234,487.4	77.60				Average	
		EXSB420	369	1,451,145.2	234,382.5	81.70					
EXSB4100-AA	34.0	EXSB420	370	1,451,145.2	234,382.5	81.70				Average	
		EXSB420	371	1,451,032.2	234,229.6	88.50				Average	
		EXSB420	372	1,450,983.9	234,146.1	91.40				Average	
		EXSB420	373	1,450,939.2	234,065.0	94.90				Average	
		EXSB421	374	1,450,835.0	233,864.6	101.50					
EXSB4100-BB	34.0	EXSB421	375	1,450,835.0	233,864.6	101.50				Average	
		EXSB421	376	1,450,762.4	233,726.0	106.20				Average	

INPUT: ROADWAYS **MD4/MD235**

		EXSB4216	377	1,450,540.0	233,306.3	120.90				Average	
		EXSB4217	378	1,450,390.8	233,026.2	126.70					
EXSB4500	35.0	EXSB4500	399	1,459,639.9	237,756.9	26.40				Average	
		EXSB4501	400	1,459,528.5	237,726.2	25.40				Average	
		EXSB4502	401	1,459,354.8	237,668.2	24.70					
EXSB4600	36.0	EXSB4600	403	1,454,946.6	234,468.2	107.80				Average	
		EXSB4601	404	1,454,725.5	234,504.9	107.00				Average	
		EXSB4602	405	1,454,506.8	234,554.1	105.50					
EXSB4700	10.0	EXSB4700	406	1,452,897.2	235,122.5	108.70				Average	
		EXSB4701	407	1,452,702.6	235,139.3	106.90				Average	
		EXSB4702	408	1,452,661.2	235,137.9	106.30				Average	
		EXSB4703	409	1,452,590.2	235,136.1	104.90					
EXSB4710-A	16.0	EXSB4710	410	1,452,559.8	235,137.0	104.70				Average	
		EXSB4711	411	1,452,439.2	235,122.9	102.00				Average	
		EXSB4712	412	1,452,337.1	235,109.8	99.60					
EXSB4710-B	24.0	EXSB4712	413	1,452,337.1	235,109.8	99.60				Average	
		EXSB4713	414	1,452,137.4	235,059.3	92.70				Average	
		EXSB4714	415	1,451,984.6	235,002.1	87.10					
EXSB5000	12.0	EXSB5000	437	1,459,644.8	237,737.4	26.00				Average	
		EXSB5001	438	1,459,537.0	237,705.1	26.00				Average	
		EXSB5002	439	1,459,380.4	237,651.3	25.00					
EXSB5100	16.0	EXSB5100	440	1,457,188.5	235,444.8	67.40				Average	
		EXSB5101	441	1,457,037.9	235,272.9	76.10				Average	
		EXSB5102	442	1,456,887.6	235,123.0	83.50				Average	
		EXSB5103	443	1,456,724.9	234,986.6	89.00					
EXSB5200	12.0	EXSB5200	444	1,450,949.1	234,059.9	94.40				Average	
		EXSB5201	445	1,450,845.1	233,859.4	101.80				Average	
		EXSB5202	446	1,450,773.0	233,720.5	106.20					
EXCLEM100-A	11.0	EXCLEM1	500	1,452,518.6	234,745.8	109.50				Average	
		EXCLEM1	501	1,452,629.4	234,693.3	104.00				Average	
		EXCLEM1	502	1,452,713.2	234,652.6	103.70				Average	
		EXCLEM1	503	1,452,762.2	234,643.3	103.90				Average	
		EXCLEM1	504	1,452,819.1	234,664.4	104.20				Average	
		EXCLEM1	505	1,452,854.2	234,668.2	104.70				Average	
		EXCLEM1	506	1,452,894.6	234,657.4	104.90				Average	
		EXCLEM1	507	1,453,051.4	234,579.7	108.00				Average	
		EXCLEM1	508	1,453,253.8	234,495.3	114.00					
EXCLEM100-B	16.0	EXCLEM1	509	1,453,253.8	234,495.3	114.00				Average	
		EXCLEM1	510	1,453,458.8	234,404.9	116.00				Average	

INPUT: ROADWAYS **MD4/MD235**

		EXCLEM1	511	1,453,673.9	234,317.1	112.00				Average	
		EXCLEM1	512	1,453,869.8	234,242.5	110.90				Average	
		EXCLEM1	513	1,453,944.6	234,207.9	111.20				Average	
		EXCLEM1	514	1,454,042.2	234,121.5	112.00				Average	
		EXCLEM1	515	1,454,169.2	233,998.3	114.00					
EXKINGSTON100	20.0	EXKINGS`	516	1,454,457.1	234,582.2	104.90				Average	
		EXKINGS`	517	1,454,516.9	234,708.5	104.20				Average	
		EXKINGS`	518	1,454,576.6	234,834.9	108.00				Average	
		EXKINGS`	519	1,454,612.8	234,890.9	108.60				Average	
		EXKINGS`	520	1,454,661.0	234,923.8	110.00				Average	
		EXKINGS`	521	1,454,955.4	235,108.8	116.00				Average	
		EXKINGS`	522	1,455,161.2	235,226.6	118.00				Average	
		EXKINGS`	523	1,455,304.6	235,287.9	119.60				Average	
		EXKINGS`	524	1,455,478.5	235,347.0	118.00				Average	
		EXKINGS`	525	1,455,615.8	235,369.2	116.00				Average	
		EXKINGS`	526	1,455,695.1	235,345.3	116.00				Average	
		EXKINGS`	527	1,455,923.0	235,250.1	110.00				Average	
		EXKINGS`	528	1,456,102.8	235,167.9	106.70				Average	
		EXKINGS`	529	1,456,290.2	235,082.5	104.00				Average	
		EXKINGS`	530	1,456,435.4	235,006.9	102.40					
EXLOUS100-A	12.0	EXLOUS1	531	1,451,403.9	235,615.2	74.00				Average	
		EXLOUS1	532	1,451,415.9	235,575.0	72.00				Average	
		EXLOUS1	533	1,451,470.2	235,490.2	70.00				Average	
		EXLOUS1	534	1,451,534.2	235,374.7	70.00				Average	
		EXLOUS1	535	1,451,592.1	235,263.9	72.00				Average	
		EXLOUS1	536	1,451,636.5	235,193.8	74.00					
EXLOUS100-B	26.0	EXLOUS1	537	1,451,636.5	235,193.8	74.00				Average	
		EXLOUS1	538	1,451,701.6	235,083.7	76.00				Average	
		EXLOUS1	539	1,451,780.8	234,934.9	80.20					
EXNTCD01-A	20.0	EXNTCD0	564	1,454,267.1	234,179.3	112.10				Average	
		EXNTCD0	565	1,454,325.4	234,307.4	110.60				Average	
		EXNTCD0	566	1,454,349.4	234,360.5	110.40					
EXNTCD01-B	60.0	EXNTCD0	567	1,454,349.4	234,360.5	110.40				Average	
		EXNTCD0	568	1,454,372.2	234,417.7	109.80					
EXOAK100	23.0	EXOAK10	570	1,451,775.8	232,996.3	94.00				Average	
		EXOAK10	571	1,451,554.8	233,175.2	110.00				Average	
		EXOAK10	572	1,451,499.8	233,220.6	112.00				Average	
		EXOAK10	573	1,451,388.5	233,307.9	114.00				Average	
		EXOAK10	574	1,451,105.4	233,535.3	106.00				Average	

INPUT: ROADWAYS **MD4/MD235**

		EXOAK10	575	1,451,003.5	233,606.7	104.00				Average	
		EXOAK10	576	1,450,915.2	233,659.5	103.80				Average	
		EXOAK10	577	1,450,848.9	233,693.7	104.70					
EXPAT01-A	30.0	EXPAT01	578	1,452,568.2	235,150.8	105.30				Average	
		EXPAT02	579	1,452,563.2	235,306.0	99.80					
EXPAT01-B	45.0	EXPAT02	580	1,452,563.2	235,306.0	99.80				Average	
		EXPAT03	581	1,452,577.0	235,409.3	95.40					
EXRDWY100-A	13.0	EXRDWY	582	1,454,611.9	233,878.2	107.90				Average	
		EXRDWY	583	1,454,609.2	233,968.1	108.00				Average	
		EXRDWY	584	1,454,602.1	234,069.1	108.00					
EXRDWY100-B	11.0	EXRDWY	585	1,454,602.1	234,069.1	108.00				Average	
		EXRDWY	586	1,454,604.0	234,097.3	107.20				Average	
		EXRDWY	587	1,454,611.4	234,123.0	106.00				Average	
		EXRDWY	588	1,454,631.8	234,172.4	102.00				Average	
		EXRDWY	589	1,454,680.5	234,310.5	100.20				Average	
		EXRDWY	590	1,454,693.0	234,335.8	100.40				Average	
		EXRDWY	591	1,454,708.2	234,352.4	100.50				Average	
		EXRDWY	592	1,454,731.5	234,363.2	100.30				Average	
		EXRDWY	593	1,454,759.2	234,359.4	99.70				Average	
		EXRDWY	594	1,454,847.6	234,344.5	99.20				Average	
		EXRDWY	595	1,454,919.6	234,337.2	101.10				Average	
		EXRDWY	596	1,455,023.2	234,346.8	103.50				Average	
		EXRDWY	597	1,455,224.8	234,347.6	105.30				Average	
		EXRDWY	598	1,455,325.8	234,352.7	105.10				Average	
		EXRDWY	599	1,455,634.1	234,390.1	101.90					
EXSPATBR100-A	23.0	EXSPATB	612	1,456,756.4	234,947.2	91.40				Average	
		EXSPATB	613	1,456,853.9	234,879.1	96.00				Average	
		EXSPATB	614	1,456,904.1	234,864.6	98.00				Average	
		EXSPATB	615	1,456,983.9	234,855.3	100.00				Average	
		EXSPATB	616	1,457,122.5	234,850.2	101.70				Average	
		EXSPATB	617	1,457,211.8	234,860.5	101.20					
EXSPATBR100-B	20.0	EXSPATB	618	1,457,211.8	234,860.5	101.20				Average	
		EXSPATB	619	1,457,290.1	234,884.0	100.30				Average	
		EXSPATB	620	1,457,421.9	234,956.0	98.00				Average	
		EXSPATB	621	1,457,532.2	235,021.0	90.00				Average	
		EXSPATB	622	1,457,662.2	235,121.5	79.80				Average	
		EXSPATB	623	1,457,739.8	235,195.5	73.90				Average	
		EXSPATB	624	1,457,891.2	235,400.0	70.00				Average	
		EXSPATB	625	1,458,119.6	235,730.5	50.00				Average	

INPUT: ROADWAYS **MD4/MD235**

		EXSPATB	626	1,458,378.9	236,101.4	38.00				Average	
		EXSPATB	627	1,458,640.9	236,473.1	34.00				Average	
		EXSPATB	628	1,458,836.1	236,750.5	32.00				Average	
		EXSPATB	629	1,458,939.2	236,936.3	30.00				Average	
		EXSPATB	630	1,459,046.6	237,166.8	28.00				Average	
		EXSPATB	631	1,459,151.9	237,383.0	26.00					
EXSPATBR100-C	23.0	EXSPATB	632	1,459,151.9	237,383.0	26.00				Average	
		EXSPATB	633	1,459,196.1	237,445.9	25.40				Average	
		EXSPATB	634	1,459,250.1	237,497.9	25.10				Average	
		EXSPATB	635	1,459,347.5	237,547.6	24.00					
EXSPATBR100-D	18.0	EXSPATB	636	1,459,347.5	237,547.6	24.00				Average	
		EXSPATB	637	1,459,434.8	237,555.7	23.40				Average	
		EXSPATB	638	1,459,885.8	237,661.2	20.60					
EXSPATBR201	20.0	EXSPATB	639	1,459,345.4	237,675.1	24.90				Average	
		EXSPATB	640	1,459,332.6	237,715.0	24.40				Average	
		EXSPATB	641	1,459,337.1	237,802.6	23.40				Average	
		EXSPATB	642	1,459,372.6	237,882.8	22.50				Average	
		EXSPATB	643	1,459,436.1	237,990.0	21.00				Average	
		EXSPATB	644	1,459,506.5	238,127.0	20.50				Average	
		EXSPATB	645	1,459,550.9	238,218.2	20.30					
EXWROSE100	10.0	EXWROS	661	1,459,840.9	237,880.1	15.70				Average	
		EXWROS	662	1,459,471.0	238,032.3	20.80					
EXWPATBR100	20.0	EXWPATE	663	1,458,684.6	237,496.2	22.70				Average	
		EXWPATE	664	1,458,865.9	237,588.9	23.40				Average	
		EXWPATE	665	1,458,983.1	237,643.5	25.30				Average	
		EXWPATE	666	1,459,129.8	237,696.6	24.90				Average	
		EXWPATE	667	1,459,199.9	237,746.7	24.00				Average	
		EXWPATE	668	1,459,286.8	237,918.9	22.80				Average	
		EXWPATE	669	1,459,326.1	237,944.0	22.60				Average	
		EXWPATE	670	1,459,370.1	237,941.2	22.20					
EXWOOD100	18.0	EXWOOD	736	1,450,273.9	232,445.7	130.00				Average	
		EXWOOD	738	1,450,447.2	232,640.2	133.00				Average	
		EXWOOD	739	1,450,513.2	232,703.6	133.60				Average	
		EXWOOD	740	1,450,560.8	232,742.3	134.30				Average	
		EXWOOD	741	1,450,626.2	232,788.3	136.00				Average	
		EXWOOD	742	1,450,697.8	232,827.4	137.60				Average	
		EXWOOD	743	1,450,781.0	232,873.7	136.00				Average	
		EXWOOD	744	1,450,888.1	232,944.5	128.00				Average	
		EXWOOD	745	1,450,951.1	233,000.1	124.00				Average	

INPUT: ROADWAYS **MD4/MD235**

		EXWOOD	746	1,450,995.5	233,042.5	122.00				Average	
		EXWOOD	747	1,451,119.4	233,158.8	118.00				Average	
		EXWOOD	748	1,451,336.0	233,316.7	114.70					

Receptors – Area 2

INPUT: RECEIVERS MD4/MD235

JMT 24 July 2009
Run Date:7/10/09 TNM 2.5

INPUT: RECEIVERS
PROJECT/CONTRACT: MD4/MD235
RUN: EWC 2009AM AREA2

Receiver Name	No.	#DUs	Coordinates (ground) X	Y	Z	Height above Ground	Input Sound Levels and Criteria Existing LAeq1h	Impact Criteria LAeq1h	Sub'l	NR Goal	Active in Calc.
			ft	ft	ft	ft	dBA	dBA	dB	dB	
M17	17	1	1,457,825.8	236,799.9	34.37	4.92	58.00	66	10.0	8.0	Y
M18	18	1	1,457,478.6	236,149.6	45.33	4.92	65.00	66	10.0	8.0	Y
M19	19	1	1,457,097.5	234,990.6	95.74	4.92	58.00	66	10.0	8.0	Y
M20	20	1	1,456,854.0	235,302.0	85.91	4.92	58.00	66	10.0	8.0	
M21	21	1	1,455,091.8	234,624.3	105.86	4.92	57.00	66	10.0	8.0	Y
M22	22	1	1,454,601.2	233,946.4	108.10	4.92	56.00	66	10.0	8.0	Y
M23	23	1	1,454,172.9	234,874.4	108.79	4.92	62.00	66	10.0	8.0	Y
M24	24	1	1,452,271.9	234,788.7	112.27	4.92	60.00	66	10.0	8.0	Y
M25	25	1	1,451,555.9	235,294.8	69.90	4.92	52.00	66	10.0	8.0	Y
M17 AREA2											
M18 AREA2											
M19 AREA2											
M20 AREA2											
M21 AREA2											
M22 AREA2											
M23 AREA2											
M24 AREA2											
M25 AREA2											

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Ground Zone – Area2

INPUT: GROUND ZONES MD4/MD235

JMT 24 July 2009
Run Date:7/10/09 TNM 2.5

INPUT: GROUND ZONES
PROJECT/CONTRACT: MD4/MD235
RUN: EWC 2009AM AREA2

Ground Zone			Points		
Name	Type	Flow Resistivity	No.	Coordinates X	Y
		cgs rayls		ft	ft
PAVEMENT 1	Pavement	20000	1	1,454,304.6	234,791.1
			2	1,454,357.2	234,774.3
			3	1,454,363.5	234,768.3
			4	1,454,415.9	234,749.3
			5	1,454,461.6	234,727.2
			6	1,454,446.5	234,696.1
			7	1,454,426.9	234,704.0
			8	1,454,421.6	234,686.5
			9	1,454,344.0	234,712.9
			10	1,454,335.2	234,717.1
			11	1,454,284.9	234,733.3
WATER 200	Water	20000	71	1,461,387.0	237,051.6
			72	1,461,376.4	237,124.3
			73	1,461,330.2	237,187.2
			74	1,461,230.8	237,125.8
			75	1,461,085.0	237,079.4
			76	1,461,057.2	237,041.8
			77	1,461,000.5	237,095.2
			78	1,461,032.2	237,216.2
			79	1,461,107.8	237,398.1
			80	1,461,184.2	237,505.3
			81	1,461,051.8	237,550.3
			82	1,461,001.2	237,544.8

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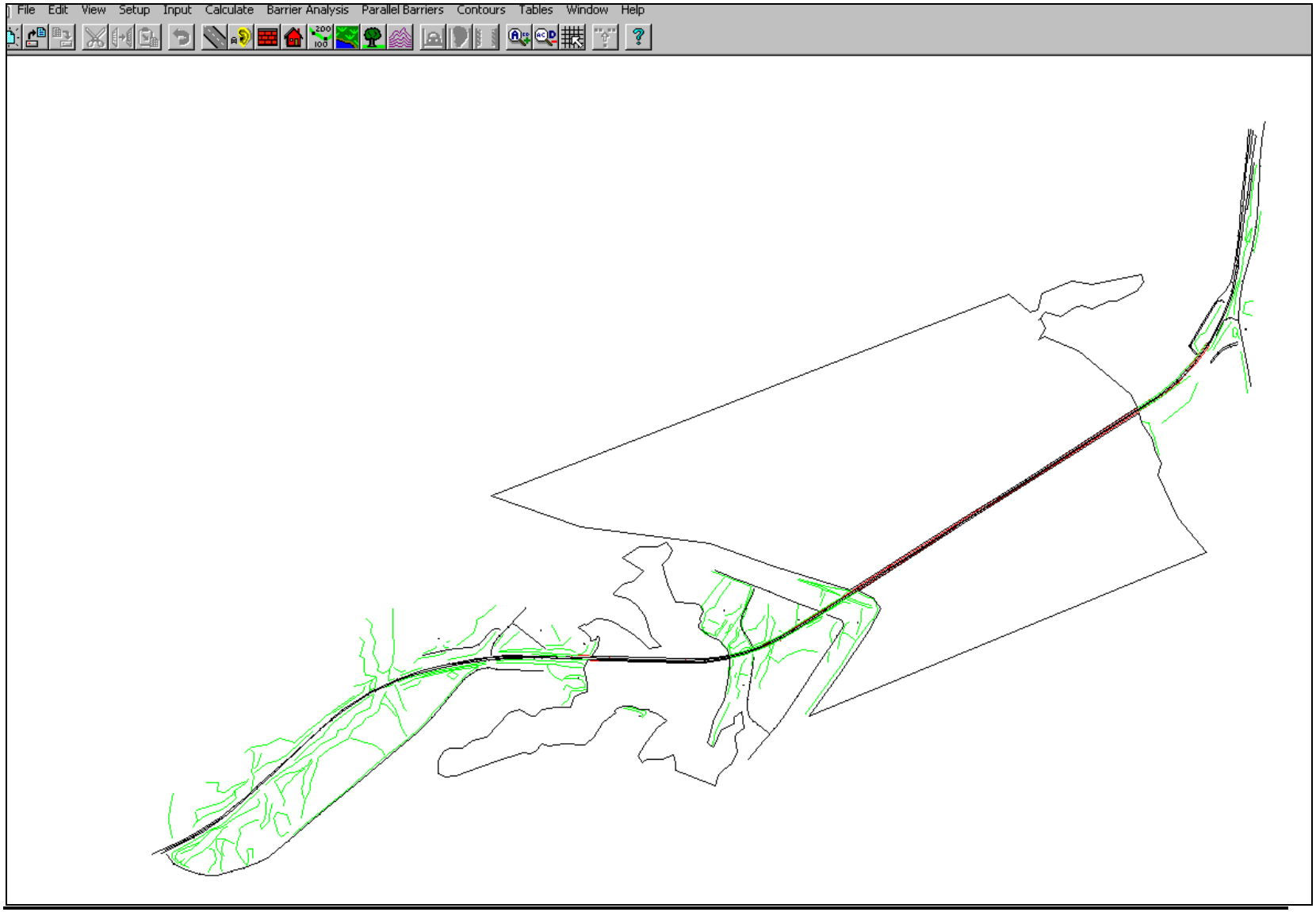
INPUT: GROUND ZONES MD4/MD235

			83	1,460,983.0	237,556.8
			84	1,460,894.6	237,542.4
			85	1,460,812.0	237,547.9
			86	1,460,745.5	237,536.3
			87	1,460,692.6	237,505.0
			88	1,460,659.2	237,464.0
			89	1,460,671.0	237,446.3
			90	1,460,579.9	237,322.7
			91	1,460,530.8	237,157.5
			92	1,460,459.8	237,059.0
			93	1,460,265.1	237,022.9
			94	1,460,116.4	236,952.4
			95	1,460,047.6	236,959.7
			96	1,460,019.8	236,886.1
			97	1,459,967.1	236,833.2
			98	1,459,898.1	236,836.0
			99	1,459,652.4	236,676.1
			100	1,459,313.6	236,437.0
			101	1,459,211.0	236,394.8
			102	1,459,141.8	236,413.7
			103	1,459,100.1	236,540.3
			104	1,459,130.5	236,633.1
			105	1,459,186.6	236,680.6
			106	1,459,309.0	236,713.3
			107	1,459,379.1	236,821.6
			108	1,459,507.0	236,884.1
			109	1,459,657.8	237,168.9
			110	1,459,750.8	237,236.6
			111	1,459,872.2	237,192.4
			112	1,459,913.6	237,202.4
			113	1,459,957.8	237,290.1
			114	1,460,090.8	237,348.4
			115	1,460,227.0	237,381.2
			116	1,460,241.1	237,487.7
			117	1,460,279.4	237,525.9
			118	1,460,354.2	237,574.2

INPUT: GROUND ZONES **MD4/MD235**

			119	1,460,334.8	237,643.8
			120	1,460,298.9	237,709.0
			121	1,460,279.6	237,744.4
			122	1,460,260.1	237,786.0
			123	1,460,256.9	237,796.6
			124	1,460,264.8	237,811.6
			125	1,460,265.0	237,840.2
			126	1,460,281.9	237,875.7
			127	1,460,469.4	237,918.0
			128	1,461,211.2	238,091.8
			129	1,461,392.8	238,147.4
			130	1,461,577.5	238,224.1
			131	1,461,622.8	238,251.4
			132	1,461,633.6	238,198.0
			133	1,461,659.9	238,079.7
			134	1,461,672.4	237,840.1
			135	1,461,624.5	237,640.4
			136	1,461,623.5	237,426.5
			137	1,461,624.2	237,392.4
			138	1,461,665.9	237,367.6
			139	1,461,688.1	237,369.0
			140	1,461,698.6	237,378.4
			141	1,461,723.4	237,550.3
			142	1,461,825.6	237,640.9
			143	1,461,817.9	237,704.6
			144	1,461,872.2	237,781.5
			145	1,461,931.9	237,621.0
			146	1,461,878.5	237,557.5
			204	1,461,881.6	237,511.9
			203	1,461,932.6	237,390.4
			202	1,461,912.1	237,263.3
			201	1,461,854.8	237,188.4
			200	1,461,814.6	237,116.9
			147	1,461,808.5	237,005.7

Plan View –Area3



Roadway- Area 3

INPUT: ROADWAYS **MD4/MD235**

JMT **24 July 2009**
Run Date:7/10/09 **TNM 2.5**

INPUT: ROADWAYS
PROJECT/CONTRACT: **MD4/MD235**
RUN: **EWC 2009AM AREA3**

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

Roadway		Points					Flow Control			Segment	
Name	Width	Name	No.	Coordinates (pavement) X	Y	Z	Control Device	Speed Constraint	Percent Vehicles Affected	Pvmt Type	On Struct?
	ft			ft	ft	ft		mph	%		
EXNB4100-I	34.0	EXNB414	139	1,456,701.1	234,951.1	90.70				Average	
		EXNB414	144	1,456,897.2	235,115.6	84.20				Average	
		EXNB414	140	1,456,973.6	235,188.6	80.70				Average	
		EXNB414	141	1,457,057.0	235,274.9	76.30				Average	
		EXNB414	142	1,457,201.8	235,447.4	67.50				Average	
		EXNB414	143	1,457,284.9	235,559.7	61.60					
EXNB4100-J	30.0	EXNB414	145	1,457,284.9	235,559.7	61.60				Average	
		EXNB415	146	1,457,366.2	235,680.8	55.30				Average	
		EXNB415	147	1,457,450.4	235,812.8	48.40				Average	
		EXNB415	148	1,457,583.2	236,021.5	40.30				Average	
		EXNB415	149	1,457,626.8	236,089.9	38.70					
EXNB4100-K	34.0	EXNB415	150	1,457,626.8	236,089.9	38.70				Average	
		EXNB415	151	1,457,905.2	236,528.9	34.60				Average	
		EXNB415	152	1,457,988.8	236,652.2	33.20				Average	
		EXNB415	153	1,458,066.5	236,757.8	32.20				Average	
		EXNB415	154	1,458,196.2	236,906.1	31.40				Average	
		EXNB415	155	1,458,277.6	236,989.8	30.50				Average	
		EXNB415	156	1,458,331.0	237,040.3	30.10				Average	
		EXNB416	157	1,458,437.9	237,131.5	29.50					
EXNB4100-L	30.0	EXNB416	158	1,458,437.9	237,131.5	29.50				Average	
		EXNB416	159	1,458,514.8	237,192.7	29.00				Average	
		EXNB416	160	1,458,639.5	237,279.3	28.20				Average	
		EXNB416	161	1,458,724.8	237,330.5	27.70					
EXNB4100-M	36.0	EXNB416	162	1,458,724.8	237,330.5	27.70				Average	
		EXNB416	163	1,458,829.9	237,393.2	27.40				Average	

INPUT: ROADWAYS **MD4/MD235**

		EXNB416	164	1,458,973.9	237,466.0	26.40				Average	
		EXNB416	165	1,459,122.6	237,534.9	25.70				Average	
		EXNB416	166	1,459,224.1	237,578.4	25.20				Average	
		EXNB416	167	1,459,338.8	237,624.6	24.20				Average	
		EXNB416	168	1,459,539.9	237,693.8	24.60				Average	
		EXNB417	169	1,459,759.4	237,760.3	27.20				Average	
		EXNB417	170	1,459,840.1	237,781.0	28.20					
EXNB4100-N	20.0	EXNB417	171	1,459,840.1	237,781.0	28.20				Average	
		EXNB417	172	1,459,970.9	237,814.2	29.10				Average	
		EXNB417	173	1,460,466.1	237,932.0	34.00				Average	
		EXNB417	174	1,461,208.2	238,106.1	41.00					
EXNB4100-O	17.0	EXNB417	175	1,461,208.2	238,106.1	41.00				Average	
		EXNB417	176	1,461,388.4	238,159.8	42.80				Average	
		EXNB417	177	1,461,572.2	238,236.3	45.00				Average	
		EXNB417	178	1,461,732.5	238,324.0	47.50				Average	
		EXNB417	179	1,461,870.6	238,415.8	51.30				Average	
		EXNB417	180	1,462,053.6	238,565.7	60.00				Average	
		EXNB418	181	1,462,159.0	238,673.9	67.00					
EXNB4100-P	14.0	EXNB418	724	1,462,159.0	238,673.9	67.00				Average	
		EXNB418	182	1,462,413.0	238,952.5	86.70				Average	
		EXNB418	720	1,462,667.0	239,231.2	105.00				Average	
		EXNB418	721	1,462,921.1	239,509.8	123.30				Average	
		EXNB418	722	1,463,175.1	239,788.5	141.40				Average	
		EXNB418	723	1,463,429.1	240,067.1	154.00				Average	
		EXNB418	183	1,463,603.8	240,256.4	157.00				Average	
		EXNB418	184	1,463,784.4	240,455.9	154.00				Average	
		EXNB418	185	1,463,993.2	240,683.0	144.00				Average	
		EXNB418	186	1,465,039.9	241,829.4	68.00				Average	
		EXNB419	187	1,465,185.9	242,027.6	56.00					
EXNB4100-Q	18.0	EXNB418	189	1,465,185.9	242,027.6	56.00				Average	
		EXNB418	190	1,465,235.9	242,119.8	49.30				Average	
		EXNB418	191	1,465,311.2	242,258.3	42.00				Average	
		EXNB418	192	1,465,386.9	242,458.7	33.10				Average	
		EXNB419	193	1,465,398.6	242,489.3	32.00				Average	
		EXNB419	194	1,465,435.5	242,631.2	26.20					
EXNB4100-R	34.0	EXNB419	195	1,465,435.5	242,631.2	26.20				Average	
		EXNB419	196	1,465,462.8	242,778.6	23.30				Average	
		EXNB419	197	1,465,477.2	242,950.2	21.10				Average	
		EXNB419	198	1,465,482.8	243,015.2	20.50				Average	

INPUT: ROADWAYS **MD4/MD235**

		EXNB419	199	1,465,468.4	243,274.1	18.00					
EXNB4100-S	58.0	EXNB419	200	1,465,468.4	243,274.1	18.00				Average	
		EXNB419	201	1,465,455.5	243,343.7	17.10				Average	
		EXNB419	202	1,465,423.8	243,564.7	15.50					
EXNB4201-A	46.0	EXNB420	203	1,465,429.8	243,565.5	15.60				Average	
		EXNB420	204	1,465,392.4	243,843.9	12.70					
EXNB4201-B	32.0	EXNB420	205	1,465,392.4	243,843.9	12.70				Average	
		EXNB420	206	1,465,373.9	243,981.9	12.30				Average	
		EXNB420	207	1,465,353.8	244,142.6	12.30				Average	
		EXNB420	208	1,465,332.8	244,312.0	12.60					
EXNB4201-C	30.0	EXNB420	209	1,465,332.8	244,312.0	12.60				Average	
		EXNB420	210	1,465,300.6	244,573.2	14.60					
EXNB4230-A	20.0	EXNB423	211	1,465,434.2	242,568.3	28.70				Average	
		EXNB423	212	1,465,469.5	242,718.0	24.40					
EXNB4230-B	34.0	EXNB423	213	1,465,469.5	242,718.0	24.40				Average	
		EXNB423	214	1,465,488.5	242,742.9	23.10				Average	
		EXNB423	215	1,465,522.4	242,764.3	20.50				Average	
		EXNB423	216	1,465,558.8	242,766.0	18.00				Average	
		EXNB423	217	1,465,604.5	242,761.4	16.30					
EXNB4500	12.0	EXNB450	226	1,465,410.0	243,843.4	12.30				Average	
		EXNB450	227	1,465,391.2	243,985.5	11.80				Average	
		EXNB450	228	1,465,371.5	244,144.8	12.00				Average	
		EXNB450	229	1,465,350.6	244,314.2	12.30					
EXNB5000	12.0	EXNB500	230	1,458,994.0	237,489.4	27.10				Average	
		EXNB500	231	1,459,121.5	237,549.1	25.90				Average	
		EXNB500	232	1,459,222.0	237,591.7	25.60				Average	
		EXNB500	233	1,459,321.6	237,630.0	24.30					
EXSB4100-A	24.0	EXSB410	248	1,465,240.8	244,606.7	15.80				Average	
		EXSB410	249	1,465,285.8	244,317.1	13.20					
EXSB4100-B	30.0	EXSB410	255	1,465,285.8	244,317.1	13.20				Average	
		EXSB410	258	1,465,313.2	244,140.7	12.50				Average	
		EXSB410	256	1,465,339.1	243,974.2	12.30				Average	
		EXSB410	257	1,465,357.8	243,853.8	12.50					
EXSB4100-C	12.0	EXSB410	259	1,465,357.8	243,853.8	12.50				Average	
		EXSB410	260	1,465,403.2	243,562.2	15.00				Average	
		EXSB410	261	1,465,439.9	243,326.4	16.90					
EXSB4100-D	36.0	EXSB411	262	1,465,446.0	243,327.7	17.00				Average	
		EXSB412	263	1,465,456.5	243,272.7	17.70				Average	
		EXSB412	264	1,465,460.0	243,215.5	18.10					

INPUT: ROADWAYS **MD4/MD235**

EXSB4100-E	52.0	EXSB412	265	1,465,460.0	243,215.5	18.10				Average	
		EXSB412	266	1,465,470.8	243,015.5	19.90				Average	
		EXSB412	267	1,465,465.2	242,951.2	20.40					
EXSB4100-F	40.0	EXSB412	268	1,465,465.2	242,951.2	20.40				Average	
		EXSB412	269	1,465,450.9	242,780.2	22.50				Average	
		EXSB412	270	1,465,423.8	242,633.9	25.90					
EXSB4100-G	20.0	EXSB412	271	1,465,423.8	242,633.9	25.90				Average	
		EXSB412	272	1,465,387.1	242,493.0	31.40					
EXSB4100-H	16.0	EXSB412	273	1,465,387.1	242,493.0	31.40				Average	
		EXSB412	274	1,465,375.0	242,460.9	32.70					
EXSB4100-I	20.0	EXSB412	275	1,465,375.0	242,460.9	32.70				Average	
		EXSB412	276	1,465,300.2	242,263.3	42.00				Average	
		EXSB412	277	1,465,238.0	242,148.7	49.30				Average	
		EXSB413	278	1,465,175.8	242,034.1	56.00				Average	
		EXSB413	279	1,465,030.8	241,837.2	68.00					
EXSB4100-J	14.0	EXSB413	280	1,465,030.8	241,837.2	68.00				Average	
		EXSB413	281	1,463,984.4	240,691.1	144.00				Average	
		EXSB413	282	1,463,776.8	240,463.6	154.00				Average	
		EXSB413	283	1,463,600.2	240,270.9	157.00				Average	
		EXSB413	284	1,463,420.8	240,074.0	154.00					
EXSB4100-K	20.0	EXSB413	285	1,463,420.8	240,074.0	154.00				Average	
		EXSB413	716	1,463,166.6	239,795.6	141.40				Average	
		EXSB413	717	1,462,912.5	239,517.2	123.30				Average	
		EXSB413	718	1,462,658.5	239,238.8	105.00				Average	
		EXSB413	719	1,462,404.4	238,960.4	86.70				Average	
		EXSB414	286	1,462,150.2	238,682.0	67.00				Average	
		EXSB414	287	1,462,044.8	238,573.8	60.00				Average	
		EXSB414	288	1,461,863.1	238,424.1	51.30				Average	
		EXSB414	289	1,461,726.2	238,334.8	47.50				Average	
		EXSB414	290	1,461,567.1	238,248.4	45.00				Average	
		EXSB414	291	1,461,384.9	238,172.2	42.80				Average	
		EXSB414	292	1,461,206.8	238,118.2	41.00				Average	
		EXSB414	293	1,460,469.8	237,944.4	34.00					
EXSB4100-L	30.0	EXSB414	294	1,460,469.8	237,944.4	34.00				Average	
		EXSB414	295	1,459,973.5	237,827.4	29.40				Average	
		EXSB414	296	1,459,838.2	237,795.7	28.30					
EXSB4100-M	60.0	EXSB414	297	1,459,838.2	237,795.7	28.30				Average	
		EXSB414	298	1,459,756.0	237,775.8	27.40				Average	
		EXSB414	299	1,459,643.0	237,745.2	26.10					

INPUT: ROADWAYS **MD4/MD235**

EXSB4100-N	12.0	EXSB4147	300	1,459,643.0	237,745.2	26.10				Average	
		EXSB4148	301	1,459,532.1	237,715.3	25.30				Average	
		EXSB4149	302	1,459,329.4	237,646.9	24.50					
EXSB4100-O	34.0	EXSB4149	303	1,459,329.4	237,646.9	24.50				Average	
		EXSB4150	735	1,459,218.4	237,602.3	26.00				Average	
		EXSB4151	304	1,459,112.2	237,558.4	26.30				Average	
		EXSB4152	305	1,458,965.2	237,485.4	27.90				Average	
		EXSB4153	306	1,458,822.4	237,410.5	28.50				Average	
		EXSB4154	307	1,458,715.5	237,345.1	28.20				Average	
		EXSB4155	308	1,458,633.4	237,293.6	29.20				Average	
		EXSB4156	309	1,458,507.4	237,204.5	29.60				Average	
		EXSB4157	310	1,458,423.1	237,135.9	1.00				Average	
		EXSB4158	311	1,458,325.5	237,051.2	1.70				Average	
		EXSB4159	312	1,458,271.0	237,000.2	31.20				Average	
		EXSB4160	313	1,458,186.8	236,913.8	32.20				Average	
		EXSB4161	314	1,458,056.8	236,765.0	33.00				Average	
		EXSB4162	315	1,457,979.1	236,658.0	33.80				Average	
		EXSB4163	316	1,457,895.0	236,535.4	34.90				Average	
		EXSB4164	317	1,457,618.8	236,101.4	38.60				Average	
		EXSB4165	318	1,457,572.2	236,027.6	40.20				Average	
		EXSB4166	319	1,457,439.5	235,818.9	48.20				Average	
		EXSB4167	320	1,457,356.0	235,687.1	54.80					
EXSB4100-P	32.0	EXSB4167	321	1,457,356.0	235,687.1	54.80				Average	
		EXSB4168	322	1,457,270.6	235,569.3	60.80				Average	
		EXSB4169	323	1,457,189.0	235,463.1	66.30				Average	
		EXSB4170	324	1,457,029.0	235,281.0	75.50				Average	
		EXSB4171	325	1,456,881.6	235,133.1	82.80					
EXSB4100-Q	40.0	EXSB4171	326	1,456,881.6	235,133.1	82.80				Average	
		EXSB4172	327	1,456,689.0	234,974.5	89.20				Average	
		EXSB4173	328	1,456,612.2	234,912.4	91.60					
EXSB4320-A	12.0	EXSB4320	385	1,465,222.8	244,604.9	16.80				Average	
		EXSB4321	386	1,465,268.0	244,314.4	13.70				Average	
		EXSB4322	387	1,465,295.5	244,138.0	12.50				Average	
		EXSB4323	388	1,465,321.4	243,972.0	11.90				Average	
		EXSB4324	389	1,465,340.0	243,851.0	11.70				Average	
		EXSB4325	390	1,465,392.2	243,561.5	14.70				Average	
		EXSB4326	391	1,465,426.8	243,328.8	16.50				Average	
		EXSB4327	392	1,465,433.6	243,269.8	17.00				Average	
		EXSB4328	393	1,465,439.6	243,195.0	17.50				Average	

INPUT: ROADWAYS **MD4/MD235**

		EXSB432	394	1,465,441.9	243,105.0	18.20					
EXSB4320-B	10.0	EXSB432	395	1,465,441.9	243,105.0	18.20				Average	
		EXSB433	672	1,465,404.5	243,007.0	18.30				Average	
		EXSB433	671	1,465,367.0	242,939.7	19.30				Average	
		EXSB433	396	1,465,339.9	242,874.8	19.30					
EXSB4340	12.0	EXSB434	397	1,465,258.8	244,608.2	15.00				Average	
		EXSB434	398	1,465,303.5	244,319.9	13.00					
EXSB4500	35.0	EXSB450	399	1,459,639.9	237,756.9	26.40				Average	
		EXSB450	400	1,459,528.5	237,726.2	25.40				Average	
		EXSB450	401	1,459,354.8	237,668.2	24.70					
EXSB5000	12.0	EXSB500	437	1,459,644.8	237,737.4	26.00				Average	
		EXSB500	438	1,459,537.0	237,705.1	26.00				Average	
		EXSB500	439	1,459,380.4	237,651.3	25.00					
EXSB5100	16.0	EXSB510	440	1,457,188.5	235,444.8	67.40				Average	
		EXSB510	441	1,457,037.9	235,272.9	76.10				Average	
		EXSB510	442	1,456,887.6	235,123.0	83.50				Average	
		EXSB510	443	1,456,724.9	234,986.6	89.00					
EXBDIXON100	12.0	EXBDIXO	480	1,462,182.2	237,644.7	14.70				Average	
		EXBDIXO	481	1,462,046.8	237,699.0	12.00				Average	
		EXBDIXO	482	1,462,001.2	237,720.0	10.00				Average	
		EXBDIXO	483	1,461,966.8	237,742.0	8.00				Average	
		EXBDIXO	484	1,461,939.2	237,768.5	6.00				Average	
		EXBDIXO	485	1,461,920.0	237,819.4	4.00				Average	
		EXBDIXO	486	1,461,897.6	237,909.8	3.80				Average	
		EXBDIXO	487	1,461,873.5	238,091.4	6.60				Average	
		EXBDIXO	488	1,461,867.2	238,159.3	7.30				Average	
		EXBDIXO	489	1,461,845.8	238,331.1	9.40					
EXBDIXON200	14.0	EXBDIXO	490	1,461,810.2	238,420.1	10.60				Average	
		EXBDIXO	491	1,461,744.8	238,488.7	14.00				Average	
		EXBDIXO	492	1,461,691.1	238,536.5	15.70				Average	
		EXBDIXO	493	1,461,663.2	238,561.3	14.00				Average	
		EXBDIXO	494	1,461,642.8	238,597.5	12.00				Average	
		EXBDIXO	495	1,461,636.8	238,626.2	8.00				Average	
		EXBDIXO	496	1,461,634.5	238,685.1	6.00				Average	
		EXBDIXO	497	1,461,648.5	238,771.8	8.00				Average	
		EXBDIXO	498	1,461,676.9	238,928.2	12.00				Average	
		EXBDIXO	499	1,461,682.9	238,980.7	14.00					
EXNPATBR100-A	16.0	EXNPATB	540	1,462,053.5	237,342.5	10.80				Average	
		EXNPATB	541	1,462,167.9	237,574.2	14.00				Average	

INPUT: ROADWAYS **MD4/MD235**

		EXNPATB	542	1,462,227.2	237,699.6	16.00				Average	
		EXNPATB	543	1,462,282.5	237,824.8	16.90				Average	
		EXNPATB	544	1,462,345.2	238,005.7	16.00				Average	
		EXNPATB	545	1,462,367.9	238,078.3	14.00				Average	
		EXNPATB	546	1,462,487.4	238,441.0	12.00				Average	
		EXNPATB	547	1,462,591.8	238,751.3	14.00					
EXNPATBR100-B	18.0	EXNPATB	548	1,462,591.8	238,751.3	14.00				Average	
		EXNPATB	549	1,462,619.8	238,840.3	12.50				Average	
		EXNPATB	550	1,462,612.9	238,881.1	13.00				Average	
		EXNPATB	551	1,462,582.2	238,903.1	13.40					
EXNPATBR100-C	16.0	EXNPATB	552	1,462,582.2	238,903.1	13.40				Average	
		EXNPATB	553	1,462,552.9	238,907.4	14.10				Average	
		EXNPATB	554	1,462,424.8	238,921.5	16.40					
EXNPATBR200	18.0	EXNPATB	555	1,462,348.9	238,930.1	16.30				Average	
		EXNPATB	556	1,462,160.8	238,951.5	17.10				Average	
		EXNPATB	557	1,461,926.6	238,976.3	15.00				Average	
		EXNPATB	558	1,461,821.8	238,988.5	15.30				Average	
		EXNPATB	559	1,461,694.2	239,002.6	15.00				Average	
		EXNPATB	560	1,461,572.6	239,016.3	14.00				Average	
		EXNPATB	561	1,461,475.0	239,026.7	12.00				Average	
		EXNPATB	562	1,461,366.8	239,038.2	11.10				Average	
		EXNPATB	563	1,461,244.9	239,050.6	12.00					
EXSOLOMON100	44.0	EXSOLON	600	1,465,895.2	242,167.9	6.90				Average	
		EXSOLON	601	1,465,832.9	242,297.0	8.00				Average	
		EXSOLON	602	1,465,709.8	242,552.1	13.20				Average	
		EXSOLON	603	1,465,607.6	242,761.1	16.20				Average	
		EXSOLON	604	1,465,568.5	242,954.3	17.80				Average	
		EXSOLON	605	1,465,549.1	243,149.2	19.20				Average	
		EXSOLON	606	1,465,560.5	243,471.0	17.80				Average	
		EXSOLON	607	1,465,535.6	243,703.9	15.70				Average	
		EXSOLON	608	1,465,490.8	243,959.8	13.50				Average	
		EXSOLON	609	1,465,418.1	244,292.8	11.90				Average	
		EXSOLON	610	1,465,374.2	244,533.5	13.10				Average	
		EXSOLON	611	1,465,355.2	244,734.3	14.30					
EXSPATBR100-A	23.0	EXSPATB	612	1,456,756.4	234,947.2	91.40				Average	
		EXSPATB	613	1,456,853.9	234,879.1	96.00				Average	
		EXSPATB	614	1,456,904.1	234,864.6	98.00				Average	
		EXSPATB	615	1,456,983.9	234,855.3	100.00				Average	
		EXSPATB	616	1,457,122.5	234,850.2	101.70				Average	

INPUT: ROADWAYS **MD4/MD235**

		EXSPATB	617	1,457,211.8	234,860.5	101.20					
EXSPATBR100-B	20.0	EXSPATB	618	1,457,211.8	234,860.5	101.20				Average	
		EXSPATB	619	1,457,290.1	234,884.0	100.30				Average	
		EXSPATB	620	1,457,421.9	234,956.0	98.00				Average	
		EXSPATB	621	1,457,532.2	235,021.0	90.00				Average	
		EXSPATB	622	1,457,662.2	235,121.5	79.80				Average	
		EXSPATB	623	1,457,739.8	235,195.5	73.90				Average	
		EXSPATB	624	1,457,891.2	235,400.0	70.00				Average	
		EXSPATB	625	1,458,119.6	235,730.5	50.00				Average	
		EXSPATB	626	1,458,378.9	236,101.4	38.00				Average	
		EXSPATB	627	1,458,640.9	236,473.1	34.00				Average	
		EXSPATB	628	1,458,836.1	236,750.5	32.00				Average	
		EXSPATB	629	1,458,939.2	236,936.3	30.00				Average	
		EXSPATB	630	1,459,046.6	237,166.8	28.00				Average	
		EXSPATB	631	1,459,151.9	237,383.0	26.00					
EXSPATBR100-C	23.0	EXSPATB	632	1,459,151.9	237,383.0	26.00				Average	
		EXSPATB	633	1,459,196.1	237,445.9	25.40				Average	
		EXSPATB	634	1,459,250.1	237,497.9	25.10				Average	
		EXSPATB	635	1,459,347.5	237,547.6	24.00					
EXSPATBR100-D	18.0	EXSPATB	636	1,459,347.5	237,547.6	24.00				Average	
		EXSPATB	637	1,459,434.8	237,555.7	23.40				Average	
		EXSPATB	638	1,459,885.8	237,661.2	20.60					
EXSPATBR201	20.0	EXSPATB	639	1,459,345.4	237,675.1	24.90				Average	
		EXSPATB	640	1,459,332.6	237,715.0	24.40				Average	
		EXSPATB	641	1,459,337.1	237,802.6	23.40				Average	
		EXSPATB	642	1,459,372.6	237,882.8	22.50				Average	
		EXSPATB	643	1,459,436.1	237,990.0	21.00				Average	
		EXSPATB	644	1,459,506.5	238,127.0	20.50				Average	
		EXSPATB	645	1,459,550.9	238,218.2	20.30					
EXWROSE100	10.0	EXWROS	661	1,459,840.9	237,880.1	15.70				Average	
		EXWROS	662	1,459,471.0	238,032.3	20.80					
EXWPATBR100	20.0	EXWPATE	663	1,458,684.6	237,496.2	22.70				Average	
		EXWPATE	664	1,458,865.9	237,588.9	23.40				Average	
		EXWPATE	665	1,458,983.1	237,643.5	25.30				Average	
		EXWPATE	666	1,459,129.8	237,696.6	24.90				Average	
		EXWPATE	667	1,459,199.9	237,746.7	24.00				Average	
		EXWPATE	668	1,459,286.8	237,918.9	22.80				Average	
		EXWPATE	669	1,459,326.1	237,944.0	22.60				Average	
		EXWPATE	670	1,459,370.1	237,941.2	22.20					

INPUT: ROADWAYS **MD4/MD235**

EXSB4320-C	12.0	EXSB4332	673	1,465,339.9	242,874.8	19.30				Average	
		EXSB4333	674	1,465,269.6	242,643.8	16.70				Average	
		EXSB4334	675	1,465,205.1	242,392.1	11.30				Average	
		EXSB4335	676	1,465,299.4	242,330.8	12.90					
EXSB4350	12.0	EXSB4350	677	1,465,653.9	242,557.1	13.80				Average	
		EXSB4351	678	1,465,582.5	242,505.4	15.90				Average	
		EXSB4352	685	1,465,525.8	242,448.4	16.40				Average	
		EXSB4353	684	1,465,494.8	242,401.4	16.80				Average	
		EXSB4354	679	1,465,445.2	242,296.4	17.60					
EXSB4336	12.0	EXSB4336	680	1,465,455.8	242,291.4	17.60				Average	
		EXSB4337	681	1,465,503.0	242,392.2	17.00				Average	
		EXSB4338	682	1,465,541.0	242,447.2	16.30				Average	
		point734	734	1,465,603.0	242,493.2	15.05				Average	
		EXSB4339	683	1,465,665.0	242,539.3	13.80					
EXSB4355	12.0	EXSB4355	686	1,465,305.9	242,340.8	13.00				Average	
		EXSB4356	687	1,465,217.5	242,398.4	11.30				Average	
		EXSB4357	688	1,465,281.1	242,640.6	16.40				Average	
		EXSB4358	689	1,465,354.2	242,880.9	19.30				Average	
		EXSB4359	690	1,465,368.6	242,901.8	18.90				Average	
		EXSB4360	691	1,465,396.8	242,912.5	18.60				Average	
		EXSB4361	692	1,465,432.5	242,892.9	19.30					
EXSB4100-K::EXSB4136 17.0											
EXSB4100-K::EXSB4137 17.7											
EXSB4100-K::EXSB4138 18.1											
EXSB4100-K::EXSB4139 19.9											
EXSB4100-K::EXSB4140 20.4											
EXSB4100-K::EXSB4141 22.5											
EXSB4100-K::EXSB4142 25.9											
EXSB4100-K::EXSB4143 31.4											
EXSB4100-K::EXSB4144 32.7											
EXSB4100-K::EXSB4145 42.0											
EXSB4100-K::EXSB4146 49.3											
EXSB4100-K::EXSB4147 56.0											

Receptors- Area 3

INPUT: RECEIVERS MD4/MD235

JMT 24 July 2009
Run Date:7/10/09 TNM 2.5

INPUT: RECEIVERS
PROJECT/CONTRACT: MD4/MD235
RUN: EWC 2009AM AREA3

Receiver Name	No.	#DUs	Coordinates (ground) X	Y	Z	Height above Ground	Input Sound Levels and Criteria Existing LAeq1h	Impact Criteria LAeq1h	Sub'l	NR Goal	Active in Calc.
			ft	ft	ft	ft	dBA	dBA	dB	dB	
M04	4	1	1,465,700.5	242,697.5	15.06	4.92	60.00	66	10.0	8.0	Y
M05	5	1	1,462,752.0	238,918.5	13.46	4.92	56.00	66	10.0	8.0	Y
M06	6	1	1,462,748.4	238,686.5	7.18	4.92	55.00	66	10.0	8.0	Y
M07	7	1	1,462,271.8	239,143.9	15.39	4.92	55.00	66	10.0	8.0	Y
M08	8	1	1,462,178.6	238,794.2	17.39	4.92	62.00	66	10.0	8.0	Y
M09	9	1	1,461,821.5	238,034.8	8.55	4.92	53.00	66	10.0	8.0	Y
M10	10	1	1,461,447.0	238,695.4	15.40	4.92	55.00	66	10.0	8.0	Y
M11	11	1	1,460,911.4	237,475.2	14.62	4.92	57.00	66	10.0	8.0	Y
M12	12	1	1,460,230.0	237,679.5	15.17	4.92	59.00	66	10.0	8.0	Y
M13	13	1	1,460,201.8	238,021.0	9.74	4.92	57.00	66	10.0	8.0	Y
M14	14	1	1,459,749.6	238,036.9	18.01	4.92	56.00	66	10.0	8.0	Y
M15	15	1	1,458,915.1	237,279.8	26.15	4.92	60.00	66	10.0	8.0	Y
M16	16	1	1,458,798.2	237,697.9	25.70	4.92	54.00	66	10.0	8.0	Y
M04 TMS01 & 24HR(M-03)AREA3											
M05 TMS01AREA3											
M06 TMS01TMS06AREA3											
M07 TMS01AREA3											
M08 TMS01AREA3											
M09 TMS03TMS06AREA3											
M10 TMS03AREA3											
M11 TMS03TMS06AREA3											
M12 TMS03TMS06AREA3											

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Ground Zones – Area 3

INPUT: GROUND ZONES **MD4/MD235**

JMT **24 July 2009**
Run Date:7/10/09 **TNM 2.5**

INPUT: GROUND ZONES
PROJECT/CONTRACT: **MD4/MD235**
RUN: **EWC 2009AM AREA3**

Ground Zone			Points		
Name	Type	Flow Resistivity	No.	Coordinates X	Y
		cgs rayls		ft	ft
WATER100	Water	20000	13	1,460,305.5	237,923.8
			14	1,460,338.9	238,030.4
			15	1,460,325.1	238,121.3
			16	1,460,305.2	238,121.0
			17	1,460,296.2	238,090.0
			18	1,460,248.6	238,059.8
			19	1,460,247.5	238,095.3
			20	1,460,176.2	238,133.3
			21	1,460,106.8	238,162.5
			22	1,460,159.1	238,205.7
			23	1,460,172.8	238,204.3
			24	1,460,223.6	238,259.8
			25	1,460,253.2	238,290.8
			26	1,460,274.5	238,297.1
			27	1,460,353.9	238,305.8
			28	1,460,445.5	238,293.9
			29	1,460,499.0	238,272.2
			30	1,460,588.8	238,254.9
			31	1,460,657.9	238,232.4
			32	1,460,765.2	238,174.9
			33	1,460,832.2	238,139.5
			34	1,460,936.5	238,191.0
			35	1,460,818.4	238,258.7

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INPUT: GROUND ZONES **MD4/MD235**

			36	1,460,700.6	238,448.1
			37	1,460,604.8	238,520.1
			38	1,460,502.2	238,557.1
			39	1,460,369.2	238,560.5
			40	1,460,350.2	238,575.8
			41	1,460,408.5	238,680.7
			42	1,460,510.8	238,745.4
			43	1,460,573.1	238,865.0
			44	1,460,340.8	238,932.8
			45	1,460,469.6	239,084.6
			46	1,460,637.8	239,129.9
			47	1,460,723.9	239,194.2
			48	1,460,800.9	239,141.4
			49	1,460,781.5	239,055.7
			50	1,460,736.9	238,976.9
			51	1,460,846.1	238,799.1
			52	1,460,962.8	238,649.9
			53	1,461,127.2	238,682.9
			54	1,461,189.5	238,688.1
			55	1,461,221.2	238,672.4
			56	1,461,246.6	238,630.9
			57	1,461,247.6	238,596.9
			58	1,461,241.1	238,556.7
			59	1,461,249.6	238,526.0
			60	1,461,243.8	238,499.4
			61	1,461,247.2	238,479.4
			62	1,461,264.8	238,460.4
			63	1,461,403.9	238,411.8
			64	1,461,464.6	238,399.1
			65	1,461,566.5	238,342.3
			199	1,461,593.2	238,306.5
			198	1,461,605.2	238,283.1
			197	1,461,560.9	238,261.1
			196	1,461,379.8	238,185.5
			195	1,461,201.2	238,137.2
			194	1,460,465.2	237,963.2

INPUT: GROUND ZONES **MD4/MD235**

			66	1,460,308.4	237,924.9
WATER 200	Water	20000	71	1,461,387.0	237,051.6
			72	1,461,376.4	237,124.3
			73	1,461,330.2	237,187.2
			74	1,461,230.8	237,125.8
			75	1,461,085.0	237,079.4
			76	1,461,057.2	237,041.8
			77	1,461,000.5	237,095.2
			78	1,461,032.2	237,216.2
			79	1,461,107.8	237,398.1
			80	1,461,184.2	237,505.3
			81	1,461,051.8	237,550.3
			82	1,461,001.2	237,544.8
			83	1,460,983.0	237,556.8
			84	1,460,894.6	237,542.4
			85	1,460,812.0	237,547.9
			86	1,460,745.5	237,536.3
			87	1,460,692.6	237,505.0
			88	1,460,659.2	237,464.0
			89	1,460,671.0	237,446.3
			90	1,460,579.9	237,322.7
			91	1,460,530.8	237,157.5
			92	1,460,459.8	237,059.0
			93	1,460,265.1	237,022.9
			94	1,460,116.4	236,952.4
			95	1,460,047.6	236,959.7
			96	1,460,019.8	236,886.1
			97	1,459,967.1	236,833.2
			98	1,459,898.1	236,836.0
			99	1,459,652.4	236,676.1
			100	1,459,313.6	236,437.0
			101	1,459,211.0	236,394.8
			102	1,459,141.8	236,413.7
			103	1,459,100.1	236,540.3
			104	1,459,130.5	236,633.1
			105	1,459,186.6	236,680.6

INPUT: GROUND ZONES MD4/MD235

			106	1,459,309.0	236,713.3
			107	1,459,379.1	236,821.6
			108	1,459,507.0	236,884.1
			109	1,459,657.8	237,168.9
			110	1,459,750.8	237,236.6
			111	1,459,872.2	237,192.4
			112	1,459,913.6	237,202.4
			113	1,459,957.8	237,290.1
			114	1,460,090.8	237,348.4
			115	1,460,227.0	237,381.2
			116	1,460,241.1	237,487.7
			117	1,460,279.4	237,525.9
			118	1,460,354.2	237,574.2
			119	1,460,334.8	237,643.8
			120	1,460,298.9	237,709.0
			121	1,460,279.6	237,744.4
			122	1,460,260.1	237,786.0
			123	1,460,256.9	237,796.6
			124	1,460,264.8	237,811.6
			125	1,460,265.0	237,840.2
			126	1,460,281.9	237,875.7
			127	1,460,469.4	237,918.0
			128	1,461,211.2	238,091.8
			129	1,461,392.8	238,147.4
			130	1,461,577.5	238,224.1
			131	1,461,622.8	238,251.4
			132	1,461,633.6	238,198.0
			133	1,461,659.9	238,079.7
			134	1,461,672.4	237,840.1
			135	1,461,624.5	237,640.4
			136	1,461,623.5	237,426.5
			137	1,461,624.2	237,392.4
			138	1,461,665.9	237,367.6
			139	1,461,688.1	237,369.0
			140	1,461,698.6	237,378.4
			141	1,461,723.4	237,550.3

INPUT: GROUND ZONES **MD4/MD235**

			142	1,461,825.6	237,640.9
			143	1,461,817.9	237,704.6
			144	1,461,872.2	237,781.5
			145	1,461,931.9	237,621.0
			146	1,461,878.5	237,557.5
			204	1,461,881.6	237,511.9
			203	1,461,932.6	237,390.4
			202	1,461,912.1	237,263.3
			201	1,461,854.8	237,188.4
			200	1,461,814.6	237,116.9
			147	1,461,808.5	237,005.7
WATER300	Water	20000	149	1,462,528.0	237,906.8
			150	1,462,717.1	238,414.7
			151	1,462,874.8	238,864.3
			152	1,462,936.0	239,112.1
			153	1,462,837.6	239,194.3
			154	1,462,803.8	239,197.6
			155	1,462,762.8	239,211.4
			156	1,462,682.9	239,217.8
			157	1,463,438.1	240,058.6
			158	1,463,613.2	240,246.4
			159	1,463,794.8	240,444.7
			160	1,464,002.2	240,673.2
			161	1,464,902.6	241,629.7
			162	1,464,942.9	241,544.5
			163	1,465,087.5	241,417.6
			208	1,465,139.4	241,327.5
			207	1,465,237.6	241,203.7
			206	1,465,238.0	241,092.2
			205	1,465,530.9	240,735.8
			164	1,465,894.9	240,477.2
WATER400	Water	20000	165	1,458,937.4	239,185.5
			166	1,459,869.8	239,126.8
			167	1,461,139.2	239,296.1
			168	1,461,817.8	239,236.9
			169	1,462,598.8	239,212.8

INPUT: GROUND ZONES **MD4/MD235**

			170	1,463,409.8	240,090.9
			171	1,463,587.8	240,283.7
			172	1,463,763.8	240,474.3
			173	1,463,973.9	240,701.8
			174	1,464,862.1	241,675.5
			175	1,464,775.1	241,779.7
			176	1,464,159.2	242,070.0
			177	1,463,794.0	242,118.4
			178	1,463,760.4	242,072.5
			179	1,463,791.1	242,193.1
			180	1,463,727.2	242,273.7
			181	1,463,704.6	242,257.8
			182	1,463,745.5	242,349.6
			183	1,463,906.8	242,348.5
			184	1,464,009.8	242,468.0
			185	1,464,081.8	242,510.0
			186	1,464,185.2	242,498.2
			187	1,464,325.6	242,617.5
			188	1,464,392.8	242,630.5
			189	1,464,569.1	242,782.6
			190	1,464,607.0	242,886.6
			191	1,464,570.4	242,949.2
			192	1,464,123.8	242,731.7
			212	1,463,919.6	242,712.6
			211	1,463,671.0	242,523.3
			210	1,463,664.6	242,353.9
			209	1,463,602.4	242,312.8
			193	1,463,359.2	242,429.3

REFERENCE FILES

Appendix C

http:\\projectcenter.jmt.com\01\01-0456-029\ProjectFiles\00-JMT\Report\Final
MD4Final_Appendix C 08-19-2009.doc

Q:\SMD\010456_029_MD 4 Noise Study\Working Data\Report\images for report\appx C

Q:\SMD\010456_029_MD 4 Noise Study\Working Data
TNM MD4 COORDINATES AND ELEVATIONS.xlsx

Q:\SMD\010456_029_MD 4 Noise Study\Working Data\TNM Runs
TMS01
TMS02
TMS03
TMS04
TMS05
TMS06
EWC-2009 AM
EWC-2009 PM
Build_2030-AM
Build_2030-PM

MD 4 (PATUXENT BEACH ROAD)
PROJECT PLANNING STUDY

Calvert County and St. Mary's County, Maryland

NOISE ANALYSIS
TECHNICAL REPORT

FINAL
August 19, 2009

Appendix D
TNM MODEL CALIBRATION

Submitted To

MARYLAND STATE HIGHWAY ADMINISTRATION

OFFICE OF PLANNING AND PRELIMINARY ENGINEERING

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INTRODUCTION

The TNM Model Calibration evaluates the model's ability to reproduce the Measured Noise Levels. Measured Noise Levels correspond to ambient measurements taken in conjunction with highway traffic counts (See Appendix B for further details).

For the calibration procedure, ambient noise measurements were performed at twenty-five locations, identified as Noise Measurement Receptors M-04 through M-28. Five receptors were monitored at a time, during 20-minute periods that coincided with 20-minute traffic monitoring sessions. Traffic counts were obtained for those roadways which were considered to be the primary contributors to the traffic noise environment (Refer to Appendix B, FIGURE B.1, B.1a, B.1b, B.1c, B.1d, & B.1e for location of counted roadways). Six traffic monitoring sessions were done in one day to complete the noise sampling.

TNM MODEL CALIBRATION

After the Noise Measurements and Traffic Counts were obtained, a TNM Model was developed for the study area, inputting all pertinent roadways, terrain, and structural elements thought to be needed for adequately characterizing the study area's noise environment. Each Noise Measurement Receptor was accurately represented in the model by a TNM Modeled Receptor (See Appendix C for TNM Model Input details). The model was then calibrated by testing it under each of the traffic conditions encountered during the six traffic monitoring sessions. SHA considers a TNM Model to be properly calibrated when the Modeled Noise Levels are within ±3 dB(A) of the Measured Noise Levels for most of the receptors. In order to bring the model into calibration, modifications were applied by inputting additional terrain and structural elements in an orderly sequence of TNM runs, with each new model revision, being re-tested until the calibration criteria were determined met by SHA.

At two receptors (M-08 and M-18), an adjustment factor was determined to be required in order to bring the receptors to within 3dB(A) of the measured noise levels.

TABLES D.1 thru D.6 show the Measured Noise Levels obtained during the two monitoring sessions and show the corresponding Modeled Noise Levels for each receptor. Each Modeled Noise Level also includes 43 dB(A) of background noise as determined by reviewing noise readings during three background measurements. The numerical difference between the Measured Noise Level and its corresponding Modeled Noise Level is shown, as well as the adjustment factors for receptors M-08 and M-18 are also shown . Those receptors meeting the calibration criteria are identified by the word "Yes" in the Calibrating Model Point column; those that do not meet calibration criteria are identified by the word "No." Data from all tables are then summarized in TABLE D.7.

TABLE D.1 compares the Modeled Noise Levels from TNM Run *TMS01* to the Measured Noise Levels during Traffic Monitoring Session 01.

TABLE D.1 TNM Model Calibration 05-20-2009 1000 -1020

Receptor Number[1]	Address	Measured Noise Level[2]	Modeled Noise Level[3]	Adjustment Factor	Predicted Noise Level[5]	Difference[4]	Calibrating Model Point (Yes)[6]	(No)[7]
M-04	14120 Solomons Island Rd., S.	60	57		57	-3	Yes	
M-05	24131 N. Patuxent Beach Road	56	54		54	-2	Yes	
M-06	? N. Patuxent Beach Road	55	53		53	-2	Yes	
M-07	24087 N. Patuxent Beach Road	55	55		55	0	Yes	
M-08	24080 N. Patuxent Beach Road	62	56	+4	60	-2	Yes	
Calibrating Model Points							**5**	**0**

1. *The Noise Measurement Receptor Number represents the Noise Measurement Receptor Sites for the field measurements (See Appendix A for Noise Measurement Data). All Receptors are Short-term Noise Measurement Receptor Sites. The Receptor Number also represents the TNM Modeled Receptor Site Number used in TNM Runs.*
2. *The Measured Noise Level is the field monitored noise level (Leq[h]). All noise levels are rounded to the nearest whole decibel.*
3. *The Modeled Noise Level is the TNM "Calculated" Noise Level (Leq[h]) using the field counted traffic with 43 dB(A) added to the TNM result. All noise levels are rounded to the nearest whole decibel.*
4. *The Difference shown is the difference between the Measured Noise Level and the Predicted Noise Level. The difference is rounded to the nearest whole decibel. A negative number implies that the Predicted Noise Level is less than the Measured Noise Level.*
5. *The Predicted Noise Level is the sum of the TNM Calculated Noise Level plus 43 dB(A background), plus an adjustment factor shown in this table.*
6. *Calibrating Model Point: The Predicted Noise Level is within 3 dB(A) of the Measured Noise Level*
7. *Non-Calibrating Model Point: The difference between the Predicted Noise Level and the Measured Noise Level is greater than 3 dB(A).*

TABLE D.2 compares the Modeled Noise Levels from TNM Run *TMS02* to the Measured Noise Levels during Traffic Monitoring Session 02.

TABLE D.2 TNM Model Calibration 05-20-2009 1040 -1100

Receptor Number[1]	Address	Measured Noise Level[2]	Modeled Noise Level[3]	Adjustment Factor	Predicted Noise Level[5]	Difference[4]	Calibrating Model Point (Yes)[6]	(No)[7]
M-14	45920 Wild Rose Lane	56	55		55	-1	Yes	
M-15	23635 S. Patuxent Beach Road	60	61		61	+1	Yes	
M-16	23702 W. Patuxent Beach Road	54	56		56	+2	Yes	
M-17	23612 Kingston Shores Lane	58	58		58	0	Yes	
M-18	23550 Kingston Shores Lane	65	61	+3	64	-1	Yes	
Calibrating Model Points							**5**	**0**

1. *The Noise Measurement Receptor Number represents the Noise Measurement Receptor Sites for the field measurements (See Appendix A for Noise Measurement Data). All Receptors are Short-term Noise Measurement Receptor Sites. The Receptor Number also represents the TNM Modeled Receptor Site Number used in TNM Runs.*
2. *The Measured Noise Level is the field monitored noise level (Leq[h]). All noise levels are rounded to the nearest whole decibel.*
3. *The Modeled Noise Level is the TNM "Calculated" Noise Level (Leq[h]) using the field counted traffic with 43 dB(A) added to the TNM result. All noise levels are rounded to the nearest whole decibel.*
4. *The Difference shown is the difference between the Measured Noise Level and the Predicted Noise Level. The difference is rounded to the nearest whole decibel. A negative number implies that the Predicted Noise Level is less than the Measured Noise Level.*
5. *The Predicted Noise Level is the sum of the TNM Calculated Noise Level plus 43 dB(A background), plus an adjustment factor shown in this table.*
6. *Calibrating Model Point: The Predicted Noise Level is within 3 dB(A) of the Measured Noise Level*
7. *Non-Calibrating Model Point: The difference between the Predicted Noise Level and the Measured Noise Level is greater than 3 dB(A).*

TABLE D.3 compares the Modeled Noise Levels from TNM Run *TMS03* to the Measured Noise Levels during Traffic Monitoring Session 03.

TABLE D.3 TNM Model Calibration 05-20-2009 1120 - 1140

Receptor Number[1]	Address		Measured Noise Level[2]	Modeled Noise Level[3]	Adjustment Factor	Predicted Noise Level[5]	Difference[4]	Calibrating Model Point (Yes)[6]	(No)[7]
M-09	23719	Bill Dixon Road	53	53		53	0	Yes	
M-10	23788	Bill Dixon Road	55	53		53	-2	Yes	
M-11	23633	Town Creek Drive	55	52		52	-3	Yes	
M-12	25969	S. Patuxent Beach Road	59	57		57	-2	Yes	
M-13	45970	Wild Rose Lane	57	56		56	-1	Yes	
Calibrating Model Points								**5**	**0**

1. *The Noise Measurement Receptor Number represents the Noise Measurement Receptor Sites for the field measurements (See Appendix A for Noise Measurement Data). All Receptorare Short-term Noise Measurement Receptor Sites. The Receptor Number also represents the TNM Modeled Receptor Site Number used in TNM Runs.*
2. *The Measured Noise Level is the field monitored noise level (Leq[h]). All noise levels are rounded to the nearest whole decibel.*
3. *The Modeled Noise Level is the TNM "Calculated" Noise Level (Leq[h]) using the field counted traffic with 43 dB(A) added to the TNM result. All noise levels are rounded to the nearest whole decibel.*
4. *The Difference shown is the difference between the Measured Noise Level and the Predicted Noise Level. The difference is rounded to the nearest whole decibel. A negative number implies that the Predicted Noise Level is less than the Measured Noise Level.*
5. *The Predicted Noise Level is the sum of the TNM Calculated Noise Level plus 43 dB(A background), plus an adjustment factor shown in this table.*
6. *Calibrating Model Point: The Predicted Noise Level is within 3 dB(A) of the Measured Noise Level*
7. *Non-Calibrating Model Point: The difference between the Predicted Noise Level and the Measured Noise Level is greater than 3 dB(A).*

TABLE D.4 compares the Modeled Noise Levels from TNM Run *TMS04* to the Measured Noise Levels during Traffic Monitoring Session 04.

TABLE D.4 TNM Model Calibration 05-20-2009 1200 – 1220

Receptor Number[1]	Address		Measured Noise Level[2]	Modeled Noise Level[3]	Adjustment Factor	Predicted Noise Level[5]	Difference[4]	Calibrating Model Point (Yes)[6]	(No)[7]
M-19	23415	S. Patuxent Beach Road	58	58		58	0	Yes	
M-20	45606	Seven Gables Lane	58	57		57	-1	Yes	
M-21	23338	Kingston Creek Road	57	60		60	+3	Yes	
M-22	23322	Shady Mile Drive	53	51		51	-2	Yes	
M-23	23421	Kingston Creek Road	62	63		63	+1	Yes	
Calibrating Model Points								**5**	**0**

1. *The Noise Measurement Receptor Number represents the Noise Measurement Receptor Sites for the field measurements (See Appendix A for Noise Measurement Data). All Receptors are Short-term Noise Measurement Receptor Sites. The Receptor Number also represents the TNM Modeled Receptor Site Number used in TNM Runs.*
2. *The Measured Noise Level is the field monitored noise level (Leq[h]). All noise levels are rounded to the nearest whole decibel.*
3. *The Modeled Noise Level is the TNM "Calculated" Noise Level (Leq[h]) using the field counted traffic with 43 dB(A) added to the TNM result. All noise levels are rounded to the nearest whole decibel.*
4. *The Difference shown is the difference between the Measured Noise Level and the Predicted Noise Level. The difference is rounded to the nearest whole decibel. A negative number implies that the Predicted Noise Level is less than the Measured Noise Level.*
5. *The Predicted Noise Level is the sum of the TNM Calculated Noise Level plus 43 dB(A background), plus an adjustment factor shown in this table.*
6. *Calibrating Model Point: The Predicted Noise Level is within 3 dB(A) of the Measured Noise Level*
7. *Non-Calibrating Model Point: The difference between the Predicted Noise Level and the Measured Noise Level is greater than 3 dB(A).*

TABLE D.5 compares the Modeled Noise Levels from TNM Run *TMS05* to the Measured Noise Levels during Traffic Monitoring Session 05.

TABLE D.5 TNM Model Calibration 05-20-2009 1240 – 1300

Receptor Number[1]	Address	Measured Noise Level[2]	Modeled Noise Level[3]	Adjustment Factor	Predicted Noise Level[5]	Difference[4]	Calibrating Model Point (Yes)[6]	(No)[7]
M-24	45222 Clements Lane	60	61		61	+1	Yes	
M-25	23445 Lous Way	52	51		51	-1	Yes	
M-26	23275 Christy Court	54	55		55	+1	Yes	
M-27	23190 Woodland Acres Road	56	55		55	-1	Yes	
M-28	45020 Patuxent Beach Road	49	48		48	-1	Yes	
Calibrating Model Points							**5**	**0**

1. *The Noise Measurement Receptor Number represents the Noise Measurement Receptor Sites for the field measurements (See Appendix A for Noise Measurement Data). All Receptors are Short-term Noise Measurement Receptor Sites. The Receptor Number also represents the TNM Modeled Receptor Site Number used in TNM Runs.*
2. *The Measured Noise Level is the field monitored noise level (Leq[h]). All noise levels are rounded to the nearest whole decibel.*
3. *The Modeled Noise Level is the TNM "Calculated" Noise Level (Leq[h]) using the field counted traffic with 43 dB(A) added to the TNM result. All noise levels are rounded to the nearest whole decibel.*
4. *The Difference shown is the difference between the Measured Noise Level and the Predicted Noise Level. The difference is rounded to the nearest whole decibel. A negative number implies that the Predicted Noise Level is less than the Measured Noise Level.*
5. *The Predicted Noise Level is the sum of the TNM Calculated Noise Level plus 43 dB(A background), plus an adjustment factor shown in this table.*
6. *Calibrating Model Point: The Predicted Noise Level is within 3 dB(A) of the Measured Noise Level*
7. *Non-Calibrating Model Point: The difference between the Predicted Noise Level and the Measured Noise Level is greater than 3 dB(A).*

TABLE D.6 compares the Modeled Noise Levels from TNM Run *TMS06* to the Measured Noise Levels during Traffic Monitoring Session 06.

TABLE D.6 TNM Model Calibration 05-20-2009 1340 – 1400

Receptor Number[1]	Address	Measured Noise Level[2]	Modeled Noise Level[3]	Adjustment Factor	Predicted Noise Level[5]	Difference[4]	Calibrating Model Point (Yes)[6]	(No)[7]
M-09	23719 Bill Dixon Road	54	56		56	+2	Yes	
M-11	23633 Town Creek Drive	55	55		55	0	Yes	
M-12	25969 S. Patuxent Beach Road	60	61		61	+1	Yes	
M-13	45970 Wild Rose Lane	60	59		59	-1	Yes	
M-15	23635 S. Patuxent Beach Road	62	66		66	+4		**No[8]**
Calibrating Model Points							**5[8]**	**0[8]**

1. *The Noise Measurement Receptor Number represents the Noise Measurement Receptor Sites for the field measurements (See Appendix A for Noise Measurement Data). All Receptors are Short-term Noise Measurement Receptor Sites. The Receptor Number also represents the TNM Modeled Receptor Site Number used in TNM Runs.*
2. *The Measured Noise Level is the field monitored noise level (Leq[h]). All noise levels are rounded to the nearest whole decibel.*
3. *The Modeled Noise Level is the TNM "Calculated" Noise Level (Leq[h]) using the field counted traffic with 43 dB(A) added to the TNM result. All noise levels are rounded to the nearest whole decibel.*
4. *The Difference shown is the difference between the Measured Noise Level and the Predicted Noise Level. The difference is rounded to the nearest whole decibel. A negative number implies that the Predicted Noise Level is less than the Measured Noise Level.*
5. *The Predicted Noise Level is the sum of the TNM Calculated Noise Level plus 43 dB(A background), plus an adjustment factor shown in this table.*
6. *Calibrating Model Point: The Predicted Noise Level is within 3 dB(A) of the Measured Noise Level*
7. *Non-Calibrating Model Point: The difference between the Predicted Noise Level and the Measured Noise Level is greater than 3 dB(A)*
8. *M-15 was considered calibrated because it calibrated in TMS- 02.*

TABLE D.7 compares the Modeled Noise Levels from TNM Runs TMS01 thru *TMS06* to the Measured Noise Levels during the six Traffic Monitoring Sessions 01 thru 06.

TABLE D.7 TNM Model Calibration Summary 05-20-2009

Receptor Number[1]	Address	Measured Noise Level[2]	Modeled Noise Level[3]	Adjustment Factor	Predicted Noise Level[5]	Difference[4]	Calibrating Model Point (Yes)[6]	(No)[7]
M-04	14120 Solomons Island Rd., S.	60	57		57	-3	Yes	
M-05	24131 N. Patuxent Beach Road	56	54		54	-2	Yes	
M-06	? N. Patuxent Beach Road	55	53		53	-2	Yes	
M-07	24087 N. Patuxent Beach Road	55	55		55	0	Yes	
M-08	24080 N. Patuxent Beach Road	62	56	+4	60	-2	Yes	
M-09	23719 Bill Dixon Road	53	53		53	0	Yes	
		54	56		56	+2	Yes	
M-10	23788 Bill Dixon Road	55	53		53	-2	Yes	
M-11	23633 Town Creek Drive	55	52		52	-3	Yes	
		55	55		55	0	Yes	
M-12	25969 S. Patuxent Beach Road	59	57		57	-2	Yes	
		60	61		61	+1	Yes	
M-13	45970 Wild Rose Lane	57	56		56	-1	Yes	
		60	59		59	-1	Yes	
M-14	45920 Wild Rose Lane	56	55		55	-1	Yes	
M-15	23635 S. Patuxent Beach Road	60	61		61	+1	Yes	
		62	66		66	+4		No[8]
M-16	23702 W. Patuxent Beach Road	54	56		56	+2	Yes	
M-17	23612 Kingston Shores Lane	58	58		58	0	Yes	
M-18	23550 Kingston Shores Lane	65	61	+3	64	-1	Yes	
M-19	23415 S. Patuxent Beach Road	58	58		58	0	Yes	
M-20	45606 Seven Gables Lane	58	57		57	-1	Yes	
M-21	23338 Kingston Creek Road	57	60		60	+3	Yes	
M-22	23322 Shady Mile Drive	53	51		51	-2	Yes	
M-23	23421 Kingston Creek Road	62	63		63	+1	Yes	
M-24	45222 Clements Lane	60	61		61	+1	Yes	
M-25	23445 Lous Way	52	51		51	-1	Yes	
M-26	23275 Christy Court	54	55		55	+1	Yes	
M-27	23190 Woodland Acres Road	56	55		55	-1	Yes	
M-28	45020 Patuxent Beach Road	49	48		48	-1	Yes	
Calibrating Model Points							**25[8]**	**0[8]**

TABLE D.7 TNM Model Calibration Summary 05-20-2009

Receptor Number[1]	Address	Measured Noise Level[2]	Modeled Noise Level[3]	Adjustment Factor	Predicted Noise Level[5]	Difference[4]	Calibrating Model Point (Yes)[6]	(No)[7]

1. The Noise Measurement Receptor Number represents the Noise Measurement Receptor Sites for the field measurements (See Appendix A for Noise Measurement Data). All Receptors are Short-term Noise Measurement Receptor Sites. The Receptor Number also represents the TNM Modeled Receptor Site Number used in TNM Runs.
2. The Measured Noise Level is the field monitored noise level (Leq[h]). All noise levels are rounded to the nearest whole decibel.
3. The Modeled Noise Level is the TNM "Calculated" Noise Level (Leq[h]) using the field counted traffic with 43 dB(A) added to the TNM result. All noise levels are rounded to the nearest whole decibel.
4. The Difference shown is the difference between the Measured Noise Level and the Predicted Noise Level. The difference is rounded to the nearest whole decibel. A negative number implies that the Predicted Noise Level is less than the Measured Noise Level.
5. The Predicted Noise Level is the sum of the TNM Calculated Noise Level plus 43 dB(A background), plus an adjustment factor shown in this table.
6. Calibrating Model Point: The Predicted Noise Level is within 3 dB(A) of the Measured Noise Level
7. Non-Calibrating Model Point: The difference between the Predicted Noise Level and the Measured Noise Level is greater than 3 dB(A).
8. M-15 was considered calibrated because it calibrated in TMS-02.

Based on the TNM models created, two (2) receptors did not meet calibration criteria without adjustments. With adjustments as shown, all receptors meet calibration criteria.

OUTPUT TABLES FROM CALIBRATION RUNS

The Modeled Noise Levels reported in TABLES D.1 through D.6 were calculated by TNM in six separate calibration runs. The Run Names for the six runs are:

- *TMS01*, which calculated noise levels resulting from traffic counts obtained during Traffic Monitoring Session 1.
- *TMS02*, which calculated noise levels resulting from traffic counts obtained during Traffic Monitoring Session 2.
- *TMS03*, which calculated noise levels resulting from traffic counts obtained during Traffic Monitoring Session 3.
- *TMS04*, which calculated noise levels resulting from traffic counts obtained during Traffic Monitoring Session 4.
- *TMS05*, which calculated noise levels resulting from traffic counts obtained during Traffic Monitoring Session 5.
- *TMS06*, which calculated noise levels resulting from traffic counts obtained during Traffic Monitoring Session 6.

Copies of the Sound Level Results Tables generated by TNM for the six calibration runs are included below. Note that while all receptors are listed in each run, noise levels were only calculated for receptors that were "active" for that run. The only receptors that were made active for a particular run were those for which noise measurements were obtained in the field during the traffic monitoring session.

TMS01 TNM Result: page 1

RESULTS: SOUND LEVELS MD4/MD235

JMT 24 July 2009
Run Date:6/10/09 TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: MD4/MD235
RUN: EXISTING: TMS01
BARRIER DESIGN: INPUT HEIGHTS

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

ATMOSPHERICS: 68 deg F, 50% RH

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over existing Calculated	Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
M04	4	1	60.0	56.5	66	-3.5	10	----	56.5	0.0	8	-8.0
M05	5	1	56.0	53.4	66	-2.6	10	----	53.4	0.0	8	-8.0
M06	6	1	55.0	52.6	66	-2.4	10	----	52.6	0.0	8	-8.0
M07	7	1	55.0	55.1	66	0.1	10	----	55.1	0.0	8	-8.0
M08	8	1	62.0	55.4	66	-6.6	10	----	55.4	0.0	8	-8.0

Dwelling Units	# DUs	Noise Reduction Min	Avg	Max
		dB	dB	dB
All Selected	5	0.0	0.0	0.0
All Impacted	0	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0

TMS02 TNM Result: page 1

RESULTS: SOUND LEVELS MD4/MD235

JMT 24 July 2009
Run Date:6/10/09 TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: MD4/MD235
RUN: EXISTING: TMS02
BARRIER DESIGN: INPUT HEIGHTS
ATMOSPHERICS: 68 deg F, 50% RH

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

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over existing Calculated	Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
M14	14	1	56.0	54.3	66	-1.7	10	----	54.3	0.0	8	-8.0
M15	15	1	60.0	60.7	66	0.7	10	----	60.7	0.0	8	-8.0
M16	16	1	54.0	55.8	66	1.8	10	----	55.8	0.0	8	-8.0
M17	17	1	58.0	57.8	66	-0.2	10	----	57.8	0.0	8	-8.0
M18	18	1	65.0	61.3	66	-3.7	10	----	61.3	0.0	8	-8.0

Dwelling Units	# DUs	Noise Reduction Min	Avg	Max
		dB	dB	dB
All Selected	5	0.0	0.0	0.0
All Impacted	0	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0

TMS03 TNM Result: page 1

RESULTS: SOUND LEVELS MD4/MD235

JMT 24 July 2009
Run Date:6/10/09 TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: MD4/MD235
RUN: EXISTING: TMS03
BARRIER DESIGN: INPUT HEIGHTS
ATMOSPHERICS: 68 deg F, 50% RH

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

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over existing Calculated	Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
M09	9	1	53.0	52.2	66	-0.8	10	----	52.2	0.0	8	-8.0
M10	10	1	55.0	52.1	66	-2.9	10	----	52.1	0.0	8	-8.0
M11	11	1	57.0	50.9	66	-6.1	10	----	50.9	0.0	8	-8.0
M12	12	1	59.0	57.2	66	-1.8	10	----	57.2	0.0	8	-8.0
M13	13	1	57.0	56.2	66	-0.8	10	----	56.2	0.0	8	-8.0

Dwelling Units	# DUs	Noise Reduction Min	Avg	Max
		dB	dB	dB
All Selected	5	0.0	0.0	0.0
All Impacted	0	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0

TMS04 TNM Result: page 1

RESULTS: SOUND LEVELS MD4/MD235

JMT 24 July 2009
Run Date:6/10/09 TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: MD4/MD235
RUN: EXISTING: TMS04
BARRIER DESIGN: INPUT HEIGHTS

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

ATMOSPHERICS: 68 deg F, 50% RH

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over existing Calculated	Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
M19	19	1	58.0	57.4	66	-0.6	10	----	57.4	0.0	8	-8.0
M20	20	1	58.0	57.3	66	-0.7	10	----	57.3	0.0	8	-8.0
M21	21	1	57.0	59.9	66	2.9	10	----	59.9	0.0	8	-8.0
M22	22	1	56.0	50.8	66	-5.2	10	----	50.8	0.0	8	-8.0
M23	23	1	62.0	63.0	66	1.0	10	----	63.0	0.0	8	-8.0

Dwelling Units	# DUs	Noise Reduction Min	Avg	Max
		dB	dB	dB
All Selected	5	0.0	0.0	0.0
All Impacted	0	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0

TMS05 TNM Result: page 1

RESULTS: SOUND LEVELS MD4/MD235

JMT 24 July 2009
Run Date:6/10/09 TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: MD4/MD235
RUN: EXISTING: TMS05
BARRIER DESIGN: INPUT HEIGHTS

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

ATMOSPHERICS: 68 deg F, 50% RH

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over existing Calculated	Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
M24	24	1	60.0	60.9	66	0.9	10	----	60.9	0.0	8	-8.0
M25	25	1	52.0	50.4	66	-1.6	10	----	50.4	0.0	8	-8.0
M26	26	1	54.0	54.4	66	0.4	10	----	54.4	0.0	8	-8.0
M27	27	1	56.0	55.1	66	-0.9	10	----	55.1	0.0	8	-8.0
M28	28	1	49.0	46.2	66	-2.8	10	----	46.2	0.0	8	-8.0

Dwelling Units	# DUs	Noise Reduction Min	Avg	Max
		dB	dB	dB
All Selected	5	0.0	0.0	0.0
All Impacted	0	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0

TMS06 TNM Result: page 1

RESULTS: SOUND LEVELS MD4/MD235

JMT 24 July 2009
Run Date:6/10/09 TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: MD4/MD235
RUN: EXISTING: TMS06
BARRIER DESIGN: INPUT HEIGHTS
ATMOSPHERICS: 68 deg F, 50% RH

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

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over existing Calculated	Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
M09	9	1	54.0	56.2	66	2.2	10	----	56.2	0.0	8	-8.0
M11	11	1	55.0	54.4	66	-0.6	10	----	54.4	0.0	8	-8.0
M12	12	1	60.0	61.2	66	1.2	10	----	61.2	0.0	8	-8.0
M13	13	1	60.0	58.9	66	-1.1	10	----	58.9	0.0	8	-8.0
M15	31	1	62.0	65.5	66	3.5	10	----	65.5	0.0	8	-8.0

Dwelling Units	# DUs	Noise Reduction Min	Avg	Max
		dB	dB	dB
All Selected	5	0.0	0.0	0.0
All Impacted	0	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0

REFERENCE FILES

Appendix D

http:\\projectcenter.jmt.com\01\01-0456-029\ProjectFiles\00-JMT\Report\Final
MD4Final__Appendix D 08-19-2009.docx

http: Q:\SMD\010456_029_MD 4 Noise Study\Working Data\TNM Runs\Calibration
TMS01
TMS02
TMS03
TMS04
TMS05
TMS06

MD 4 (PATUXENT BEACH ROAD)
PROJECT PLANNING STUDY

Calvert County and St. Mary's County, Maryland

NOISE ANALYSIS
TECHNICAL REPORT

FINAL
AUGUST 19, 2009

Appendix E
TRAFFIC VOLUMES FOR IMPACT ANALYSIS & SOUND BARRIER DESIGN

Submitted To

MARYLAND STATE HIGHWAY ADMINISTRATION
OFFICE OF PLANNING AND PRELIMINARY ENGINEERING

Prepared By

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72 Loveton Circle
Sparks, Maryland 21152-0949
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Fax (410) 472-2200

Appendix E – TRAFFIC VOLUMES FOR IMPACT ANALYSIS & SOUND BARRIER DESIGN

MD 4 (Patuxent Beach Road)

PROJECT PLANNING STUDY

FINAL REPORT – August 19, 2009

INTRODUCTION

General

This appendix documents the traffic volumes and speeds assumed for the Impact Analysis and Sound Barrier Design, and it details the process used for determining those assumed values (See Appendix F for further details on the Sound Barrier Design).

Traffic Data for Type I Studies

The Sound Barrier Design requires traffic data for each alternate to be developed that represents traffic conditions that could produce the highest one hour average noise levels that would reasonably be expected to occur within the study area on a typical weekday (Peak Noise Hour). That set of traffic data must then be held constant throughout the analysis in order for various barrier configurations to be tested as the only variable. Since counted traffic volumes (See Appendix B) used in the calibration runs (See Appendix D) represent only isolated instances in time and are not necessarily obtained during the noisiest time of the day, they are usually not appropriate for this purpose. Therefore, for Type I studies, *sound barrier design traffic volumes* are typically developed based on forecasted traffic data.

TRAFFIC DATA SOURCES

Average Counted Traffic

The Average Counted Traffic was obtained from the simultaneous traffic counts collected during Traffic Monitoring Sessions TMS01 thru TMS06. In addition to the average volumes and speeds, the average directional distributions, lane distributions and vehicle mix percentages are also compiled from this data. Generally, these average distributions and vehicle mix percentages are applied to traffic data from other sources.

Forecasted Traffic

The following 2009 and 2030 Forecasted Traffic for MD 4 (between Patuxent Beach Road N & Thomas Johnson Bridge) were obtained from a April 2009 Memorandum (FIGURE E.1) from the Travel Forecasting Division of the Office of Planning and Preliminary Engineering (OPPE):

MD 4

	2009	2030 No Build	2030 Build
Average Daily Traffic (ADT)	28,900	35,200	40,500
Design Hour Volumes (DHV)	9%	9%	9%
Directional Distribution of DHV	61%	61%	61%
Percent Trucks – ADT	7%	7%	7%
Percent Trucks - DHV	5%	5%	5%

April 23, 2009 Memorandum from the Travel Forecasting Division of the Office of Planning and Preliminary Engineering (OPPE)

FIGURE E.1 April 23, 2009 Memorandum

MEMORANDUM

TO: Mr. Joseph Kresslein
Assistant Division Chief
Environmental Planning Division

ATTN: Ms. Alexis Zimmerer

FROM: Morteza Tadayon, Chief
Travel Forecasting Division
Office of Planning and Preliminary Engineering

DATE: April 23, 2009

SUBJECT: MD 4: Patuxent Point Parkway to MD 235
Contract No. SM351A11

In response to your recent request for environmental traffic data on the subject project, we offer the following:

MD4 (between Patuxent Beach Rd. N & Thomas Johnson Bridge)	2009	2020	2030	2030 Build
Average Daily Traffic (ADT)	28,900	32,300	35,200	40,500
Design Hour Volume (DHV)	9%	9%	9%	9%
Directional Distribution of DHV	61%	61%	61%	61%
Percent Trucks- ADT	7%	7%	7%	7%
Percent Trucks- DHV	5%	5%	5%	5%

FIGURE E.1 April 23, 2009 Memorandum (Cont.)

Mr. Joseph Kresslein
Page Two

ADT and DHV breakdown of truck percentages for MD 4

Average Daily Traffic	Light	Medium	Heavy	Total
Gas	0.525%	1.925%	0.10%	**2.55%**
Diesel	0.525%	1.925%	2.00%	**4.45%**
Total	**1.05%**	**3.85%**	**2.10%**	**7.00%**

Design Hour Volume	Light	Medium	Heavy	Total
Gas	0.325%	1.575%	0.06%	**1.96%**
Diesel	0.325%	1.575%	1.14%	**3.04%**
Total	**0.65%**	**3.15%**	**1.20%**	**5.00%**

Level of Service (LOS) D and E Volumes and Operating Speeds:

Lanes Per Direction	LOS	Volume Per Direction (vph)	Avg. Speed (mph)
One lane	C/D Split	~~387~~ 377	~~45.0~~ 48.5
One Lane	D/E Split	~~491~~ 791	~~39.6~~ 42.9
Two Lanes	C/D Split	2,462	59.5
Two Lanes	D/E Split	3,161	56.7

Please refer to attached MD 4 Diurnal Curve for traffic distribution.

If we may be of further assistance, please contact the writer or Lisa Shemer, Assistant Division Chief, Travel Forecasting Division at 410-545-5640.

By: Stevie Eveland
Travel Forecasting Division

cc: Mr. Russell Anderson
Mr. Harvey Muller
Ms. L'Kiesha Markley

FIGURE E.2 **2009 AM(PM) Peak Hour Traffic Average Daily Traffic**

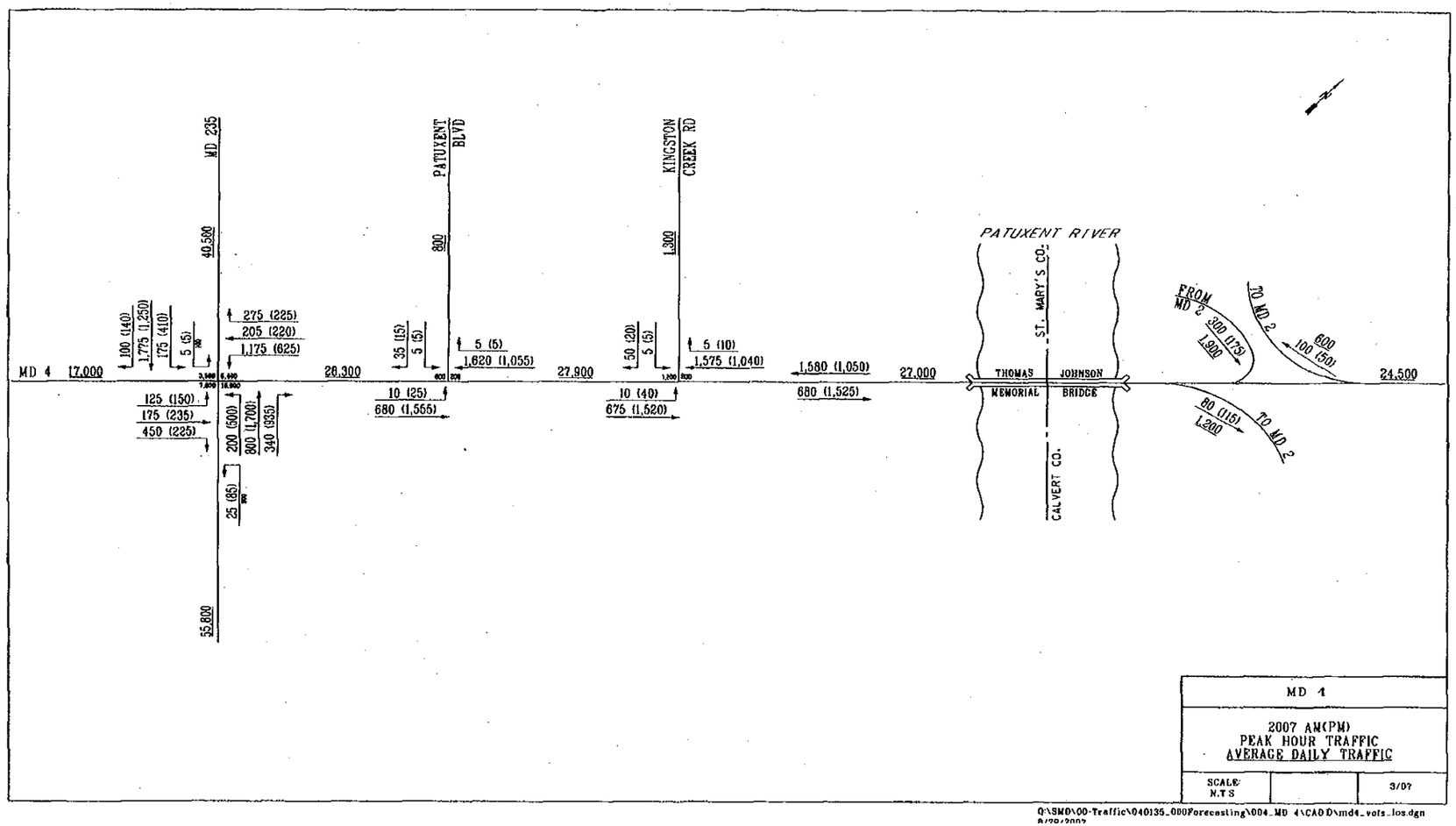
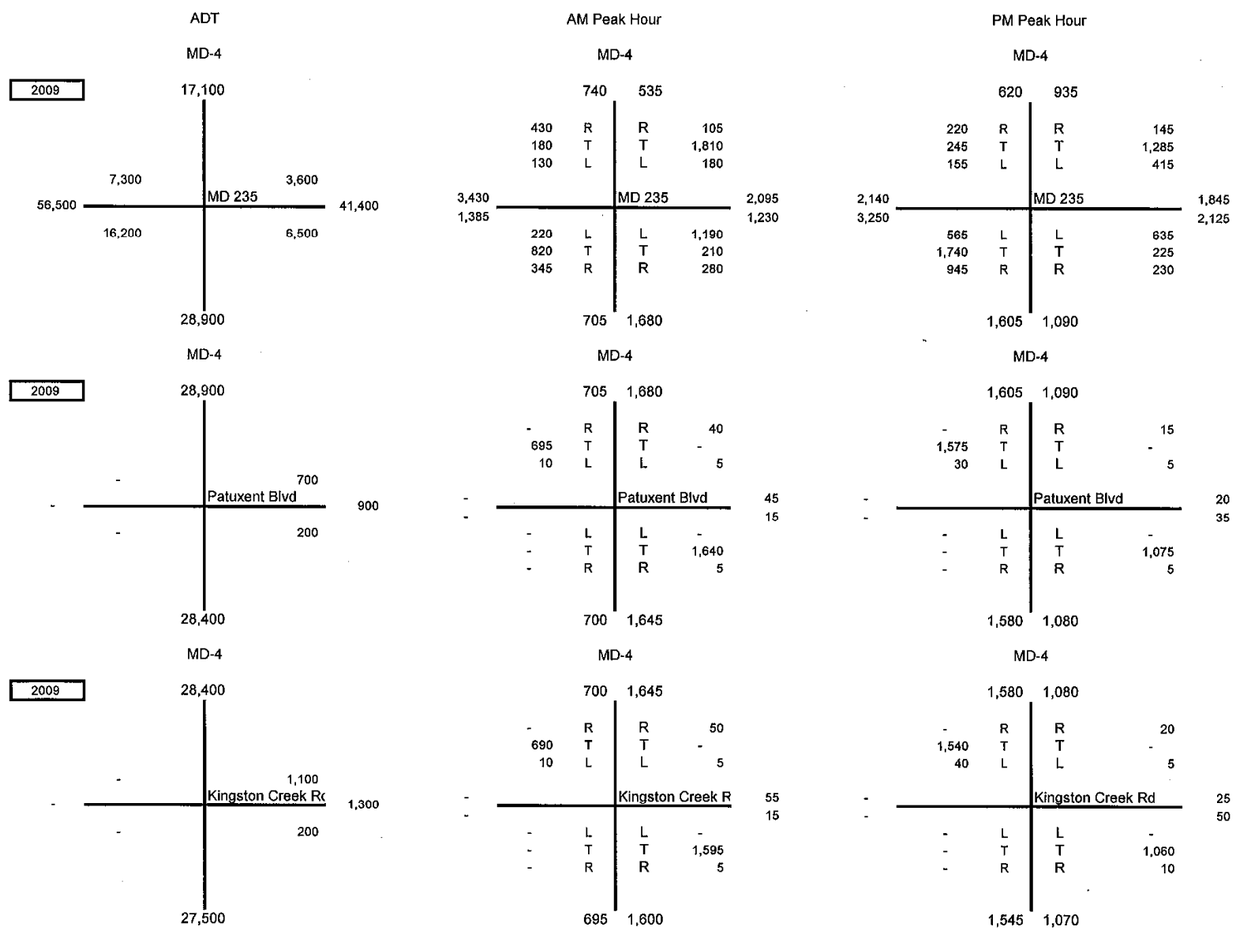


FIGURE E.3 2009 AM(PM) Peak Hour Traffic, Average Daily Traffic, MD4 Plus Diagram

MD-4_Plus Diagrams.xlsx

DRAFT



Source: SHA Travel Forecasting Section

Page 1

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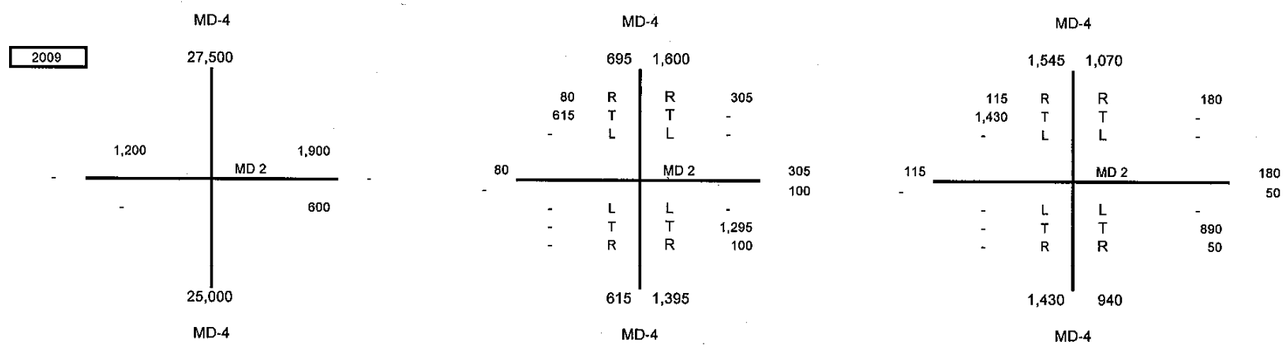
FIGURE E.3 2009 AM(PM) Peak Hour Traffic, Average Daily Traffic, MD4 Plus Diagram (Cont.)

MD-4_Plus Diagrams.xlsx

DRAFT



Source: SHA Travel Forecasting Section

Page 2

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FIGURE E.4 2030 No Build- AM(PM) Peak Hour Traffic Average Daily Traffic

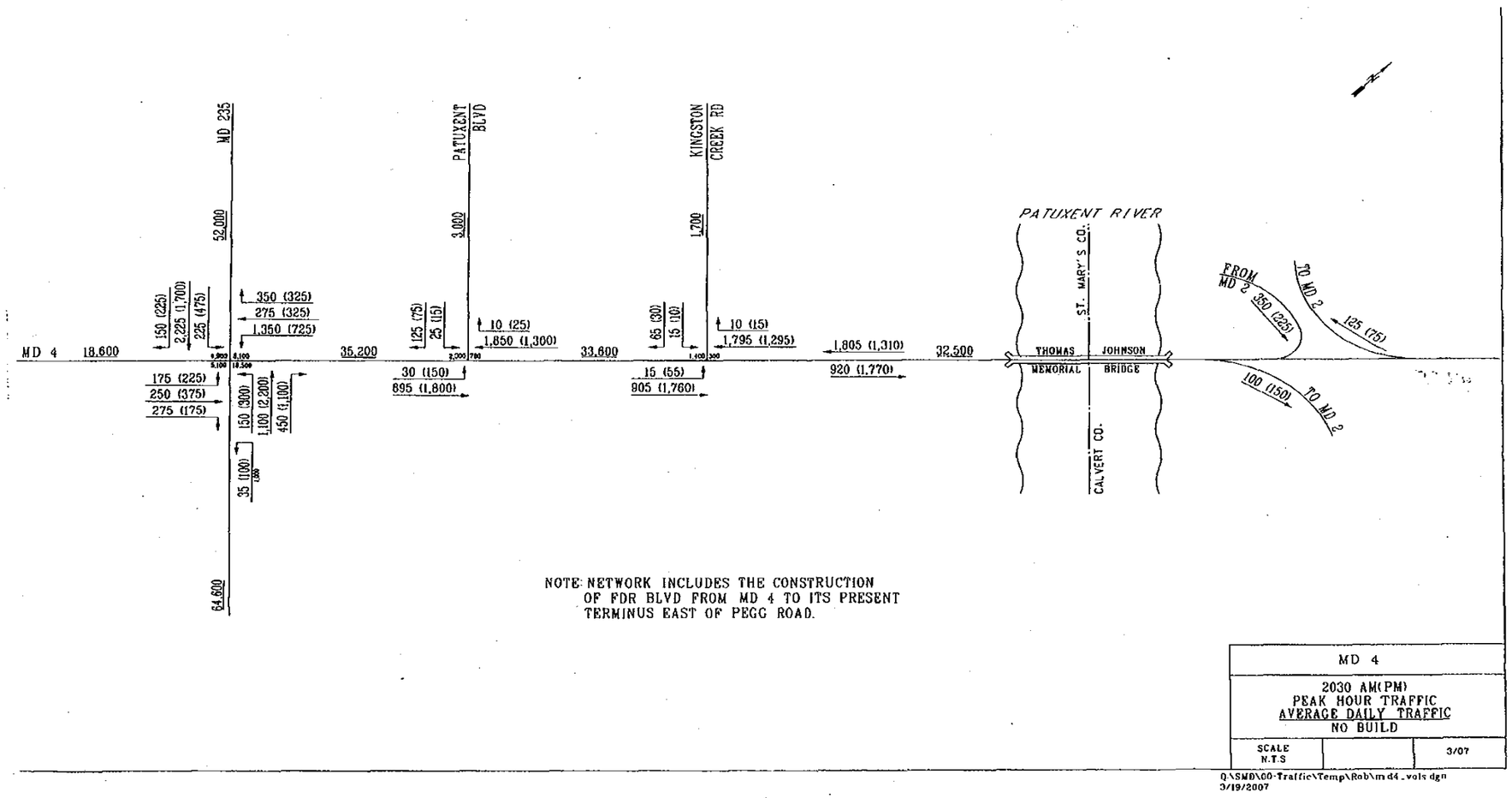
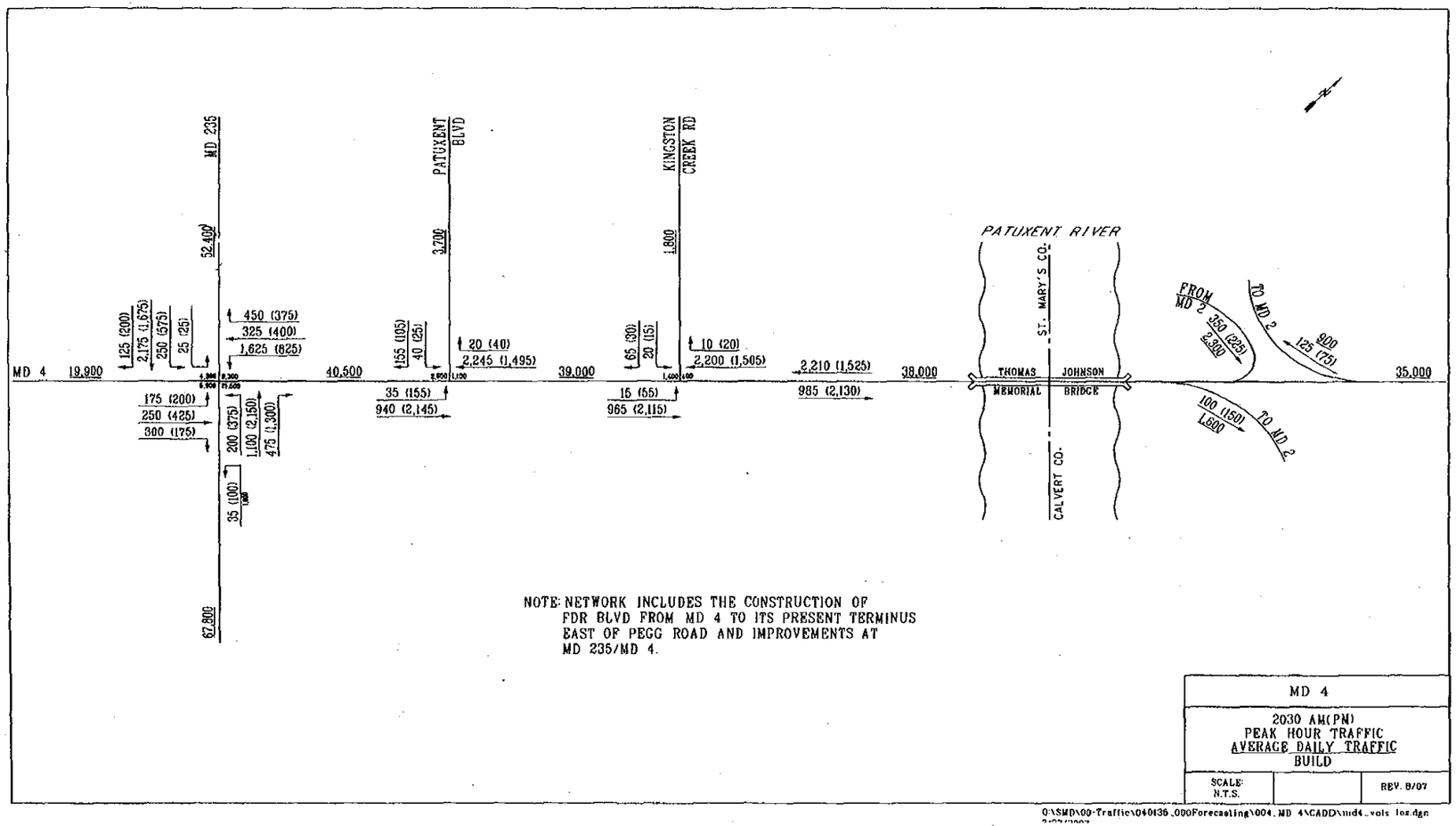


FIGURE E.5 2030 Build- AM(PM) Peak Hour Traffic Average Daily Traffic



LEVEL OF SERVICE ANALYSIS AND PREDICTED TRAFFIC VOLUMES

General

This section is based on Chapters 13, 23, 24 and 25 of the 2000 Highway Capacity Manual[1] (HCM2000). Only the key concepts will be mentioned in this discussion. The reader is encouraged to reference the source material for additional information.

Characteristics

The Level of Service (LOS) should be determined for any potential *sound barrier analysis traffic volumes* to ensure that the appropriate speeds are associated with the volumes. The Level of Service is defined by the density of vehicles along a particular roadway segment with each density having a unique speed: the higher the density, the slower the speed. The density also increases with flow rate until the roadway capacity is reached. Thus, several different densities may need to be investigated to determine, which traffic volumes generate the higher noise levels.

TABLE E.1 explains the density ranges and the operational characteristics of the six LOS.

TABLE E.1 Level of Service (LOS) Density Ranges and Characteristics[1]

Level of Service (LOS)	Density Range (pc/mi/ln)[2]	Operational Characteristics
A	0-11	LOS A describes free-flow operations. Free-flow speeds (FFS) prevail. Vehicles are almost completely unimpeded in their ability to maneuver within the traffic stream. The effects of incidents or point breakdowns are easily absorbed at this level.
B	>11-18	LOS B represents reasonably free flow, and free-flow speeds are maintained. The ability to maneuver within the traffic stream is only slightly restricted, and the general level of physical and psychological comfort provided to drivers is still high. The effects of minor incidents and point breakdowns are still easily absorbed.
C	>18-26	LOS C provides for flow with speeds at or near FFS of the freeway. Freedom to maneuver within the traffic stream is noticeably restricted, and lane changes require more care and vigilance on the part of the driver. Minor incidents may still be absorbed, but the local deterioration in service will be substantial. Queues may be expected to form behind any significant blockage.
D	>26-35	LOS D is the level at which speeds begin to decline slightly with increasing flows and density begins to increase somewhat more quickly. Freedom to maneuver within the traffic stream is more noticeably limited, and the driver experiences reduced physical and psychological comfort levels. Even minor incidents can be expected to create queuing, because the traffic stream has little space to absorb disruptions.
E	>35-45	At its highest density value [45], LOS E describes operation at capacity. Operations at this level are volatile, because there are virtually no usable gaps in the traffic stream. Vehicles are closely spaced, leaving little room to maneuver within the traffic stream at speeds that still exceed 49 mi/h. Any disruption of the traffic stream, such as vehicles entering from a ramp or a vehicle changing lanes, can establish a disruption wave that propagates throughout the upstream traffic flow. At capacity, the traffic stream has no ability to dissipate even the most minor disruption, and any incident can be expected to produce a serious breakdown with extensive queuing. Maneuverability within the traffic stream is extremely limited, and the level of physical and psychological comfort afforded the driver is poor.

[1] Transportation Research Board. 2000. Highway Capacity Manual [standard]. Washington, D.C.: National Research Council. National Academy of Sciences.

TABLE E.1 Level of Service (LOS) Density Ranges and Characteristics[1]

Level of Service (LOS)	Density Range (pc/mi/ln)[2]	Operational Characteristics
F	>45	LOS F describes breakdowns in vehicular flow. Such conditions generally exist within queues forming behind breakdown points. Breakdowns[3] occur when the ratio of existing demand to actual capacity or of forecast demand to estimated capacity exceeds 1.00. Operations immediately downstream of such a point, however, are generally at or near capacity, and downstream operations improve (assuming that there are no additional downstream bottlenecks) as discharging vehicles move away from the bottleneck. LOS F operations within a queue are the result of a breakdown or bottleneck at a downstream point. LOS F is also used to describe conditions at the point of the breakdown or bottleneck and the queue discharge flow that occurs at speeds lower than the lowest speed for LOS E, as well as operations within the queue that forms upstream. Whenever LOS F conditions exist, they have the potential to extend upstream for significant distances.

1. Information compiled from pages 23-3 and pages 13-8 through 13-11 of HCM2000.
2. Density units are in passenger car (equivalents) per mile per lane.
3. Breakdowns occur for a number of reasons:
- *Traffic incidents can cause a temporary reduction in capacity of a short segment, so that the number of vehicles arriving at the point is greater than the number of vehicles that can move through it.*
- *Points of recurring congestion, such as merge or weaving segments and lane drops, experience very high demand in which the number of vehicles arriving is greater than the number of vehicles discharged.*
- *In forecasting situations, the projected peak-hour (or other) flow rate can exceed the estimated capacity of the location.*

Level of Service

Level of Service volume and operating speeds for C/D and D/E breakpoints for MD 4 were supplied within the April 23, 2009 Memorandum. The result summary is shown in FIGURE E.1 page three.

TRAFFIC VOLUME COMPARISON AND TNM ANALYSIS TRAFFIC

TABLES E.2 thru E.7 compare the predicted traffic volumes with the LOS 'D/E' analysis and show the TNM Analysis traffic for both 2009 AM/PM, 2030 No Build AM/PM, 2030 Build AM/PM. Both AM and PM worst case traffic volumes were used to determine the worst case traffic noise levels.

TABLE E.2 **Traffic Volume Comparison & TNM Analysis Traffic, 2009 AM EWC**

MD 4 From MD 2 to MD 235
Vehicle Per Hour - Vehicle Type Distribution

2009 AM - Existing Worst Case

		MD 4 NB															MD 4 SB												
		MD 4 NB THRU (South of MD 235)	MD 4 NB LT TURN (South of MD 235)	MD 4 NB RT TURN (South of MD 235)	MD 4 NB TOTAL THRU (South of MD 235)	MD 4 NB THRU (North of MD 235)	MD 4 NB TOTAL THRU (MD 235 to Patuxent Blvd)	MD 4 NB THRU (South of Patuxent Blvd)	MD 4 NB LT TURN (at Patuxent Blvd)	MD 4 NB TOTAL THRU (Patuxent Blvd to Kingston Creek Rd)	MD 4 NB THRU (South of Kingston Creek Rd)	MD 4 NB LT TURN (at Kingston Creek Rd)	MD 4 NB TOTAL THRU (Kingston Creek Rd to MD 2)	MD 4 NB THRU (North of MD 2)	MD 4 NB THRU (North of MD 2)	MD 4 SB THRU (North of MD 2)	MD 4 SB THRU (North of MD 2)	MD 4 SB LT TURN (North of MD 2)	MD 4 SB TOTAL THRU (MD2 to Kingston Creek Rd)	MD 4 SB THRU (North of Kingston Creek Rd)	MD 4 SB RT TURN (at Kingston Creek Rd)	MD 4 SB TOTAL THRU (Kingston Creek Rd to Patuxent Blvd)	MD 4 SB THRU (North of Patuxent Blvd)	MD 4 SB RT TURN (at Patuxent Blvd)	MD 4 SB THRU (South of Patuxent Blvd)	MD 4 SB TOTAL THRU (Patuxent Blvd to MD 235)	MD 4 SB THRU (North of MD 235)	MD 4 SB LT TURN (at MD 235)	MD 4 SB RT TURN (at MD 235)	MD 4 SB (South of MD 235)
Predicted Volumes		180	130	430	610	360	705	695	10	700	690	10	695	615	615	1295	1295	1600	1595	5	1645	1640	5	1640	1680	210	1190	280	535
LOS 'D/E' Analysis Result **		791	791	791	791	791	791	791	791	791	791	791	791	791	3161	3161	791	791	791	791	791	791	791	791	791	791	3161	791	791
# of lanes		1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	1	1	1	1	1	1	1	1	1	1	2	1	1
Design Speed		60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60
Truck %		5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%
Notes		PRED.	PRED.	PRED.	PRED.	PRED.	PRED.	PRED.	PRED.	PRED.	PRED.	PRED.	PRED.	PRED.	PRED.	PRED.	LOS 'D/E'	LOS 'D/E'	LOS 'D/E'	PRED.	LOS 'D/E'	LOS 'D/E'	PRED.	LOS 'D/E'	LOS 'D/E'	PRED.	PRED.	PRED.	PRED.
		180	130	430	610	360	705	695	10	700	690	10	695	615	615	1295	791	791	791	5	791	791	5	791	791	210	1190	280	535
Truck Percentage Breakout	Cars	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%
	Medium Trucks	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%
	Heavy Trucks	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%
	Buses	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%
	Motorcycles	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	% Check	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok
average percentage for all TMS																													
Percentage Broken Out	Cars	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%
	Medium Trucks	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%
	Heavy Trucks	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%
	Buses	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%
	Motorcycles	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Pre-Motorcycle Adjustment Volumes	Cars	171.0	123.5	408.5	579.5	342.0	669.8	660.3	9.5	665.0	655.5	9.5	660.3	584.3	584.3	1230.3	751.5	751.5	751.5	4.8	751.5	751.5	4.8	751.5	751.5	199.5	1130.5	266.0	508.3
	Medium Trucks	5.7	4.1	13.5	19.2	11.3	22.2	21.9	0.3	22.1	21.7	0.3	21.9	19.4	19.4	40.8	24.9	24.9	24.9	0.2	24.9	24.9	0.2	24.9	24.9	6.6	37.5	8.8	16.9
	Heavy Trucks	2.2	1.6	5.2	7.3	4.3	8.5	8.3	0.1	8.4	8.3	0.1	8.3	7.4	7.4	15.5	9.5	9.5	9.5	0.1	9.5	9.5	0.1	9.5	9.5	2.5	14.3	3.4	6.4
	Buses	1.2	0.8	2.8	4.0	2.3	4.6	4.5	0.1	4.6	4.5	0.1	4.5	4.0	4.0	8.4	5.1	5.1	5.1	0.0	5.1	5.1	0.0	5.1	5.1	1.4	7.7	1.8	3.5
	Motorcycles	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
based on ave. % for all TMS																													
Motorcycles?	Do you want to check motorcycles?	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
	Cars	171	124	409	580	342	670	660	10	665	656	10	660	584	584	1230	751	751	751	5	751	751	5	751	751	200	1131	266	508
	Motorcycles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
USE THESE VOLUMES	TOTAL	180	130	430	610	360	705	695	10	700	690	10	695	615	615	1295	791	791	791	5	791	791	5	791	791	210	1190	280	535
	Cars	171	124	409	580	342	670	660	10	665	656	10	660	584	584	1230	751	751	751	5	751	751	5	751	751	200	1131	266	508
	Medium Trucks	6	4	14	19	11	22	22	0	22	22	0	22	19	19	41	25	25	25	0	25	25	0	25	25	7	37	9	17
	Heavy Trucks	2	2	5	7	4	8	8	0	8	8	0	8	7	7	16	9	9	9	0	9	9	0	9	9	3	14	3	6
	Buses	1	0	2	4	3	5	5	0	5	4	0	5	5	5	8	6	6	6	0	6	6	0	6	6	0	8	2	4
	Motorcycles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Speed	46.5	46.5	47.8	45.3	46.5	44.1	44.2	30.0	44.1	44.3	30.0	44.2	45.3	45.3	42.9	42.9	42.9	42.9	30.0	42.9	42.9	30.0	42.9	42.9	46.5	30.0	30.0	46.4

File: http://projectcenter.jmt.com/01/01-0456-029/ProjectFiles/00-JMT/TNM/Prop Traffic Data_MD4.xls
Tab: 2009 AM - EWC
Printed: 7/24/2009 4:41 PM

TABLE E.2 (Cont.) **Traffic Volume Comparison & TNM Analysis Traffic, 2009 AM EWC**

MD 4 From MD 2 to MD 235
Vehicle Per Hour - Vehicle Type

2009 AM - Existing Worst Case

		MD 235															PATUXENT BLVD			KINGSTON CREEK RD			MD2		
		MD 235 WB Thru + LT (East of MD4)	MD 235 WB THRU (East of MD4)	MD 235 WB LT TURN (East of MD4)	MD 235 WB RT. TURN (East of MD4)	MD 235 WB U-TURN (East of MD4)	MD 235 WB THRU (West of MD4)	MD 235 WB TOTAL THRU (West of MD4)	MD 235 EB TOTAL THRU (West of MD4)	MD 235 EB Thru + LT (West of MD4)	MD 235 EB THRU (West of MD4)	MD 235 EB LT TURN (West of MD4)	MD 235 EB RT. TURN (West of MD4)	MD 235 EB U-TURN (West of MD4)	MD 235 EB THRU (East of MD4)	MD 235 EB TOTAL THRU (East of MD4)	PATUXENT BLVD WB (West of MD4)	PATUXENT BLVD EB LT. TURN (West of MD4)	PATUXENT BLVD EB RT. TURN (West of MD4)	KINGSTON CREEK WB (West of MD4)	KINGSTON CREEK EB LT. TURN (West of MD4)	KINGSTON CREEK EB RT. TURN (West of MD4)	MD2-SB (Exit From SB MD4)	MD2 NB (Ramp to SB MD4)	MD2 EB (Slt from NB MD4)
	Predicted Volumes	1040	820	220	345	0	950	1230	2095	1990	1810	180	105	0	3000	3430	15	5	40	15	5	50	100	305	80
	LOS 'D/E' Analysis Result **	3161	3161	3161	791	791	3161	3161	3161	3161	3161	3161	791	791	3161	3161	791	791	791	791	791	791	791	791	791
	# of lanes	3	3	2	1	1	3	2	2	3	3	2	1	1	3	3	1	1	1	1	1	1	1	1	1
	Design Speed	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60
	Truck %	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%
	Notes	PRED.	PRED.	PRED.	PRED.	PRED.	PRED.	PRED.	PRED.	PRED.	PRED.	PRED.	PRED.	PRED.	PRED.	LOS "D/E"	PRED.	PRED.	PRED.	PRED.	PRED.	PRED.	PRED.	PRED.	PRED.
		1040	820	220	345	0	950	1230	2095	1990	1810	180	105	0	3000	3161	15	5	40	15	5	50	100	305	80
Truck Percentage Breakout	Cars	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%
	Medium Trucks	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%
	Heavy Trucks	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%
	Buses	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%
	Motorcycles	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	% Check	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok
	average percentage for all TMS																								
Percentage Broken Out	Cars	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%
	Medium Trucks	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%
	Heavy Trucks	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%
	Buses	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%
	Motorcycles	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Pre-Motorcycle Adjustment Volumes	Cars	988.0	779.0	209.0	327.8	0.0	902.5	1168.5	1990.3	1890.5	1719.5	171.0	99.8	0.0	2850.0	3003.0	14.3	4.8	38.0	14.3	4.8	47.5	95.0	289.8	76.0
	Medium Trucks	32.8	25.8	6.9	10.9	0.0	29.9	38.7	66.0	62.7	57.0	5.7	3.3	0.0	94.5	99.6	0.5	0.2	1.3	0.5	0.2	1.6	3.2	9.6	2.5
	Heavy Trucks	12.5	9.8	2.6	4.1	0.0	11.4	14.8	25.1	23.9	21.7	2.2	1.3	0.0	36.0	37.9	0.2	0.1	0.5	0.2	0.1	0.6	1.2	3.7	1.0
	Buses	6.8	5.3	1.4	2.2	0.0	6.2	8.0	13.6	12.9	11.8	1.2	0.7	0.0	19.5	20.5	0.1	0.0	0.3	0.1	0.0	0.3	0.7	2.0	0.5
	Motorcycles	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	based on ave. % for all TMS																								
Motorcycles?	Do you want to check motorcycles?	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
	Cars	988	779	209	328	0	903	1169	1990	1891	1720	171	100	0	2850	3003	14	5	38	14	5	48	95	290	76
	Motorcycles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
USE THESE VOLUMES	TOTAL	1040	820	220	345	0	950	1230	2095	1990	1810	180	105	0	3000	3161	15	5	40	15	5	50	100	305	80
	Cars	988	779	209	328	0	903	1169	1990	1891	1720	171	100	0	2850	3003	14	5	38	14	5	48	95	290	76
	Medium Trucks	33	26	7	11	0	30	39	66	63	57	6	3	0	95	100	0	0	1	0	0	2	3	10	3
	Heavy Trucks	12	10	3	4	0	11	15	25	24	22	2	1	0	36	38	0	0	0	0	0	1	1	4	1
	Buses	7	5	1	2	0	6	7	14	12	11	1	1	0	19	20	1	0	1	1	0	-1	1	1	0
	Motorcycles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Speed	59.5	59.5	30.0	46.5	46.5	59.5	59.5	59.5	59.5	59.5	30.0	30.0	46.5	57.3	56.7	30.0	30.0	30.0	30.0	30.0	30.0	46.5	30.0	30.0

File: http://projectcenter.jmt.com/01/01-0456-029/ProjectFiles/00-JMT/TNM/Prop Traffic Data_MD4.xls
Tab: 2009 AM - EWC
Printed: 7/24/2009 4:41 PM

TABLE E.3 — Traffic Volume Comparison & TNM Analysis Traffic, 2009 PM EWC

MD 4 From MD 2 to MD 235
Vehicle Per Hour - Vehicle Type Distribution

2009 PM - Existing Worst Case

		MD 4 NB														
		MD 4 NB THRU (South of MD 235)	MD 4 NB LT TURN (South of MD 235)	MD 4 NB RT TURN (South of MD 235)	MD 4 NB TOTAL THRU (South of MD 235)	MD 4 NB THRU (North of MD 235)	MD 4 NB TOTAL THRU (MD 235 To Patuxent Blvd)	MD 4 NB THRU (South of Patuxent Blvd)	MD 4 NB LT TURN (at Patuxent Blvd)	MD 4 NB TOTAL THRU (Patuxent Blvd to Kingston Creek Rd)	MD 4 NB THRU (South of Kingston Creek Rd)	MD 4 NB LT TURN (at Kingston Creek Rd)	MD 4 NB TOTAL THRU (Kingston Creek Rd to MD 2)	MD 4 NB THRU (North of MD 2)	MD 4 NB THRU (North of MD 2)	MD 4 SB THRU (North of MD 2)
	Predicted Volumes	245	155	220	465	660	1605	1575	30	1580	1540	40	1545	1430	1430	890
	LOS 'D/E' Analysis Result **	791	791	791	791	791	791	791	791	791	791	791	791	791	3161	3161
	# of lanes	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2
	Design Speed	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
	Truck %	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%
	Notes	PRED.	PRED.	PRED.	PRED.	PRED.	LOS 'D/E'	LOS 'D/E'	PRED.	LOS 'D/E'	LOS 'D/E'	PRED.	LOS 'D/E'	LOS 'D/E'	PRED.	PRED.
		245	155	220	465	660	791	791	30	791	791	40	791	791	1430	890
Truck Percentage Breakout	Cars	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%
	Medium Trucks	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%
	Heavy Trucks	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%
	Buses	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%
	Motorcycles	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	% Check	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok
average percentage for all TMS																
Percentage Broken Out	Cars	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%
	Medium Trucks	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%
	Heavy Trucks	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%
	Buses	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%
	Motorcycles	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Pre-Motorcycle Adjusment Volumes	Cars	232.8	147.3	209.0	441.8	627.0	751.5	751.5	28.5	751.5	751.5	38.0	751.5	751.5	1358.5	845.5
	Medium Trucks	7.7	4.9	6.9	14.6	20.8	24.9	24.9	0.9	24.9	24.9	1.3	24.9	24.9	45.0	28.0
	Heavy Trucks	2.9	1.9	2.6	5.6	7.9	9.5	9.5	0.4	9.5	9.5	0.5	9.5	9.5	17.2	10.7
	Buses	1.6	1.0	1.4	3.0	4.3	5.1	5.1	0.2	5.1	5.1	0.3	5.1	5.1	9.3	5.8
	Motorcycles	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
based on ave. % for all TMS																
Motorcycle?	Do you want to check motorcycles?	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
	Cars	233	147	209	442	627	751	751	29	751	751	38	751	751	1359	846
	Motorcycles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
USE THESE VOLUMES	TOTAL	245	155	220	465	660	791	791	30	791	791	40	791	791	1430	890
	Cars	233	147	209	442	627	751	751	29	751	751	38	751	751	1359	846
	Medium Trucks	8	5	7	15	21	25	25	1	25	25	1	25	25	45	28
	Heavy Trucks	3	2	3	6	8	9	9	0	9	9	0	9	9	17	11
	Buses	1	1	1	2	4	6	6	0	6	6	1	6	6	9	5
	Motorcycles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Speed	48.5	48.5	48.5	47.3	44.7	42.9	42.9	30.0	42.9	42.9	30.0	42.9	42.9	42.9	42.9

		MD 4 SB														
		MD 4 SB THRU (North of MD 2)	MD 4 SB TOTAL THRU (MD 2 to Kingston Creek Rd)	MD 4 SB THRU (South of Kingston Creek Rd)	MD 4 SB RT TURN (at Kingston Creek Rd)	MD 4 SB TOTAL THRU (Kingston Creek Rd to Patuxent Blvd)	MD 4 SB THRU (North of Patuxent Blvd)	MD 4 SB RT TURN (at Patuxent Blvd)	MD 4 SB THRU (South of Patuxent Blvd)	MD 4 SB TOTAL THRU (Patuxent Blvd to MD 235)	MD 4 SB THRU (North of MD 235)	MD 4 SB LT TURN (at MD 235)	MD 4 SB RT TURN (at MD 235)	MD 4 SB (South of MD 235)
	Predicted Volumes	890	1070	1060	10	1080	1075	5	1075	1090	225	635	230	935
	LOS 'D/E' Analysis Result **	791	791	791	791	791	791	791	791	791	791	3161	791	791
	# of lanes	1	1	1	1	1	1	1	1	1	1	2	1	1
	Design Speed	00	00	00	00	00	00	00	00	00	00	00	00	00
	Truck %	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%
	Notes	LOS 'D/E'	LOS 'D/E'	LOS 'D/E'	PRED.	LOS 'D/E'	LOS 'D/E'	PRED.	LOS 'D/E'	LOS 'D/E'	PRED.	PRED.	PRED.	LOS 'D/E'
		791	791	791	10	791	791	5	791	791	225	635	230	791
Truck Percentage Breakout	Cars	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%
	Medium Trucks	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%
	Heavy Trucks	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%
	Buses	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%
	Motorcycles	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	% Check	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok
average percentage for all TMS														
Percentage Broken Out	Cars	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%
	Medium Trucks	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%
	Heavy Trucks	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%
	Buses	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%
	Motorcycles	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Pre-Motorcycle Adjusment Volumes	Cars	751.5	751.5	751.5	9.5	751.5	751.5	4.8	751.5	751.5	213.8	603.3	218.5	751.5
	Medium Trucks	24.9	24.9	24.9	0.3	24.9	24.9	0.2	24.9	24.9	7.1	20.0	7.2	24.9
	Heavy Trucks	9.5	9.5	9.5	0.1	9.5	9.5	0.1	9.5	9.5	2.7	7.6	2.8	9.5
	Buses	5.1	5.1	5.1	0.1	5.1	5.1	0.0	5.1	5.1	1.5	4.1	1.5	5.1
	Motorcycles	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
based on ave. % for all TMS														
Motorcycle?	Do you want to check motorcycles?	No	No	No	No	No	No	No	No	No	No	No	No	No
	Cars	751	751	751	10	751	751	5	751	751	214	603	219	751
	Motorcycles	0	0	0	0	0	0	0	0	0	0	0	0	0
USE THESE VOLUMES	TOTAL	791	791	791	10	791	791	5	791	791	225	635	230	791
	Cars	751	751	751	10	751	751	5	751	751	214	603	219	751
	Medium Trucks	25	25	25	0	25	25	0	25	25	7	20	7	25
	Heavy Trucks	9	9	9	0	9	9	0	9	9	3	8	3	9
	Buses	6	6	6	0	6	6	0	6	6	1	4	1	6
	Motorcycles	0	0	0	0	0	0	0	0	0	0	0	0	0
	Speed	42.9	42.9	42.9	30.0	42.9	42.9	30.0	42.9	42.9	48.5	30.0	30.0	42.9

File: http://projectcenter.jmt.com/01/01-0456-029/ProjectFiles/00-JMT/TNM/Prop Traffic Data_MD4.xls
Tab: 2009 PM - EWC
Printed: 7/24/2009 4:41 PM

TABLE E.3(Cont.) **Traffic Volume Comparison & TNM Analysis Traffic, 2009 PM EWC**

MD 4 From MD 2 to MD 235
Vehicle Per Hour - Vehicle Type

2009 PM - Existing Worst Case

		MD 235															PATUXENT BLVD.			KINGSTON CREEK RD.			MD2		
		MD 235 WB Thru + LT (East of MD2)	MD 235 WB THRU (East of MD2)	MD 235 WB LT TURN (East of MD2)	MD 235 WB RT TURN (East of MD2)	MD 235 WB U TURN (East of MD2)	MD 235 WB THRU (West of MD2)	MD 235 WB TOTAL THRU (West of MD2)	MD 235 EB TOTAL THRU (West of MD2)	MD 235 EB Thru + LT (West of MD2)	MD 235 EB THRU (West of MD2)	MD 235 EB LT TURN (West of MD2)	MD 235 EB RT TURN (West of MD2)	MD 235 EB U TURN (West of MD2)	MD 235 EB THRU (East of MD2)	MD 235 EB TOTAL THRU (East of MD2)	PATUXENT BLVD WB (West of MD2)	PATUXENT BLVD EB LT TURN (West of MD2)	PATUXENT BLVD EB RT TURN (West of MD2)	KINGSTON CREEK WB (West of MD2)	KINGSTON CREEK EB LT TURN (West of MD2)	KINGSTON CREEK EB RT TURN (West of MD2)	MD 2 SB (Exit From SB MD2)	MD2 WB (Ramp to SB MD2)	MD2 EB (Exit from WB MD2)
	Predicted Volumes	2305	1740	565	945	0	1895	2125	1845	1700	1285	415	145	0	1920	2140	35	5	15	50	5	20	50	180	115
	LOS 'D/E' Analysis Result **	3161	3161	3161	791	791	3161	3161	3161	3161	3161	3161	791	791	3161	3161	791	791	791	791	791	791	791	791	791
	# of lanes	3	3	2	1	1	3	2	2	3	3	2	1	1	3	3	1	1	1	1	1	1	1	1	1
	Design Speed	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
	Truck %	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%
	Notes	PRED.	PRED.	PRED.	LOS "D/E"	PRED.	PRED.	PRED.	PRED.	PRED.	PRED.	PRED.	PRED.	PRED.	PRED.	PRED.	PRED.	PRED.	PRED.	PRED.	PRED.	PRED.	PRED.	PRED.	PRED.
		2305	1740	565	791	0	1895	2125	1845	1700	1285	415	145	0	1920	2140	35	5	15	50	5	20	50	180	115
Truck Percentage Breakout	Cars	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%
	Medium Trucks	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%
	Heavy Trucks	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%
	Buses	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%
	Motorcycles	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	% Check	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok
average percentage for all TMS																									
Percentage Broken Out	Cars	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%
	Medium Trucks	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%
	Heavy Trucks	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%
	Buses	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%
	Motorcycles	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Pre-Motorcycle Adjusment Volumes	Cars	2189.8	1653.0	536.8	751.5	0.0	1800.3	2018.8	1752.8	1615.0	1220.8	394.3	137.8	0.0	1824.0	2033.0	33.3	4.8	14.3	47.5	4.8	19.0	47.5	171.0	109.3
	Medium Trucks	72.6	54.8	17.8	24.9	0.0	59.7	66.9	58.1	53.6	40.5	13.1	4.6	0.0	60.5	67.4	1.1	0.2	0.5	1.6	0.2	0.6	1.6	5.7	3.6
	Heavy Trucks	27.7	20.9	6.8	9.5	0.0	22.7	25.5	22.1	20.4	15.4	5.0	1.7	0.0	23.0	25.7	0.4	0.1	0.2	0.6	0.1	0.2	0.6	2.2	1.4
	Buses	15.0	11.3	3.7	5.1	0.0	12.3	13.8	12.0	11.1	8.4	2.7	0.9	0.0	12.5	13.9	0.2	0.0	0.1	0.3	0.0	0.1	0.3	1.2	0.7
	Motorcycles	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
based on ave. % for all TMS																									
Motorcycles?	Do you want to check motorcycles?	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
	Cars	2190	1653	537	751	0	1800	2019	1753	1615	1221	394	138	0	1824	2033	33	5	14	48	5	19	48	171	109
	Motorcycles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
USE THESE VOLUMES	TOTAL	2305	1740	565	791	0	1895	2125	1845	1700	1285	415	145	0	1920	2140	35	5	15	50	5	20	50	180	115
	Cars	2190	1653	537	751	0	1800	2019	1753	1615	1221	394	138	0	1824	2033	33	5	14	48	5	19	48	171	109
	Medium Trucks	73	55	18	25	0	60	67	58	54	40	13	5	0	60	67	1	0	0	2	0	1	2	6	4
	Heavy Trucks	28	21	7	9	0	23	26	22	20	15	5	2	0	23	26	0	0	0	1	0	0	1	2	1
	Buses	14	11	3	6	0	12	13	12	11	9	3	0	0	13	14	1	0	1	-1	0	0	-1	1	1
	Motorcycles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Speed	59.5	59.5	30.0	42.9	48.5	59.5	59.5	59.5	59.5	59.5	30.0	30.0	48.5	59.5	59.5	30.0	30.0	30.0	30.0	30.0	30.0	48.5	30.0	30.0

File: http://projectcenter.jmt.com/01/01-0456-029/Project Files/00-JMT/TNM/Prop Traffic Data_MD4.xls
Tab: 2009 PM - EWC
Printed: 7/24/2009 4:41 PM

TABLE E.4 — Traffic Volume Comparison & TNM Analysis Traffic, 2030 AM NO BUILD

MD 4 From MD 2 to MD 235
Vehicle Per Hour - Vehicle Type Distribution

2030 AM - No Build

		MD 4 NB															MD 4 SB												
		MD 4 NB THRU (South of MD 235)	MD 4 NB LT TURN (South of MD 235)	MD 4 NB RT TURN (South of MD 235)	MD 4 NB TOTAL THRU (South of MD 235)	MD 4 NB THRU (North of MD 235)	MD 4 NB TOTAL THRU (MD 235 To Patuxent Blvd)	MD 4 NB THRU (South of Patuxent Blvd)	MD 4 NB LT TURN (at Patuxent Blvd)	MD 4 NB TOTAL THRU (Patuxent Blvd to Kingston Creek Rd)	MD 4 NB THRU (South of Kingston Creek Rd)	MD 4 NB LT TURN (at Kingston Creek Rd)	MD 4 NB TOTAL THRU (Kingston Creek Rd to MD 2)	MD 4 NB THRU (North of MD 2)	MD 4 NB THRU (North of MD 2)	MD 4 SB THRU (North of MD 2)	MD 4 SB THRU (North of MD 2)	MD 4 SB TOTAL THRU (MD2 to Kingston Creek Rd)	MD 4 SB THRU (North of Kingston Creek Rd)	MD 4 SB RT TURN (at Kingston Creek Rd)	MD 4 SB TOTAL THRU (Kingston Creek Rd to Patuxent Blvd)	MD 4 SB THRU (North of Patuxent Blvd)	MD 4 SB RT TURN (at Patuxent Blvd)	MD 4 SB THRU (South of Patuxent Blvd)	MD 4 SB TOTAL THRU (Patuxent Blvd to MD 235)	MD 4 SB THRU (North of MD 235)	MD 4 SB LT TURN (at MD 235)	MD 4 SB RT TURN (at MD 235)	MD 4 SB (South of MD 235)
	Predicted Volumes	250	175	275	525	475	925	895	30	920	905	15	920	820	820	1455	1455	1805	1795	10	1860	1850	10	1850	1975	275	1350	350	575
	LOS 'D/E' Analysis Result **	791	791	791	791	791	791	791	791	791	791	791	791	791	3161	3161	791	791	791	791	791	791	791	791	791	791	3161	791	791
	# of lanes	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	1	1	1	1	1	1	1	1	1	1	2	1	1
	Design Speed	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60
	Truck %	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%
	Notes	PRED.	PRED.	PRED.	PRED.	PRED.	LOS 'D/E'	LOS 'D/E'	PRED.	LOS 'D/E'	LOS 'D/E'	PRED.	LOS 'D/E'	LOS 'D/E'	PRED.	PRED.	LOS 'D/E'	LOS 'D/E'	LOS 'D/E'	PRED.	LOS 'D/E'	LOS 'D/E'	PRED.	LOS 'D/E'	LOS 'D/E'	PRED.	PRED.	PRED.	PRED.
		250	175	275	525	475	791	791	30	791	791	15	791	791	820	1455	791	791	791	10	791	791	10	791	791	275	1350	350	575
Truck Percentage Breakout	Cars	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%
	Medium Trucks	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%
	Heavy Trucks	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%
	Buses	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%
	Motorcycles	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	% Check	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok
	average percentage for all TMS																												
Percentage Broken Out	Cars	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%
	Medium Trucks	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%
	Heavy Trucks	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%
	Buses	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%
	Motorcycles	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Pre-Motorcycle Adjustment Volumes	Cars	237.5	166.3	261.3	498.8	451.3	751.5	751.5	28.5	751.5	751.5	14.3	751.5	751.5	779.0	1382.3	751.5	751.5	751.5	9.5	751.5	751.5	9.5	751.5	751.5	261.3	1282.5	332.5	546.3
	Medium Trucks	7.9	5.5	8.7	16.5	15.0	24.9	24.9	0.9	24.9	24.9	0.5	24.9	24.9	25.8	45.8	24.9	24.9	24.9	0.3	24.9	24.9	0.3	24.9	24.9	8.7	42.5	11.0	18.1
	Heavy Trucks	3.0	2.1	3.3	6.3	5.7	9.5	9.5	0.4	9.5	9.5	0.2	9.5	9.5	9.8	17.5	9.5	9.5	9.5	0.1	9.5	9.5	0.1	9.5	9.5	3.3	16.2	4.2	6.9
	Buses	1.6	1.1	1.8	3.4	3.1	5.1	5.1	0.2	5.1	5.1	0.1	5.1	5.1	5.3	9.5	5.1	5.1	5.1	0.1	5.1	5.1	0.1	5.1	5.1	1.8	8.8	2.3	3.7
	Motorcycles	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	based on ave. % for all TMS																												
Motorcycles?	Do you want to check motorcycles?	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
	Cars	238	166	261	499	451	751	751	29	751	751	14	751	751	779	1382	751	751	751	10	751	751	10	751	751	261	1283	333	546
	Motorcycles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
USE THESE VOLUMES	TOTAL	250	175	275	525	475	791	791	30	791	791	15	791	791	820	1455	791	791	791	10	791	791	10	791	791	275	1350	350	575
	Cars	238	166	261	499	451	751	751	29	751	751	14	751	751	779	1382	751	751	751	10	751	751	10	751	751	261	1283	333	546
	Medium Trucks	8	6	9	17	15	25	25	1	25	25	0	25	25	26	46	25	25	25	0	25	25	0	25	25	9	43	11	18
	Heavy Trucks	3	2	3	6	6	9	9	0	9	9	0	9	9	10	17	9	9	9	0	9	9	0	9	9	3	16	4	7
	Buses	1	1	2	3	3	6	6	0	6	6	1	6	6	5	10	6	6	6	0	6	6	0	6	6	2	8	2	4
	Motorcycles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Speed	48.5	48.5	48.5	46.5	47.2	42.9	42.9	30.0	42.9	42.9	30.0	42.9	42.9	42.9	42.9	42.9	42.9	42.9	30.0	42.9	42.9	30.0	42.9	42.9	48.5	30.0	30.0	45.8

File: http://projectcenter.jmt.com/01/01-0456-029/ProjectFiles/00-JMT/TNM/Prop Traffic Data_MD4.xls
Tab: 2030 AM No Build
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TABLE E.4 (Cont.) **Traffic Volume Comparison & TNM Analysis Traffic, 2030 AM NO BUILD**

MD 4 From MD 2 to MD 235
Vehicle Per Hour - Vehicle Type

2030 AM - No Build

		MD 235															PATUXENT BLVD.			KINGSTON CREEK RD.			MD2		
		MD 235 WB Thru + LT (East of MD4)	MD 235 WB THRU (East of MD4)	MD 235 WB LT-TURN (East of MD4)	MD 235 WB RT-TURN (East of MD4)	MD 235 WB U-TURN (East of MD4)	MD 235 WB THRU (West of MD4)	MD 235 WB TOTAL THRU (West of MD4)	MD 235 EB TOTAL THRU (West of MD4)	MD 235 EB Thru + LT (West of MD4)	MD 235 EB THRU (West of MD4)	MD 235 EB LT-TURN (West of MD4)	MD 235 EB RT-TURN (West of MD4)	MD 235 EB U-TURN (West of MD4)	MD 235 EB THRU (East of MD4)	MD 235 EB TOTAL THRU (East of MD4)	PATUXENT BLVD WB (West of MD4)	PATUXENT BLVD EB LT-TURN (West of MD4)	PATUXENT BLVD EB RT-TURN (West of MD4)	KINGSTON CREEK WB (West of MD4)	KINGSTON CREEK EB LT-TURN (West of MD4)	KINGSTON CREEK EB RT-TURN (West of MD4)	MD 2 SB (Exit From SB MD4)	MD2 NB (Ramp to SB MD4)	MD2 EB (Exit from NB MD4)
	Predicted Volumes	1250	1100	150	450	35	1275	1625	2600	2450	2225	225	150	0	3610	3885	40	25	125	25	15	65	125	350	100
	LOS 'D/E' Analysis Result **	3161	3161	3161	791	791	3161	3161	3161	3161	3161	3161	791	791	3161	3161	791	791	791	791	791	791	791	791	791
	# of lanes	3	3	2	1	1	3	2	2	3	3	2	1	1	3	3	1	1	1	1	1	1	1	1	1
	Design Speed	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60
	Truck %	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%
	Notes	PRED.	PRED.	PRED.	PRED.	PRED.	PRED.	PRED.	PRED.	PRED.	PRED.	PRED.	PRED.	PRED.	LOS 'D/E'	LOS 'D/E'	PRED.	PRED.	PRED.	PRED.	PRED.	PRED.	PRED.	PRED.	PRED.
		1250	1100	150	450	35	1275	1625	2600	2450	2225	225	150	0	3161	3161	40	25	125	25	15	65	125	350	100
Truck Percentage Breakout	Cars	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%
	Medium Trucks	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%
	Heavy Trucks	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%
	Buses	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%
	Motorcycles	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	% Check	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok
	average percentage for all TMS																								
Percentage Broken Out	Cars	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%
	Medium Trucks	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%
	Heavy Trucks	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%
	Buses	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%
	Motorcycles	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Pre-Motorcycle Adjustment Volumes	Cars	1187.5	1045.0	142.5	427.5	33.3	1211.3	1543.8	2470.0	2327.5	2113.8	213.8	142.5	0.0	3003.0	3003.0	38.0	23.8	118.8	23.8	14.3	61.8	118.8	332.5	95.0
	Medium Trucks	39.4	34.7	4.7	14.2	1.1	40.2	51.2	81.9	77.2	70.1	7.1	4.7	0.0	99.6	99.6	1.3	0.8	3.9	0.8	0.5	2.0	3.9	11.0	3.2
	Heavy Trucks	15.0	13.2	1.8	5.4	0.4	15.3	19.5	31.2	29.4	26.7	2.7	1.8	0.0	37.9	37.9	0.5	0.3	1.5	0.3	0.2	0.8	1.5	4.2	1.2
	Buses	8.1	7.2	1.0	2.9	0.2	8.3	10.6	16.9	15.9	14.5	1.5	1.0	0.0	20.5	20.5	0.3	0.2	0.8	0.2	0.1	0.4	0.8	2.3	0.7
	Motorcycles	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	based on ave. % for all TMS																								
Motorcycles?	Do you want to check motorcycles?	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
	Cars	1188	1045	143	428	33	1211	1544	2470	2328	2114	214	143	0	3003	3003	38	24	119	24	14	62	119	333	95
	Motorcycles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
USE THESE VOLUMES	TOTAL	1250	1100	150	450	35	1275	1625	2600	2450	2225	225	150	0	3161	3161	40	25	125	25	15	65	125	350	100
	Cars	1188	1045	143	428	33	1211	1544	2470	2328	2114	214	143	0	3003	3003	38	24	119	24	14	62	119	333	95
	Medium Trucks	39	35	5	14	1	40	51	82	77	70	7	5	0	100	100	1	1	4	1	0	2	4	11	3
	Heavy Trucks	15	13	2	5	0	15	20	31	29	27	3	2	0	38	38	0	0	2	0	0	1	2	4	1
	Buses	8	7	0	3	1	9	10	17	16	14	1	0	0	20	20	1	0	0	0	1	0	0	2	1
	Motorcycles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Speed	59.5	59.5	30.0	47.5	48.5	59.5	59.5	58.9	59.5	59.5	30.0	30.0	48.5	56.7	56.7	30.0	30.0	30.0	30.0	30.0	30.0	48.5	30.0	30.0

File: http://projectcenter.jmt.com/01/01-0456-029/ProjectFiles/00-JMT/TNM/Prop Traffic Data_MD4.xls
Tab: 2030 AM No Build
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TABLE E.5 — **Traffic Volume Comparison & TNM Analysis Traffic, 2030 PM NO BUILD**

MD 4 From MD 2 to MD 235
Vehicle Per Hour - Vehicle Type Distribution

2030 PM - No Build

		MD 4 NB														
		MD 4 NB THRU (South of MD 235)	MD 4 NB LT TURN (South of MD 235)	MD 4 NB RT TURN (South of MD 235)	MD 4 NB TOTAL THRU (South of MD 235)	MD 4 NB THRU (North of MD 235)	MD 4 NB TOTAL THRU (MD 235 To Patuxent Blvd)	MD 4 NB THRU (South of Patuxent Blvd)	MD 4 NB LT TURN (at Patuxent Blvd)	MD 4 NB TOTAL THRU (Patuxent Blvd to Kingston Creek Rd)	MD 4 NB THRU (South of Kingston Creek Rd)	MD 4 NB LT TURN (at Kingston Creek Rd)	MD 4 NB TOTAL THRU (Kingston Creek Rd to MD 2)	MD 4 NB THRU (North of MD 2)	MD 4 NB THRU (North of MD 2)	MD 4 SB THRU (North of MD 2)
	Predicted Volumes	375	225	175	550	850	1950	1800	150	1815	1760	55	1770	1620	1620	1085
	LOS 'D/E' Analysis Result **	791	791	791	791	791	791	791	791	791	791	791	791	791	3161	3161
	# of lanes	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2
	Design Speed	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60
	Truck %	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%
	Notes	PRED.	PRED.	PRED.	PRED.	LOS 'D/E'	LOS 'D/E'	LOS 'D/E'	PRED.	LOS 'D/E'	LOS 'D/E'	PRED.	LOS 'D/E'	LOS 'D/E'	PRED.	PRED.
		375	225	175	550	791	791	791	150	791	791	55	791	791	1620	1085
Truck Percentage Breakout	Cars	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%
	Medium Trucks	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%
	Heavy Trucks	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%
	Buses	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%
	Motorcycles	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	% Check	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok
	average percentage for all TMS															
Percentage Broken Out	Cars	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%
	Medium Trucks	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%
	Heavy Trucks	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%
	Buses	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%
	Motorcycles	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Pre-Motorcycle Adjustment Volumes	Cars	356.3	213.8	166.3	522.5	751.5	751.5	751.5	142.5	751.5	751.5	52.3	751.5	751.5	1539.0	1030.8
	Medium Trucks	11.8	7.1	5.5	17.3	24.9	24.9	24.9	4.7	24.9	24.9	1.7	24.9	24.9	51.0	34.2
	Heavy Trucks	4.5	2.7	2.1	6.6	9.5	9.5	9.5	1.8	9.5	9.5	0.7	9.5	9.5	19.4	13.0
	Buses	2.4	1.5	1.1	3.6	5.1	5.1	5.1	1.0	5.1	5.1	0.4	5.1	5.1	10.5	7.1
	Motorcycles	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	based on ave. % for all TMS															
Motorcycles?	Do you want to check motorcycles?	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
	Cars	356	214	166	523	751	751	751	143	751	751	52	751	751	1539	1031
	Motorcycles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
USE THESE VOLUMES	TOTAL	375	225	175	550	791	791	791	150	791	791	55	791	791	1620	1085
	Cars	356	214	166	523	751	751	751	143	751	751	52	751	751	1539	1031
	Medium Trucks	12	7	6	17	25	25	25	5	25	25	2	25	25	51	34
	Heavy Trucks	5	3	2	7	9	9	9	2	9	9	1	9	9	19	13
	Buses	2	1	1	3	6	6	6	0	6	6	0	6	6	11	7
	Motorcycles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Speed	48.5	48.5	48.5	46.2	42.9	42.9	42.9	30.0	42.9	42.9	30.0	42.9	42.9	42.9	42.9

		MD 4 SB												
		MD 4 SB THRU (North of MD 2)	MD 4 SB TOTAL THRU (MD 2 To Kingston Creek Rd)	MD 4 SB THRU (North of Kingston Creek Rd)	MD 4 SB RT TURN (at Kingston Creek Rd)	MD 4 SB TOTAL THRU (Kingston Creek Rd to Patuxent Blvd)	MD 4 SB THRU (North of Patuxent Blvd)	MD 4 SB RT TURN (at Patuxent Blvd)	MD 4 SB THRU (South of Patuxent Blvd)	MD 4 SB TOTAL THRU (Patuxent Blvd to MD 235)	MD 4 SB THRU (North of MD 235)	MD 4 SB LT TURN (at MD 235)	MD 4 SB RT TURN (at MD 235)	MD 4 SB (South of MD 235)
	Predicted Volumes	1085	1310	1295	15	1325	1300	25	1300	1375	325	725	325	850
	LOS 'D/E' Analysis Result **	791	791	791	791	791	791	791	791	791	791	3161	791	791
	# of lanes	1	1	1	1	1	1	1	1	1	1	2	1	1
	Design Speed	60	60	60	60	60	60	60	60	60	60	60	60	60
	Truck %	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%
	Notes	LOS 'D/E'	LOS 'D/E'	LOS 'D/E'	PRED.	LOS 'D/E'	LOS 'D/E'	PRED.	LOS 'D/E'	LOS 'D/E'	PRED.	PRED.	PRED.	LOS 'D/E'
		791	791	791	15	791	791	25	791	791	325	725	325	791
Truck Percentage Breakout	Cars	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%
	Medium Trucks	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%
	Heavy Trucks	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%
	Buses	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%
	Motorcycles	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	% Check	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok
	average percentage for all TMS													
Percentage Broken Out	Cars	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%
	Medium Trucks	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%
	Heavy Trucks	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%
	Buses	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%
	Motorcycles	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Pre-Motorcycle Adjustment Volumes	Cars	751.5	751.5	751.5	14.3	751.5	751.5	23.8	751.5	751.5	308.8	688.8	308.8	751.5
	Medium Trucks	24.9	24.9	24.9	0.5	24.9	24.9	0.8	24.9	24.9	10.2	22.8	10.2	24.9
	Heavy Trucks	9.5	9.5	9.5	0.2	9.5	9.5	0.3	9.5	9.5	3.9	8.7	3.9	9.5
	Buses	5.1	5.1	5.1	0.1	5.1	5.1	0.2	5.1	5.1	2.1	4.7	2.1	5.1
	Motorcycles	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	based on ave. % for all TMS													
Motorcycles?	Do you want to check motorcycles?	No	No	No	No	No	No	No	No	No	No	No	No	No
	Cars	751	751	751	14	751	751	24	751	751	309	689	309	751
	Motorcycles	0	0	0	0	0	0	0	0	0	0	0	0	0
USE THESE VOLUMES	TOTAL	791	791	791	15	791	791	25	791	791	325	725	325	791
	Cars	751	751	751	14	751	751	24	751	751	309	689	309	751
	Medium Trucks	25	25	25	0	25	25	1	25	25	10	23	10	25
	Heavy Trucks	9	9	9	0	9	9	0	9	9	4	9	4	9
	Buses	6	6	6	1	6	6	0	6	6	2	4	2	6
	Motorcycles	0	0	0	0	0	0	0	0	0	0	0	0	0
	Speed	42.9	42.9	42.9	30.0	42.9	42.9	30.0	42.9	42.9	48.5	30.0	30.0	42.9

File: http://projectcenter.jmt.com/01/01-0456-029/ProjectFiles/00-JMT/TNM/Prop Traffic Data_MD4.xls
Tab: 2030 PM No Build
Printed: 7/24/2009 4:41 PM

TABLE E.5 (Cont.) **Traffic Volume Comparison & TNM Analysis Traffic, 2030 PM NO BUILD**

MD 4 From MD 2 to MD 235
Vehicle Per Hour - Vehicle Type

2030 PM - No Build

		MD 235															PATUXENT BLVD.			KINGSTON CREEK RD.		MD2		
		MD 235 WB Thru + LT (East of MD4)	MD 235 WB THRU (East of MD4)	MD 235 WB L T TURN (East of MD4)	MD 235 WB RT. TURN (East of MD4)	MD 235 WB U TURN (East of MD4)	MD 235 WB THRU (West of MD4)	MD 235 WB TOTAL THRU (West of MD4)	MD 235 EB TOTAL THRU (West of MD4)	MD 235 EB Thru + LT (West of MD4)	MD 235 EB THRU (West of MD4)	MD 235 EB L T TURN (West of MD4)	MD 235 EB RT. TURN (West of MD4)	MD 235 EB U TURN (West of MD4)	MD 235 EB THRU (East of MD4)	MD 235 EB TOTAL THRU (East of MD4)	PATUXENT BLVD WB (West of MD4)	PATUXENT BLVD EB L T TURN (West of MD4)	PATUXENT BLVD EB RT. TURN (West of MD4)	KINGSTON CREEK WB (West of MD4)	KINGSTON CREEK EB L T TURN (West of MD4)	KINGSTON CREEK EB RT. TURN (West of MD4)	MD2 SB (Exit From SB MD4)	MD2 NB (Ramp to SB MD4)	MD2 EB (Exit from NB MD4)
	Predicted Volumes	2500	2200	300	1100	100	2425	2750	2400	2175	1700	475	225	0	2525	2700	175	15	75	70	10	30	75	225	150
	LOS 'D/E' Analysis Result **	3161	3161	3161	791	791	3161	3161	3161	3161	3161	3161	791	791	3161	3161	791	791	791	791	791	791	791	791	791
	# of lanes	3	3	2	1	1	3	3	2	3	3	2	1	1	3	3	1	1	1	1	1	1	1	1	1
	Design Speed	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60
	Truck %	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%
	Notes	PRED.	PRED.	PRED.	LOS 'D/E'	PRED.	PRED.	PRED.	PRED.	PRED.	PRED.	PRED.	PRED.	PRED.	PRED.	PRED.	PRED.	PRED.	PRED.	PRED.	PRED.	PRED.	PRED.	PRED.	PRED.
		2500	2200	300	791	100	2425	2750	2400	2175	1700	475	225	0	2525	2700	175	15	75	70	10	30	75	225	150
Truck Percentage Breakout	Cars	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%
	Medium Trucks	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%
	Heavy Trucks	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%
	Buses	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%
	Motorcycles	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	% Check	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok
	average percentage for all TMS																								
Percentage Broken Out	Cars	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%
	Medium Trucks	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%
	Heavy Trucks	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%
	Buses	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%
	Motorcycles	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Pre-Motorcycle Adjustment Volumes	Cars	2375.0	2090.0	285.0	751.5	95.0	2303.8	2612.5	2280.0	2066.3	1615.0	451.3	213.8	0.0	2398.8	2565.0	166.3	14.3	71.3	66.5	9.5	28.5	71.3	213.8	142.5
	Medium Trucks	78.8	69.3	9.5	24.9	3.2	76.4	86.6	75.6	68.5	53.6	15.0	7.1	0.0	79.5	85.1	5.5	0.5	2.4	2.2	0.3	0.9	2.4	7.1	4.7
	Heavy Trucks	30.0	26.4	3.6	9.5	1.2	29.1	33.0	28.8	26.1	20.4	5.7	2.7	0.0	30.3	32.4	2.1	0.2	0.9	0.8	0.1	0.4	0.9	2.7	1.8
	Buses	16.3	14.3	2.0	5.1	0.7	15.8	17.9	15.6	14.1	11.1	3.1	1.5	0.0	16.4	17.6	1.1	0.1	0.5	0.5	0.1	0.2	0.5	1.5	1.0
	Motorcycles	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	based on ave. % for all TMS																								
Motorcycles?	Do you want to check motorcycles?	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
	Cars	2375	2090	285	751	95	2304	2613	2280	2066	1615	451	214	0	2399	2565	166	14	71	67	10	29	71	214	143
	Motorcycles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
USE THESE VOLUMES	TOTAL	2500	2200	300	791	100	2425	2750	2400	2175	1700	475	225	0	2525	2700	175	15	75	70	10	30	75	225	150
	Cars	2375	2090	285	751	95	2304	2613	2280	2066	1615	451	214	0	2399	2565	166	14	71	67	10	29	71	214	143
	Medium Trucks	79	69	9	25	3	76	87	76	69	54	15	7	0	80	85	6	0	2	2	0	1	2	7	5
	Heavy Trucks	30	26	4	9	1	29	33	29	26	20	6	3	0	30	32	2	0	1	1	0	0	1	3	2
	Buses	16	15	2	6	1	16	17	15	14	11	3	1	0	16	18	1	1	1	0	0	0	1	1	0
	Motorcycles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Speed	59.3	59.5	30.0	42.9	48.5	59.5	58.3	59.5	59.5	59.5	30.0	30.0	48.5	59.2	58.5	30.0	30.0	30.0	30.0	30.0	30.0	48.5	30.0	30.0

File: http://projectcenter.jmt.com/01/01-0456-029/ProjectFiles/00-JMT/TNM/Prop Traffic Data_MD4.xls
Tab: 2030 PM No Build
Printed: 7/24/2009 4:41 PM

TABLE E.6 **Traffic Volume Comparison & TNM Analysis Traffic, 2030 AM BUILD**

MD 4 From MD 2 to MD 235
Vehicle Per Hour - Vehicle Type Distribution

2030 AM - Build

MD 4 NB

Group	Row	MD 4 NB TOTAL THRU (South of MD 235)	MD 4 NB Thru + Lt (South of MD 235)	MD 4 NB THRU (South of MD 235)	MD 4 NB LT. TURN (South of MD 235)	MD 4 NB RT. TURN (South of MD 235)	MD 4 NB TOTAL THRU (South of MD 235)	MD 4 NB THRU (North of MD 235)	MD 4 NB TOTAL THRU (MD 235 To Patuxent Blvd)	MD 4 NB THRU (South of Patuxent Blvd)	MD 4 NB LT. TURN (at Patuxent Blvd)	MD 4 NB TOTAL THRU (Patuxent Blvd to Kingston Creek Rd)	MD 4 NB THRU (South of Kingston Creek Rd)	MD 4 NB LT. TURN (at Kingston Creek Rd)	MD 4 NB TOTAL THRU (Kingston Creek Rd to MD 2)	MD 4 NB THRU (North of MD 2)	MD 4 NB THRU (North of MD 2)
	Predicted Volumes	725	425	250	175	300	550	500	975	940	35	980	965	15	985	885	885
	LOS 'D/E' Analysis Result **	3161	3161	3161	791	791	3161	3161	3161	3161	791	3161	3161	791	3161	3161	3161
	# of lanes	2	2	2	1	1	2	2	2	2	1	2	2	1	2	2	2
	Design Speed	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60
	Truck %	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%
	Notes	PRED.	PRED.	PRED.	PRED.	PRED.	PRED.	PRED.	PRED.	PRED.	PRED.	PRED.	PRED.	PRED.	PRED.	PRED.	PRED.
		725	425	250	175	300	550	500	975	940	35	980	965	15	985	885	885
Truck Percentage Breakout	Cars	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%
	Medium Trucks	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%
	Heavy Trucks	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%
	Buses	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%
	Motorcycles	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	% Check	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok
average percentage for all TMS																	
Percentage Broken Out	Cars	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%
	Medium Trucks	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%
	Heavy Trucks	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%
	Buses	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%
	Motorcycles	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Pre-Motorcycle Adjustment Volumes	Cars	688.8	403.8	237.5	166.3	285.0	522.5	475.0	926.3	893.0	33.3	931.0	916.8	14.3	935.8	840.8	840.8
	Medium Trucks	22.8	13.4	7.9	5.5	9.5	17.3	15.8	30.7	29.6	1.1	30.9	30.4	0.5	31.0	27.9	27.9
	Heavy Trucks	8.7	5.1	3.0	2.1	3.6	6.6	6.0	11.7	11.3	0.4	11.8	11.6	0.2	11.8	10.6	10.6
	Buses	4.7	2.8	1.6	1.1	2.0	3.6	3.3	6.3	6.1	0.2	6.4	6.3	0.1	6.4	5.8	5.8
	Motorcycles	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
based on ave. % for all TMS																	
Motorcycles?	Do you want to check motorcycles	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
	Cars	689	404	238	166	285	523	475	926	893	33	931	917	14	936	841	841
	Motorcycles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
USE THESE VOLUMES	TOTAL	725	425	250	175	300	550	500	975	940	35	980	965	15	985	885	885
	Cars	689	404	238	166	285	523	475	926	893	33	931	917	14	936	841	841
	Medium Trucks	23	13	8	6	9	17	16	31	30	1	31	30	0	31	28	28
	Heavy Trucks	9	5	3	2	4	7	6	12	11	0	12	12	0	12	11	11
	Buses	4	3	1	1	2	3	3	6	6	1	6	6	1	6	5	5
	Motorcycles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Speed	59.5	59.5	59.5	48.5	48.5	59.5	59.5	59.5	59.5	30.0	59.5	59.5	30.0	59.5	59.5	59.5

MD 4 SB

Group	Row	MD 4 SB THRU (North of MD 2)	MD 4 SB THRU (North of MD 2)	MD 4 SB TOTAL THRU (MD2 to Kingston Creek Rd)	MD 4 SB THRU (North of Kingston Creek Rd)	MD 4 SB RT. TURN (at Kingston Creek Rd)	MD 4 SB TOTAL THRU (Kingston Creek Rd to Patuxent Blvd)	MD 4 SB THRU (North of Patuxent Blvd)	MD 4 SB RT. TURN (at Patuxent Blvd)	MD 4 SB THRU (South of Patuxent Blvd)	MD 4 SB TOTAL THRU (Patuxent Blvd to MD 235)	MD 4 SB Thru + Rt (North of MD 235)	MD 4 SB THRU (North of MD 235)	MD 4 SB LT. TURN (at MD 235)	MD 4 SB RT. TURN (at MD 235)	MD 4 SB THRU (South of MD 235)	MD 4 SB TOTAL THRU (South of MD 235)
	Predicted Volumes	1860	1860	2210	2200	10	2265	2245	20	2245	2400	775	325	1625	450	525	650
	LOS 'D/E' Analysis Result **	3161	3161	3161	3161	791	3161	3161	791	3161	3161	3161	3161	3161	791	3161	3161
	# of lanes	2	2	2	2	1	2	2	1	2	2	2	2	2	1	2	2
	Design Speed	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60
	Truck %	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%
	Notes	PRED.	PRED.	PRED.	PRED.	PRED.	PRED.	PRED.	PRED.	PRED.	PRED.	PRED.	PRED.	PRED.	PRED.	PRED.	PRED.
		1860	1860	2210	2200	10	2265	2245	20	2245	2400	775	325	1625	450	525	650
Truck Percentage Breakout	Cars	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%
	Medium Trucks	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%
	Heavy Trucks	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%
	Buses	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%
	Motorcycles	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	% Check	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok
average percentage for all TMS																	
Percentage Broken Out	Cars	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%
	Medium Trucks	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%
	Heavy Trucks	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%
	Buses	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%
	Motorcycles	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Pre-Motorcycle Adjustment Volumes	Cars	1767.0	1767.0	2099.5	2090.0	9.5	2151.8	2132.8	19.0	2132.8	2280.0	736.3	308.8	1543.8	427.5	498.8	617.5
	Medium Trucks	58.6	58.6	69.6	69.3	0.3	71.3	70.7	0.6	70.7	75.6	24.4	10.2	51.2	14.2	16.5	20.5
	Heavy Trucks	22.3	22.3	26.5	26.4	0.1	27.2	26.9	0.2	26.9	28.8	9.3	3.9	19.5	5.4	6.3	7.8
	Buses	12.1	12.1	14.4	14.3	0.1	14.7	14.6	0.1	14.6	15.6	5.0	2.1	10.6	2.9	3.4	4.2
	Motorcycles	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
based on ave. % for all TMS																	
Motorcycles?	Do you want to check motorcycles	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
	Cars	1767	1767	2100	2090	10	2152	2133	19	2133	2280	736	309	1544	428	499	618
	Motorcycles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
USE THESE VOLUMES	TOTAL	1860	1860	2210	2200	10	2265	2245	20	2245	2400	775	325	1625	450	525	650
	Cars	1767	1767	2100	2090	10	2152	2133	19	2133	2280	736	309	1544	428	499	618
	Medium Trucks	59	59	70	69	0	71	71	1	71	76	24	10	51	14	17	20
	Heavy Trucks	22	22	27	26	0	27	27	0	27	29	9	4	20	5	6	8
	Buses	12	12	13	15	0	15	14	0	14	15	6	2	10	3	3	4
	Motorcycles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Speed	59.5	59.5	59.5	59.5	30.0	59.5	59.5	30.0	59.5	59.5	59.5	59.5	30.0	47.5	59.5	59.5

File: http://projectcenter.jmt.com/01/01-0456-029/ProjectFiles/00-JMT/TNM/Prop Traffic Data_MD4.xls
Tab: 2030 AM Build
Printed: 7/24/2009 4:41 PM

TABLE E.6 (Cont.) **Traffic Volume Comparison & TNM Analysis Traffic, 2030 AM BUILD**

MD 4 From MD 2 to MD 235
Vehicle Per Hour - Vehicle Type

2030 AM - Build

		MD 235																							PATUXENT BLVD.			KINGSTON CREEK RD.			MD2	
		MD 235 WB Thru + LT (East of MD4)	MD 235 WB THRU (East of MD4)	MD 235 WB RT. TURN (East of MD4)	MD 235 WB LT + RT (East of MD4)	MD 235 WB LT + RT (West of MD4)	MD 235 WB LT TURN (East of MD4)	MD 235 WB THRU (West of MD4)	MD 235 WB THRU (West of MD4)	MD 235 WB TOTAL THRU (West of MD4)	MD 235 EB TOTAL THRU (West of MD4)	MD 235 EB Thru + LT (West of MD4)	MD 235 EB THRU (West of MD4)	MD 235 EB LT - TURN (West of MD4)	MD 235 EB RT - TURN (West of MD4)	MD 235 EB LT + RT (West of MD4)	MD 235 EB LT + RT (East of MD4)	MD 235 EB L TURN (West of MD4)	MD 235 EB THRU (East of MD4)	MD 235 EB THRU (East of MD4)	MD 235 EB THRU (East of MD4)	MD 235 EB TOTAL THRU (East of MD4)	PATUXENT BLVD WB (West of MD4)	PATUXENT BLVD EB LT - TURN (West of MD4)	PATUXENT BLVD EB RT - TURN (West of MD4)	KINGSTON CREEK WB (West of MD4)	KINGSTON CREEK EB LT - TURN (West of MD4)	KINGSTON CREEK EB RT - TURN (West of MD4)	MD-235 (East from SB MD4)	MD2 NB (Ramp to SB MD4)	MD2 EB (East from NB MD4)
Predicted Volumes		1300	1100	200	475	675	625	35	1125	1300	1750	2550	2425	2175	250	125	375	1925	25	2210	2510	3835	4135	55	40	155	25	20	65	125	350	100
LOS 'D/E' Analysis Result **		3161	3161	3161	791	3161	3161	791	3161	3161	3161	3161	3161	3161	3161	791	791	3161	791	3161	3161	3161	3161	791	791	791	791	791	791	791	791	791
# of lanes		3	3	2	1	2	2	1	3	3	2	3	3	3	2	1	1	2	1	3	3	3	3	1	1	1	1	1	1	1	1	1
Design Speed		60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60
Truck %		5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%
Notes		PRED	PRED	PRED	PRED	PRED	PRED	PRED	PRED	PRED	PRED	PRED	PRED	PRED	PRED	PRED	PRED	PRED	PRED	PRED	PRED	LOS 'D/E'	LOS 'D/E'	PRED	PRED	PRED	PRED	PRED	PRED	PRED	PRED	PRED
		1300	1100	200	475	675	625	35	1125	1300	1750	2550	2425	2175	250	125	375	1925	25	2210	2510	3161	3161	55	40	155	25	20	65	125	350	100
Truck Percentage Breakout	Cars	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%
	Medium Trucks	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%
	Heavy Trucks	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%
	Buses	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%
	Motorcycles	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	% Check	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok
average percentage for all TMS																																
Percentage Broken Out	Cars	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%
	Medium Trucks	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%
	Heavy Trucks	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%
	Buses	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%
	Motorcycles	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Pre-Motorcycle Adjustment Volumes	Cars	1235.0	1045.0	190.0	451.3	641.3	593.8	33.3	1068.8	1235.0	1662.5	2422.5	2303.8	2066.3	237.5	118.8	356.3	1828.8	23.8	2099.5	2384.5	3003.0	3003.0	52.3	38.0	147.3	23.8	19.0	61.8	118.8	332.5	95.0
	Medium Trucks	41.0	34.7	6.3	15.0	21.3	19.7	1.1	35.4	41.0	55.1	80.3	76.4	68.5	7.9	3.9	11.8	60.6	0.8	69.6	79.1	99.6	99.6	1.7	1.3	4.9	0.8	0.6	2.0	3.9	11.0	3.2
	Heavy Trucks	15.6	13.2	2.4	5.7	8.1	7.5	0.4	13.5	15.6	21.0	30.6	29.1	26.1	3.0	1.5	4.5	23.1	0.3	26.5	30.1	37.9	37.9	0.7	0.5	1.9	0.3	0.2	0.8	1.5	4.2	1.2
	Buses	8.5	7.2	1.3	3.1	4.4	4.1	0.2	7.3	8.5	11.4	16.6	15.8	14.1	1.6	0.8	2.4	12.5	0.2	14.4	16.3	20.5	20.5	0.4	0.3	1.0	0.2	0.1	0.4	0.8	2.3	0.7
	Motorcycles	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
based on ave. % for all TMS																																
Motorcycle?	Do you want to check motorcycles	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
	Cars	1235	1045	190	451	641	594	33	1069	1235	1663	2423	2304	2066	238	119	356	1829	24	2100	2385	3003	3003	52	38	147	24	19	62	119	333	95
	Motorcycles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
USE THESE VOLUMES	TOTAL	1300	1100	200	475	675	625	35	1125	1300	1750	2550	2425	2175	250	125	375	1925	25	2210	2510	3161	3161	55	40	155	25	20	65	125	350	100
	Cars	1235	1045	190	451	641	594	33	1069	1235	1663	2423	2304	2066	238	119	356	1829	24	2100	2385	3003	3003	52	38	147	24	19	62	119	333	95
	Medium Trucks	41	35	6	15	21	20	1	35	41	55	80	76	69	8	4	12	61	1	70	79	100	100	2	1	5	1	1	2	4	11	3
	Heavy Trucks	16	13	2	6	8	8	0	14	16	21	31	29	26	3	2	5	23	0	27	30	38	38	1	0	2	0	0	1	2	4	1
	Buses	8	7	2	3	5	3	1	7	8	11	16	16	14	1	0	2	12	0	13	16	20	20	0	1	1	0	0	0	0	2	1
	Motorcycles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Speed	59.5	59.5	30.0	47.2	59.5	59.5	48.5	59.5	59.5	59.5	59.1	59.5	59.5	30.0	30.0	48.5	59.5	48.5	59.5	59.3	56.7	56.7	30.0	30.0	30.0	30.0	30.0	30.0	48.5	30.0	30.0

File: http://projectcenter.jmt.com/01/01-0456-029/ProjectFiles/00-JMT/TNM/Prop Traffic Data_MD4.xls
Tab: 2030 AM Build
Printed: 7/24/2009 4:41 PM

TABLE E.7 **Traffic Volume Comparison & TNM Analysis Traffic, 2030 PM BUILD**

MD 4 From MD 2 to MD 235
Vehicle Per Hour - Vehicle Type Distribution

2030 PM - Build

MD 4 NB

	MD 4 NB TOTAL THRU (South of MD 235)	MD 4 NB Thru + Lt (South of MD 235)	MD 4 NB THRU (South of MD 235)	MD 4 NB LT TURN (South of MD 235)	MD 4 NB RT TURN (South of MD 235)	MD 4 NB TOTAL THRU (South of MD 235)	MD 4 NB THRU (North of MD 235)	MD 4 NB TOTAL THRU (MD 235 To Pearson Blvd)	MD 4 NB THRU (South of Pearson Blvd)	MD 4 NB LT TURN (at Pearson Blvd)	MD 4 NB TOTAL THRU (Pearson Blvd to Kingston Creek Rd)	MD 4 NB THRU (South of Kingston Creek Rd)	MD 4 NB LT TURN (at Kingston Creek Rd)	MD 4 NB TOTAL THRU (Kingston Creek Rd to MD 2)	MD 4 NB THRU (North of MD 2)	MD 4 NB THRU (North of MD 2)
Predicted Volumes	800	625	425	200	175	600	1000	2300	2145	155	2130	2115	15	2130	1980	1980
LOS 'D/E' Analysis Result **	3161	3161	3161	791	791	3161	3161	3161	3161	791	3161	3161	791	3161	3161	3161
# of lanes	2	2	2	1	1	2	2	2	2	1	2	2	1	2	2	2
Design Speed	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60
Truck %	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%
Notes	PRED	PRED	PRED	PRED	PRED	PRED	PRED	PRED	PRED	PRED	PRED	PRED	PRED	PRED	PRED	PRED
	800	625	425	200	175	600	1000	2300	2145	155	2130	2115	15	2130	1980	1980
Truck Percentage Breakout: Cars	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%
Medium Trucks	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%
Heavy Trucks	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%
Buses	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%
Motorcycles	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
% Check	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok
average percentage for all TMS																
Percentage Broken Out: Cars	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%
Medium Trucks	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%
Heavy Trucks	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%
Buses	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%
Motorcycles	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Pre-Motorcycle Adjustment Volumes: Cars	760.0	593.8	403.8	190.0	166.3	570.0	950.0	2185.0	2037.8	147.3	2023.5	2009.3	14.3	2023.5	1881.0	1881.0
Medium Trucks	25.2	19.7	13.4	6.3	5.5	18.9	31.5	72.5	67.6	4.9	67.1	66.6	0.5	67.1	62.4	62.4
Heavy Trucks	9.6	7.5	5.1	2.4	2.1	7.2	12.0	27.6	25.7	1.9	25.6	25.4	0.2	25.6	23.8	23.8
Buses	5.2	4.1	2.8	1.3	1.1	3.9	6.5	15.0	13.9	1.0	13.8	13.7	0.1	13.8	12.9	12.9
Motorcycles	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
based on ave. % for all TMS																
Motorcycles?	Do you want to check motorcycles	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
	Cars	760	594	404	190	166	570	950	2185	2038	147	2024	2009	14	2024	1881	1881
	Motorcycles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
USE THESE VOLUMES	TOTAL	800	625	425	200	175	600	1000	2300	2145	155	2130	2115	15	2130	1980	1980
	Cars	760	594	404	190	166	570	950	2185	2038	147	2024	2009	14	2024	1881	1881
	Medium Trucks	25	20	13	6	6	19	32	72	68	5	67	67	0	67	62	62
	Heavy Trucks	10	8	5	2	2	7	12	28	26	2	26	25	0	26	24	24
	Buses	5	3	3	2	1	4	6	15	13	1	13	14	1	13	13	13
	Motorcycles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Speed	59.5	59.5	59.5	48.5	48.5	59.5	59.5	59.5	59.5	30.0	59.5	59.5	30.0	59.5	59.5	59.5

MD 4 SB

	MD 4 SB THRU (North of MD 2)	MD 4 SB THRU (North of MD 2)	MD 4 SB TOTAL THRU (MD 2 to Kingston Creek Rd)	MD 4 SB THRU (North of Kingston Creek Rd)	MD 4 SB TOTAL THRU (Kingston Creek Rd to Pearson Blvd)	MD 4 SB THRU (South of Pearson Blvd)	MD 4 SB RT. TURN (at Pearson Blvd)	MD 4 SB THRU (South of Pearson Blvd)	MD 4 SB TOTAL THRU (Pearson Blvd to MD 235)	MD 4 SB THRU (North of MD 235)	MD 4 SB LT. TURN (at MD 235)	MD 4 SB RT. TURN (at MD 235)	MD 4 SB THRU (South of MD 235)
Predicted Volumes	1300	1300	1525	1505	20	1535	1495	40	1495	1600	775	400	825	375	775	975
LOS 'D/E' Analysis Result **	3161	3161	3161	3161	791	3161	3161	791	3161	3161	3161	3161	3161	791	3161	3161
# of lanes	2	2	2	2	1	2	2	1	2	2	2	2	2	1	2	2
Design Speed	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60
Truck %	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%
Notes	PRED	PRED	PRED	PRED	PRED	PRED	PRED	PRED	PRED	PRED	PRED	PRED	PRED	PRED	PRED	PRED
	1300	1300	1525	1505	20	1535	1495	40	1495	1600	775	400	825	375	775	975
Truck Percentage Breakout: Cars	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%
Medium Trucks	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%
Heavy Trucks	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%
Buses	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%
Motorcycles	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
% Check	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok
average percentage for all TMS																
Percentage Broken Out: Cars	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%
Medium Trucks	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%
Heavy Trucks	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%
Buses	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%
Motorcycles	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Pre-Motorcycle Adjustment Volumes: Cars	1235.0	1235.0	1448.8	1429.8	19.0	1458.3	1420.3	38.0	1420.3	1520.0	736.3	380.0	783.8	356.3	736.3	926.3
Medium Trucks	41.0	41.0	48.0	47.4	0.6	48.4	47.1	1.3	47.1	50.4	24.4	12.6	26.0	11.8	24.4	30.7
Heavy Trucks	15.6	15.6	18.3	18.1	0.2	18.4	17.9	0.5	17.9	19.2	9.3	4.8	9.9	4.5	9.3	11.7
Buses	8.5	8.5	9.9	9.8	0.1	10.0	9.7	0.3	9.7	10.4	5.0	2.6	5.4	2.4	5.0	6.3
Motorcycles	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
based on ave. % for all TMS																
Motorcycles?	Do you want to check motorcycles	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
	Cars	1235	1235	1449	1430	19	1458	1420	38	1420	1520	736	380	784	356	736	926
	Motorcycles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
USE THESE VOLUMES	TOTAL	1300	1300	1525	1505	20	1535	1495	40	1495	1600	775	400	825	375	775	975
	Cars	1235	1235	1449	1430	19	1458	1420	38	1420	1520	736	380	784	356	736	926
	Medium Trucks	41	41	48	47	1	48	47	1	47	50	24	13	26	12	24	31
	Heavy Trucks	16	16	18	18	0	18	18	0	18	19	9	5	10	5	9	12
	Buses	8	8	10	10	0	11	10	1	10	11	6	2	5	2	6	6
	Motorcycles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Speed	59.5	59.5	59.5	59.5	30.0	59.5	59.5	30.0	59.5	59.5	59.5	59.5	30.0	30.0	59.5	59.5

File: http://projectcenter.jmt.com/01/01-0456-029/ProjectFiles/00-JMT/TNM/Prop Traffic Data_MD4.xls
Tab: 2030 PM Build
Printed: 7/24/2009 4:41 PM

TABLE E.7 (Cont.) **Traffic Volume Comparison & TNM Analysis Traffic, 2030 PM BUILD**

MD 4 From MD 2 to MD 235
Vehicle Per Hour - Vehicle Type

2030 PM - Build

		MD 235																							PATUXENT BLVD.			KINGSTON CREEK RD.			MD2	
		MD 235 WB Thru + LT (East of MD4)	MD 235 WB THRU (East of MD4)	MD 235 WB LT TURN (East of MD4)	MD 235 WB RT TURN (East of MD4)	MD 235 WB L1 + RT (West of MD4)	MD 235 WB L1 + RT (East of MD4)	MD 235 WB U TURN (East of MD4)	MD 235 WB THRU (West of MD4)	MD 235 WB THRU (West of MD4)	MD 235 WB TOTAL THRU (West of MD4)	MD 235 EB TOTAL THRU (West of MD4)	MD 235 EB Thru + LT (West of MD4)	MD 235 EB THRU (West of MD4)	MD 235 EB LT TURN (West of MD4)	MD 235 EB RT TURN (West of MD4)	MD 235 EB L1 + RT (West of MD4)	MD 235 EB L1 + RT (East of MD4)	MD 235 EB L TURN (West of MD4)	MD 235 EB THRU (East of MD4)	MD 235 EB THRU (East of MD4)	MD 235 EB THRU (East of MD4)	MD 235 EB TOTAL THRU (East of MD4)	PATUXENT BLVD WB (West of MD4)	PATUXENT BLVD EB LT TURN (West of MD4)	PATUXENT BLVD EB RT TURN (West of MD4)	KINGSTON CREEK WB (West of MD4)	KINGSTON CREEK EB LT TURN (West of MD4)	KINGSTON CREEK EB RT TURN (West of MD4)	MD 235 (East from SB MD4)	MD2 NB (Ramp to SB MD4)	MD2 EB (East from NB MD4)
Predicted Volumes		2525	2150	375	1300	1675	575	100	2175	2375	2750	2450	2250	1675	575	200	775	1000	25	1775	1950	2600	2775	195	25	105	75	15	30	75	225	150
LOS 'D/E' Analysis Result **		3161	3161	3161	791	3161	3161	791	3161	3161	3161	3161	3161	3161	3161	791	791	3161	791	3161	3161	3161	3161	791	791	791	791	791	791	791	791	791
# of lanes		3	3	2	1	2	2	1	3	3	2	3	3	3	2	1	1	2	1	3	3	3	3	1	1	1	1	1	1	1	1	1
Design Speed		60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60
Truck %		5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%
Notes		PRED	PRED	PRED	LOS 'D/E'	PRED	PRED	PRED	PRED	PRED	PRED	PRED	PRED	PRED	PRED	PRED	PRED	PRED	PRED	PRED	PRED	PRED	PRED	PRED	PRED	PRED	PRED	PRED	PRED	PRED	PRED	PRED
		2525	2150	375	791	1675	575	100	2175	2375	2750	2450	2250	1675	575	200	775	1000	25	1775	1950	2600	2775	195	25	105	75	15	30	75	225	150
Truck Percentage Breakout	Cars	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%
	Medium Trucks	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%
	Heavy Trucks	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%
	Buses	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%
	Motorcycles	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	% Check	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok
average percentage for all TMS																																
Percentage Broken Out	Cars	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%
	Medium Trucks	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%
	Heavy Trucks	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%
	Buses	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%
	Motorcycles	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Pre-Motorcycle Adjustment Volumes	Cars	2398.8	2042.5	356.3	751.5	1591.3	546.3	95.0	2066.3	2256.3	2612.5	2327.5	2137.5	1591.3	546.3	190.0	736.3	950.0	23.8	1686.3	1852.5	2470.0	2636.3	185.3	23.8	99.8	71.3	14.3	28.5	71.3	213.8	142.5
	Medium Trucks	79.5	67.7	11.8	24.9	52.8	18.1	3.2	68.5	74.8	86.6	77.2	70.9	52.8	18.1	6.3	24.4	31.5	0.8	55.9	61.4	81.9	87.4	6.1	0.8	3.3	2.4	0.5	0.9	2.4	7.1	4.7
	Heavy Trucks	30.3	25.8	4.5	9.5	20.1	6.9	1.2	26.1	28.5	33.0	29.4	27.0	20.1	6.9	2.4	9.3	12.0	0.3	21.3	23.4	31.2	33.3	2.3	0.3	1.3	0.9	0.2	0.4	0.9	2.7	1.8
	Buses	16.4	14.0	2.4	5.1	10.9	3.7	0.7	14.1	15.4	17.9	15.9	14.6	10.9	3.7	1.3	5.0	6.5	0.2	11.5	12.7	16.9	18.0	1.3	0.2	0.7	0.5	0.1	0.2	0.5	1.5	1.0
	Motorcycles	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
based on ave. % for all TMS																																
Motorcycle?	Do you want to check motorcycles	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
	Cars	2399	2043	356	751	1591	546	95	2066	2256	2613	2328	2138	1591	546	190	736	950	24	1686	1853	2470	2636	185	24	100	71	14	29	71	214	143
	Motorcycles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
USE THESE VOLUMES	TOTAL	2525	2150	375	791	1675	575	100	2175	2375	2750	2450	2250	1675	575	200	775	1000	25	1775	1950	2600	2775	195	25	105	75	15	30	75	225	150
	Cars	2399	2043	356	751	1591	546	95	2066	2256	2613	2328	2138	1591	546	190	736	950	24	1686	1853	2470	2636	185	24	100	71	14	29	71	214	143
	Medium Trucks	80	68	12	25	53	18	3	69	75	87	77	71	53	18	6	24	32	1	56	61	82	87	6	1	3	2	0	1	2	7	5
	Heavy Trucks	30	26	5	9	20	7	1	26	29	33	29	27	20	7	2	9	12	0	21	23	31	33	2	0	1	1	0	0	1	3	2
	Buses	16	13	2	6	11	4	1	14	15	17	16	14	11	4	2	6	6	0	12	13	17	19	2	0	1	1	1	0	1	1	0
	Motorcycles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Speed	59.2	59.5	30.0	42.9	59.5	59.5	48.5	59.5	59.5	58.3	59.5	59.5	59.5	30.0	30.0	43.1	59.5	48.5	59.5	59.5	58.9	58.2	30.0	30.0	30.0	30.0	30.0	30.0	48.5	30.0	30.0

File: http://projectcenter.jmt.com/01/01-0456-029/ProjectFiles/00-JMT/TNM/Prop Traffic Data_MD4.xls
Tab: 2030 PM Build
Printed: 7/24/2009 4:41 PM

REFERENCE FILES

Appendix E

http:\\projectcenter.jmt.com\01\01-0456-029\ProjectFiles\00-JMT\Report\Final\MD4Final_Appendix E 08-19-2009.doc

Q:\SMD\010456_029_MD 4 Noise Study\Working Data\Report\images for report\appx E
TJbridge_ET2.pdf
TJbridge_ET1.pdf
traffic.pdf

http:\\projectcenter.jmt.com\01\01-0456-027\ProjectFiles\00-JMT\TNM
Prop Traffic Data_MD4.xls

MD 4 (PATUXENT BEACH ROAD)
PROJECT PLANNING STUDY

Calvert County and St. Mary's County, Maryland

NOISE ANALYSIS
TECHNICAL REPORT

FINAL
August 19, 2009

Appendix F
IMPACT ANALYSIS

Submitted To

MARYLAND STATE HIGHWAY ADMINISTRATION
OFFICE OF PLANNING AND PRELIMINARY ENGINEERING

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INTRODUCTION

General

This Appendix documents the details of the Impact Analysis. All noise levels listed in this Appendix, except for the TNM Output Tables, are rounded[1] to the nearest whole decibel. All Noise Levels are reported in units of A-weighted Decibels [dB(A)], unless otherwise specified.

Impact Analysis

For Type I projects, the determination of impact is performed by comparing the Predicted future noise levels to the Existing Worst Case (EWC) conditions and the noise abatement criteria (NAC) for the study area.

IMPACT ANALYSIS DATA

The predicted existing noise levels and 2030 No-Build noise levels for this project were determined by creating new TNM runs: Area-1 (Intersection Segment), Area-2 (MD4 Mainline Segment), and Area-3 (Bridge Segment). For each of the segments, both AM/PM TNM models were created with projected traffic volumes. (shown in Appendix E).

For entire project , the Predicted 2030 Build noise levels were determined by creating TNM runs CFI_ 2030 Build-AM and PM, SPUI_ 2030 Build-AM and PM, Flyover_ 2030 Build-AM and PM, MD4mainline_ 2030 Build-AM and PM, 2Bridge_ 2030 Build-AM and PM and 4Bridge_ 2030 Build-AM and PM.

Table F.1 shows the measured noise levels, modeled EWC noise levels, the 2030 No-Build Predicted noise levels, and the 2030 Build Predicted noise levels for each proposed options. Table F.1 shows the addition of 45 dB(A) background noise into all of the predicted TNM 2.5 noise levels because TNM does not account for background noise.

[1] If the remainder beyond the last digit was exactly 5, then the last digit was rounded up.

TABLE F.1 TNM Noise Analysis Summary

Receptor Number	Residence Address or Property Description		Measured Noise Level	EWC 2009 AM From TNM	EWC 2009 AM (TNM + Background)	EWC 2009 PM From TNM	EWC 2009 PM (TNM + Background)	EWC 2009 Noise Level	2030 No Build AM From TNM	2030 No Build AM (TNM + Background)	2030 No Build PM From TNM	2030 No Build PM (TNM + Background)	2030 No Build Noise Level	CFI Intersection Option: 2030 Build AM From TNM	CFI Intersection Option: 2030 Build AM (TNM + Background)	CFI Intersection Option: 2030 Build PM From TNM	CFI Intersection Option: 2030 Build PM (TNM + Background)	CFI Intersection Option: 2030 Build Noise Level
M-04	14120	Solomons Island Rd S.	60	56.6	56.79	56.6	56.79	57	56.9	57.1	56.9	57.1	57					
M-05	24131	N. Patuxent Beach Road	56	52.1	52.60	52.3	52.78	53	52.3	52.8	52.3	52.8	53					
M-06	24163	N. Patuxent Beach Road	55	51.9	52.43	52.1	52.60	53	52.1	52.6	52.1	52.6	53					
M-07	24087	N. Patuxent Beach Road	55	53.5	53.87	53.7	54.05	54	53.7	54.1	53.7	54.1	54					
M-08	24080	N. Patuxent Beach Road	62	54.0	58.14	54.1	58.23	58	54.1	58.2	54.1	58.2	58					
M-09	23719	Bill Dixon Road	53	54.4	54.70	54.5	54.80	55	54.5	54.8	54.5	54.8	55					
M-10	23788	Bill Dixon Road	55	54.1	54.42	54.2	54.52	55	54.2	54.5	54.2	54.5	55					
M-11	23633	Town Creek Drive	55	52.6	53.05	52.7	53.14	53	52.7	53.1	52.7	53.1	53					
M-12	25969	S. Patuxent Beach Road	59	59.3	59.40	59.4	59.50	59	59.4	59.5	59.4	59.5	59					
M-13	45970	Wild Rose Lane	57	57.5	57.65	57.6	57.75	58	57.6	57.7	57.6	57.7	58					
M-14	45920	Wild Rose Lane	56	56.6	56.79	56.7	56.88	57	56.7	56.9	56.7	56.9	57					
M-15	23635	S. Patuxent Beach Road	60	63.4	63.44	63.5	63.54	64	63.5	63.5	63.5	63.5	64					
M-16	23702	W. Patuxent Beach Road	54	58.1	58.23	58.2	58.33	58	58.2	58.3	58.2	58.3	58					
M-17	23612	Kingston Shores Lane	58	59.8	59.89	59.9	59.99	60	59.9	60.0	59.9	60.0	60					
M-18	23550	Gross Drive	65	63.6	66.62	63.7	66.72	**67**	63.7	66.7	63.7	66.7	**67**					
M-19	23415	S. Patuxent Beach Road	58	55.8	56.02	55.9	56.12	56	55.9	56.1	55.9	56.1	56					
M-20	45606	Seven Gables Lane	58	55.9	56.12	56.0	56.21	56	56.0	56.2	56.0	56.2	56					
M-21	23338	Kingston Creek Road	57	58.1	58.23	58.3	58.43	58	58.3	58.4	58.3	58.4	58					
M-22	23322	Shady Mile Drive	53	49.1	50.05	49.3	50.21	50	49.3	50.2	49.3	50.2	50					
M-23	0	Patuxent Presb. Church	62	61.2	61.27	61.3	61.36	61	61.3	61.4	61.3	61.4	61					
M-24	45222	Clements Lane	60	58.0	58.14	58.1	58.23	58	58.2	58.3	58.2	58.3	58					
M-25	23445	Lous Way	52	47.6	48.89	47.7	48.97	49	47.7	49.0	47.7	49.0	49					
M-26	23275	Christy Court	54	55.0	55.27	55.4	55.64	56	55.3	55.5	55.6	55.8	56	60.3	60.4	61.4	61.5	61
M-27	23190	Woodland Acres Road	56	61.2	61.27	61.7	61.76	62	61.8	61.9	62.5	62.5	63	63.1	63.1	64.1	64.1	64
M-28	0	Patuxent Assembly of God	49	48.2	49.35	49.0	49.97	50	49.2	50.1	49.6	50.5	50	52.8	53.2	53.3	53.7	54
R-01	41	Three Notch Road		69.8	69.81	70.7	70.71	**71**	70.6	70.6	71.6	71.6	**72**	71.1	71.1	72.2	72.2	**72**
R-02	23182	Three Notch Road		69.2	69.21	70.8	70.81	**71**	70.3	70.3	71.8	71.8	**72**	70.4	70.4	71.9	71.9	**72**
R-03	23530	Gross Drive		57.3	57.46	57.4	57.55	58	57.4	57.6	57.4	57.6	58					
R-04	23552	Gross Drive		59.5	59.60	59.5	59.60	60	59.5	59.6	59.5	59.6	60					
R-05	23186	Three Notch Road		59.2	59.30	59.9	59.99	60	60.1	60.2	60.8	60.9	61	62.3	62.4	63.2	63.2	63
R-06	15218	Clements Lane		49.6	50.46	49.8	50.62	51	49.9	50.7	49.9	50.7	51					
R-07	45275	Clements Lane		49.6	50.46	49.7	50.54	51	49.7	50.5	49.7	50.5	51					
R-08	23338	Kingston Creek Road		61.1	61.17	61.2	61.27	61	61.2	61.3	61.2	61.3	61					
R-09	23350	Kingston Creek Road		54.2	54.52	54.3	54.61	55	54.3	54.6	54.3	54.6	55					
R-10	45600	Seven Gables Lane		47.6	48.89	47.7	48.97	49	47.7	49.0	47.7	49.0	49					
R-11	25569	Seven Gables Lane		60.9	60.97	61.0	61.07	61	61.0	61.1	61.0	61.1	61					
R-12	12345	Seven Gables Lane		54.1	54.42	54.2	54.52	55	54.2	54.5	54.2	54.5	55					
R-13	23560	Gross Drive		52.3	52.78	52.5	52.96	53	52.5	53.0	52.5	53.0	53					
R-14	23613	Kingston Shores Lane		53.2	53.60	53.3	53.69	54	53.3	53.7	53.3	53.7	54					
R-15	23628	Kingston Shores Lane		57.8	57.94	57.9	58.04	58	57.9	58.0	57.9	58.0	58					
R-16	23690	W.Patuxent Beach Road		54.0	54.33	54.1	54.42	54	54.1	54.4	54.1	54.4	54					
R-17	23708	W. Patuxent Beach Road		54.5	54.80	54.6	54.89	55	54.6	54.9	54.6	54.9	55					
R-18	23569	S. Patuxent Beach Road		57.1	57.27	57.2	57.36	57	57.2	57.4	57.2	57.4	57					
R-19	14130	Solomons Island Rd S.		55.5	55.74	55.1	55.36	56	55.9	56.1	55.5	55.7	56					

2030 Build Options continues on next sheet

TABLE F.1 TNM Noise Analysis Summary (Cont.)

				SPUI Intersection Option					Flyover Intersection Option					MD 4 Mainline Option				
Receptor Number	Residence Address or Property Description		Measured Noise Level	2030 Build AM From TNM	2030 Build AM (TNM + Background)	2030 Build PM From TNM	2030 Build PM (TNM + Background)	2030 Build Noise Level	2030 Build AM From TNM	2030 Build AM (TNM + Background)	2030 Build PM From TNM	2030 Build PM (TNM + Background)	2030 Build Noise Level	2030 Build AM From TNM	2030 Build AM (TNM + Background)	2030 Build PM From TNM	2030 Build PM (TNM + Background)	2030 Build Noise Level
M-04	14120	Solomons Island Rd S.	60															
M-05	24131	N. Patuxent Beach Road	56															
M-06	24163	N. Patuxent Beach Road	55															
M-07	24087	N. Patuxent Beach Road	55															
M-08	24080	N. Patuxent Beach Road	62															
M-09	23719	Bill Dixon Road	53															
M-10	23788	Bill Dixon Road	55															
M-11	23633	Town Creek Drive	55															
M-12	25969	S. Patuxent Beach Road	59															
M-13	45970	Wild Rose Lane	57															
M-14	45920	Wild Rose Lane	56															
M-15	23635	S. Patuxent Beach Road	60															
M-16	23702	W. Patuxent Beach Road	54															
M-17	23612	Kingston Shores Lane	58											**68.1**	**68.1**	**67.7**	**67.7**	**68**
M-18	23550	Gross Drive	65											**72.8**	**75.8**	**72.7**	**75.7**	**76**
M-19	23415	S. Patuxent Beach Road	58											62.6	62.6	63.7	63.7	64
M-20	45606	Seven Gables Lane	58											**70.6**	**70.6**	**70.5**	**70.5**	**71**
M-21	23338	Kingston Creek Road	57											**70.1**	**70.1**	**69.6**	**69.6**	**70**
M-22	23322	Shady Mile Drive	53											56.2	56.4	57	57.2	57
M-23	0	Patuxent Presb. Church	62											**69.9**	**69.9**	**69.8**	**69.8**	**70**
M-24	45222	Clements Lane	60											65.6	65.6	**66.8**	**66.8**	**67**
M-25	23445	Lous Way	52											54.5	54.8	54.7	55.0	55
M-26	23275	Christy Court	54	60.3	60.4	61.5	61.6	62	60.3	60.4	61.5	61.6	62					
M-27	23190	Woodland Acres Road	56	62.4	62.4	64.6	64.6	65	61.3	61.4	62.2	62.3	62					
M-28	0	Patuxent Assembly of God	49	52.3	52.8	53	53.4	53	52.8	53.2	53.2	53.6	54					
R-01	41	Three Notch Road		**70.5**	**70.5**	**71.6**	**71.6**	**72**	71	71.0	72.0	72.0	**72**					
R-02	23182	Three Notch Road		**66.2**	**66.2**	**66.8**	**66.8**	**67**	70.8	70.8	71.7	71.7	**72**					
R-03	23530	Gross Drive												65.3	65.3	65.4	65.4	65
R-04	23552	Gross Drive												**67.9**	**67.9**	**68**	**68.0**	**68**
R-05	23186	Three Notch Road		59	59.1	60.5	60.6	61	61.5	61.6	60.8	60.9	62					
R-06	15218	Clements Lane												56.7	56.9	57.2	57.4	57
R-07	45275	Clements Lane												56.5	56.7	57.8	57.9	58
R-08	23338	Kingston Creek Road												**71.3**	**71.3**	**71.1**	**71.1**	**71**
R-09	23350	Kingston Creek Road												62	62.1	62.3	62.4	62
R-10	45600	Seven Gables Lane												56.1	56.3	56	56.2	56
R-11	25569	Seven Gables Lane												**69.4**	**69.4**	**69.5**	**69.5**	**70**
R-12	12345	Seven Gables Lane												63.1	63.1	63.2	63.2	63
R-13	23560	Gross Drive												58.9	59.0	59.5	59.6	60
R-14	23613	Kingston Shores Lane												60.3	60.4	60.7	60.8	61
R-15	23628	Kingston Shores Lane												65.2	65.2	65.2	65.2	65
R-16	23690	W.Patuxent Beach Road																
R-17	23708	W. Patuxent Beach Road																
R-18	23569	S. Patuxent Beach Road																
R-19	14130	Solomons Island Rd S.																

2030 Build Options continues on next sheet

TABLE F.1 TNM Noise Analysis Summary (Cont.)

				2 Lane Bridge Option					4 Lane Bridge Option				
Receptor Number	Residence Address or Property Description		Measured Noise Level	2030 Build AM From TNM	2030 Build AM (TNM + Background)	2030 Build PM From TNM	2030 Build PM (TNM + Background)	2030 Build Noise Level	2030 Build AM From TNM	2030 Build AM (TNM + Background)	2030 Build PM From TNM	2030 Build PM (TNM + Background)	2030 Build Noise Level
M-04	14120	Solomons Island Rd S.	60	63.6	63.6	64.4	64.4	64	63.6	63.6	64.9	64.9	65
M-05	24131	N. Patuxent Beach Road	56	48.7	49.7	51.2	51.8	52	52	52.5	53.5	53.9	54
M-06	24163	N. Patuxent Beach Road	55	49.8	50.6	52.2	52.7	53	53.8	54.1	55.4	55.6	56
M-07	24087	N. Patuxent Beach Road	55	57.5	57.7	56.3	56.5	58	56.3	56.5	55.9	56.1	56
M-08	24080	N. Patuxent Beach Road	62	57.4	61.5	56.3	60.4	61	57	61.1	56.8	60.9	61
M-09	23719	Bill Dixon Road	53	54.6	54.9	56.8	57.0	57	56.9	57.1	58.5	58.6	59
M-10	23788	Bill Dixon Road	55	59.6	59.7	58.9	59.0	60	59.4	59.5	59.2	59.3	59
M-11	23633	Town Creek Drive	55	56.2	56.4	57.7	57.8	58	58.9	59.0	60.3	60.4	60
M-12	25969	S. Patuxent Beach Road	59	60.1	60.2	62.3	62.4	62	62.6	62.6	63.7	63.7	64
M-13	45970	Wild Rose Lane	57	64.9	64.9	63.9	63.9	65	59.7	59.8	60.0	60.1	60
M-14	45920	Wild Rose Lane	56	63.9	63.9	63.6	63.6	64	62.2	62.3	62.2	62.3	62
M-15	23635	S. Patuxent Beach Road	60	**67.6**	**67.6**	**69.3**	**69.3**	**69**	**67.6**	**67.6**	**69.3**	**69.3**	**69**
M-16	23702	W. Patuxent Beach Road	54	**66.8**	**66.8**	**66.6**	**66.6**	**67**	**66.8**	**66.8**	**66.6**	**66.6**	**67**
M-17	23612	Kingston Shores Lane	58										
M-18	23550	Gross Drive	65										
M-19	23415	S. Patuxent Beach Road	58										
M-20	45606	Seven Gables Lane	58										
M-21	23338	Kingston Creek Road	57										
M-22	23322	Shady Mile Drive	53										
M-23	0	Patuxent Presb. Church	62										
M-24	45222	Clements Lane	60										
M-25	23445	Lous Way	52										
M-26	23275	Christy Court	54										
M-27	23190	Woodland Acres Road	56										
M-28	0	Patuxent Assembly of God	49										
R-01	41	Three Notch Road											
R-02	23182	Three Notch Road											
R-03	23530	Gross Drive											
R-04	23552	Gross Drive											
R-05	23186	Three Notch Road											
R-06	15218	Clements Lane											
R-07	45275	Clements Lane											
R-08	23338	Kingston Creek Road											
R-09	23350	Kingston Creek Road											
R-10	45600	Seven Gables Lane											
R-11	25569	Seven Gables Lane											
R-12	12345	Seven Gables Lane											
R-13	23560	Gross Drive											
R-14	23613	Kingston Shores Lane											
R-15	23628	Kingston Shores Lane											
R-16	23690	W.Patuxent Beach Road		60.4	60.5	60.4	60.5	60	60.5	60.6	60.4	60.5	61
R-17	23708	W. Patuxent Beach Road		62.5	62.5	62.3	62.4	63	62.3	62.4	62.3	62.4	62
R-18	23569	S. Patuxent Beach Road		63	63.0	64.5	64.5	65	63.1	63.1	64.5	64.5	65
R-19	14130	Solomons Island Rd S.		62	62.1	62.8	62.8	63	61.6	61.7	62.6	62.6	63

End of Table F.1

TNM Output file for EWC-2009 AM – Area 1

RESULTS: SOUND LEVELS MD4/MD235

JMT 26 July 2009
Run Date:7/10/09 TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: MD4/MD235
RUN: EWC 2009AM AREA1
BARRIER DESIGN: INPUT HEIGHTS
ATMOSPHERICS: 68 deg F, 50% RH

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

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over existing Calculated	Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
M26	26	1	54.0	55.0	66	1.0	10	----	55.0	0.0	8	-8.0
M27	27	1	56.0	61.2	66	5.2	10	----	61.2	0.0	8	-8.0
M28	28	1	49.0	48.2	66	-0.8	10	----	48.2	0.0	8	-8.0
R01	31	1	0.0	69.8	66	69.8	10	Snd Lvl	69.8	0.0	8	-8.0
R02	32	1	0.0	69.2	66	69.2	10	Snd Lvl	69.2	0.0	8	-8.0
R05	35	1	0.0	59.2	66	59.2	10	----	59.2	0.0	8	-8.0

Dwelling Units	# DUs	Noise Reduction Min	Avg	Max
		dB	dB	dB
All Selected	6	0.0	0.0	0.0
All Impacted	2	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0

TNM Output file for EWC-2009 AM – Area 2

RESULTS: SOUND LEVELS MD4/MD235

JMT 26 July 2009
Run Date:7/10/09 TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: MD4/MD235
RUN: EWC 2009AM AREA2
BARRIER DESIGN: INPUT HEIGHTS
ATMOSPHERICS: 68 deg F, 50% RH

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

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over existing Calculated	Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Noise Reduction Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
M17	17	1	58.0	59.8	66	1.8	10	----	59.8	0.0	8	-8.0
M18	18	1	65.0	63.6	66	-1.4	10	----	63.6	0.0	8	-8.0
M19	19	1	58.0	55.8	66	-2.2	10	----	55.8	0.0	8	-8.0
M20	20	1	58.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
M21	21	1	57.0	58.1	66	1.1	10	----	58.1	0.0	8	-8.0
M22	22	1	56.0	49.1	66	-6.9	10	----	49.1	0.0	8	-8.0
M23	23	1	62.0	61.2	66	-0.8	10	----	61.2	0.0	8	-8.0
M24	24	1	60.0	58.0	66	-2.0	10	----	58.0	0.0	8	-8.0
M25	25	1	52.0	47.6	66	-4.4	10	----	47.6	0.0	8	-8.0
R01	31	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
R02	32	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
R03	33	1	0.0	57.3	66	57.3	10	----	57.3	0.0	8	-8.0
R04	34	1	0.0	59.5	66	59.5	10	----	59.5	0.0	8	-8.0
R05	35	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
R06	36	1	0.0	49.6	66	49.6	10	----	49.6	0.0	8	-8.0
R07	37	1	0.0	49.6	66	49.6	10	----	49.6	0.0	8	-8.0
R08	38	1	0.0	61.1	66	61.1	10	----	61.1	0.0	8	-8.0
R09	39	1	0.0	54.2	66	54.2	10	----	54.2	0.0	8	-8.0
R10	40	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
R11	41	1	0.0	60.9	66	60.9	10	----	60.9	0.0	8	-8.0
R12	42	1	0.0	54.1	66	54.1	10	----	54.1	0.0	8	-8.0
R13	43	1	0.0	52.3	66	52.3	10	----	52.3	0.0	8	-8.0
R14	44	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
R15	45	1	0.0	57.8	66	57.8	10	----	57.8	0.0	8	-8.0

G:\Working Data\TNM Runs\EWC\2009AM\AREA2 1 26 July 2009

TNM Output file for EWC-2009 AM – Area 2 (Cont.)

RESULTS: SOUND LEVELS **MD4/MD235**

R16	46	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
R17	47	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
R18	48	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
R19	49	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0

Dwelling Units	# DUs	Noise Reduction		
		Min	Avg	Max
		dB	dB	dB
All Selected	28	0.0	0.0	0.0
All Impacted	0	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0

TNM Output file for EWC-2009 AM – Area 3

RESULTS: SOUND LEVELS MD4/MD235

JMT 26 July 2009
Run Date:7/10/09 TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: MD4/MD235
RUN: EWC 2009AM AREA3
BARRIER DESIGN: INPUT HEIGHTS
ATMOSPHERICS: 68 deg F, 50% RH

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

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over existing Calculated	Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
M04	4	1	60.0	56.6	66	-3.4	10	----	56.6	0.0	8	-8.0
M05	5	1	56.0	52.1	66	-3.9	10	----	52.1	0.0	8	-8.0
M06	6	1	55.0	51.9	66	-3.1	10	----	51.9	0.0	8	-8.0
M07	7	1	55.0	53.5	66	-1.5	10	----	53.5	0.0	8	-8.0
M08	8	1	62.0	54.0	66	-8.0	10	----	54.0	0.0	8	-8.0
M09	9	1	53.0	54.4	66	1.4	10	----	54.4	0.0	8	-8.0
M10	10	1	55.0	54.1	66	-0.9	10	----	54.1	0.0	8	-8.0
M11	11	1	57.0	52.6	66	-4.4	10	----	52.6	0.0	8	-8.0
M12	12	1	59.0	59.3	66	0.3	10	----	59.3	0.0	8	-8.0
M13	13	1	57.0	57.5	66	0.5	10	----	57.5	0.0	8	-8.0
M14	14	1	56.0	56.6	66	0.6	10	----	56.6	0.0	8	-8.0
M15	15	1	60.0	63.4	66	3.4	10	----	63.4	0.0	8	-8.0
M16	16	1	54.0	58.1	66	4.1	10	----	58.1	0.0	8	-8.0
R01	31	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
R02	32	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
R03	33	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
R04	34	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
R05	35	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
R06	36	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
R07	37	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
R08	38	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
R09	39	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
R10	40	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
R11	41	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0

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TNM Output file for EWC-2009 AM – Area 3 (Cont.)

RESULTS: SOUND LEVELS **MD4/MD235**

R12	42	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
R13	43	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
R14	44	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
R15	45	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
R16	46	1	0.0	54.0	66	54.0	10	----	54.0	0.0	8	-8.0
R17	47	1	0.0	54.5	66	54.5	10	----	54.5	0.0	8	-8.0
R18	48	1	0.0	57.1	66	57.1	10	----	57.1	0.0	8	-8.0
R19	49	1	0.0	55.5	66	55.5	10	----	55.5	0.0	8	-8.0

Dwelling Units	# DUs	Noise Reduction		
		Min	Avg	Max
		dB	dB	dB
All Selected	32	0.0	0.0	0.0
All Impacted	0	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0

TNM Output file for EWC-2009 PM – Area 1

RESULTS: SOUND LEVELS MD4/MD235

JMT 26 July 2009
Run Date:7/10/09 TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: MD4/MD235
RUN: EWC 2009PM AREA1
BARRIER DESIGN: INPUT HEIGHTS

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

ATMOSPHERICS: 68 deg F, 50% RH

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over existing Calculated	Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
M26	26	1	54.0	55.4	66	1.4	10	----	55.4	0.0	8	-8.0
M27	27	1	56.0	61.7	66	5.7	10	----	61.7	0.0	8	-8.0
M28	28	1	49.0	49.0	66	0.0	10	----	49.0	0.0	8	-8.0
R01	31	1	0.0	70.7	66	70.7	10	Snd Lvl	70.7	0.0	8	-8.0
R02	32	1	0.0	70.8	66	70.8	10	Snd Lvl	70.8	0.0	8	-8.0
R05	34	1	0.0	59.9	66	59.9	10	----	59.9	0.0	8	-8.0

Dwelling Units	# DUs	Noise Reduction Min	Avg	Max
		dB	dB	dB
All Selected	6	0.0	0.0	0.0
All Impacted	2	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0

TNM Output file for EWC-2009 PM – Area 2

RESULTS: SOUND LEVELS MD4/MD235

JMT 26 July 2009
Run Date:7/10/09 TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: MD4/MD235
RUN: EWC 2009PM AREA2
BARRIER DESIGN: INPUT HEIGHTS
ATMOSPHERICS: 68 deg F, 50% RH

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

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over existing Calculated	Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
M17	17	1	58.0	59.9	66	1.9	10	----	59.9	0.0	8	-8.0
M18	18	1	65.0	63.7	66	-1.3	10	----	63.7	0.0	8	-8.0
M19	19	1	58.0	55.9	66	-2.1	10	----	55.9	0.0	8	-8.0
M20	20	1	58.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
M21	21	1	57.0	58.3	66	1.3	10	----	58.3	0.0	8	-8.0
M22	22	1	56.0	49.3	66	-6.7	10	----	49.3	0.0	8	-8.0
M23	23	1	62.0	61.3	66	-0.7	10	----	61.3	0.0	8	-8.0
M24	24	1	60.0	58.1	66	-1.9	10	----	58.1	0.0	8	-8.0
M25	25	1	52.0	47.7	66	-4.3	10	----	47.7	0.0	8	-8.0
R01	31	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
R02	32	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
R03	33	1	0.0	57.4	66	57.4	10	----	57.4	0.0	8	-8.0
R04	34	1	0.0	59.5	66	59.5	10	----	59.5	0.0	8	-8.0
R05	35	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
R06	36	1	0.0	49.8	66	49.8	10	----	49.8	0.0	8	-8.0
R07	37	1	0.0	49.7	66	49.7	10	----	49.7	0.0	8	-8.0
R08	38	1	0.0	61.2	66	61.2	10	----	61.2	0.0	8	-8.0
R09	39	1	0.0	54.3	66	54.3	10	----	54.3	0.0	8	-8.0
R10	40	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
R11	41	1	0.0	61.0	66	61.0	10	----	61.0	0.0	8	-8.0
R12	42	1	0.0	54.2	66	54.2	10	----	54.2	0.0	8	-8.0
R13	43	1	0.0	52.5	66	52.5	10	----	52.5	0.0	8	-8.0
R14	44	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
R15	45	1	0.0	57.9	66	57.9	10	----	57.9	0.0	8	-8.0

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TNM Output file for EWC-2009 PM – Area 2 (Cont.)

RESULTS: SOUND LEVELS **MD4/MD235**

R16	46	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
R17	47	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
R18	48	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
R19	49	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0

Dwelling Units	# DUs	Noise Reduction		
		Min	Avg	Max
		dB	dB	dB
All Selected	28	0.0	0.0	0.0
All Impacted	0	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0

TNM Output file for EWC-2009 PM – Area 3

RESULTS: SOUND LEVELS MD4/MD235

JMT 26 July 2009
Run Date:7/10/09 TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: MD4/MD235
RUN: EWC 2009PM AREA3
BARRIER DESIGN: INPUT HEIGHTS

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

ATMOSPHERICS: 68 deg F, 50% RH

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over existing Calculated	Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
M04	4	1	60.0	56.6	66	-3.4	10	----	56.6	0.0	8	-8.0
M05	5	1	56.0	52.3	66	-3.7	10	----	52.3	0.0	8	-8.0
M06	6	1	55.0	52.1	66	-2.9	10	----	52.1	0.0	8	-8.0
M07	7	1	55.0	53.7	66	-1.3	10	----	53.7	0.0	8	-8.0
M08	8	1	62.0	54.1	66	-7.9	10	----	54.1	0.0	8	-8.0
M09	9	1	53.0	54.5	66	1.5	10	----	54.5	0.0	8	-8.0
M10	10	1	55.0	54.2	66	-0.8	10	----	54.2	0.0	8	-8.0
M11	11	1	57.0	52.7	66	-4.3	10	----	52.7	0.0	8	-8.0
M12	12	1	59.0	59.4	66	0.4	10	----	59.4	0.0	8	-8.0
M13	13	1	57.0	57.6	66	0.6	10	----	57.6	0.0	8	-8.0
M14	14	1	56.0	56.7	66	0.7	10	----	56.7	0.0	8	-8.0
M15	15	1	60.0	63.5	66	3.5	10	----	63.5	0.0	8	-8.0
M16	16	1	54.0	58.2	66	4.2	10	----	58.2	0.0	8	-8.0
R01	31	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
R02	32	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
R03	33	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
R04	34	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
R05	35	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
R06	36	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
R07	37	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
R08	38	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
R09	39	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
R10	40	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
R11	41	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0

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TNM Output file for EWC-2009 PM – Area 3 (Cont.)

RESULTS: SOUND LEVELS **MD4/MD235**

R12	42	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
R13	43	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
R14	44	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
R15	45	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
R16	46	1	0.0	54.1	66	54.1	10	----	54.1	0.0	8	-8.0
R17	47	1	0.0	54.6	66	54.6	10	----	54.6	0.0	8	-8.0
R18	48	1	0.0	57.2	66	57.2	10	----	57.2	0.0	8	-8.0
R19	49	1	0.0	55.1	66	55.1	10	----	55.1	0.0	8	-8.0

Dwelling Units	# DUs	Noise Reduction		
		Min	Avg	Max
		dB	dB	dB
All Selected	32	0.0	0.0	0.0
All Impacted	0	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0

TNM Output file for No-BUILD_2030-AM – Area 1

RESULTS: SOUND LEVELS MD4/MD235

JMT 26 July 2009
Run Date:7/10/09 TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: MD4/MD235
RUN: No Build 2030AM AREA1
BARRIER DESIGN: INPUT HEIGHTS
ATMOSPHERICS: 68 deg F, 50% RH

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

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over existing Calculated	Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
M26	26	1	54.0	55.3	66	1.3	10	----	55.3	0.0	8	-8.0
M27	27	1	56.0	61.8	66	5.8	10	----	61.8	0.0	8	-8.0
M28	28	1	49.0	49.2	66	0.2	10	----	49.2	0.0	8	-8.0
R01	31	1	0.0	70.6	66	70.6	10	Snd Lvl	70.6	0.0	8	-8.0
R02	32	1	0.0	70.3	66	70.3	10	Snd Lvl	70.3	0.0	8	-8.0
R05	34	1	0.0	60.1	66	60.1	10	----	60.1	0.0	8	-8.0

Dwelling Units	# DUs	Noise Reduction Min	Avg	Max
		dB	dB	dB
All Selected	6	0.0	0.0	0.0
All Impacted	2	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0

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TNM Output file for No-BUILD_2030-AM – Area 2

RESULTS: SOUND LEVELS MD4/MD235

JMT 26 July 2009
Run Date:7/10/09 TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: MD4/MD235
RUN: No Build 2030AM AREA2
BARRIER DESIGN: INPUT HEIGHTS
ATMOSPHERICS: 68 deg F, 50% RH

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

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over existing Calculated	Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
M17	17	1	58.0	59.9	66	1.9	10	----	59.9	0.0	8	-8.0
M18	18	1	65.0	63.7	66	-1.3	10	----	63.7	0.0	8	-8.0
M19	19	1	58.0	55.9	66	-2.1	10	----	55.9	0.0	8	-8.0
M20	20	1	58.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
M21	21	1	57.0	58.3	66	1.3	10	----	58.3	0.0	8	-8.0
M22	22	1	56.0	49.3	66	-6.7	10	----	49.3	0.0	8	-8.0
M23	23	1	62.0	61.3	66	-0.7	10	----	61.3	0.0	8	-8.0
M24	24	1	60.0	58.2	66	-1.8	10	----	58.2	0.0	8	-8.0
M25	25	1	52.0	47.7	66	-4.3	10	----	47.7	0.0	8	-8.0
R01	31	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
R02	32	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
R03	33	1	0.0	57.4	66	57.4	10	----	57.4	0.0	8	-8.0
R04	34	1	0.0	59.5	66	59.5	10	----	59.5	0.0	8	-8.0
R05	35	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
R06	36	1	0.0	49.9	66	49.9	10	----	49.9	0.0	8	-8.0
R07	37	1	0.0	49.7	66	49.7	10	----	49.7	0.0	8	-8.0
R08	38	1	0.0	61.2	66	61.2	10	----	61.2	0.0	8	-8.0
R09	39	1	0.0	54.3	66	54.3	10	----	54.3	0.0	8	-8.0
R10	40	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
R11	41	1	0.0	61.0	66	61.0	10	----	61.0	0.0	8	-8.0
R12	42	1	0.0	54.2	66	54.2	10	----	54.2	0.0	8	-8.0
R13	43	1	0.0	52.5	66	52.5	10	----	52.5	0.0	8	-8.0
R14	44	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
R15	45	1	0.0	57.9	66	57.9	10	----	57.9	0.0	8	-8.0

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TNM Output file for No-BUILD_2030-AM – Area 2 (Cont.)

RESULTS: SOUND LEVELS MD4/MD235

R16	46	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
R17	47	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
R18	48	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
R19	49	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0

Dwelling Units	# DUs	Noise Reduction		
		Min	Avg	Max
		dB	dB	dB
All Selected	28	0.0	0.0	0.0
All Impacted	0	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0

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TNM Output file for No-BUILD_2030-AM – Area 3

RESULTS: SOUND LEVELS MD4/MD235

JMT 26 July 2009
Run Date:7/10/09 TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: MD4/MD235
RUN: No Build 2030AM AREA3
BARRIER DESIGN: INPUT HEIGHTS
ATMOSPHERICS: 68 deg F, 50% RH

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

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over existing Calculated	Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
M04	4	1	60.0	56.9	66	-3.1	10	----	56.9	0.0	8	-8.0
M05	5	1	56.0	52.3	66	-3.7	10	----	52.3	0.0	8	-8.0
M06	6	1	55.0	52.1	66	-2.9	10	----	52.1	0.0	8	-8.0
M07	7	1	55.0	53.7	66	-1.3	10	----	53.7	0.0	8	-8.0
M08	8	1	62.0	54.1	66	-7.9	10	----	54.1	0.0	8	-8.0
M09	9	1	53.0	54.5	66	1.5	10	----	54.5	0.0	8	-8.0
M10	10	1	55.0	54.2	66	-0.8	10	----	54.2	0.0	8	-8.0
M11	11	1	57.0	52.7	66	-4.3	10	----	52.7	0.0	8	-8.0
M12	12	1	59.0	59.4	66	0.4	10	----	59.4	0.0	8	-8.0
M13	13	1	57.0	57.6	66	0.6	10	----	57.6	0.0	8	-8.0
M14	14	1	56.0	56.7	66	0.7	10	----	56.7	0.0	8	-8.0
M15	15	1	60.0	63.5	66	3.5	10	----	63.5	0.0	8	-8.0
M16	16	1	54.0	58.2	66	4.2	10	----	58.2	0.0	8	-8.0
R01	31	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
R02	32	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
R03	33	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
R04	34	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
R05	35	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
R06	36	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
R07	37	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
R08	38	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
R09	39	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
R10	40	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
R11	41	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0

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TNM Output file for No-BUILD_2030-AM – Area 3 (Cont.)

RESULTS: SOUND LEVELS **MD4/MD235**

R12	42	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
R13	43	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
R14	44	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
R15	45	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
R16	46	1	0.0	54.1	66	54.1	10	----	54.1	0.0	8	-8.0
R17	47	1	0.0	54.6	66	54.6	10	----	54.6	0.0	8	-8.0
R18	48	1	0.0	57.2	66	57.2	10	----	57.2	0.0	8	-8.0
R19	49	1	0.0	55.9	66	55.9	10	----	55.9	0.0	8	-8.0

Dwelling Units	**# DUs**	**Noise Reduction**		
		Min	**Avg**	**Max**
		dB	**dB**	**dB**
All Selected	32	0.0	0.0	0.0
All Impacted	0	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0

TNM Output file for No-BUILD_2030-PM – Area 1

RESULTS: SOUND LEVELS MD4/MD235

JMT 26 July 2009
Run Date:7/10/09 TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: MD4/MD235
RUN: No Build 2030PM AREA1
BARRIER DESIGN: INPUT HEIGHTS
ATMOSPHERICS: 68 deg F, 50% RH

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

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over existing Calculated	Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
M26	26	1	54.0	55.6	66	1.6	10	----	55.6	0.0	8	-8.0
M27	27	1	56.0	62.5	66	6.5	10	----	62.5	0.0	8	-8.0
M28	28	1	49.0	49.6	66	0.6	10	----	49.6	0.0	8	-8.0
R01	31	1	0.0	71.6	66	71.6	10	Snd Lvl	71.6	0.0	8	-8.0
R02	32	1	0.0	71.8	66	71.8	10	Snd Lvl	71.8	0.0	8	-8.0
R05	34	1	0.0	60.8	66	60.8	10	----	60.8	0.0	8	-8.0

Dwelling Units	# DUs	Noise Reduction Min	Avg	Max
		dB	dB	dB
All Selected	6	0.0	0.0	0.0
All Impacted	2	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0

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TNM Output file for No-BUILD_2030-PM – Area 2

RESULTS: SOUND LEVELS MD4/MD235

JMT 26 July 2009
Run Date:7/10/09 TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: MD4/MD235
RUN: NO BUILD 2030PM AREA2
BARRIER DESIGN: INPUT HEIGHTS
ATMOSPHERICS: 68 deg F, 50% RH

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

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over existing Calculated	Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
M17	17	1	58.0	59.9	66	1.9	10	----	59.9	0.0	8	-8.0
M18	18	1	65.0	63.7	66	-1.3	10	----	63.7	0.0	8	-8.0
M19	19	1	58.0	55.9	66	-2.1	10	----	55.9	0.0	8	-8.0
M20	20	1	58.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
M21	21	1	57.0	58.3	66	1.3	10	----	58.3	0.0	8	-8.0
M22	22	1	56.0	49.3	66	-6.7	10	----	49.3	0.0	8	-8.0
M23	23	1	62.0	61.3	66	-0.7	10	----	61.3	0.0	8	-8.0
M24	24	1	60.0	58.2	66	-1.8	10	----	58.2	0.0	8	-8.0
M25	25	1	52.0	47.7	66	-4.3	10	----	47.7	0.0	8	-8.0
R01	31	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
R02	32	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
R03	33	1	0.0	57.4	66	57.4	10	----	57.4	0.0	8	-8.0
R04	34	1	0.0	59.5	66	59.5	10	----	59.5	0.0	8	-8.0
R05	35	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
R06	36	1	0.0	49.9	66	49.9	10	----	49.9	0.0	8	-8.0
R07	37	1	0.0	49.7	66	49.7	10	----	49.7	0.0	8	-8.0
R08	38	1	0.0	61.2	66	61.2	10	----	61.2	0.0	8	-8.0
R09	39	1	0.0	54.3	66	54.3	10	----	54.3	0.0	8	-8.0
R10	40	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
R11	41	1	0.0	61.0	66	61.0	10	----	61.0	0.0	8	-8.0
R12	42	1	0.0	54.2	66	54.2	10	----	54.2	0.0	8	-8.0
R13	43	1	0.0	52.5	66	52.5	10	----	52.5	0.0	8	-8.0
R14	44	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
R15	45	1	0.0	57.9	66	57.9	10	----	57.9	0.0	8	-8.0

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TNM Output file for No-BUILD_2030-PM – Area 2 (Cont.)

RESULTS: SOUND LEVELS MD4/MD235

R16	46	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
R17	47	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
R18	48	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
R19	49	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0

Dwelling Units	# DUs	Noise Reduction		
		Min	Avg	Max
		dB	dB	dB
All Selected	28	0.0	0.0	0.0
All Impacted	0	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0

G:\WORKING DATA\TNM RUNS\2030 NO BUILD\2030PM\AREA2 2 26 J

TNM Output file for No-BUILD_2030-PM – Area 3

RESULTS: SOUND LEVELS MD4/MD235

JMT 26 July 2009
Run Date:7/10/09 TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: MD4/MD235
RUN: No Build 2030PM AREA3
BARRIER DESIGN: INPUT HEIGHTS

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

ATMOSPHERICS: 68 deg F, 50% RH

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over existing Calculated	Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
M04	4	1	60.0	56.9	66	-3.1	10	----	56.9	0.0	8	-8.0
M05	5	1	56.0	52.3	66	-3.7	10	----	52.3	0.0	8	-8.0
M06	6	1	55.0	52.1	66	-2.9	10	----	52.1	0.0	8	-8.0
M07	7	1	55.0	53.7	66	-1.3	10	----	53.7	0.0	8	-8.0
M08	8	1	62.0	54.1	66	-7.9	10	----	54.1	0.0	8	-8.0
M09	9	1	53.0	54.5	66	1.5	10	----	54.5	0.0	8	-8.0
M10	10	1	55.0	54.2	66	-0.8	10	----	54.2	0.0	8	-8.0
M11	11	1	57.0	52.7	66	-4.3	10	----	52.7	0.0	8	-8.0
M12	12	1	59.0	59.4	66	0.4	10	----	59.4	0.0	8	-8.0
M13	13	1	57.0	57.6	66	0.6	10	----	57.6	0.0	8	-8.0
M14	14	1	56.0	56.7	66	0.7	10	----	56.7	0.0	8	-8.0
M15	15	1	60.0	63.5	66	3.5	10	----	63.5	0.0	8	-8.0
M16	16	1	54.0	58.2	66	4.2	10	----	58.2	0.0	8	-8.0
R01	31	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
R02	32	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
R03	33	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
R04	34	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
R05	35	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
R06	36	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
R07	37	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
R08	38	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
R09	39	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
R10	40	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
R11	41	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0

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TNM Output file for No-BUILD_2030-PM – Area 3 (Cont.)

RESULTS: SOUND LEVELS MD4/MD235

R12	42	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
R13	43	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
R14	44	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
R15	45	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
R16	46	1	0.0	54.1	66	54.1	10	----	54.1	0.0	8	-8.0
R17	47	1	0.0	54.6	66	54.6	10	----	54.6	0.0	8	-8.0
R18	48	1	0.0	57.2	66	57.2	10	----	57.2	0.0	8	-8.0
R19	49	1	0.0	55.5	66	55.5	10	----	55.5	0.0	8	-8.0

Dwelling Units	# DUs	Noise Reduction		
		Min	Avg	Max
		dB	dB	dB
All Selected	32	0.0	0.0	0.0
All Impacted	0	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0

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TNM Output file for BUILD_2030-AM – CFI Option

RESULTS: SOUND LEVELS — MD 4 Planning Study

JMT — 26 July 2009
Run Date: July 22, 2009 — TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: MD 4 Planning Study
RUN: 2030AM BUILD CFI
BARRIER DESIGN: INPUT HEIGHTS
ATMOSPHERICS: 68 deg F, 50% RH

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

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over existing Calculated	Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Noise Reduction Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
M24	21	1	60.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
M25	22	1	52.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
M26	23	1	54.0	60.3	66	6.3	10	----	60.3	0.0	8	-8.0
M27	24	1	56.0	63.1	66	7.1	10	----	63.1	0.0	8	-8.0
M28	25	1	49.0	52.8	66	3.8	10	----	52.8	0.0	8	-8.0
R01	30	1	0.0	71.1	66	71.1	10	Snd Lvl	71.1	0.0	8	-8.0
R02	31	1	0.0	70.4	66	70.4	10	Snd Lvl	70.4	0.0	8	-8.0
R05	33	1	0.0	62.3	66	62.3	10	----	62.3	0.0	8	-8.0

Dwelling Units	# DUs	Noise Reduction Min	Avg	Max
		dB	dB	dB
All Selected	8	0.0	0.0	0.0
All Impacted	2	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0

TNM Output file for BUILD_2030-AM – SPUI Option

RESULTS: SOUND LEVELS MD4

JMT 26 July 2009
Run Date: July 24, 2009 TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: MD4
RUN: BUILD PM - MD4-SPUI
BARRIER DESIGN: INPUT HEIGHTS
ATMOSPHERICS: 68 deg F, 50% RH

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

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over existing Calculated	Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Noise Reduction Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
M24	1	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
M25	2	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
M26	3	1	0.0	61.5	66	61.5	10	----	61.5	0.0	8	-8.0
M27	4	1	0.0	64.6	66	64.6	10	----	64.6	0.0	8	-8.0
M28	9	1	0.0	53.0	66	53.0	10	----	53.0	0.0	8	-8.0
R01	10	1	0.0	71.6	66	71.6	10	Snd Lvl	71.6	0.0	8	-8.0
R02	11	1	0.0	66.8	66	66.8	10	Snd Lvl	66.8	0.0	8	-8.0
R05	13	1	0.0	60.5	66	60.5	10	----	60.5	0.0	8	-8.0

Dwelling Units	# DUs	Noise Reduction Min	Avg	Max
		dB	dB	dB
All Selected	8	0.0	0.0	0.0
All Impacted	2	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0

TNM Output file for BUILD_2030-AM – Flyover Option

RESULTS: SOUND LEVELS MD4

JMT 26 July 2009
Run Date: July 22, 2009 TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: MD4
RUN: BUILD AM - MD4-FLYOVER
BARRIER DESIGN: INPUT HEIGHTS
ATMOSPHERICS: 68 deg F, 50% RH

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

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over existing Calculated	Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
M24	1	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
M25	2	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
M26	3	1	0.0	60.3	66	60.3	10	----	60.3	0.0	8	-8.0
M27	4	1	0.0	61.3	66	61.3	10	----	61.3	0.0	8	-8.0
M28	9	1	0.0	52.8	66	52.8	10	----	52.8	0.0	8	-8.0
R01	10	1	0.0	71.0	66	71.0	10	Snd Lvl	71.0	0.0	8	-8.0
R02	11	1	0.0	70.8	66	70.8	10	Snd Lvl	70.8	0.0	8	-8.0
R05	13	1	0.0	61.5	66	61.5	10	----	61.5	0.0	8	-8.0

Dwelling Units	# DUs	Noise Reduction Min	Avg	Max
		dB	dB	dB
All Selected	8	0.0	0.0	0.0
All Impacted	2	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0

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TNM Output file for BUILD_2030-AM – MD4 Option

RESULTS: SOUND LEVELS MD4/MD235

JMT 26 July 2009
Run Date:7/10/09 TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: MD4/MD235
RUN: Build 2030AM AREA2
BARRIER DESIGN: INPUT HEIGHTS
ATMOSPHERICS: 68 deg F, 50% RH

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

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over existing Calculated	Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
M04	17	1	60.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
M05	18	1	56.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
M06	19	1	55.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
M07	20	1	55.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
M08	21	1	62.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
M09	22	1	53.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
M10	23	1	55.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
M11	24	1	55.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
M12	25	1	59.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
M13	31	1	57.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
M14	32	1	56.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
M15	34	1	60.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
M16	35	1	54.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
M17	36	1	58.0	68.1	66	10.1	10	Both	68.1	0.0	8	-8.0
M18	37	1	65.0	72.8	66	7.8	10	Snd Lvl	72.8	0.0	8	-8.0
M19	38	1	58.0	62.6	66	4.6	10	----	62.6	0.0	8	-8.0
M20	39	1	58.0	70.6	66	12.6	10	Both	70.6	0.0	8	-8.0
M21	40	1	57.0	70.1	66	13.1	10	Both	70.1	0.0	8	-8.0
M22	41	1	53.0	56.2	66	3.2	10	----	56.2	0.0	8	-8.0
M23	42	1	62.0	69.9	66	7.9	10	Snd Lvl	69.9	0.0	8	-8.0
M24	43	1	60.0	65.6	66	5.6	10	----	65.6	0.0	8	-8.0
M25	44	1	52.0	54.5	66	2.5	10	----	54.5	0.0	8	-8.0
M26	45	1	54.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
M27	46	1	56.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0

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TNM Output file for BUILD_2030-AM – MD4 Option (Cont.)

RESULTS: SOUND LEVELS MD4/MD235

M28	48	1	49.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
R01	49	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
R02	50	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
R03	51	1	0.0	65.3	66	65.3	10	----	65.3	0.0	8	-8.0
R04	52	1	0.0	67.9	66	67.9	10	Snd Lvl	67.9	0.0	8	-8.0
R05	54	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
R06	55	1	0.0	56.7	66	56.7	10	----	56.7	0.0	8	-8.0
R07	56	1	0.0	56.5	66	56.5	10	----	56.5	0.0	8	-8.0
R08	57	1	0.0	71.3	66	71.3	10	Snd Lvl	71.3	0.0	8	-8.0
R09	58	1	0.0	62.0	66	62.0	10	----	62.0	0.0	8	-8.0
R10	59	1	0.0	56.1	66	56.1	10	----	56.1	0.0	8	-8.0
R11	60	1	0.0	69.4	66	69.4	10	Snd Lvl	69.4	0.0	8	-8.0
R12	61	1	0.0	63.1	66	63.1	10	----	63.1	0.0	8	-8.0
R13	62	1	0.0	58.9	66	58.9	10	----	58.9	0.0	8	-8.0
R14	63	1	0.0	60.3	66	60.3	10	----	60.3	0.0	8	-8.0
R15	64	1	0.0	65.2	66	65.2	10	----	65.2	0.0	8	-8.0
R16	65	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
R17	66	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
R18	67	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
R19	68	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0

Dwelling Units	# DUs	Noise Reduction		
		Min	Avg	Max
		dB	dB	dB
All Selected	44	0.0	0.0	0.0
All Impacted	8	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0

TNM Output file for BUILD_2030-AM – 2 Ln Bridge Option

RESULTS: SOUND LEVELS MD4/MD235

JMT 26 July 2009
Run Date:7/10/09 TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: MD4/MD235
RUN: Build 2030AM AREA3 2-Bridge
BARRIER DESIGN: INPUT HEIGHTS
ATMOSPHERICS: 68 deg F, 50% RH

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

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over existing Calculated	Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
M04	4	1	60.0	63.6	66	3.6	10	----	63.6	0.0	8	-8.0
M05	5	1	56.0	48.7	66	-7.3	10	----	48.7	0.0	8	-8.0
M06	6	1	55.0	49.8	66	-5.2	10	----	49.8	0.0	8	-8.0
M07	7	1	55.0	57.5	66	2.5	10	----	57.5	0.0	8	-8.0
M08	8	1	62.0	57.4	66	-4.6	10	----	57.4	0.0	8	-8.0
M09	9	1	53.0	54.6	66	1.6	10	----	54.6	0.0	8	-8.0
M10	10	1	55.0	59.6	66	4.6	10	----	59.6	0.0	8	-8.0
M11	11	1	55.0	56.2	66	1.2	10	----	56.2	0.0	8	-8.0
M12	12	1	59.0	60.1	66	1.1	10	----	60.1	0.0	8	-8.0
M13	13	1	57.0	64.9	66	7.9	10	----	64.9	0.0	8	-8.0
M14	14	1	56.0	63.9	66	7.9	10	----	63.9	0.0	8	-8.0
M15	15	1	60.0	67.6	66	7.6	10	Snd Lvl	67.6	0.0	8	-8.0
M16	16	1	54.0	66.8	66	12.8	10	Both	66.8	0.0	8	-8.0
M17	31	1	58.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
M18	32	1	65.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
M19	33	1	58.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
M20	34	1	58.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
M21	35	1	57.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
M22	36	1	53.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
M23	37	1	62.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
M24	38	1	60.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
M25	39	1	52.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
M26	40	1	54.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
M27	41	1	56.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0

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RESULTS: SOUND LEVELS MD4/MD235

M28	42	1	49.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
R01	43	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
R02	44	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
R03	45	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
R04	46	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
R05	48	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
R06	49	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
R07	50	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
R08	51	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
R09	52	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
R10	53	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
R11	54	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
R12	55	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
R13	56	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
R14	57	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
R15	58	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
R16	59	1	0.0	60.4	66	60.4	10	----	60.4	0.0	8	-8.0
R17	60	1	0.0	62.5	66	62.5	10	----	62.5	0.0	8	-8.0
R18	61	1	0.0	63.0	66	63.0	10	----	63.0	0.0	8	-8.0
R19	62	1	0.0	62.0	66	62.0	10	----	62.0	0.0	8	-8.0

Dwelling Units	# DUs	Noise Reduction		
		Min	Avg	Max
		dB	dB	dB
All Selected	44	0.0	0.0	0.0
All Impacted	2	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0

TNM Output file for BUILD_2030-AM – 4 LnBridge Option

RESULTS: SOUND LEVELS MD4/MD235

JMT 26 July 2009
Run Date:7/10/09 TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: MD4/MD235
RUN: Build 2030AM AREA3 4-Bridge
BARRIER DESIGN: INPUT HEIGHTS
ATMOSPHERICS: 68 deg F, 50% RH

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

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over existing Calculated	Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
M04	4	1	60.0	63.6	66	3.6	10	----	63.6	0.0	8	-8.0
M05	5	1	56.0	52.0	66	-4.0	10	----	52.0	0.0	8	-8.0
M06	6	1	55.0	53.8	66	-1.2	10	----	53.8	0.0	8	-8.0
M07	7	1	55.0	56.3	66	1.3	10	----	56.3	0.0	8	-8.0
M08	8	1	62.0	57.0	66	-5.0	10	----	57.0	0.0	8	-8.0
M09	9	1	53.0	56.9	66	3.9	10	----	56.9	0.0	8	-8.0
M10	10	1	55.0	59.4	66	4.4	10	----	59.4	0.0	8	-8.0
M11	11	1	55.0	58.9	66	3.9	10	----	58.9	0.0	8	-8.0
M12	12	1	59.0	62.6	66	3.6	10	----	62.6	0.0	8	-8.0
M13	13	1	57.0	59.7	66	2.7	10	----	59.7	0.0	8	-8.0
M14	14	1	56.0	62.2	66	6.2	10	----	62.2	0.0	8	-8.0
M15	15	1	60.0	67.6	66	7.6	10	Snd Lvl	67.6	0.0	8	-8.0
M16	16	1	54.0	66.8	66	12.8	10	Both	66.8	0.0	8	-8.0
M17	31	1	58.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
M18	32	1	65.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
M19	33	1	58.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
M20	34	1	58.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
M21	35	1	57.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
M22	36	1	53.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
M23	37	1	62.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
M24	38	1	60.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
M25	39	1	52.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
M26	40	1	54.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
M27	41	1	56.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0

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RESULTS: SOUND LEVELS MD4/MD235

M28	42	1	49.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
R01	43	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
R02	44	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
R03	45	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
R04	46	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
R05	48	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
R06	49	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
R07	50	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
R08	51	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
R09	52	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
R10	53	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
R11	54	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
R12	55	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
R13	56	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
R14	57	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
R15	58	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
R16	59	1	0.0	60.5	66	60.5	10	----	60.5	0.0	8	-8.0
R17	60	1	0.0	62.3	66	62.3	10	----	62.3	0.0	8	-8.0
R18	61	1	0.0	63.1	66	63.1	10	----	63.1	0.0	8	-8.0
R19	62	1	0.0	61.6	66	61.6	10	----	61.6	0.0	8	-8.0

Dwelling Units	# DUs	Noise Reduction		
		Min	Avg	Max
		dB	dB	dB
All Selected	44	0.0	0.0	0.0
All Impacted	2	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0

TNM Output file for BUILD_2030-PM – CFI Option

RESULTS: SOUND LEVELS — MD 4 Planning Study

JMT — 26 July 2009
Run Date: July 22, 2009 — TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: MD 4 Planning Study
RUN: 2030PM BUILD CFI
BARRIER DESIGN: INPUT HEIGHTS
ATMOSPHERICS: 68 deg F, 50% RH

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

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over existing Calculated	Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Noise Reduction Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
M24	21	1	60.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
M25	22	1	52.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
M26	23	1	54.0	61.4	66	7.4	10	----	61.4	0.0	8	-8.0
M27	24	1	56.0	64.1	66	8.1	10	----	64.1	0.0	8	-8.0
M28	25	1	49.0	53.3	66	4.3	10	----	53.3	0.0	8	-8.0
R01	30	1	0.0	72.2	66	72.2	10	Snd Lvl	72.2	0.0	8	-8.0
R02	31	1	0.0	71.9	66	71.9	10	Snd Lvl	71.9	0.0	8	-8.0
R05	33	1	0.0	63.2	66	63.2	10	----	63.2	0.0	8	-8.0

Dwelling Units	# DUs	Noise Reduction Min	Avg	Max
		dB	dB	dB
All Selected	8	0.0	0.0	0.0
All Impacted	2	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0

TNM Output file for BUILD_2030-PM – SPUI Option

RESULTS: SOUND LEVELS MD4

JMT 26 July 2009
Run Date: July 24, 2009 TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: MD4
RUN: BUILD PM - MD4-SPUI
BARRIER DESIGN: INPUT HEIGHTS
ATMOSPHERICS: 68 deg F, 50% RH

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

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over existing Calculated	Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Noise Reduction Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
M24	1	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
M25	2	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
M26	3	1	0.0	61.5	66	61.5	10	----	61.5	0.0	8	-8.0
M27	4	1	0.0	64.6	66	64.6	10	----	64.6	0.0	8	-8.0
M28	9	1	0.0	53.0	66	53.0	10	----	53.0	0.0	8	-8.0
R01	10	1	0.0	71.6	66	71.6	10	Snd Lvl	71.6	0.0	8	-8.0
R02	11	1	0.0	66.8	66	66.8	10	Snd Lvl	66.8	0.0	8	-8.0
R05	13	1	0.0	60.5	66	60.5	10	----	60.5	0.0	8	-8.0

Dwelling Units	# DUs	Noise Reduction Min	Avg	Max
		dB	dB	dB
All Selected	8	0.0	0.0	0.0
All Impacted	2	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0

TNM Output file for BUILD_2030-PM – Flyover Option

RESULTS: SOUND LEVELS MD4

JMT 26 July 2009
Run Date: July 22, 2009 TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: MD4
RUN: BUILD PM - MD4-FLYOVER
BARRIER DESIGN: INPUT HEIGHTS
ATMOSPHERICS: 68 deg F, 50% RH

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

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over existing Calculated	Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
M24	1	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
M25	2	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
M26	3	1	0.0	61.5	66	61.5	10	----	61.5	0.0	8	-8.0
M27	4	1	0.0	62.2	66	62.2	10	----	62.2	0.0	8	-8.0
M28	9	1	0.0	53.2	66	53.2	10	----	53.2	0.0	8	-8.0
R01	10	1	0.0	72.0	66	72.0	10	Snd Lvl	72.0	0.0	8	-8.0
R02	11	1	0.0	71.7	66	71.7	10	Snd Lvl	71.7	0.0	8	-8.0
R05	13	1	0.0	60.8	66	60.8	10	----	60.8	0.0	8	-8.0

Dwelling Units	# DUs	Noise Reduction Min	Avg	Max
		dB	dB	dB
All Selected	8	0.0	0.0	0.0
All Impacted	2	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0

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TNM Output file for BUILD_2030-PM – MD4 Option

RESULTS: SOUND LEVELS MD4/MD235

JMT 26 July 2009
Run Date:7/10/09 TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: MD4/MD235
RUN: Build 2030PM AREA2
BARRIER DESIGN: INPUT HEIGHTS
ATMOSPHERICS: 68 deg F, 50% RH

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

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over existing Calculated	Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
M04	17	1	60.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
M05	18	1	56.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
M06	19	1	55.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
M07	20	1	55.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
M08	21	1	62.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
M09	22	1	53.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
M10	23	1	55.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
M11	24	1	55.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
M12	25	1	59.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
M13	31	1	57.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
M14	32	1	56.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
M15	34	1	60.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
M16	35	1	54.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
M17	36	1	58.0	67.7	66	9.7	10	Snd Lvl	67.7	0.0	8	-8.0
M18	37	1	65.0	72.7	66	7.7	10	Snd Lvl	72.7	0.0	8	-8.0
M19	38	1	58.0	63.7	66	5.7	10	----	63.7	0.0	8	-8.0
M20	39	1	58.0	70.5	66	12.5	10	Both	70.5	0.0	8	-8.0
M21	40	1	57.0	69.6	66	12.6	10	Both	69.6	0.0	8	-8.0
M22	41	1	53.0	57.0	66	4.0	10	----	57.0	0.0	8	-8.0
M23	42	1	62.0	69.8	66	7.8	10	Snd Lvl	69.8	0.0	8	-8.0
M24	43	1	60.0	66.8	66	6.8	10	Snd Lvl	66.8	0.0	8	-8.0
M25	44	1	52.0	54.7	66	2.7	10	----	54.7	0.0	8	-8.0
M26	45	1	54.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
M27	46	1	56.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0

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RESULTS: SOUND LEVELS MD4/MD235

M28	48	1	49.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
R01	49	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
R02	50	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
R03	51	1	0.0	65.4	66	65.4	10	----	65.4	0.0	8	-8.0
R04	52	1	0.0	68.0	66	68.0	10	Snd Lvl	68.0	0.0	8	-8.0
R05	54	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
R06	55	1	0.0	57.2	66	57.2	10	----	57.2	0.0	8	-8.0
R07	56	1	0.0	57.8	66	57.8	10	----	57.8	0.0	8	-8.0
R08	57	1	0.0	71.1	66	71.1	10	Snd Lvl	71.1	0.0	8	-8.0
R09	58	1	0.0	62.3	66	62.3	10	----	62.3	0.0	8	-8.0
R10	59	1	0.0	56.0	66	56.0	10	----	56.0	0.0	8	-8.0
R11	60	1	0.0	69.5	66	69.5	10	Snd Lvl	69.5	0.0	8	-8.0
R12	61	1	0.0	63.2	66	63.2	10	----	63.2	0.0	8	-8.0
R13	62	1	0.0	59.5	66	59.5	10	----	59.5	0.0	8	-8.0
R14	63	1	0.0	60.7	66	60.7	10	----	60.7	0.0	8	-8.0
R15	64	1	0.0	65.2	66	65.2	10	----	65.2	0.0	8	-8.0
R16	65	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
R17	66	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
R18	67	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
R19	68	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0

Dwelling Units	# DUs	Noise Reduction		
		Min	Avg	Max
		dB	dB	dB
All Selected	44	0.0	0.0	0.0
All Impacted	9	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0

TNM Output file for BUILD_2030-PM – 2 LnBridge Option

RESULTS: SOUND LEVELS MD4/MD235

JMT 26 July 2009
Run Date:7/10/09 TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: MD4/MD235
RUN: Build 2030PM AREA3 2-Bridge
BARRIER DESIGN: INPUT HEIGHTS
ATMOSPHERICS: 68 deg F, 50% RH

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

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over existing Calculated	Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
M04	4	1	60.0	64.4	66	4.4	10	----	64.4	0.0	8	-8.0
M05	5	1	56.0	51.2	66	-4.8	10	----	51.2	0.0	8	-8.0
M06	6	1	55.0	52.2	66	-2.8	10	----	52.2	0.0	8	-8.0
M07	7	1	55.0	56.3	66	1.3	10	----	56.3	0.0	8	-8.0
M08	8	1	62.0	56.3	66	-5.7	10	----	56.3	0.0	8	-8.0
M09	9	1	53.0	56.8	66	3.8	10	----	56.8	0.0	8	-8.0
M10	10	1	55.0	58.9	66	3.9	10	----	58.9	0.0	8	-8.0
M11	11	1	55.0	57.7	66	2.7	10	----	57.7	0.0	8	-8.0
M12	12	1	59.0	62.3	66	3.3	10	----	62.3	0.0	8	-8.0
M13	13	1	57.0	63.9	66	6.9	10	----	63.9	0.0	8	-8.0
M14	14	1	56.0	63.6	66	7.6	10	----	63.6	0.0	8	-8.0
M15	15	1	60.0	69.3	66	9.3	10	Snd Lvl	69.3	0.0	8	-8.0
M16	16	1	54.0	66.6	66	12.6	10	Both	66.6	0.0	8	-8.0
M17	31	1	58.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
M18	32	1	65.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
M19	33	1	58.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
M20	34	1	58.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
M21	35	1	57.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
M22	36	1	53.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
M23	37	1	62.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
M24	38	1	60.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
M25	39	1	52.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
M26	40	1	54.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
M27	41	1	56.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0

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RESULTS: SOUND LEVELS MD4/MD235

M28	42	1	49.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
R01	43	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
R02	44	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
R03	45	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
R04	46	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
R05	48	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
R06	49	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
R07	50	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
R08	51	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
R09	52	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
R10	53	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
R11	54	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
R12	55	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
R13	56	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
R14	57	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
R15	58	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
R16	59	1	0.0	60.4	66	60.4	10	----	60.4	0.0	8	-8.0
R17	60	1	0.0	62.3	66	62.3	10	----	62.3	0.0	8	-8.0
R18	61	1	0.0	64.5	66	64.5	10	----	64.5	0.0	8	-8.0
R19	62	1	0.0	62.8	66	62.8	10	----	62.8	0.0	8	-8.0

Dwelling Units	# DUs	Noise Reduction		
		Min	Avg	Max
		dB	dB	dB
All Selected	44	0.0	0.0	0.0
All Impacted	2	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0

TNM Output file for BUILD_2030-PM – 4 LnBridge Option

RESULTS: SOUND LEVELS MD4/MD235

JMT 26 July 2009
Run Date:7/10/09 TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: MD4/MD235
RUN: Build 2030PM AREA3 4-Bridge
BARRIER DESIGN: INPUT HEIGHTS
ATMOSPHERICS: 68 deg F, 50% RH

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

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over existing Calculated	Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
M04	4	1	60.0	64.9	66	4.9	10	----	64.9	0.0	8	-8.0
M05	5	1	56.0	53.5	66	-2.5	10	----	53.5	0.0	8	-8.0
M06	6	1	55.0	55.4	66	0.4	10	----	55.4	0.0	8	-8.0
M07	7	1	55.0	55.9	66	0.9	10	----	55.9	0.0	8	-8.0
M08	8	1	62.0	56.8	66	-5.2	10	----	56.8	0.0	8	-8.0
M09	9	1	53.0	58.5	66	5.5	10	----	58.5	0.0	8	-8.0
M10	10	1	55.0	59.2	66	4.2	10	----	59.2	0.0	8	-8.0
M11	11	1	55.0	60.3	66	5.3	10	----	60.3	0.0	8	-8.0
M12	12	1	59.0	63.7	66	4.7	10	----	63.7	0.0	8	-8.0
M13	13	1	57.0	60.0	66	3.0	10	----	60.0	0.0	8	-8.0
M14	14	1	56.0	62.2	66	6.2	10	----	62.2	0.0	8	-8.0
M15	15	1	60.0	69.3	66	9.3	10	Snd Lvl	69.3	0.0	8	-8.0
M16	16	1	54.0	66.6	66	12.6	10	Both	66.6	0.0	8	-8.0
M17	31	1	58.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
M18	32	1	65.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
M19	33	1	58.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
M20	34	1	58.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
M21	35	1	57.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
M22	36	1	53.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
M23	37	1	62.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
M24	38	1	60.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
M25	39	1	52.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
M26	40	1	54.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
M27	41	1	56.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0

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RESULTS: SOUND LEVELS MD4/MD235

M28	42	1	49.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
R01	43	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
R02	44	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
R03	45	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
R04	46	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
R05	48	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
R06	49	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
R07	50	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
R08	51	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
R09	52	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
R10	53	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
R11	54	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
R12	55	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
R13	56	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
R14	57	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
R15	58	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
R16	59	1	0.0	60.4	66	60.4	10	----	60.4	0.0	8	-8.0
R17	60	1	0.0	62.3	66	62.3	10	----	62.3	0.0	8	-8.0
R18	61	1	0.0	64.5	66	64.5	10	----	64.5	0.0	8	-8.0
R19	62	1	0.0	62.6	66	62.6	10	----	62.6	0.0	8	-8.0

Dwelling Units	# DUs	Noise Reduction		
		Min	Avg	Max
		dB	dB	dB
All Selected	44	0.0	0.0	0.0
All Impacted	2	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0

REFERENCE FILES

Appendix F

http:\\projectcenter.jmt.com\01\01-0456-029\ProjectFiles\00-JMT\Report\Final
MD4Final_Appendix F 08-19-2009.doc

http:\\projectcenter.jmt.com\01\01-0456-029\ProjectFiles\00-JMT\TNM
Noise Analysis.xls

Q:\SMD\010456_029_MD 4 Noise Study\Working Data\TNM Runs
2009 EWC
2030 No Build
2030 Build

Q:\SMD\010456_029_MD 4 Noise Study\Working Data\Report\images for report\appx F

MD 4 (PATUXENT BEACH ROAD)
PROJECT PLANNING STUDY

Calvert County and St. Mary's County, Maryland

NOISE ANALYSIS
TECHNICAL REPORT

FINAL
AUGUST 19, 2009

Appendix G
SOUND BARRIER DESIGN

Submitted To

MARYLAND STATE HIGHWAY ADMINISTRATION
OFFICE OF PLANNING AND PRELIMINARY ENGINEERING

Prepared By

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INTRODUCTION

General

This Appendix documents the details of the sound barrier options. All noise levels listed in this Appendix, except for the TNM Output Tables, are rounded[1] to the nearest whole decibel. All Noise Levels are reported in units of A-weighted Decibels [dB(A)], unless otherwise specified.

TNM 2.5 Model

TNM Version 2.5 was released on April 14, 2004 and is required for use in all new traffic noise analyses for Federal-aid highway projects that begin six months or later from the above mentioned date. TNM 2.5 essentially eliminates the vehicle emission level over-prediction from previous versions and corrects an anomaly related to diffraction points. The TNM Models used for the final TNM 2.5 Sound Barrier Designs are listed below. The barrier Input Heights and Perturbations in each design was set in an attempt to provide a smooth top of wall profile.

NSA-04: *Build Barrier_2030PM_MD4, Analysis: NSA04*
NSA-06: *Build Barrier_2030AM_MD4, Analysis: NSA06 M21gapR11*
NSA-07: *Build Barrier_2030PM_4Bridge, Analysis: NSA07*
NSA-09: *Build Barrier_2030AM_MD4, Analysis: NSA09*
CFI Option: *Build Barrier_2030PM_CFI, Analysis: CFI-NSA14*
Flyover Option: *Build Barrier_2030PM_Flyover, Analysis: Flyover-NSA14*
SPUI Option: *Build Barrier_2030PM_SPUI, Analysis: SPUI-NSA14*

TNM Modeled Receptor Sites

Although receptors are generally located at specific residences, receptors should not be confused with residences. Modeled receptors are data points and its purpose is to do the following:

- Optimize the Barrier Design to meet Design Goals
- Develop the Impact Contour
- Develop the Insertion Loss Contours

Output Data

Receptors are generally modeled throughout the Study Area to generate the following data:

- *Modeled Noise Level* – The Calculated Noise Level [Leq(h)] generated by the TNM model for the "No Barrier" condition.
- *Insertion Loss* – The amount of Noise Reduction [dB(A)] provided by the sound barrier.
- *"With-Barrier" Modeled Noise Level* – The Calculated Noise Level [Leq(h)] generated by the TNM Model for the "With-Barrier" condition.

Contours

By interpolating between data points (TNM Modeled Receptor Sites), the following noise level contours were generated:

[1] If the remainder beyond the last digit was exactly 5, then the last digit was rounded up.

- Impact Contour [66 dB(A)]
- Insertion Loss Contours [3, 5 or 7 dB(A)]

Using the contours as a guide, the Sound Barrier Analysis Data is reviewed with the topography and then the number of Impacted and Benefited Residences can be calculated (See Section 3 of report for further details).

Note: A modeled receptor represents a single point on the property. The contours provide an overall view of noise levels throughout the property. The noise contours approximate existing and proposed conditions based on a single point in time. Actual noise contours fluctuate constantly.

Critical Sensitive Receptors

Critical Sensitive (CS) Receptors are typically defined as first-row, ground level sites, where worst-case noise impacts are found. Only critical sensitive receptors should typically be used to govern barrier design. Sound attenuation at second-row receptors or other locations not directly adjacent to the proposed barrier is considered a secondary benefit, but should not govern barrier design.

Background Noise

The Sound Barrier is only designed to reduce Highway Traffic Noise Levels. However, the study area is also subjected to Background Noise. Background Noise is comprised of any Non-Highway Noise such as rustling leaves, children playing, local traffic, dogs barking, airplane fly-overs, lawn-mowing, cicadas, etc. To check the background noise, three field measurements were taken on June 30, 2009 at a distance between 1200' to 1300' from the MD 4 roadway. Based on visual readings of the noise meter display and the L_{90} values, it was determined that a 43 dB(A) Background Noise Level would be more appropriate than the 20-min Leq of 45 to 47 dB(A).

The noise measurement data is located in Appendix A and location map is located in Section 5 Map 2a of report.

The Background Noise Level reduces the effectiveness of the Sound Barrier. For example, if a Receptor is subjected to 66 dB(A) Highway Traffic Noise and TNM calculates that a particular barrier design will reduce the level by 10 dB(A), then the "With-Barrier" Noise Level would be 56 dB(A). However, if the Background Noise Level is 50 dB(A), then the actual "With-Barrier" Noise Level would be 57 dB(A), calculated using decibel addition. Thus, the insertion loss would actually be 9 dB(A), not 10 dB(A). For this reason, a Background Noise Level has been applied to the TNM Output in for all TNM runs so that the barrier benefits would not be unrealistically overstated.

When computing the total noise level, L_{tot}, the TNM calculated noise levels plus backgound noise, it must be calculated logarithmically because it is an energy average. The formula for calculating L_{tot} is listed below:

$$Ltot(i) = 10 \log \left[\sum_{i=1}^{N} 10^{L(i)/10} \right] \qquad \text{Equation G.1}$$

N = Total number of noise sources.
i = Individual noise source.
L(i) = Sound level in dB(A) for any individual noise source.

Total Sound Level Calculation

The Total Sound Level Calculation totals the “With-Barrier” modeled noise levels with the background noise level to generate an adjusted “With-Barrier” noise level using Equation G.1.

Example G.1:

N = 2

$$\begin{aligned}
Ltot(i) &= 10\log\left[\sum_{i=1}^{N} 10^{L(i)/10}\right] \\
&= 10\log\left[\left(10^{L(1)/10} + 10^{Leq(2)/10} + \ldots + 10^{Leq(N-1)/10} + 10^{Leq(N)/10}\right)\right] \\
&= 10\log\left[\left(10^{56.3/10} + 10^{50.0/10}\right)\right] \\
&= 10\log\left[\left(10^{5.63} + 10^{5.00}\right)\right] \\
&= 10\log\left[\left(526579 .518802\right)\right] \\
&= 10\left(5.721\right) \\
&= 57.21
\end{aligned}$$

$$Leq(5-\min) = 57$$

SOUND BARRIER DESIGN – NSA-04

Sound Barrier Design Goal Compliance

One of the 2030 build barrier option is located in NSA 04 of the MD 4 study area. The barrier design selected is *NB-NSA04* within TNM Run *Build Barrier_2030PM_MD4*. *NB-NSA04* was evaluated according to the SHA Design Goals[2]. TABLE G.1 summarizes NB-*NSA04* compliance to each goal. Design Goals 1, 2, 3 and 5 are primarily targeted at critical sensitive receptors. Design Goal 4 deals more with the physical aspects of the sound barrier. All five Design Goals were achieved.

TABLE G.1 Sound Barrier Design Goal Compliance – NSA 04

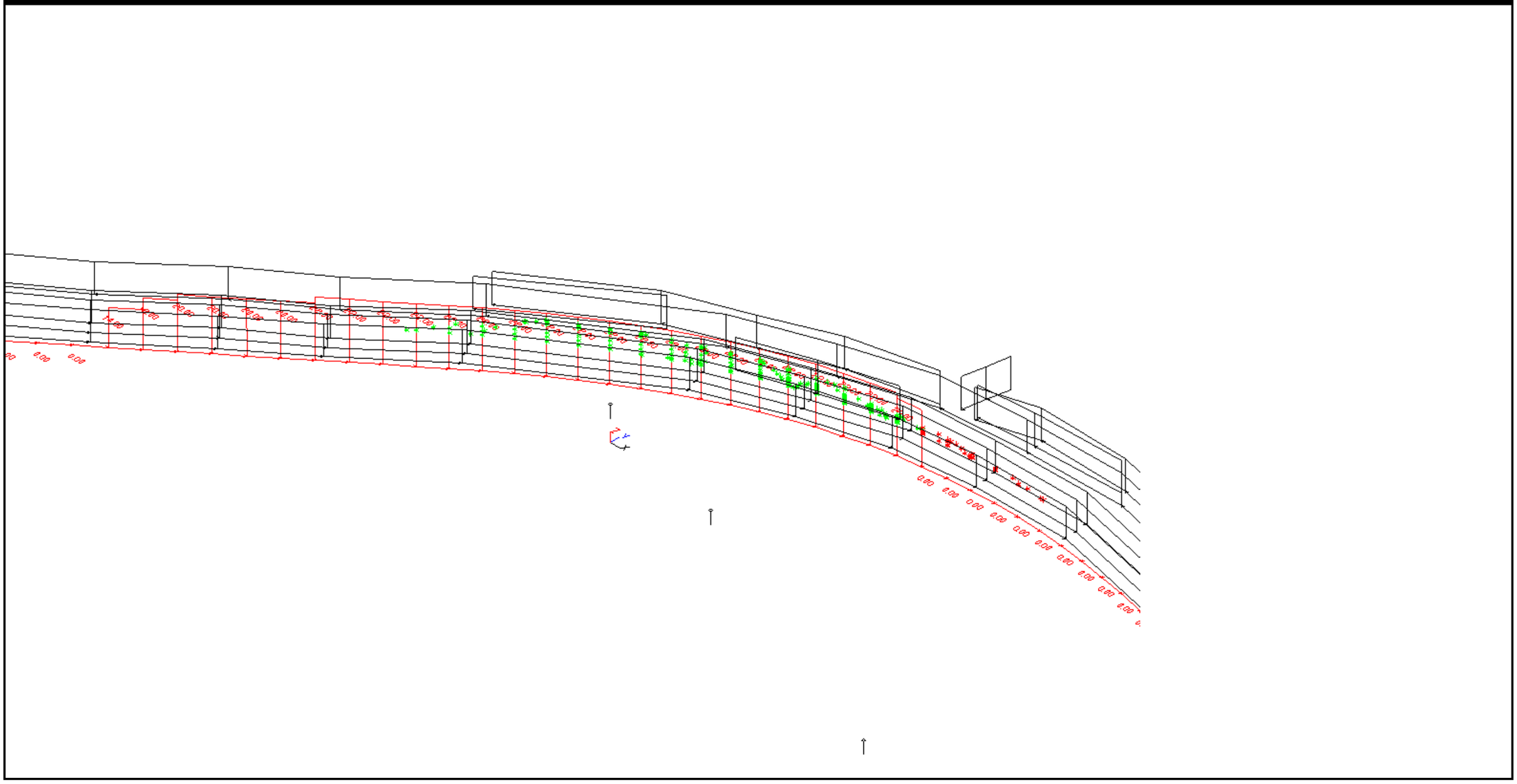
Design Goal	Meets Goal	Comments
1. Achieve 10 dB(A) insertion loss (noise reduction) at all critical sensitive receptors. If 10 dB(A) insertion loss is not practical, 7-9 dB(A) insertion loss is considered acceptable.	Yes	One (1) critical sensitive receptors received 10 dB(A) insertion loss.
2. Achieve "With-Barrier" Modeled Noise Levels below the SHA Noise Impact Threshold (NIT) level of 66 dB(A) at all critical sensitive receptors.	Yes	All "With-Barrier" Modeled Noise Levels are below the SHA Noise Impact Threshold.
3. Achieve a certain degree of uniformity [within approximately 3 dB(A)] of "With-Barrier" Modeled Noise Levels throughout the project area at critical sensitive receptors. If the "With-Barrier" Modeled Noise Levels for any of the critical sensitive receptors are outside of the 3 dB(A) uniformity range, then it is considered acceptable if those levels are below the uniformity range.	Yes	The degree of uniformity for the "With-Barrier" Modeled Noise Levels was within 2 dB(A) [Range: 56 to 58 dB(A)] for all critical sensitive receptors.
4. The optimum barrier height should not exceed 24 feet. When necessary to achieve design and performance goals, a maximum barrier height of 34 feet is acceptable. Sound barriers in excess of 34 feet are only acceptable in short segments to account for terrain changes (i.e. swale crossing).	Yes	The maximum barrier height as optimized in TNM is 22 feet.
5. Noise barriers should break the line-of-sight between critical sensitive receptors (5 feet above ground) and the exhaust stack of a heavy-duty truck (typically 12 feet above pavement level).	Yes	The sound barrier breaks the Line-of-Sight at all critical sensitive receptors.

[2] Maryland Department of Transportation, State Highway Administration, Office of Environmental Design, Noise Abatement Team. 2000. Appendix C – Technical Design and Performance Criteria for Highway Sound Barrier Projects. Guidelines and Procedures for Program Administration and Technical Analysis and Reporting: C-1 – C-2.

Line of Sight Check

FIGURE G.1 below illustrates the Line-of-Sight Barrier Analysis performed in TNM. This shows that the line of sight from the top of truck stacks to all of the receivers is being blocked by the barrier.

FIGURE G.1 Line of Sight Barrier Analysis – NSA 04



Sound Barrier Analysis Data

TABLE G.2 documents the Sound Barrier Analysis Data for *Build Barrier_2030PM_MD4*. This table was used to develop the Sound Barrier Analysis and Modeled Noise Level Mapping.

TABLE G.2 Sound Barrier Analysis Summary – NSA 04

Modeled Receptor Number[1]	"No Barrier" Modeled Noise Level [2]	"With-Barrier" Modeled Noise Level [3]	"With-Barrier" Noise Level + Background Noise (Rounded)	Insertion Loss[4]
M-24	67	57	57	10
R-06	57	54	55	2
R-07	58	58	58	0
Total Number of Impacted and Benefited Residences (receiving a 3 dB(A) or greater benefit)				**1**
Total Number of Non-Impacted and Benefited Residences (receiving a 5 dB(A) or greater benefit)				**0**
Total Number of Benefited Residences				**1**

LEGEND

Critical Sensitive Receptor

1. *The Receptor Number represents the TNM Modeled Receptor Site and corresponds to the Receiver Name in the TNM Model.*
2. *The "No-Barrier" Modeled Noise Level is the Noise Level (Leq[h]) generated by TNM Run 2030 BuildPM_MD4, for the "No-Barrier" condition.*
3. *The "With-Barrier" Modeled Noise Level is the Noise Level (Leq[h]) generated by the NB-NSA04 barrier within TNM Run Build Barrier_2030PM_MD4, for the "With Barrier" condition.*
4. *The Insertion Loss is the amount of Noise Reduction [dB(A)] from "No Barrier" 2030 Build Noise Level to "With Barrier" Noise Level + Background Noise (TNM Build Barrier_2030PM_MD4).*

TABLE G.3 below summarizes the Sound Barrier Description for *NB-NSA 04* within TNM Run *Build Barrier_2030PM_MD4.*

TABLE G.3 Sound Barrier Description – NSA 04

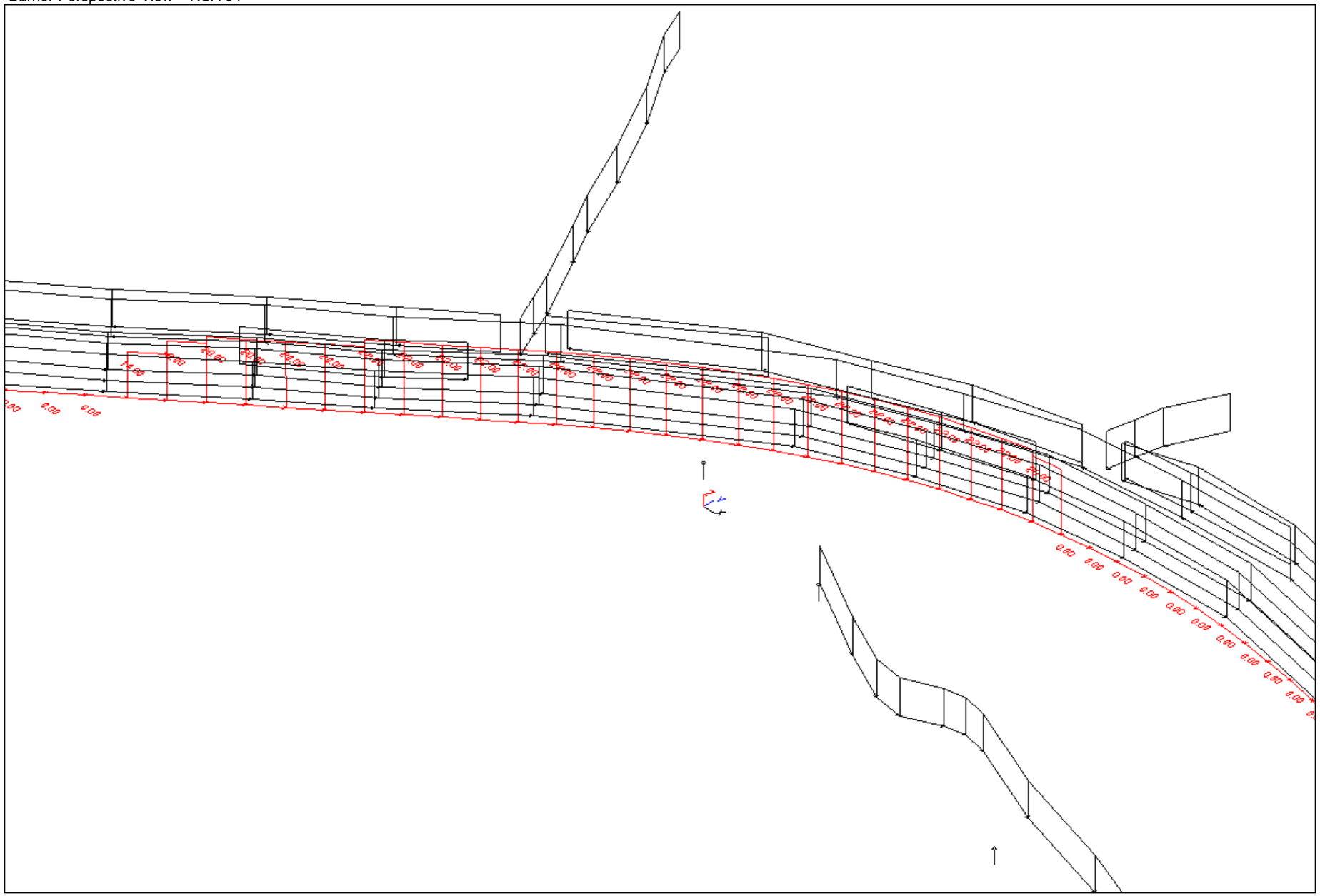
	NSA 04
Area (square feet) (From TNM)	29,047
Length (feet)	1,297
Average Height (feet)	21.15
Minimum Height (feet)	14.00
Maximum Height (feet)	22.00

TNM Tables

Reproductions of the TNM Tables pertinent to this Appendix begin on the following pages:

TNM Table/Figure	TNM Run
Barrier Perspective View – NSA 04	*Build Barrier_2030PM_MD4*
Barrier Description – NSA 04	*Build Barrier_2030PM_MD4*
Barrier-Segment Description – NSA 04	*Build Barrier_2030PM_MD4*
Sound Levels – NSA 04	*Build Barrier_2030PM_MD4*

Barrier Perspective View – NSA 04



Barrier Description – NSA 04

RESULTS: BARRIER DESCRIPTIONS **MD4/MD235**

JMT **27 July 2009**
Run Date:7/25/09 **TNM 2.5**

RESULTS: BARRIER DESCRIPTIONS
PROJECT/CONTRACT: **MD4/MD235**
RUN: **Build Barrier 2030PM AREA2**
BARRIER DESIGN: **INPUT HEIGHTS**

Barriers

Name	Type	Heights along Barrier			Length	If Wall	If Berm			Cost
		Min	Avg	Max		Area	Volume	Top Width	Run:Rise	
		ft	ft	ft	ft	sq ft	cu yd	ft	ft:ft	$
NB Wall 1	W	20.00	20.00	20.00	3142	62849				0
									Total Cost:	0

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Barrier-Segment Description – NSA 04

RESULTS: BARRIER-SEGMENT DESCRIPTIONS MD4/MD235

JMT 27 July 2009
Run Date:7/25/09 TNM 2.5

RESULTS: BARRIER-SEGMENT DESCRIPTIONS
PROJECT/CONTRACT: MD4/MD235
RUN: Build Barrier 2030PM AREA2
BARRIER DESIGN: INPUT HEIGHTS

Barriers		Segments										
Name	Type	Name	No.	Heights First Point	Average	Second Point	Length	If Wall Area	On Struc?	Important Reflections?	If Berm Volume	Cost
				ft	ft	ft	ft	sq ft			cu yd	$
NB Wall 1	W	BBNB1000	96	20.00	20.00	20.00	50	996				0
		BBNB1001	98	20.00	20.00	20.00	50	998				0
		BBNB1002	99	20.00	20.00	20.00	50	996				0
		BBNB1003	100	20.00	20.00	20.00	50	998				0
		BBNB1004	101	20.00	20.00	20.00	50	999				0
		BBNB1005	102	20.00	20.00	20.00	50	997				0
		BBNB1006	103	20.00	20.00	20.00	50	996				0
		BBNB1007	104	20.00	20.00	20.00	50	996				0
		BBNB1008	105	20.00	20.00	20.00	50	999				0
		BBNB1009	106	20.00	20.00	20.00	50	997				0
		BBNB1010	107	20.00	20.00	20.00	50	998				0
		BBNB1011	108	20.00	20.00	20.00	50	998				0
		BBNB1012	109	20.00	20.00	20.00	50	996				0
		BBNB1013	110	20.00	20.00	20.00	50	997				0
		BBNB1014	111	20.00	20.00	20.00	50	999				0
		BBNB1015	112	20.00	20.00	20.00	50	998				0
		BBNB1016	113	20.00	20.00	20.00	50	996				0
		BBNB1017	114	20.00	20.00	20.00	50	997				0
		BBNB1018	115	20.00	20.00	20.00	50	998				0
		BBNB1019	116	20.00	20.00	20.00	50	997				0
		BBNB1020	117	20.00	20.00	20.00	50	999				0
		BBNB1021	118	20.00	20.00	20.00	50	996				0
		BBNB1022	119	20.00	20.00	20.00	50	999				0
		BBNB1023	120	20.00	20.00	20.00	50	996				0
		BBNB1024	121	20.00	20.00	20.00	50	998				0
		BBNB1025	122	20.00	20.00	20.00	50	997				0

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RESULTS: BARRIER-SEGMENT DESCRIPTIONS MD4/MD235

		BBNB1026	123	20.00	20.00	20.00	50	999				0
		BBNB1027	124	20.00	20.00	20.00	50	995				0
		BBNB1028	125	20.00	20.00	20.00	50	998				0
		BBNB1029	126	20.00	20.00	20.00	50	997				0
		BBNB1030	127	20.00	20.00	20.00	50	997				0
		BBNB1031	128	20.00	20.00	20.00	50	998				0
		BBNB1032	129	20.00	20.00	20.00	50	997				0
		BBNB1033	130	20.00	20.00	20.00	50	997				0
		BBNB1034	131	20.00	20.00	20.00	50	997				0
		BBNB1035	132	20.00	20.00	20.00	50	998				0
		BBNB1036	133	20.00	20.00	20.00	50	999				0
		BBNB1037	134	20.00	20.00	20.00	50	994				0
		BBNB1038	135	20.00	20.00	20.00	50	999				0
		BBNB1039	136	20.00	20.00	20.00	50	996				0
		BBNB1040	137	20.00	20.00	20.00	50	998				0
		BBNB1041	138	20.00	20.00	20.00	50	998				0
		BBNB1042	139	20.00	20.00	20.00	50	998				0
		BBNB1043	140	20.00	20.00	20.00	50	997				0
		BBNB1044	141	20.00	20.00	20.00	50	995				0
		BBNB1045	142	20.00	20.00	20.00	50	997				0
		BBNB1046	143	20.00	20.00	20.00	50	1001				0
		BBNB1047	144	20.00	20.00	20.00	50	995				0
		BBNB1048	145	20.00	20.00	20.00	50	998				0
		BBNB1049	146	20.00	20.00	20.00	50	998				0
		BBNB1050	147	20.00	20.00	20.00	50	997				0
		BBNB1051	148	20.00	20.00	20.00	50	997				0
		BBNB1052	149	20.00	20.00	20.00	50	997				0
		BBNB1053	150	20.00	20.00	20.00	50	997				0
		BBNB1054	151	20.00	20.00	20.00	50	999				0
		BBNB1055	152	20.00	20.00	20.00	50	996				0
		BBNB1056	153	20.00	20.00	20.00	50	1001				0
		BBNB1057	154	20.00	20.00	20.00	50	1000				0
		BBNB1058	155	20.00	20.00	20.00	50	1001				0
		BBNB1059	156	20.00	20.00	20.00	50	998				0
		BBNB1060	157	20.00	20.00	20.00	50	1001				0
		BBNB1061	158	20.00	20.00	20.00	50	1000				0
		BBNB1062	159	20.00	20.00	20.00	50	1001				0

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Sound Levels – NSA 04

RESULTS: SOUND LEVELS MD4/MD235

JMT 27 July 2009
Run Date:7/25/09 TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: MD4/MD235
RUN: Build Barrier 2030PM AREA2
BARRIER DESIGN: NB NSA04
ATMOSPHERICS: 68 deg F, 50% RH

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

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over existing Calculated	Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Noise Reduction Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
M24	43	1	60.0	66.6	66	6.6	10	Snd Lvl	57.2	9.4	8	1.4
M26	45	1	54.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
R06	55	1	0.0	56.9	66	56.9	10	----	54.2	2.7	8	-5.3
R07	56	1	0.0	57.9	66	57.9	10	----	57.7	0.2	8	-7.8

Dwelling Units	# DUs	Noise Reduction Min	Avg	Max
		dB	dB	dB
All Selected	4	0.0	3.1	9.4
All Impacted	1	9.4	9.4	9.4
All that meet NR Goal	1	9.4	9.4	9.4

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SOUND BARRIER DESIGN – NSA-06

Sound Barrier Design Goal Compliance

One of the 2030 build barrier option is located in NSA 06 of the MD 4 study area. The barrier design selected is *SB-NSA06 M21gapR11* within TNM Run *Build Barrier_2030AM_MD4*. *SB-NSA06 M21gapR11* was evaluated according to the SHA Design Goals[3]. TABLE G.4 summarizes *SB-NSA06 M21gapR11* compliance to each goal. Design Goals 1, 2, 3 and 5 are primarily targeted at critical sensitive receptors. Design Goal 4 deals more with the physical aspects of the sound barrier. All five Design Goals were achieved.

TABLE G.4 Sound Barrier Design Goal Compliance – NSA 06

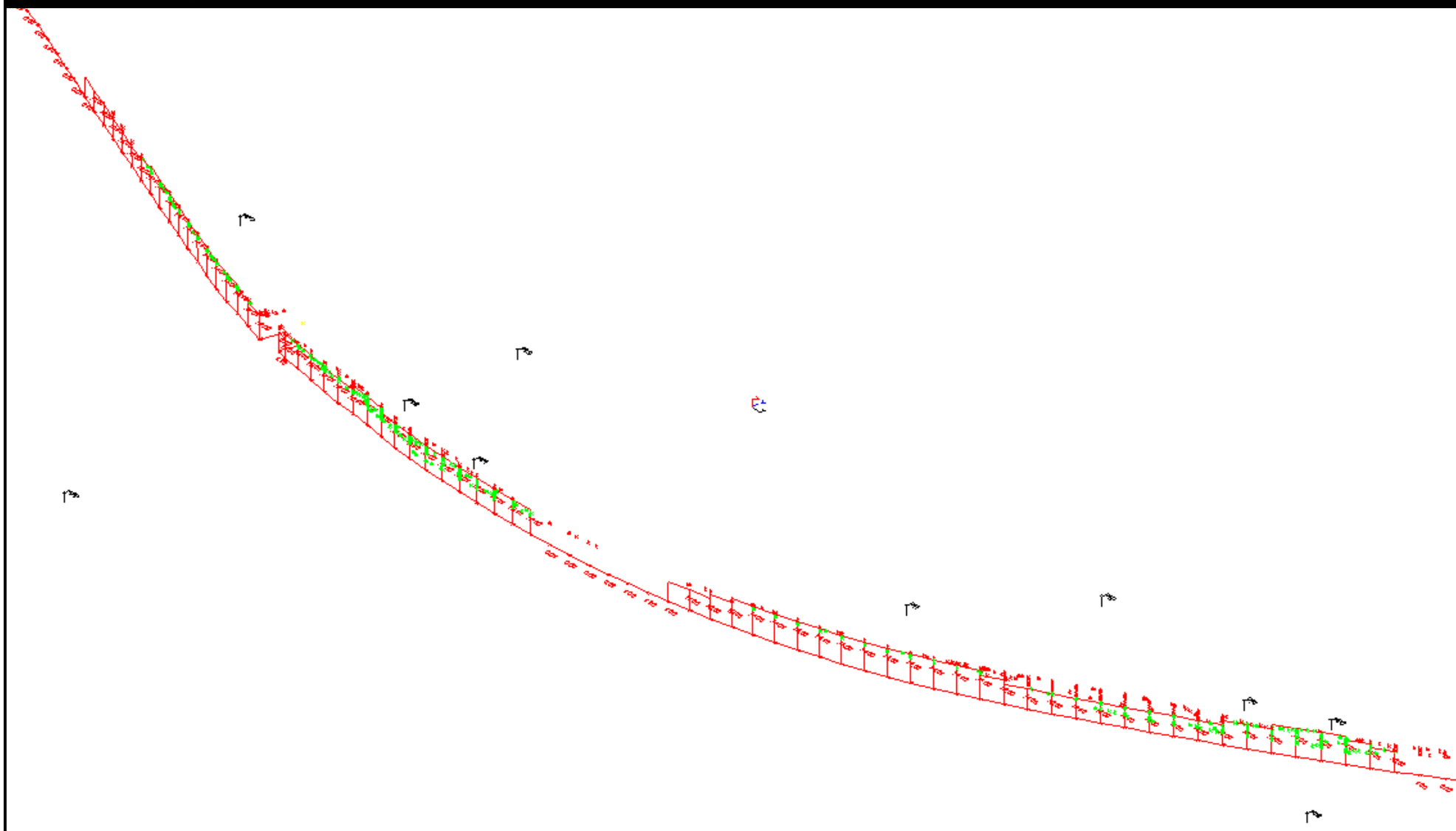
Design Goal	Meets Goal	Comments
1. Achieve 10 dB(A) insertion loss (noise reduction) at all critical sensitive receptors. If 10 dB(A) insertion loss is not practical, 7-9 dB(A) insertion loss is considered acceptable.	Yes	Five (5) critical sensitive receptors received 10 dB(A) insertion loss.
2. Achieve "With-Barrier" Modeled Noise Levels below the SHA Noise Impact Threshold (NIT) level of 66 dB(A) at all critical sensitive receptors.	Yes	All "With-Barrier" Modeled Noise Levels are below the SHA Noise Impact Threshold.
3. Achieve a certain degree of uniformity [within approximately 3 dB(A)] of "With-Barrier" Modeled Noise Levels throughout the project area at critical sensitive receptors. If the "With-Barrier" Modeled Noise Levels for any of the critical sensitive receptors are outside of the 3 dB(A) uniformity range, then it is considered acceptable if those levels are below the uniformity range.	Yes	The degree of uniformity for the "With-Barrier" Modeled Noise Levels was within 2 dB(A) [Range: 56 to 58 dB(A)] for all critical sensitive receptors.
4. The optimum barrier height should not exceed 24 feet. When necessary to achieve design and performance goals, a maximum barrier height of 34 feet is acceptable. Sound barriers in excess of 34 feet are only acceptable in short segments to account for terrain changes (i.e. swale crossing).	Yes	The maximum barrier height as optimized in TNM is 14 feet.
5. Noise barriers should break the line-of-sight between critical sensitive receptors (5 feet above ground) and the exhaust stack of a heavy-duty truck (typically 12 feet above pavement level).	Yes	The sound barrier breaks the Line-of-Sight at all critical sensitive receptors.

[3] Maryland Department of Transportation, State Highway Administration, Office of Environmental Design, Noise Abatement Team. 2000. Appendix C – Technical Design and Performance Criteria for Highway Sound Barrier Projects. Guidelines and Procedures for Program Administration and Technical Analysis and Reporting: C-1 – C-2.

Line of Sight Check

FIGURE G.2 below illustrates the Line-of-Sight Barrier Analysis performed in TNM. This shows that the line of sight from the top of truck stacks to all of the receivers is being blocked by the barrier.

FIGURE G.2 Line of Sight Barrier Analysis – NSA 06



Sound Barrier Analysis Data

TABLE G.5 documents the Sound Barrier Analysis Data for *Build Barrier_2030AM_MD4*. This table was used to develop the Sound Barrier Analysis and Modeled Noise Level Mapping.

TABLE G.5 Sound Barrier Analysis Summary – NSA 06

Modeled Receptor Number[1]	"No Barrier" Modeled Noise Level [2]	"With-Barrier" Modeled Noise Level [3]	"With-Barrier" Noise Level + Background Noise (Rounded)	Insertion Loss[4]
M-17	68	68	68	0
M-18	76	76	76	0
M-20	71	61	61	10
M-21	70	60	60	10
M-23 [5]	70	60	60	10
R-03	65	64	64	1
R-04	68	68	68	0
R-08	71	61	61	10
R-09	62	58	58	4
R-10	56	53	53	3
R-11	70	60	60	10
R-12	63	59	59	4
R-13	60	58	58	2
R-14	61	60	60	1
R-15	65	65	65	0
Total Number of Impacted and Benefited Residences (receiving a 3 dB(A) or greater benefit)				**14**
Total Number of Non-Impacted and Benefited Residences (receiving a 5 dB(A) or greater benefit)				**0**
Total Number of Benefited Residences				**14**

LEGEND

Critical Sensitive Receptor

1. *The Receptor Number represents the TNM Modeled Receptor Site and corresponds to the Receiver Name in the TNM Model.*
2. *The "No-Barrier" Modeled Noise Level is the Noise Level (Leq[h]) generated by TNM Run 2030 BuildAM_MD4, for the "No-Barrier" condition.*
3. *The "With-Barrier" Modeled Noise Level is the Noise Level (Leq[h]) generated by the SB-NSA06 M21gapR11within TNM Run Build Barrier_2030AM_MD4, for the "With Barrier" condition.*
4. *The Insertion Loss is the amount of Noise Reduction [dB(A)] from "No Barrier" 2030 Build Noise Level to "With Barrier" Noise Level + Background Noise (TNM Build Barrier_2030AM_MD4).*
5. *This receptor represents Patuxent Presbyterian Chruch and counts as 10 equivalent cost per residence.*

TABLE G.6 below summarizes the Sound Barrier Description for *SB-NSA06 M21gapR11* within TNM Run *Build Barrier_2030AM_MD4.*

TABLE G.6 Sound Barrier Description – NSA 06

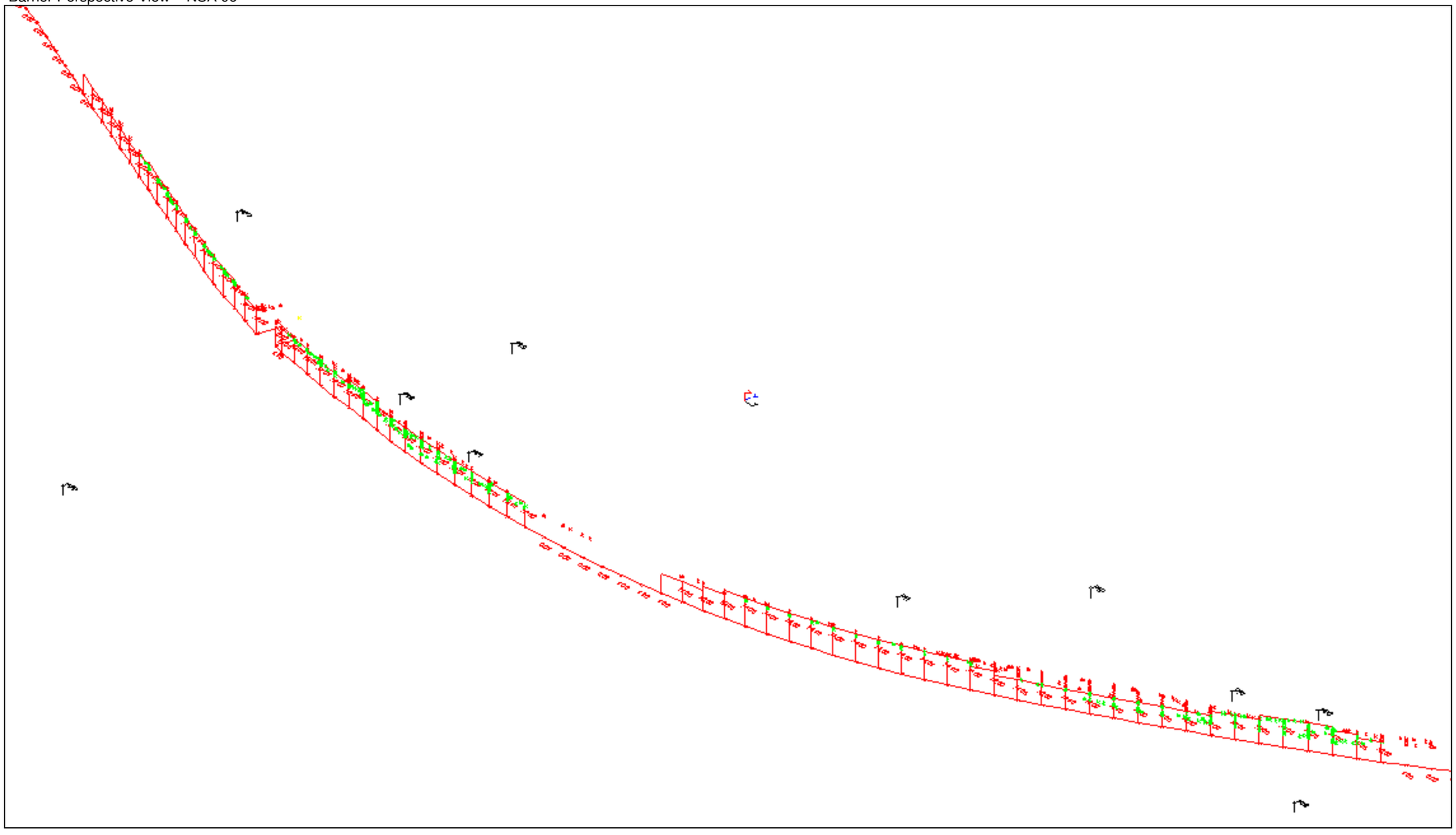
	NSA 06
Area (square feet) (From TNM)	43,823
Length (feet)	3,258
Average Height (feet)	12.20
Minimum Height (feet)	10.00
Maximum Height (feet)	14.00

TNM Tables

Reproductions of the TNM Tables pertinent to this Appendix begin on the following pages:

TNM Table/Figure	TNM Run
Barrier Perspective View – NSA 06	*Build Barrier_2030AM_MD4*
Barrier Description – NSA 06	*Build Barrier_2030AM_MD4*
Barrier-Segment Description – NSA 06	*Build Barrier_2030AM_MD4*
Sound Levels – NSA 06	*Build Barrier_2030AM_MD4*

Barrier Perspective View – NSA 06



Barrier Description – NSA 06

RESULTS: BARRIER DESCRIPTIONS **MD4/MD235**

JMT **27 July 2009**
Run Date:7/25/09 **TNM 2.5**

RESULTS: BARRIER DESCRIPTIONS
PROJECT/CONTRACT: **MD4/MD235**
RUN: **Build Barrier 2030AM AREA2**
BARRIER DESIGN: **INPUT HEIGHTS**

Barriers

Name	Type	Heights along Barrier			Length	If Wall	If Berm			Cost
		Min	Avg	Max		Area	Volume	Top Width	Run:Rise	
		ft	ft	ft	ft	sq ft	cu yd	ft	ft:ft	$
SB Wall 1	W	20.00	20.00	20.00	6217	124339				0
SB Wall 2	W	20.00	20.00	20.00	1541	30811				0
									Total Cost:	0

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Barrier-Segment Description – NSA 06

RESULTS: BARRIER-SEGMENT DESCRIPTIONS MD4/MD235

JMT 27 July 2009
Run Date:7/25/09 TNM 2.5

RESULTS: BARRIER-SEGMENT DESCRIPTIONS
PROJECT/CONTRACT: MD4/MD235
RUN: Build Barrier 2030AM AREA2
BARRIER DESIGN: INPUT HEIGHTS

Barriers		Segments										
Name	Type	Name	No.	Heights First Point	Average	Second Point	Length	If Wall Area	On Struc?	Important Reflections?	If Berm Volume	Cost
				ft	ft	ft	ft	sq ft			cu yd	$
SB Wall 1	W	BBSB4	96	20.00	20.00	20.00	50	996				0
		BBSB1000	98	20.00	20.00	20.00	51	1014				0
		BBSB1001	99	20.00	20.00	20.00	51	1016				0
		BBSB1002	100	20.00	20.00	20.00	51	1013				0
		BBSB1003	101	20.00	20.00	20.00	51	1013				0
		BBSB1004	102	20.00	20.00	20.00	51	1015				0
		BBSB1005	103	20.00	20.00	20.00	50	1007				0
		BBSB1006	104	20.00	20.00	20.00	50	1001				0
		BBSB1007	105	20.00	20.00	20.00	50	999				0
		BBSB1008	106	20.00	20.00	20.00	50	1000				0
		BBSB1009	107	20.00	20.00	20.00	50	1001				0
		BBSB1010	108	20.00	20.00	20.00	50	999				0
		BBSB1011	109	20.00	20.00	20.00	50	1006				0
		BBSB1012	110	20.00	20.00	20.00	50	1006				0
		BBSB1013	111	20.00	20.00	20.00	50	1007				0
		BBSB1014	112	20.00	20.00	20.00	50	1006				0
		BBSB1015	113	20.00	20.00	20.00	50	1004				0
		BBSB1016	114	20.00	20.00	20.00	50	1008				0
		BBSB1017	115	20.00	20.00	20.00	50	1004				0
		BBSB1018	116	20.00	20.00	20.00	50	1008				0
		BBSB1019	117	20.00	20.00	20.00	50	1006				0
		BBSB1020	118	20.00	20.00	20.00	50	1007				0
		BBSB1021	119	20.00	20.00	20.00	50	1005				0
		BBSB1022	120	20.00	20.00	20.00	50	1007				0
		BBSB1023	121	20.00	20.00	20.00	50	1004				0
		BBSB1024	122	20.00	20.00	20.00	50	1006				0

G:\WORKING DATA\TNM RUNS\2030 BUILD BARRIER\2030AM\MD4 1

RESULTS: BARRIER-SEGMENT DESCRIPTIONS MD4/MD235

JMT 27 July 2009
Run Date:7/25/09 TNM 2.5

RESULTS: BARRIER-SEGMENT DESCRIPTIONS
PROJECT/CONTRACT: MD4/MD235
RUN: Build Barrier 2030AM AREA2
BARRIER DESIGN: INPUT HEIGHTS

Barriers		Segments										
Name	Type	Name	No.	Heights First Point	Average	Second Point	Length	If Wall Area	On Struc?	Important Reflections?	If Berm Volume	Cost
				ft	ft	ft	ft	sq ft			cu yd	$
SB Wall 1	W	BBSB4	96	20.00	20.00	20.00	50	996				0
		BBSB1000	98	20.00	20.00	20.00	51	1014				0
		BBSB1001	99	20.00	20.00	20.00	51	1016				0
		BBSB1002	100	20.00	20.00	20.00	51	1013				0
		BBSB1003	101	20.00	20.00	20.00	51	1013				0
		BBSB1004	102	20.00	20.00	20.00	51	1015				0
		BBSB1005	103	20.00	20.00	20.00	50	1007				0
		BBSB1006	104	20.00	20.00	20.00	50	1001				0
		BBSB1007	105	20.00	20.00	20.00	50	999				0
		BBSB1008	106	20.00	20.00	20.00	50	1000				0
		BBSB1009	107	20.00	20.00	20.00	50	1001				0
		BBSB1010	108	20.00	20.00	20.00	50	999				0
		BBSB1011	109	20.00	20.00	20.00	50	1006				0
		BBSB1012	110	20.00	20.00	20.00	50	1006				0
		BBSB1013	111	20.00	20.00	20.00	50	1007				0
		BBSB1014	112	20.00	20.00	20.00	50	1006				0
		BBSB1015	113	20.00	20.00	20.00	50	1004				0
		BBSB1016	114	20.00	20.00	20.00	50	1008				0
		BBSB1017	115	20.00	20.00	20.00	50	1004				0
		BBSB1018	116	20.00	20.00	20.00	50	1008				0
		BBSB1019	117	20.00	20.00	20.00	50	1006				0
		BBSB1020	118	20.00	20.00	20.00	50	1007				0
		BBSB1021	119	20.00	20.00	20.00	50	1005				0
		BBSB1022	120	20.00	20.00	20.00	50	1007				0
		BBSB1023	121	20.00	20.00	20.00	50	1004				0
		BBSB1024	122	20.00	20.00	20.00	50	1006				0

G:\WORKING DATA\TNM RUNS\2030 BUILD BARRIER\2030AM\MD4 1

RESULTS: BARRIER-SEGMENT DESCRIPTIONS MD4/MD235

		BBSB1064	162	20.00	20.00	20.00	50	995				0
		BBSB1065	163	20.00	20.00	20.00	50	992				0
		BBSB1066	164	20.00	20.00	20.00	50	996				0
		BBSB1067	165	20.00	20.00	20.00	50	993				0
		BBSB1068	166	20.00	20.00	20.00	50	993				0
		BBSB1069	167	20.00	20.00	20.00	50	995				0
		BBSB1070	168	20.00	20.00	20.00	50	994				0
		BBSB1071	169	20.00	20.00	20.00	50	994				0
		BBSB1072	170	20.00	20.00	20.00	50	995				0
		BBSB1073	171	20.00	20.00	20.00	50	993				0
		BBSB1074	172	20.00	20.00	20.00	50	994				0
		BBSB1075	173	20.00	20.00	20.00	50	995				0
		BBSB1076	174	20.00	20.00	20.00	50	994				0
		BBSB1077	175	20.00	20.00	20.00	50	993				0
		BBSB1078	176	20.00	20.00	20.00	50	995				0
		BBSB1079	177	20.00	20.00	20.00	50	993				0
		BBSB1080	178	20.00	20.00	20.00	50	995				0
		BBSB1081	179	20.00	20.00	20.00	50	994				0
		BBSB1082	205	20.00	20.00	20.00	50	993				0
		BBSB1083	206	20.00	20.00	20.00	50	993				0
		BBSB1084	207	20.00	20.00	20.00	50	994				0
		BBSB1085	208	20.00	20.00	20.00	50	997				0
		BBSB1086	209	20.00	20.00	20.00	50	993				0
		BBSB1087	210	20.00	20.00	20.00	50	994				0
		BBSB1088	211	20.00	20.00	20.00	50	993				0
		BBSB1089	212	20.00	20.00	20.00	50	993				0
		BBSB1090	213	20.00	20.00	20.00	50	995				0
		BBSB1091	180	20.00	20.00	20.00	50	996				0
		BBSB1092	181	20.00	20.00	20.00	50	992				0
		BBSB1093	196	20.00	20.00	20.00	50	995				0
		BBSB1094	197	20.00	20.00	20.00	50	994				0
		BBSB1095	198	20.00	20.00	20.00	50	993				0
		BBSB1096	199	20.00	20.00	20.00	50	995				0
		BBSB1097	200	20.00	20.00	20.00	50	993				0
		BBSB1098	201	20.00	20.00	20.00	50	994				0
		BBSB1099	202	20.00	20.00	20.00	50	994				0
		BBSB1100	203	20.00	20.00	20.00	50	996				0
		BBSB1101	204	20.00	20.00	20.00	50	992				0
		BBSB1102	182	20.00	20.00	20.00	50	994				0

G:\WORKING DATA\TNM RUNS\2030 BUILD BARRIER\2030AM\MD4 3

RESULTS: BARRIER-SEGMENT DESCRIPTIONS MD4/MD235

		BBSB1064	162	20.00	20.00	20.00	50	995				0
		BBSB1065	163	20.00	20.00	20.00	50	992				0
		BBSB1066	164	20.00	20.00	20.00	50	996				0
		BBSB1067	165	20.00	20.00	20.00	50	993				0
		BBSB1068	166	20.00	20.00	20.00	50	993				0
		BBSB1069	167	20.00	20.00	20.00	50	995				0
		BBSB1070	168	20.00	20.00	20.00	50	994				0
		BBSB1071	169	20.00	20.00	20.00	50	994				0
		BBSB1072	170	20.00	20.00	20.00	50	995				0
		BBSB1073	171	20.00	20.00	20.00	50	993				0
		BBSB1074	172	20.00	20.00	20.00	50	994				0
		BBSB1075	173	20.00	20.00	20.00	50	995				0
		BBSB1076	174	20.00	20.00	20.00	50	994				0
		BBSB1077	175	20.00	20.00	20.00	50	993				0
		BBSB1078	176	20.00	20.00	20.00	50	995				0
		BBSB1079	177	20.00	20.00	20.00	50	993				0
		BBSB1080	178	20.00	20.00	20.00	50	995				0
		BBSB1081	179	20.00	20.00	20.00	50	994				0
		BBSB1082	205	20.00	20.00	20.00	50	993				0
		BBSB1083	206	20.00	20.00	20.00	50	993				0
		BBSB1084	207	20.00	20.00	20.00	50	994				0
		BBSB1085	208	20.00	20.00	20.00	50	997				0
		BBSB1086	209	20.00	20.00	20.00	50	993				0
		BBSB1087	210	20.00	20.00	20.00	50	994				0
		BBSB1088	211	20.00	20.00	20.00	50	993				0
		BBSB1089	212	20.00	20.00	20.00	50	993				0
		BBSB1090	213	20.00	20.00	20.00	50	995				0
		BBSB1091	180	20.00	20.00	20.00	50	996				0
		BBSB1092	181	20.00	20.00	20.00	50	992				0
		BBSB1093	196	20.00	20.00	20.00	50	995				0
		BBSB1094	197	20.00	20.00	20.00	50	994				0
		BBSB1095	198	20.00	20.00	20.00	50	993				0
		BBSB1096	199	20.00	20.00	20.00	50	995				0
		BBSB1097	200	20.00	20.00	20.00	50	993				0
		BBSB1098	201	20.00	20.00	20.00	50	994				0
		BBSB1099	202	20.00	20.00	20.00	50	994				0
		BBSB1100	203	20.00	20.00	20.00	50	996				0
		BBSB1101	204	20.00	20.00	20.00	50	992				0
		BBSB1102	182	20.00	20.00	20.00	50	994				0

G:\WORKING DATA\TNM RUNS\2030 BUILD BARRIER\2030AM\MD4 3

RESULTS: BARRIER-SEGMENT DESCRIPTIONS MD4/MD235

		BBSB2016	249	20.00	20.00	20.00	50	1001				0
		BBSB2017	250	20.00	20.00	20.00	50	998				0
		BBSB2018	251	20.00	20.00	20.00	50	1001				0
		BBSB2019	252	20.00	20.00	20.00	50	1000				0
		BBSB2020	253	20.00	20.00	20.00	50	1003				0
		BBSB2021	254	20.00	20.00	20.00	50	1000				0
		BBSB2022	255	20.00	20.00	20.00	50	1007				0
		BBSB2023	256	20.00	20.00	20.00	50	1009				0
		BBSB2024	257	20.00	20.00	20.00	50	1006				0
		BBSB2025	258	20.00	20.00	20.00	50	1010				0
		BBSB2026	259	20.00	20.00	20.00	50	1006				0
		BBSB2027	260	20.00	20.00	20.00	50	1009				0
		BBSB2028	261	20.00	20.00	20.00	50	1006				0
		BBSB2029	262	20.00	20.00	20.00	40	791				0

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Sound Levels – NSA 06

RESULTS: SOUND LEVELS MD4/MD235

JMT 27 July 2009
Run Date:7/25/09 TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: MD4/MD235
RUN: Build Barrier 2030AM AREA2
BARRIER DESIGN: SB - NSA06 M21gapR11
ATMOSPHERICS: 68 deg F, 50% RH

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

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over existing Calculated	Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
M12	25	1	59.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
M13	31	1	57.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
M14	32	1	56.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
M15	34	1	60.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
M16	35	1	54.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
M17	36	1	58.0	67.5	66	9.5	10	Snd Lvl	67.5	0.0	8	-8.0
M18	37	1	65.0	72.9	66	7.9	10	Snd Lvl	72.9	0.0	8	-8.0
M19	38	1	58.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
M20	39	1	58.0	70.2	66	12.2	10	Both	61.1	9.1	8	1.1
M21	40	1	57.0	69.6	66	12.6	10	Both	60.1	9.5	8	1.5
M22	41	1	53.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
M23	42	1	62.0	69.9	66	7.9	10	Snd Lvl	60.1	9.8	8	1.8
R03	51	1	0.0	64.0	66	64.0	10	----	63.9	0.1	8	-7.9
R04	52	1	0.0	68.0	66	68.0	10	Snd Lvl	68.0	0.0	8	-8.0
R08	57	1	0.0	71.1	66	71.1	10	Snd Lvl	60.8	10.3	8	2.3
R09	58	1	0.0	61.7	66	61.7	10	----	57.6	4.1	8	-3.9
R10	59	1	0.0	55.5	66	55.5	10	----	52.6	2.9	8	-5.1
R11	60	1	0.0	69.5	66	69.5	10	Snd Lvl	60.2	9.3	8	1.3
R12	61	1	0.0	63.0	66	63.0	10	----	58.8	4.2	8	-3.8
R13	62	1	0.0	58.1	66	58.1	10	----	58.1	0.0	8	-8.0
R14	63	1	0.0	59.6	66	59.6	10	----	59.6	0.0	8	-8.0
R15	64	1	0.0	65.2	66	65.2	10	----	65.2	0.0	8	-8.0
R16	65	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
R17	66	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0

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RESULTS: SOUND LEVELS **MD4/MD235**

R18	67	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0

Dwelling Units	# DUs	Noise Reduction		
		Min	Avg	Max
		dB	dB	dB
All Selected	25	0.0	2.4	10.3
All Impacted	8	0.0	6.0	10.3
All that meet NR Goal	5	9.1	9.6	10.3

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SOUND BARRIER DESIGN – NSA-07

Sound Barrier Design Goal Compliance

One of the 2030 build barrier option is located in NSA 07 of the MD 4 study area. The barrier design selected is *NB-NSA07* within TNM Run *Build Barrier_2030PM_4Bridge*. *NB-NSA07* was evaluated according to the SHA Design Goals[4]. TABLE G.7 summarizes *NB-NSA07* compliance to each goal. Design Goals 1, 2, 3 and 5 are primarily targeted at critical sensitive receptors. Design Goal 4 deals more with the physical aspects of the sound barrier. All five Design Goals were achieved.

TABLE G.7 Sound Barrier Design Goal Compliance – NSA 07

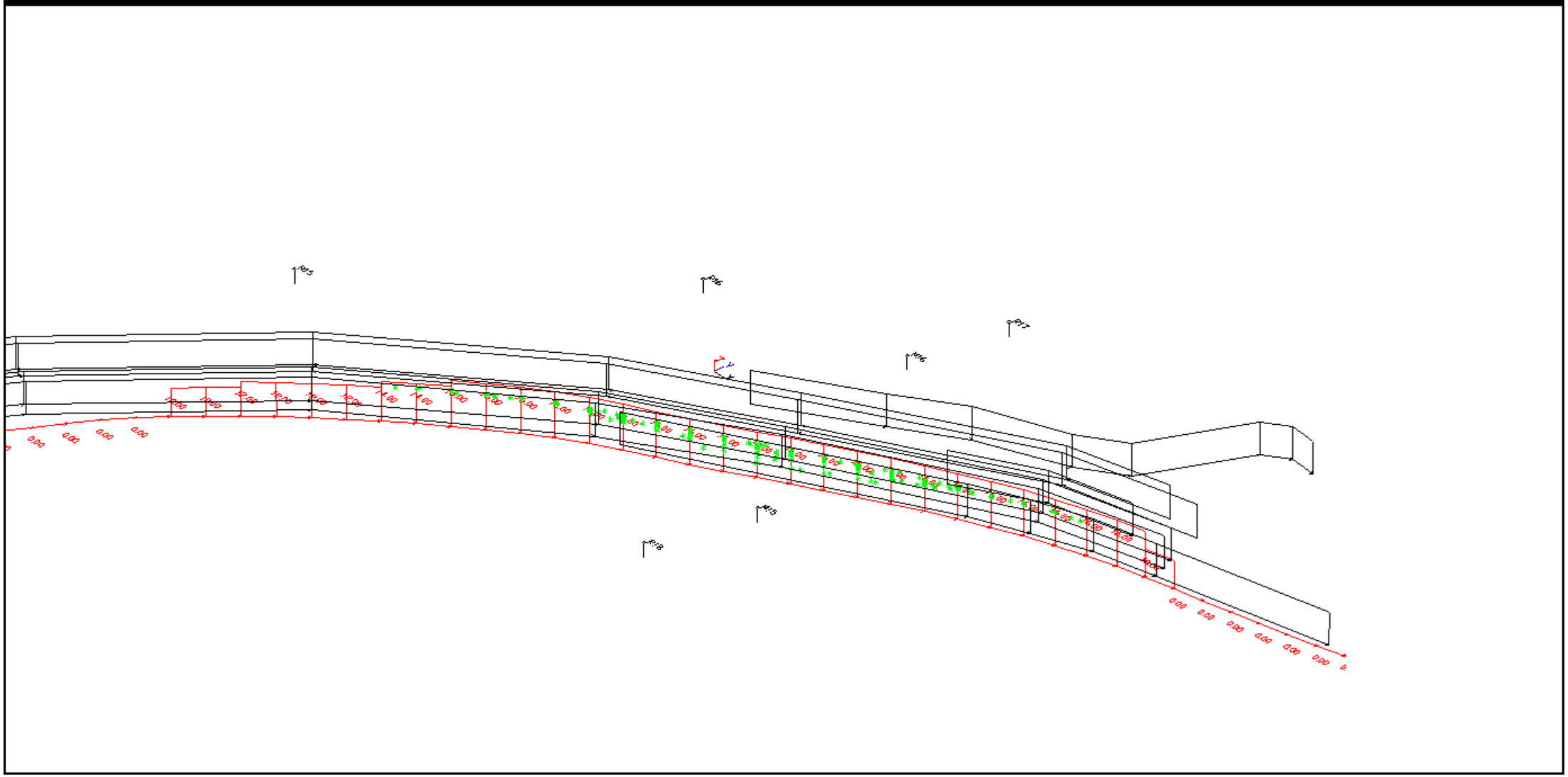
Design Goal	Meets Goal	Comments
1. Achieve 10 dB(A) insertion loss (noise reduction) at all critical sensitive receptors. If 10 dB(A) insertion loss is not practical, 7-9 dB(A) insertion loss is considered acceptable.	Yes	One (1) critical sensitive receptors received 10 dB(A) insertion loss.
2. Achieve "With-Barrier" Modeled Noise Levels below the SHA Noise Impact Threshold (NIT) level of 66 dB(A) at all critical sensitive receptors.	Yes	All "With-Barrier" Modeled Noise Levels are below the SHA Noise Impact Threshold.
3. Achieve a certain degree of uniformity [within approximately 3 dB(A)] of "With-Barrier" Modeled Noise Levels throughout the project area at critical sensitive receptors. If the "With-Barrier" Modeled Noise Levels for any of the critical sensitive receptors are outside of the 3 dB(A) uniformity range, then it is considered acceptable if those levels are below the uniformity range.	Yes	The degree of uniformity for the "With-Barrier" Modeled Noise Levels was within 2 dB(A) [Range: 56 to 58 dB(A)] for all critical sensitive receptors.
4. The optimum barrier height should not exceed 24 feet. When necessary to achieve design and performance goals, a maximum barrier height of 34 feet is acceptable. Sound barriers in excess of 34 feet are only acceptable in short segments to account for terrain changes (i.e. swale crossing).	Yes	The maximum barrier height as optimized in TNM is 16 feet.
5. Noise barriers should break the line-of-sight between critical sensitive receptors (5 feet above ground) and the exhaust stack of a heavy-duty truck (typically 12 feet above pavement level).	Yes	The sound barrier breaks the Line-of-Sight at all critical sensitive receptors.

[4] Maryland Department of Transportation, State Highway Administration, Office of Environmental Design, Noise Abatement Team. 2000. Appendix C – Technical Design and Performance Criteria for Highway Sound Barrier Projects. Guidelines and Procedures for Program Administration and Technical Analysis and Reporting: C-1 – C-2.

Line of Sight Check

FIGURE G.3 below illustrates the Line-of-Sight Barrier Analysis performed in TNM. This shows that the line of sight from the top of truck stacks to all of the receivers is being blocked by the barrier.

FIGURE G.3 Line of Sight Barrier Analysis – NSA 07



Sound Barrier Analysis Data

TABLE G.8 documents the Sound Barrier Analysis Data for *Build Barrier_2030PM_4Bridge*. This table was used to develop the Sound Barrier Analysis and Modeled Noise Level Mapping.

TABLE G.8 Sound Barrier Analysis Summary – NSA 07

Modeled Receptor Number[1]	"No Barrier" Modeled Noise Level [2]	"With-Barrier" Modeled Noise Level [3]	"With-Barrier" Noise Level + Background Noise (Rounded)	Insertion Loss[4]
M-15	69	59	59	10
R-18	65	58	58	7
Total Number of Impacted and Benefited Residences (receiving a 3 dB(A) or greater benefit)				**1**
Total Number of Non-Impacted and Benefited Residences (receiving a 5 dB(A) or greater benefit)				**1**
Total Number of Benefited Residences				**2**

LEGEND

Critical Sensitive Receptor

6. *The Receptor Number represents the TNM Modeled Receptor Site and corresponds to the Receiver Name in the TNM Model.*
7. *The "No-Barrier" Modeled Noise Level is the Noise Level (Leq[h]) generated by TNM Run 2030 BuildPM_4Bridge, for the "No-Barrier" condition.*
8. *The "With-Barrier" Modeled Noise Level is the Noise Level (Leq[h]) generated by the NB-NSA07 within TNM Run Build Barrier_2030PM_4Bridge, for the "With Barrier" condition.*
9. *The Insertion Loss is the amount of Noise Reduction [dB(A)] from "No Barrier" 2030 Build Noise Level to "With Barrier" Noise Level + Background Noise (TNM Build Barrier_2030PM_4Bridge).*
10. *This receptor represents Patuxent Presbyterian Chruch and counts as 10 equivalent cost per residence.*

TABLE G.9 below summarizes the Sound Barrier Description for *NB-NSA07* within TNM Run *Build Barrier_2030PM_4Bridge.*

TABLE G.9 Sound Barrier Description – NSA 07

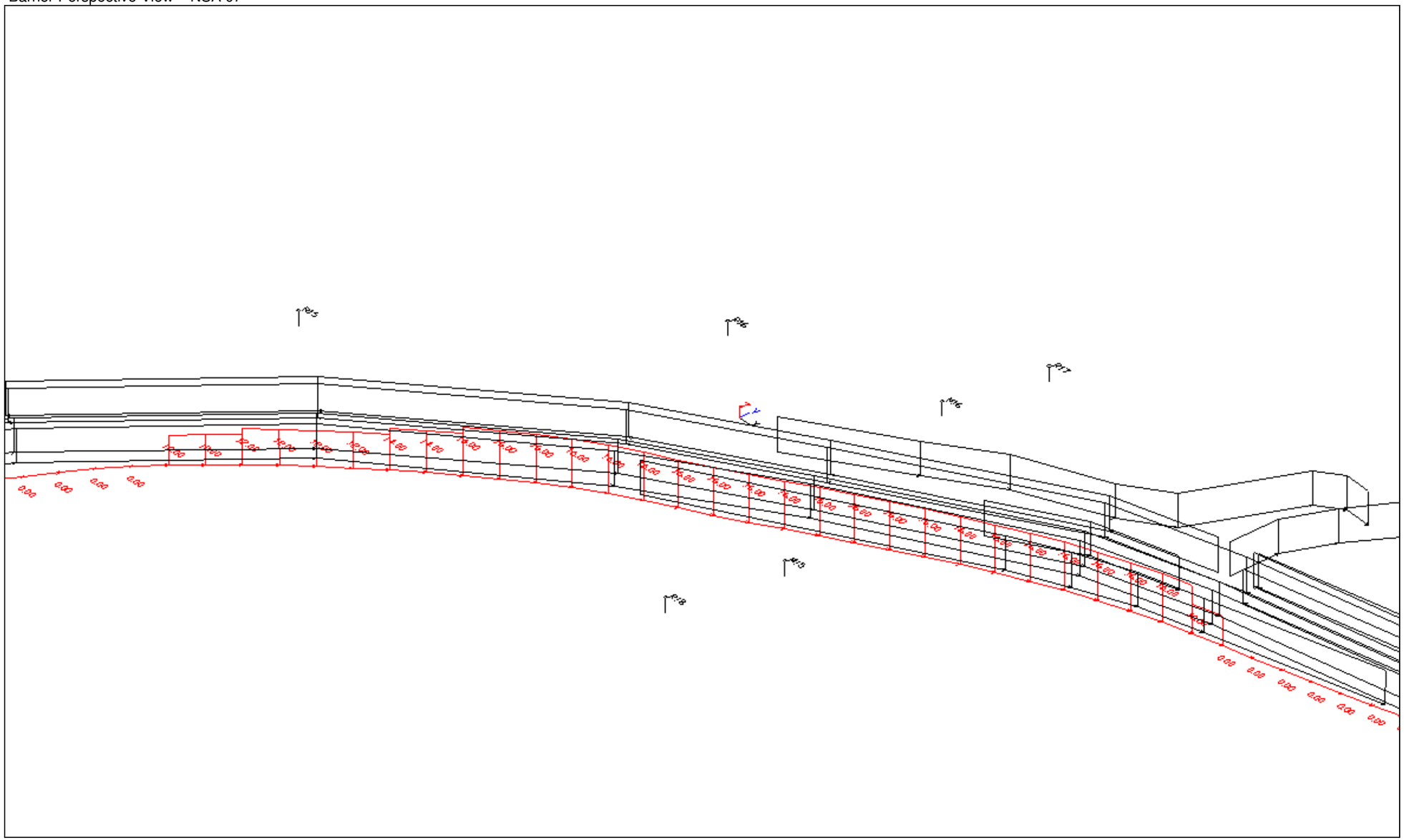
	NSA 07
Area (square feet) (From TNM)	23,917
Length (feet)	1,496
Average Height (feet)	14.73
Minimum Height (feet)	10.00
Maximum Height (feet)	16.00

TNM Tables

Reproductions of the TNM Tables pertinent to this Appendix begin on the following pages:

TNM Table/Figure	TNM Run
Barrier Perspective View – NSA 07	*Build Barrier_2030PM_4Bridge*
Barrier Description – NSA 07	*Build Barrier_2030PM_4Bridge*
Barrier-Segment Description – NSA 07	*Build Barrier_2030PM_4Bridge*
Sound Levels – NSA 07	*Build Barrier_2030PM_4Bridge*

Barrier Perspective View – NSA 07



Barrier Description – NSA 07

RESULTS: BARRIER DESCRIPTIONS **MD4/MD235**

JMT **27 July 2009**
Run Date:7/25/09 **TNM 2.5**

RESULTS: BARRIER DESCRIPTIONS
PROJECT/CONTRACT: **MD4/MD235**
RUN: **Build Barrier 2030PM AREA3 4-Bridge**
BARRIER DESIGN: **INPUT HEIGHTS**

Barriers

Name	Type	Heights along Barrier			Length	If Wall	If Berm			Cost
		Min	Avg	Max		Area	Volume	Top Width	Run:Rise	
		ft	ft	ft	ft	sq ft	cu yd	ft	ft:ft	$
Barrier18	W	3.50	3.50	3.50	7204	25215				0
Barrier19	W	3.50	3.50	3.50	7561	26464				0
NB Wall 2	W	20.00	20.00	20.00	2546	50914				0
									Total Cost:	0

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Barrier-Segment Description – NSA 07

RESULTS: BARRIER-SEGMENT DESCRIPTIONS MD4/MD235

JMT 27 July 2009
Run Date:7/25/09 TNM 2.5

RESULTS: BARRIER-SEGMENT DESCRIPTIONS
PROJECT/CONTRACT: MD4/MD235
RUN: Build Barrier 2030PM AREA3 4-Bridge
BARRIER DESIGN: INPUT HEIGHTS

Barriers		Segments										
Name	Type	Name	No.	Heights First Point	Average	Second Point	Length	If Wall Area	On Struc?	Important Reflections?	If Berm Volume	Cost
				ft	ft	ft	ft	sq ft			cu yd	$
Barrier18	W	FOURBRBA2	180	3.50	3.50	3.50	251	878				0
		FOURBRBA2	181	3.50	3.50	3.50	278	972				0
		FOURBRBA2	182	3.50	3.50	3.50	255	892				0
		FOURBRBA2	183	3.50	3.50	3.50	1676	5864				0
		FOURBRBA2	184	3.50	3.50	3.50	249	870				0
		FOURBRBA2	185	3.50	3.50	3.50	270	945				0
		FOURBRBA2	186	3.50	3.50	3.50	934	3269				0
		FOURBRBA2	187	3.50	3.50	3.50	57	201				0
		FOURBRBA2	188	3.50	3.50	3.50	57	201				0
		FOURBRBA2	189	3.50	3.50	3.50	349	1222				0
		FOURBRBA2	190	3.50	3.50	3.50	343	1202				0
		FOURBRBA2	191	3.50	3.50	3.50	260	911				0
		FOURBRBA2	192	3.50	3.50	3.50	286	999				0
		FOURBRBA2	193	3.50	3.50	3.50	216	757				0
		FOURBRBA2	194	3.50	3.50	3.50	224	784				0
		FOURBRBA2	195	3.50	3.50	3.50	186	649				0
		FOURBRBA2	196	3.50	3.50	3.50	164	573				0
		FOURBRBA2	197	3.50	3.50	3.50	1054	3688				0
		FOURBRBA2	198	3.50	3.50	3.50	49	171				0
		FOURBRBA2	199	3.50	3.50	3.50	47	165				0
Barrier19	W	FOURBRBA1	201	3.50	3.50	3.50	38	134				0
		FOURBRBA1	202	3.50	3.50	3.50	36	128				0
		FOURBRBA1	203	3.50	3.50	3.50	1077	3770				0
		FOURBRBA1	204	3.50	3.50	3.50	160	559				0
		FOURBRBA1	205	3.50	3.50	3.50	199	698				0

G:\WORKING DATA\TNM RUNS\2030 BUILD BARRIER\2030PM\4BRIDGE 1

RESULTS: BARRIER-SEGMENT DESCRIPTIONS MD4/MD235

		FOURBRBA1	206	3.50	3.50	3.50	120	420				0
		FOURBRBA1	207	3.50	3.50	3.50	115	402				0
		FOURBRBA1	208	3.50	3.50	3.50	222	776				0
		FOURBRBA1	209	3.50	3.50	3.50	171	597				0
		FOURBRBA1	210	3.50	3.50	3.50	132	462				0
		FOURBRBA1	211	3.50	3.50	3.50	297	1041				0
		FOURBRBA1	212	3.50	3.50	3.50	355	1243				0
		FOURBRBA1	213	3.50	3.50	3.50	161	562				0
		FOURBRBA1	214	3.50	3.50	3.50	141	494				0
		FOURBRBA1	215	3.50	3.50	3.50	57	201				0
		FOURBRBA1	216	3.50	3.50	3.50	64	224				0
		FOURBRBA1	217	3.50	3.50	3.50	925	3237				0
		FOURBRBA1	218	3.50	3.50	3.50	270	946				0
		FOURBRBA1	219	3.50	3.50	3.50	251	877				0
		FOURBRBA1	220	3.50	3.50	3.50	1680	5880				0
		FOURBRBA1	221	3.50	3.50	3.50	262	916				0
		FOURBRBA1	222	3.50	3.50	3.50	286	1000				0
		FOURBRBA1	223	3.50	3.50	3.50	268	937				0
		FOURBRBA1	224	3.50	3.50	3.50	147	516				0
		FOURBRBA1	225	3.50	3.50	3.50	127	445				0
NB Wall 2	W	BBNB2000	227	20.00	20.00	20.00	50	1002				0
		BBNB2001	229	20.00	20.00	20.00	50	998				0
		BBNB2002	230	20.00	20.00	20.00	50	999				0
		BBNB2003	231	20.00	20.00	20.00	50	1002				0
		BBNB2004	232	20.00	20.00	20.00	50	999				0
		BBNB2005	233	20.00	20.00	20.00	50	1001				0
		BBNB2006	234	20.00	20.00	20.00	50	1001				0
		BBNB2007	235	20.00	20.00	20.00	50	999				0
		BBNB2008	236	20.00	20.00	20.00	50	1001				0
		BBNB2009	237	20.00	20.00	20.00	50	999				0
		BBNB2010	238	20.00	20.00	20.00	50	999				0
		BBNB2011	239	20.00	20.00	20.00	50	996				0
		BBNB2012	240	20.00	20.00	20.00	50	996				0
		BBNB2013	241	20.00	20.00	20.00	50	995				0
		BBNB2014	242	20.00	20.00	20.00	50	995				0
		BBNB2015	243	20.00	20.00	20.00	50	1000				0
		BBNB2016	244	20.00	20.00	20.00	50	998				0
		BBNB2017	245	20.00	20.00	20.00	50	996				0

G:\WORKING DATA\TNM RUNS\2030 BUILD BARRIER\2030PM\4BRIDGE 2

RESULTS: BARRIER-SEGMENT DESCRIPTIONS MD4/MD235

		BBNB2018	246	20.00	20.00	20.00	50	998				0
		BBNB2019	247	20.00	20.00	20.00	50	999				0
		BBNB2020	248	20.00	20.00	20.00	50	998				0
		BBNB2021	249	20.00	20.00	20.00	50	995				0
		BBNB2022	250	20.00	20.00	20.00	50	997				0
		BBNB2023	251	20.00	20.00	20.00	50	999				0
		BBNB2024	252	20.00	20.00	20.00	50	993				0
		BBNB2025	253	20.00	20.00	20.00	50	995				0
		BBNB2026	254	20.00	20.00	20.00	50	996				0
		BBNB2027	255	20.00	20.00	20.00	50	1001				0
		BBNB2028	256	20.00	20.00	20.00	50	1000				0
		BBNB2029	257	20.00	20.00	20.00	50	999				0
		BBNB2030	258	20.00	20.00	20.00	50	1001				0
		BBNB2031	259	20.00	20.00	20.00	50	1001				0
		BBNB2032	260	20.00	20.00	20.00	50	998				0
		BBNB2033	261	20.00	20.00	20.00	50	1001				0
		BBNB2034	262	20.00	20.00	20.00	50	999				0
		BBNB2035	263	20.00	20.00	20.00	50	1000				0
		BBNB2036	264	20.00	20.00	20.00	50	1001				0
		BBNB2037	265	20.00	20.00	20.00	50	996				0
		BBNB2038	266	20.00	20.00	20.00	50	994				0
		BBNB2039	267	20.00	20.00	20.00	50	995				0
		BBNB2040	268	20.00	20.00	20.00	50	996				0
		BBNB2041	269	20.00	20.00	20.00	50	994				0
		BBNB2042	270	20.00	20.00	20.00	50	995				0
		BBNB2043	271	20.00	20.00	20.00	50	998				0
		BBNB2044	272	20.00	20.00	20.00	50	1001				0
		BBNB2045	273	20.00	20.00	20.00	50	1001				0
		BBNB2046	274	20.00	20.00	20.00	50	998				0
		BBNB2047	275	20.00	20.00	20.00	50	1000				0
		BBNB2048	276	20.00	20.00	20.00	50	1001				0
		BBNB2049	277	20.00	20.00	20.00	50	998				0
		BBNB2050	278	20.00	20.00	20.00	50	1001				0

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Sound Levels – NSA 07

RESULTS: SOUND LEVELS MD4/MD235

JMT 27 July 2009
Run Date:7/25/09 TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: MD4/MD235
RUN: Build Barrier 2030PM AREA3 4-Bridge
BARRIER DESIGN: NB NSA07
ATMOSPHERICS: 68 deg F, 50% RH

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

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over existing Calculated	Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
M14	14	1	56.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
M15	15	1	60.0	69.3	66	9.3	10	Snd Lvl	59.1	10.2	8	2.2
M16	16	1	54.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
M17	31	1	58.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
R14	57	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
R15	58	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
R16	59	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
R17	60	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
R18	61	1	0.0	64.6	66	64.6	10	----	58.2	6.4	8	-1.6

Dwelling Units	# DUs	Noise Reduction Min	Avg	Max
		dB	dB	dB
All Selected	9	0.0	1.8	10.2
All Impacted	1	10.2	10.2	10.2
All that meet NR Goal	1	10.2	10.2	10.2

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SOUND BARRIER DESIGN – NSA-09

Sound Barrier Design Goal Compliance

One of the 2030 build barrier option is located in NSA 09 of the MD 4 study area. The barrier design selected is *SB-NSA09* within TNM Run *Build Barrier_2030AM_MD4*. *SB-NSA09* was evaluated according to the SHA Design Goals[5]. TABLE G.10 summarizes *SB-NSA09* compliance to each goal. Design Goals 1, 2, 3 and 5 are primarily targeted at critical sensitive receptors. Design Goal 4 deals more with the physical aspects of the sound barrier. All five Design Goals were achieved.

TABLE G.10 Sound Barrier Design Goal Compliance – NSA 09

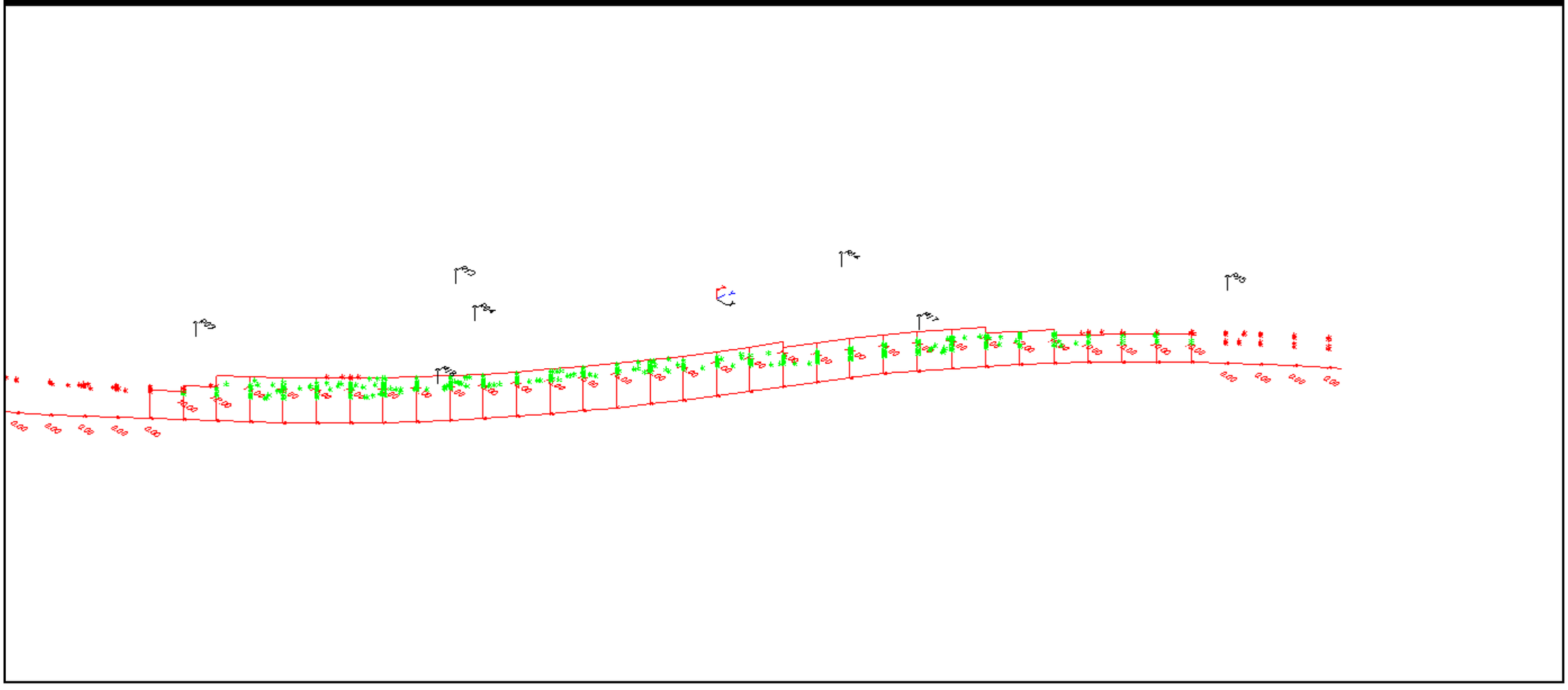
Design Goal	Meets Goal	Comments
1. Achieve 10 dB(A) insertion loss (noise reduction) at all critical sensitive receptors. If 10 dB(A) insertion loss is not practical, 7-9 dB(A) insertion loss is considered acceptable.	Yes	Four (4) critical sensitive receptors received 10 dB(A) insertion loss.
2. Achieve "With-Barrier" Modeled Noise Levels below the SHA Noise Impact Threshold (NIT) level of 66 dB(A) at all critical sensitive receptors.	Yes	All "With-Barrier" Modeled Noise Levels are below the SHA Noise Impact Threshold.
3. Achieve a certain degree of uniformity [within approximately 3 dB(A)] of "With-Barrier" Modeled Noise Levels throughout the project area at critical sensitive receptors. If the "With-Barrier" Modeled Noise Levels for any of the critical sensitive receptors are outside of the 3 dB(A) uniformity range, then it is considered acceptable if those levels are below the uniformity range.	Yes	The degree of uniformity for the "With-Barrier" Modeled Noise Levels was within 2 dB(A) [Range: 56 to 58 dB(A)] for all critical sensitive receptors.
4. The optimum barrier height should not exceed 24 feet. When necessary to achieve design and performance goals, a maximum barrier height of 34 feet is acceptable. Sound barriers in excess of 34 feet are only acceptable in short segments to account for terrain changes (i.e. swale crossing).	Yes	The maximum barrier height as optimized in TNM is 16 feet.
5. Noise barriers should break the line-of-sight between critical sensitive receptors (5 feet above ground) and the exhaust stack of a heavy-duty truck (typically 12 feet above pavement level).	Yes	The sound barrier breaks the Line-of-Sight at all critical sensitive receptors.

[5] Maryland Department of Transportation, State Highway Administration, Office of Environmental Design, Noise Abatement Team. 2000. Appendix C – Technical Design and Performance Criteria for Highway Sound Barrier Projects. Guidelines and Procedures for Program Administration and Technical Analysis and Reporting: C-1 – C-2.

Line of Sight Check

FIGURE G.4 below illustrates the Line-of-Sight Barrier Analysis performed in TNM. This shows that the line of sight from the top of truck stacks to all of the receivers is being blocked by the barrier.

FIGURE G.4 Line of Sight Barrier Analysis – NSA 09



Sound Barrier Analysis Data

TABLE G.11 documents the Sound Barrier Analysis Data for *Build Barrier_2030AM_MD4*. This table was used to develop the Sound Barrier Analysis and Modeled Noise Level Mapping.

TABLE G.11 Sound Barrier Analysis Summary – NSA 09

Modeled Receptor Number[1]	"No Barrier" Modeled Noise Level [2]	"With-Barrier" Modeled Noise Level [3]	"With-Barrier" Noise Level + Background Noise (Rounded)	Insertion Loss[4]
M-16	67	57	57	10
M-17	68	58	58	10
M-18	76	60	63	13
R-03	65	56	57	8
R-04	68	58	58	10
R-13	60	54	54	6
R-14	61	56	56	5
R-15	65	63	63	2
R-16	61	57	57	4
R-17	63	58	58	5
Total Number of Impacted and Benefited Residences (receiving a 3 dB(A) or greater benefit)				**4**
Total Number of Non-Impacted and Benefited Residences (receiving a 5 dB(A) or greater benefit)				**5**
Total Number of Benefited Residences				**9**

LEGEND

Critical Sensitive Receptor

1. *The Receptor Number represents the TNM Modeled Receptor Site and corresponds to the Receiver Name in the TNM Model.*
2. *The "No-Barrier" Modeled Noise Level is the Noise Level (Leq[h]) generated by TNM Run 2030 BuildAM_MD4, for the "No-Barrier" condition.*
3. *The "With-Barrier" Modeled Noise Level is the Noise Level (Leq[h]) generated by the SB-NSA09 within TNM Run Build Barrier_2030AM_MD4, for the "With Barrier" condition.*
4. *The Insertion Loss is the amount of Noise Reduction [dB(A)] from "No Barrier" 2030 Build Noise Level to "With Barrier" Noise Level + Background Noise (TNM Build Barrier_2030AM_MD4).*

TABLE G.12 below summarizes the Sound Barrier Description for *SB-NSA09* within TNM Run *Build Barrier_2030AM_MD4.*

TABLE G.12 Sound Barrier Description – NSA 09

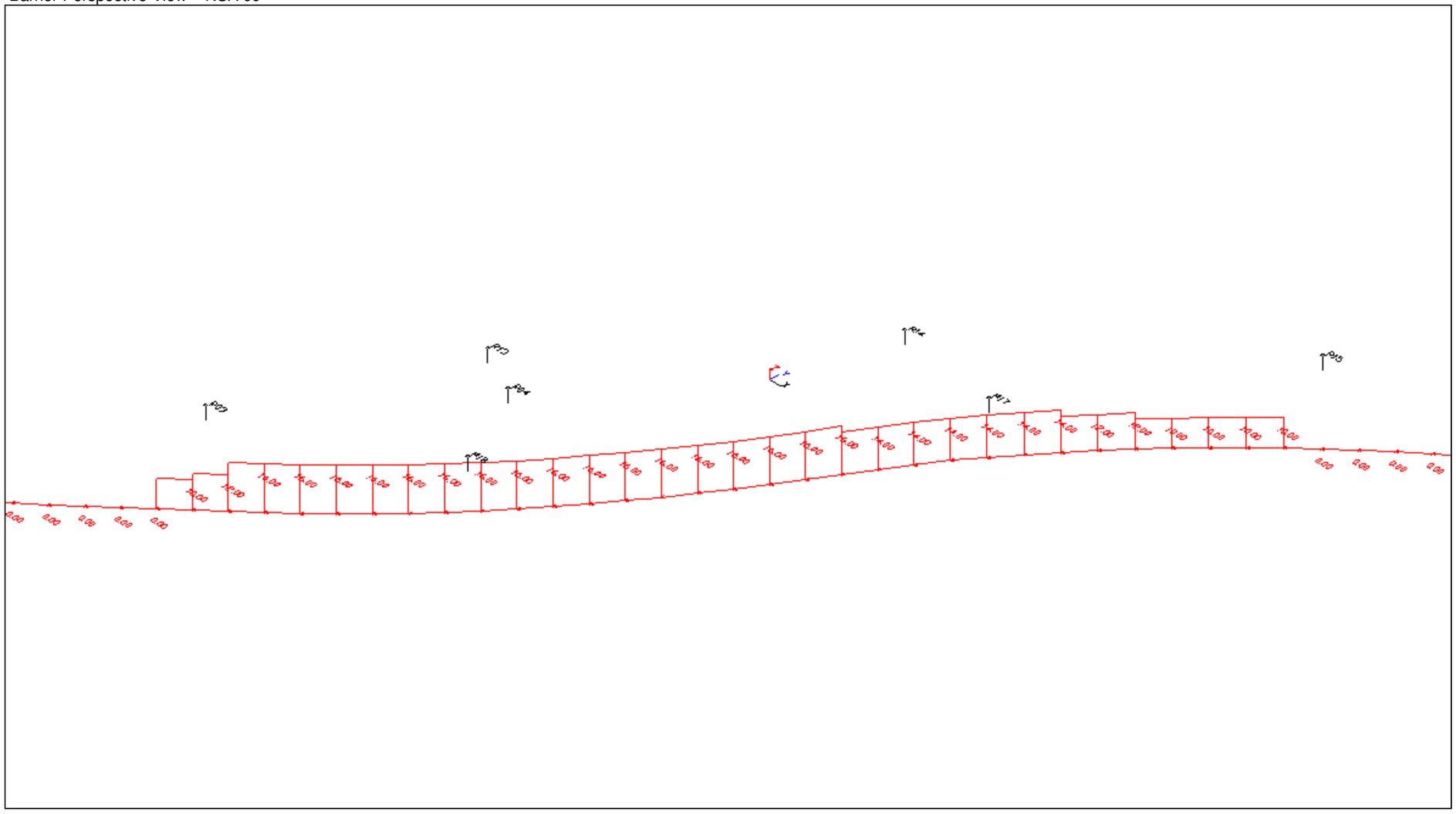
	NSA 09
Area (square feet) (From TNM)	39,319
Length (feet)	2,559
Average Height (feet)	14.25
Minimum Height (feet)	10.00
Maximum Height (feet)	16.00

TNM Tables

Reproductions of the TNM Tables pertinent to this Appendix begin on the following pages:

TNM Table/Figure	TNM Run
Barrier Perspective View – NSA 09	*Build Barrier_2030AM_MD4*
Barrier Description – NSA 09	*Build Barrier_2030AM_MD4*
Barrier-Segment Description – NSA 09	*Build Barrier_2030AM_MD4*
Sound Levels – NSA 09	*Build Barrier_2030AM_MD4*

Barrier Perspective View – NSA 09



Barrier Description – NSA 09

RESULTS: BARRIER DESCRIPTIONS **MD4/MD235**

JMT **27 July 2009**
Run Date:7/25/09 **TNM 2.5**

RESULTS: BARRIER DESCRIPTIONS
PROJECT/CONTRACT: **MD4/MD235**
RUN: **Build Barrier 2030AM AREA2**
BARRIER DESIGN: **INPUT HEIGHTS**

Barriers

Name	Type	Heights along Barrier			Length	If Wall	If Berm			Cost
		Min	Avg	Max		Area	Volume	Top Width	Run:Rise	
		ft	ft	ft	ft	sq ft	cu yd	ft	ft:ft	$
SB Wall 1	W	20.00	20.00	20.00	6217	124339				0
SB Wall 2	W	20.00	20.00	20.00	1541	30811				0
									Total Cost:	0

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Barrier-Segment Description – NSA 09

RESULTS: BARRIER-SEGMENT DESCRIPTIONS MD4/MD235

JMT 27 July 2009
Run Date:7/25/09 TNM 2.5

RESULTS: BARRIER-SEGMENT DESCRIPTIONS
PROJECT/CONTRACT: MD4/MD235
RUN: Build Barrier 2030AM AREA2
BARRIER DESIGN: INPUT HEIGHTS

Barriers		Segments										
Name	Type	Name	No.	Heights First Point	Average	Second Point	Length	If Wall Area	On Struc?	Important Reflections?	If Berm Volume	Cost
				ft	ft	ft	ft	sq ft			cu yd	$
SB Wall 1	W	BBSB4	96	20.00	20.00	20.00	50	996				0
		BBSB1000	98	20.00	20.00	20.00	51	1014				0
		BBSB1001	99	20.00	20.00	20.00	51	1016				0
		BBSB1002	100	20.00	20.00	20.00	51	1013				0
		BBSB1003	101	20.00	20.00	20.00	51	1013				0
		BBSB1004	102	20.00	20.00	20.00	51	1015				0
		BBSB1005	103	20.00	20.00	20.00	50	1007				0
		BBSB1006	104	20.00	20.00	20.00	50	1001				0
		BBSB1007	105	20.00	20.00	20.00	50	999				0
		BBSB1008	106	20.00	20.00	20.00	50	1000				0
		BBSB1009	107	20.00	20.00	20.00	50	1001				0
		BBSB1010	108	20.00	20.00	20.00	50	999				0
		BBSB1011	109	20.00	20.00	20.00	50	1006				0
		BBSB1012	110	20.00	20.00	20.00	50	1006				0
		BBSB1013	111	20.00	20.00	20.00	50	1007				0
		BBSB1014	112	20.00	20.00	20.00	50	1006				0
		BBSB1015	113	20.00	20.00	20.00	50	1004				0
		BBSB1016	114	20.00	20.00	20.00	50	1008				0
		BBSB1017	115	20.00	20.00	20.00	50	1004				0
		BBSB1018	116	20.00	20.00	20.00	50	1008				0
		BBSB1019	117	20.00	20.00	20.00	50	1006				0
		BBSB1020	118	20.00	20.00	20.00	50	1007				0
		BBSB1021	119	20.00	20.00	20.00	50	1005				0
		BBSB1022	120	20.00	20.00	20.00	50	1007				0
		BBSB1023	121	20.00	20.00	20.00	50	1004				0
		BBSB1024	122	20.00	20.00	20.00	50	1006				0

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RESULTS: BARRIER-SEGMENT DESCRIPTIONS MD4/MD235

		BBSB1025	123	20.00	20.00	20.00	50	1009				0
		BBSB1026	124	20.00	20.00	20.00	50	1004				0
		BBSB1027	125	20.00	20.00	20.00	50	1007				0
		BBSB1028	126	20.00	20.00	20.00	50	1005				0
		BBSB1029	127	20.00	20.00	20.00	50	1007				0
		BBSB1030	128	20.00	20.00	20.00	50	1006				0
		BBSB1031	129	20.00	20.00	20.00	50	1006				0
		BBSB1032	130	20.00	20.00	20.00	50	1006				0
		BBSB1033	131	20.00	20.00	20.00	50	1006				0
		BBSB1034	132	20.00	20.00	20.00	50	1006				0
		BBSB1035	133	20.00	20.00	20.00	50	1005				0
		BBSB1036	134	20.00	20.00	20.00	50	1007				0
		BBSB1037	135	20.00	20.00	20.00	50	1002				0
		BBSB1038	136	20.00	20.00	20.00	50	1000				0
		BBSB1039	137	20.00	20.00	20.00	50	999				0
		BBSB1040	138	20.00	20.00	20.00	50	1001				0
		BBSB1041	139	20.00	20.00	20.00	50	1001				0
		BBSB1042	140	20.00	20.00	20.00	50	999				0
		BBSB1043	141	20.00	20.00	20.00	50	1000				0
		BBSB1044	142	20.00	20.00	20.00	50	1001				0
		BBSB1045	143	20.00	20.00	20.00	50	998				0
		BBSB1046	144	20.00	20.00	20.00	50	1000				0
		BBSB1047	145	20.00	20.00	20.00	50	1001				0
		BBSB1048	146	20.00	20.00	20.00	50	1001				0
		BBSB1049	147	20.00	20.00	20.00	50	999				0
		BBSB1050	148	20.00	20.00	20.00	50	1001				0
		BBSB1051	149	20.00	20.00	20.00	50	1000				0
		BBSB1052	150	20.00	20.00	20.00	50	999				0
		BBSB1053	151	20.00	20.00	20.00	50	999				0
		BBSB1054	152	20.00	20.00	20.00	50	1000				0
		BBSB1055	153	20.00	20.00	20.00	50	999				0
		BBSB1056	154	20.00	20.00	20.00	50	1001				0
		BBSB1057	155	20.00	20.00	20.00	50	1001				0
		BBSB1058	156	20.00	20.00	20.00	50	999				0
		BBSB1059	157	20.00	20.00	20.00	50	997				0
		BBSB1060	158	20.00	20.00	20.00	50	994				0
		BBSB1061	159	20.00	20.00	20.00	50	994				0
		BBSB1062	160	20.00	20.00	20.00	50	994				0
		BBSB1063	161	20.00	20.00	20.00	50	994				0

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RESULTS: BARRIER-SEGMENT DESCRIPTIONS MD4/MD235

		BBSB1064	162	20.00	20.00	20.00	50	995				0
		BBSB1065	163	20.00	20.00	20.00	50	992				0
		BBSB1066	164	20.00	20.00	20.00	50	996				0
		BBSB1067	165	20.00	20.00	20.00	50	993				0
		BBSB1068	166	20.00	20.00	20.00	50	993				0
		BBSB1069	167	20.00	20.00	20.00	50	995				0
		BBSB1070	168	20.00	20.00	20.00	50	994				0
		BBSB1071	169	20.00	20.00	20.00	50	994				0
		BBSB1072	170	20.00	20.00	20.00	50	995				0
		BBSB1073	171	20.00	20.00	20.00	50	993				0
		BBSB1074	172	20.00	20.00	20.00	50	994				0
		BBSB1075	173	20.00	20.00	20.00	50	995				0
		BBSB1076	174	20.00	20.00	20.00	50	994				0
		BBSB1077	175	20.00	20.00	20.00	50	993				0
		BBSB1078	176	20.00	20.00	20.00	50	995				0
		BBSB1079	177	20.00	20.00	20.00	50	993				0
		BBSB1080	178	20.00	20.00	20.00	50	995				0
		BBSB1081	179	20.00	20.00	20.00	50	994				0
		BBSB1082	205	20.00	20.00	20.00	50	993				0
		BBSB1083	206	20.00	20.00	20.00	50	993				0
		BBSB1084	207	20.00	20.00	20.00	50	994				0
		BBSB1085	208	20.00	20.00	20.00	50	997				0
		BBSB1086	209	20.00	20.00	20.00	50	993				0
		BBSB1087	210	20.00	20.00	20.00	50	994				0
		BBSB1088	211	20.00	20.00	20.00	50	993				0
		BBSB1089	212	20.00	20.00	20.00	50	993				0
		BBSB1090	213	20.00	20.00	20.00	50	995				0
		BBSB1091	180	20.00	20.00	20.00	50	996				0
		BBSB1092	181	20.00	20.00	20.00	50	992				0
		BBSB1093	196	20.00	20.00	20.00	50	995				0
		BBSB1094	197	20.00	20.00	20.00	50	994				0
		BBSB1095	198	20.00	20.00	20.00	50	993				0
		BBSB1096	199	20.00	20.00	20.00	50	995				0
		BBSB1097	200	20.00	20.00	20.00	50	993				0
		BBSB1098	201	20.00	20.00	20.00	50	994				0
		BBSB1099	202	20.00	20.00	20.00	50	994				0
		BBSB1100	203	20.00	20.00	20.00	50	996				0
		BBSB1101	204	20.00	20.00	20.00	50	992				0
		BBSB1102	182	20.00	20.00	20.00	50	994				0

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RESULTS: BARRIER-SEGMENT DESCRIPTIONS MD4/MD235

		BBSB1103	183	20.00	20.00	20.00	50	994				0
		BBSB1104	184	20.00	20.00	20.00	50	995				0
		BBSB1105	214	20.00	20.00	20.00	50	993				0
		BBSB1106	215	20.00	20.00	20.00	50	994				0
		BBSB1107	216	20.00	20.00	20.00	50	993				0
		BBSB1108	217	20.00	20.00	20.00	50	995				0
		BBSB1109	218	20.00	20.00	20.00	50	993				0
		BBSB1110	219	20.00	20.00	20.00	50	995				0
		BBSB1111	220	20.00	20.00	20.00	50	993				0
		BBSB1112	221	20.00	20.00	20.00	50	994				0
		BBSB1113	222	20.00	20.00	20.00	48	963				0
		BBSB1114	185	20.00	20.00	20.00	50	1001				0
		BBSB1115	186	20.00	20.00	20.00	50	998				0
		BBSB1116	223	20.00	20.00	20.00	51	1011				0
		BBSB1117	224	20.00	20.00	20.00	50	996				0
		BBSB1118	225	20.00	20.00	20.00	50	992				0
		BBSB1119	226	20.00	20.00	20.00	50	995				0
		BBSB1120	227	20.00	20.00	20.00	50	993				0
		BBSB1121	228	20.00	20.00	20.00	50	997				0
		BBSB1122	229	20.00	20.00	20.00	24	487				0
		BBSB5	230	20.00	20.00	20.00	50	999				0
SB Wall 2	W	BBSB3	231	20.00	20.00	20.00	50	1000				0
		BBSB2000	233	20.00	20.00	20.00	50	994				0
		BBSB2001	234	20.00	20.00	20.00	50	992				0
		BBSB2002	235	20.00	20.00	20.00	50	993				0
		BBSB2003	236	20.00	20.00	20.00	50	995				0
		BBSB2004	237	20.00	20.00	20.00	50	995				0
		BBSB2005	238	20.00	20.00	20.00	50	997				0
		BBSB2006	239	20.00	20.00	20.00	50	1001				0
		BBSB2007	240	20.00	20.00	20.00	50	998				0
		BBSB2008	241	20.00	20.00	20.00	50	1001				0
		BBSB2009	242	20.00	20.00	20.00	50	1000				0
		BBSB2010	243	20.00	20.00	20.00	50	1001				0
		BBSB2011	244	20.00	20.00	20.00	50	1000				0
		BBSB2012	245	20.00	20.00	20.00	50	999				0
		BBSB2013	246	20.00	20.00	20.00	50	1000				0
		BBSB2014	247	20.00	20.00	20.00	50	1001				0
		BBSB2015	248	20.00	20.00	20.00	50	1000				0

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RESULTS: BARRIER-SEGMENT DESCRIPTIONS MD4/MD235

		BBSB2016	249	20.00	20.00	20.00	50	1001				0
		BBSB2017	250	20.00	20.00	20.00	50	998				0
		BBSB2018	251	20.00	20.00	20.00	50	1001				0
		BBSB2019	252	20.00	20.00	20.00	50	1000				0
		BBSB2020	253	20.00	20.00	20.00	50	1003				0
		BBSB2021	254	20.00	20.00	20.00	50	1000				0
		BBSB2022	255	20.00	20.00	20.00	50	1007				0
		BBSB2023	256	20.00	20.00	20.00	50	1009				0
		BBSB2024	257	20.00	20.00	20.00	50	1006				0
		BBSB2025	258	20.00	20.00	20.00	50	1010				0
		BBSB2026	259	20.00	20.00	20.00	50	1006				0
		BBSB2027	260	20.00	20.00	20.00	50	1009				0
		BBSB2028	261	20.00	20.00	20.00	50	1006				0
		BBSB2029	262	20.00	20.00	20.00	40	791				0

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Sound Levels – NSA 09

RESULTS: SOUND LEVELS MD4/MD235

JMT 27 July 2009
Run Date:7/25/09 TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: MD4/MD235
RUN: Build Barrier 2030AM AREA2
BARRIER DESIGN: SB - NSA09
ATMOSPHERICS: 68 deg F, 50% RH

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

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over existing Calculated	Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
M15	34	1	60.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
M16	35	1	54.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
M17	36	1	58.0	67.5	66	9.5	10	Snd Lvl	58.1	9.4	8	1.4
M18	37	1	65.0	72.9	66	7.9	10	Snd Lvl	60.0	12.9	8	4.9
M19	38	1	58.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
M20	39	1	58.0	70.2	66	12.2	10	Both	70.2	0.0	8	-8.0
R03	51	1	0.0	64.0	66	64.0	10	----	56.4	7.6	8	-0.4
R04	52	1	0.0	68.0	66	68.0	10	Snd Lvl	58.2	9.8	8	1.8
R10	59	1	0.0	55.5	66	55.5	10	----	55.4	0.1	8	-7.9
R11	60	1	0.0	69.5	66	69.5	10	Snd Lvl	69.5	0.0	8	-8.0
R12	61	1	0.0	63.0	66	63.0	10	----	62.9	0.1	8	-7.9
R13	62	1	0.0	58.1	66	58.1	10	----	53.5	4.6	8	-3.4
R14	63	1	0.0	59.6	66	59.6	10	----	56.2	3.4	8	-4.6
R15	64	1	0.0	65.2	66	65.2	10	----	64.4	0.8	8	-7.2
R16	65	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
R17	66	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
R18	67	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0

Dwelling Units	# DUs	Noise Reduction Min	Avg	Max
		dB	dB	dB
All Selected	17	0.0	2.9	12.9
All Impacted	5	0.0	6.4	12.9
All that meet NR Goal	3	9.4	10.7	12.9

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SOUND BARRIER DESIGN – CFI OPTION

Sound Barrier Design Goal Compliance

CFI barrier option is located in NSA 14 of the MD 4 study area. The barrier design selected is *CFI-NSA14* within TNM Run *Build Barrier_2030PM_CFI*. *CFI-NSA14* was evaluated according to the SHA Design Goals[6]. TABLE G.13 summarizes *CFI-NSA14* compliance to each goal. Design Goals 1, 2, 3 and 5 are primarily targeted at critical sensitive receptors. Design Goal 4 deals more with the physical aspects of the sound barrier. All five Design Goals were achieved.

TABLE G.13 Sound Barrier Design Goal Compliance – CFI Option

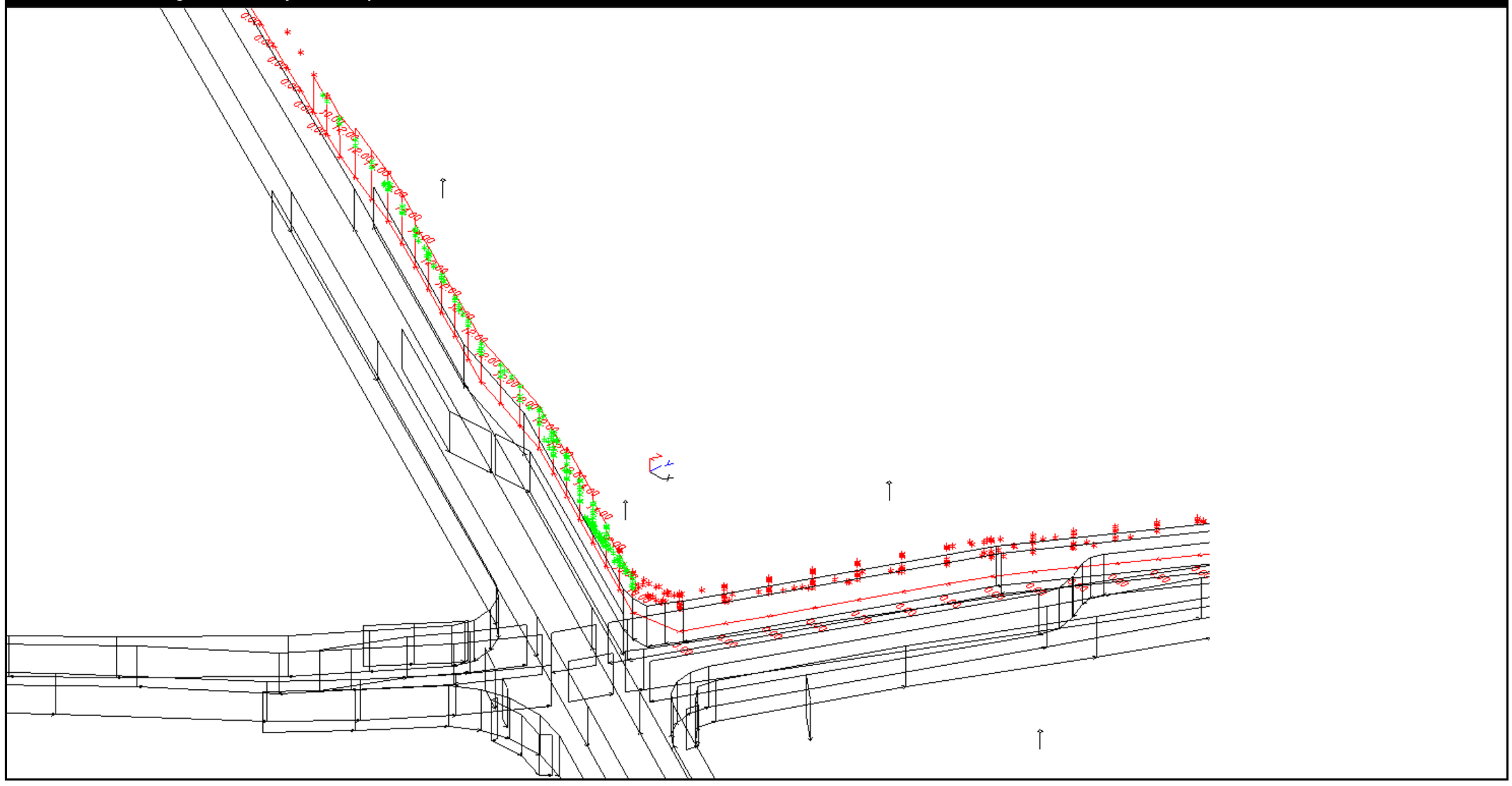
Design Goal	Meets Goal	Comments
1. Achieve 10 dB(A) insertion loss (noise reduction) at all critical sensitive receptors. If 10 dB(A) insertion loss is not practical, 7-9 dB(A) insertion loss is considered acceptable.	Yes	Two (2) critical sensitive receptors received 10 dB(A) insertion loss.
2. Achieve "With-Barrier" Modeled Noise Levels below the SHA Noise Impact Threshold (NIT) level of 66 dB(A) at all critical sensitive receptors.	Yes	All "With-Barrier" Modeled Noise Levels are below the SHA Noise Impact Threshold.
3. Achieve a certain degree of uniformity [within approximately 3 dB(A)] of "With-Barrier" Modeled Noise Levels throughout the project area at critical sensitive receptors. If the "With-Barrier" Modeled Noise Levels for any of the critical sensitive receptors are outside of the 3 dB(A) uniformity range, then it is considered acceptable if those levels are below the uniformity range.	Yes	The degree of uniformity for the "With-Barrier" Modeled Noise Levels was within 2 dB(A) [Range: 56 to 58 dB(A)] for all critical sensitive receptors.
4. The optimum barrier height should not exceed 24 feet. When necessary to achieve design and performance goals, a maximum barrier height of 34 feet is acceptable. Sound barriers in excess of 34 feet are only acceptable in short segments to account for terrain changes (i.e. swale crossing).	Yes	The maximum barrier height as optimized in TNM is 14 feet.
5. Noise barriers should break the line-of-sight between critical sensitive receptors (5 feet above ground) and the exhaust stack of a heavy-duty truck (typically 12 feet above pavement level).	Yes	The sound barrier breaks the Line-of-Sight at all critical sensitive receptors.

[6] Maryland Department of Transportation, State Highway Administration, Office of Environmental Design, Noise Abatement Team. 2000. Appendix C – Technical Design and Performance Criteria for Highway Sound Barrier Projects. Guidelines and Procedures for Program Administration and Technical Analysis and Reporting: C-1 – C-2.

Line of Sight Check

FIGURE G.5 below illustrates the Line-of-Sight Barrier Analysis performed in TNM. This shows that the line of sight from the top of truck stacks to all of the receivers is being blocked by the barrier.

FIGURE G.5 Line of Sight Barrier Analysis – CFI Option



Sound Barrier Analysis Data

TABLE G.14 documents the Sound Barrier Analysis Data for *Build Barrier_2030PM_CFI*. This table was used to develop the Sound Barrier Analysis and Modeled Noise Level Mapping.

TABLE G.14 Sound Barrier Analysis Summary – CFI Option

Modeled Receptor Number[1]	"No Barrier" Modeled Noise Level [2]	"With-Barrier" Modeled Noise Level [3]	"With-Barrier" Noise Level + Background Noise (Rounded)	Insertion Loss[4]
R-01	72	62	62	10
R-02	72	62	62	10
R-05	63	61	61	2
Total Number of Impacted and Benefited Residences (receiving a 3 dB(A) or greater benefit)				**2**
Total Number of Non-Impacted and Benefited Residences (receiving a 5 dB(A) or greater benefit)				**0**
Total Number of Benefited Residences				**2**

LEGEND

Critical Sensitive Receptor

5. *The Receptor Number represents the TNM Modeled Receptor Site and corresponds to the Receiver Name in the TNM Model.*
6. *The "No-Barrier" Modeled Noise Level is the Noise Level (Leq[h]) generated by TNM Run 2030 BuildPM_CFI, for the "No-Barrier" condition.*
7. *The "With-Barrier" Modeled Noise Level is the Noise Level (Leq[h]) generated by the CFI-NSA14 barrier within TNM Run Build Barrier_2030PM_CFI, for the "With Barrier" condition.*
8. *The Insertion Loss is the amount of Noise Reduction [dB(A)] from "No Barrier" 2030 Build Noise Level to "With Barrier" Noise Level + Background Noise (TNM Build Barrier_2030PM_CFI).*

TABLE G.15 below summarizes the Sound Barrier Description for *CFI-NSA 14* within TNM Run *Build Barrier_2030PM_CFI.*

TABLE G.15 Sound Barrier Description – CFI Option

	CFI OPTION
Area (square feet) (From TNM)	14,876
Length (feet)	1,100
Average Height (feet)	12.27
Minimum Height (feet)	10.00
Maximum Height (feet)	14.00

TNM Tables

Reproductions of the TNM Tables pertinent to this Appendix begin on the following pages:

TNM Table/Figure	TNM Run
Barrier Perspective View – CFI Option	*Build Barrier_2030PM_CFI*
Barrier Description – CFI Option	*Build Barrier_2030PM_CFI*
Barrier-Segment Description – CFI Option	*Build Barrier_2030PM_CFI*
Sound Levels – CFI Option	*Build Barrier_2030PM_CFI*

Barrier Perspective View – CFI Option

Barrier Description – CFI Option

RESULTS: BARRIER DESCRIPTIONS **MD 4 Planning Study**

JMT **27 July 2009**
Run Date: July 26, 2009 **TNM 2.5**

RESULTS: BARRIER DESCRIPTIONS
PROJECT/CONTRACT: **MD 4 Planning Study**
RUN: **2030PM BUILD BARRIER CFI**
BARRIER DESIGN: **CFI NSA14**

Barriers

Name	Type	Heights along Barrier			Length	If Wall	If Berm			Cost
		Min	Avg	Max		Area	Volume	Top Width	Run:Rise	
		ft	ft	ft	ft	sq ft	cu yd	ft	ft:ft	$
Barrier CFI	W	10.00	12.27	14.00	1100	13501				0
									Total Cost:	0

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Barrier-Segment Description – CFI Option

RESULTS: BARRIER-SEGMENT DESCRIPTIONS MD 4 Planning Study

JMT 27 July 2009
Run Date: July 26, 2009 TNM 2.5

RESULTS: BARRIER-SEGMENT DESCRIPTIONS
PROJECT/CONTRACT: MD 4 Planning Study
RUN: 2030PM BUILD BARRIER CFI
BARRIER DESIGN: CFI NSA14

Barriers		Segments										
Name	Type	Name	No.	Heights First Point	Average	Second Point	Length	If Wall Area	On Struc?	Important Reflections?	If Berm Volume	Cost
				ft	ft	ft	ft	sq ft			cu yd	$
Barrier CFI	W	BBCF500	71	0.00	0.00	0.00	0	0				0
		point80	80	0.00	0.00	0.00	0	0				0
		point81	81	0.00	0.00	0.00	0	0				0
		point82	82	0.00	0.00	0.00	0	0				0
		point83	83	0.00	0.00	0.00	0	0				0
		point84	84	0.00	0.00	0.00	0	0				0
		point85	85	0.00	0.00	0.00	0	0				0
		BBCF501	72	0.00	0.00	0.00	0	0				0
		point86	86	0.00	0.00	0.00	0	0				0
		point87	87	0.00	0.00	0.00	0	0				0
		point88	88	0.00	0.00	0.00	0	0				0
		point89	89	0.00	0.00	0.00	0	0				0
		point90	90	0.00	0.00	0.00	0	0				0
		point91	91	0.00	0.00	0.00	0	0				0
		BBCF502	73	0.00	0.00	0.00	0	0				0
		point92	92	0.00	0.00	0.00	0	0				0
		point93	93	0.00	0.00	0.00	0	0				0
		point94	94	0.00	0.00	0.00	0	0				0
		point95	95	0.00	0.00	0.00	0	0				0
		point96	96	0.00	0.00	0.00	0	0				0
		point97	97	0.00	0.00	0.00	0	0				0
		BBCF503	74	0.00	0.00	0.00	0	0				0
		BBCF524	39	10.00	10.00	10.00	50	500				0
		BBCF525	41	10.00	10.00	10.00	50	500				0
		BBCF526	42	12.00	12.00	12.00	50	600				0
		BBCF527	43	14.00	14.00	14.00	50	701				0

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RESULTS: BARRIER-SEGMENT DESCRIPTIONS MD 4 Planning Study

		BBCF528	44	14.00	14.00	14.00	50	698				0
		BBCF529	45	12.00	12.00	12.00	50	601				0
		BBCF530	46	12.00	12.00	12.00	52	628				0
		BBCF531	47	12.00	12.00	12.00	50	600				0
		BBCF532	48	12.00	12.00	12.00	50	601				0
		BBCF533	49	12.00	12.00	12.00	48	571				0
		BBCF534	50	12.00	12.00	12.00	50	601				0
		BBCF535	51	12.00	12.00	12.00	50	600				0
		BBCF536	52	12.00	12.00	12.00	50	601				0
		BBCF537	53	12.00	12.00	12.00	50	600				0
		BBCF538	54	12.00	12.00	12.00	50	601				0
		BBCF539	55	14.00	14.00	14.00	50	698				0
		BBCF540	56	14.00	14.00	14.00	51	716				0
		BBCF541	57	14.00	14.00	14.00	50	701				0
		BBCF542	58	14.00	14.00	14.00	50	700				0
		BBCF543	59	12.00	12.00	12.00	49	586				0
		BBCF544	60	12.00	12.00	12.00	50	601				0
		BBCF545	61	10.00	10.00	10.00	50	499				0
		BBCF546	62	0.00	0.00	0.00	0	0				0
		BBCF547	63	0.00	0.00	0.00	0	0				0
		BBCF548	64	0.00	0.00	0.00	0	0				0
		BBCF549	65	0.00	0.00	0.00	0	0				0
		BBCF550	66	0.00	0.00	0.00	0	0				0
		BBCF551	67	0.00	0.00	0.00	0	0				0
		BBCF552	68	0.00	0.00	0.00	0	0				0
		BBCF553	69	0.00	0.00	0.00	0	0				0
		BBCF554	70	0.00	0.00	0.00	0	0				0

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Sound Levels – CFI Option

RESULTS: SOUND LEVELS — MD 4 Planning Study

JMT — 27 July 2009
Run Date: July 26, 2009 — TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: MD 4 Planning Study
RUN: 2030PM BUILD BARRIER CFI
BARRIER DESIGN: CFI NSA14
ATMOSPHERICS: 68 deg F, 50% RH

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

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over existing Calculated	Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
M27	24	1	56.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
R01	30	1	0.0	72.4	66	72.4	10	Snd Lvl	62.2	10.2	8	2.2
R02	31	1	0.0	71.9	66	71.9	10	Snd Lvl	62.2	9.7	8	1.7
R05	33	1	0.0	63.3	66	63.3	10	----	60.8	2.5	8	-5.5

Dwelling Units	# DUs	Noise Reduction Min	Avg	Max
		dB	dB	dB
All Selected	4	0.0	5.6	10.2
All Impacted	2	9.7	10.0	10.2
All that meet NR Goal	2	9.7	10.0	10.2

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SOUND BARRIER DESIGN – Flyover OPTION

Sound Barrier Design Goal Compliance

Flyover barrier option is located in NSA 14 of the MD 4 study area. The barrier design selected is *Flyover-NSA14* within TNM Run *Build Barrier_2030PM_Flyover*. *Flyover-NSA14* was evaluated according to the SHA Design Goals[7]. TABLE G.16 summarizes *Flyover-NSA14* compliance to each goal. Design Goals 1, 2, 3 and 5 are primarily targeted at critical sensitive receptors. Design Goal 4 deals more with the physical aspects of the sound barrier. All five Design Goals were achieved.

TABLE G.16 Sound Barrier Design Goal Compliance – Flyover Option

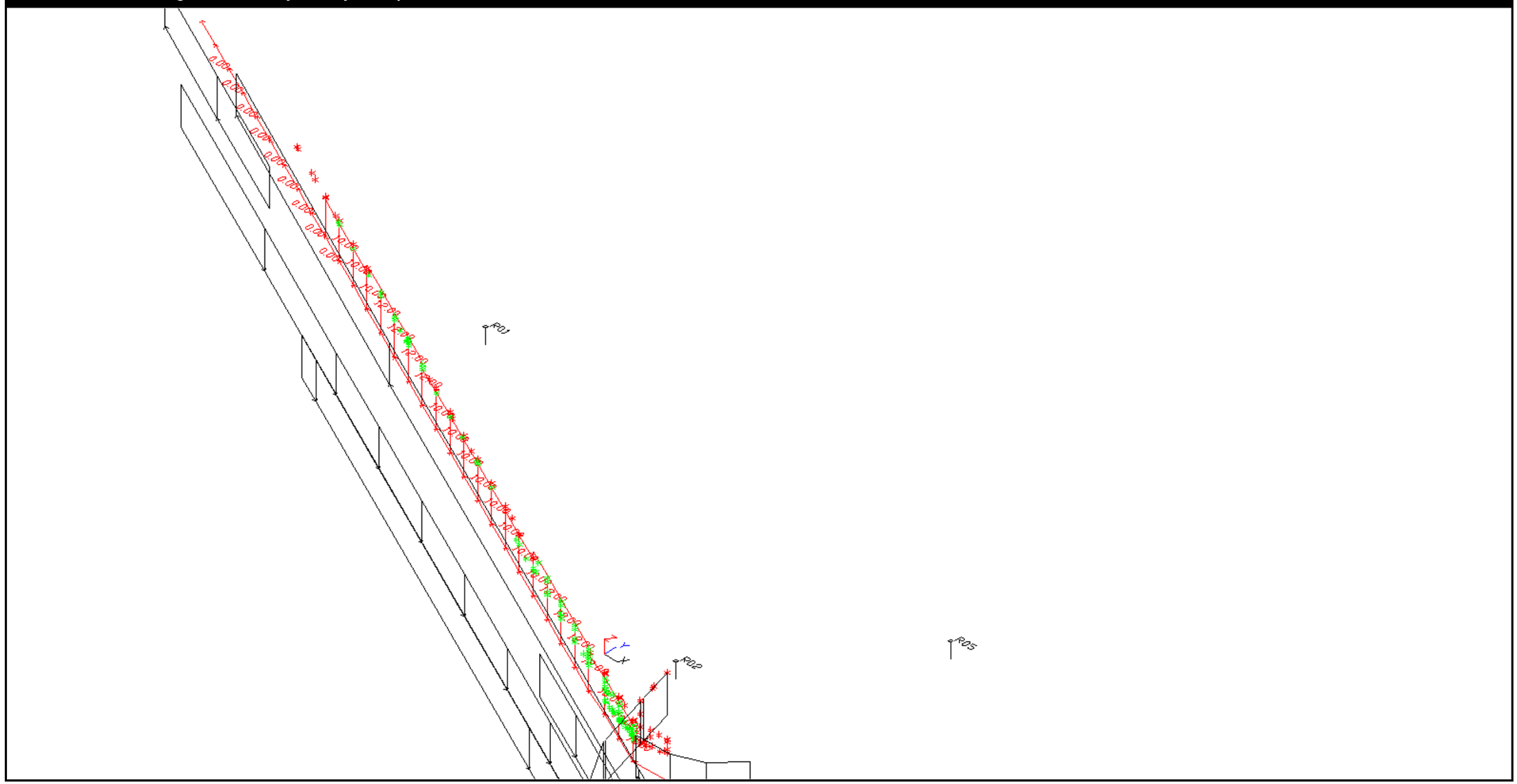
Design Goal	Meets Goal	Comments
1. Achieve 10 dB(A) insertion loss (noise reduction) at all critical sensitive receptors. If 10 dB(A) insertion loss is not practical, 7-9 dB(A) insertion loss is considered acceptable.	Yes	Two (2) critical sensitive receptors received 10 dB(A) insertion loss.
2. Achieve "With-Barrier" Modeled Noise Levels below the SHA Noise Impact Threshold (NIT) level of 66 dB(A) at all critical sensitive receptors.	Yes	All "With-Barrier" Modeled Noise Levels are below the SHA Noise Impact Threshold.
3. Achieve a certain degree of uniformity [within approximately 3 dB(A)] of "With-Barrier" Modeled Noise Levels throughout the project area at critical sensitive receptors. If the "With-Barrier" Modeled Noise Levels for any of the critical sensitive receptors are outside of the 3 dB(A) uniformity range, then it is considered acceptable if those levels are below the uniformity range.	Yes	The degree of uniformity for the "With-Barrier" Modeled Noise Levels was within 2 dB(A) [Range: 56 to 58 dB(A)] for all critical sensitive receptors.
4. The optimum barrier height should not exceed 24 feet. When necessary to achieve design and performance goals, a maximum barrier height of 34 feet is acceptable. Sound barriers in excess of 34 feet are only acceptable in short segments to account for terrain changes (i.e. swale crossing).	Yes	The maximum barrier height as optimized in TNM is 12 feet.
5. Noise barriers should break the line-of-sight between critical sensitive receptors (5 feet above ground) and the exhaust stack of a heavy-duty truck (typically 12 feet above pavement level).	Yes	The sound barrier breaks the Line-of-Sight at all critical sensitive receptors.

[7] Maryland Department of Transportation, State Highway Administration, Office of Environmental Design, Noise Abatement Team. 2000. Appendix C – Technical Design and Performance Criteria for Highway Sound Barrier Projects. Guidelines and Procedures for Program Administration and Technical Analysis and Reporting: C-1 – C-2.

Line of Sight Check

FIGURE G.6 below illustrates the Line-of-Sight Barrier Analysis performed in TNM. This shows that the line of sight from the top of truck stacks to all of the receivers is being blocked by the barrier.

FIGURE G.1 Line of Sight Barrier Analysis – Flyover Option



Sound Barrier Analysis Data

TABLE G.17 documents the Sound Barrier Analysis Data for *Build Barrier_2030PM_Flyover*. This table was used to develop the Sound Barrier Analysis and Modeled Noise Level Mapping.

TABLE G.17 Sound Barrier Analysis Summary – Flyover Option

Modeled Receptor Number[1]	"No Barrier" Modeled Noise Level [2]	"With-Barrier" Modeled Noise Level [3]	"With-Barrier" Noise Level + Background Noise (Rounded)	Insertion Loss[4]
R-01	72	62	62	10
R-02	72	62	62	10
R-05	63	59	59	4
Total Number of Impacted and Benefited Residences (receiving a 3 dB(A) or greater benefit)				**2**
Total Number of Non-Impacted and Benefited Residences (receiving a 5 dB(A) or greater benefit)				**0**
Total Number of Benefited Residences				**2**

LEGEND

Critical Sensitive Receptor

9. *The Receptor Number represents the TNM Modeled Receptor Site and corresponds to the Receiver Name in the TNM Model.*
10. *The "No-Barrier" Modeled Noise Level is the Noise Level (Leq[h]) generated by TNM Run 2030 BuildPM_flyover, for the "No-Barrier" condition.*
11. *The "With-Barrier" Modeled Noise Level is the Noise Level (Leq[h]) generated by the Flyover-NSA14 barrier within TNM Run Build Barrier_2030PM_flyover, for the "With Barrier" condition.*
12. *The Insertion Loss is the amount of Noise Reduction [dB(A)] from "No Barrier" 2030 Build Noise Level to "With Barrier" Noise Level + Background Noise (TNM Build Barrier_2030PM_Flyover).*

TABLE G.18 below summarizes the Sound Barrier Description for Flyover-*NSA 14* within TNM Run *Build Barrier_2030PM_Flyover.*

TABLE G.18 Sound Barrier Description – Flyover Option

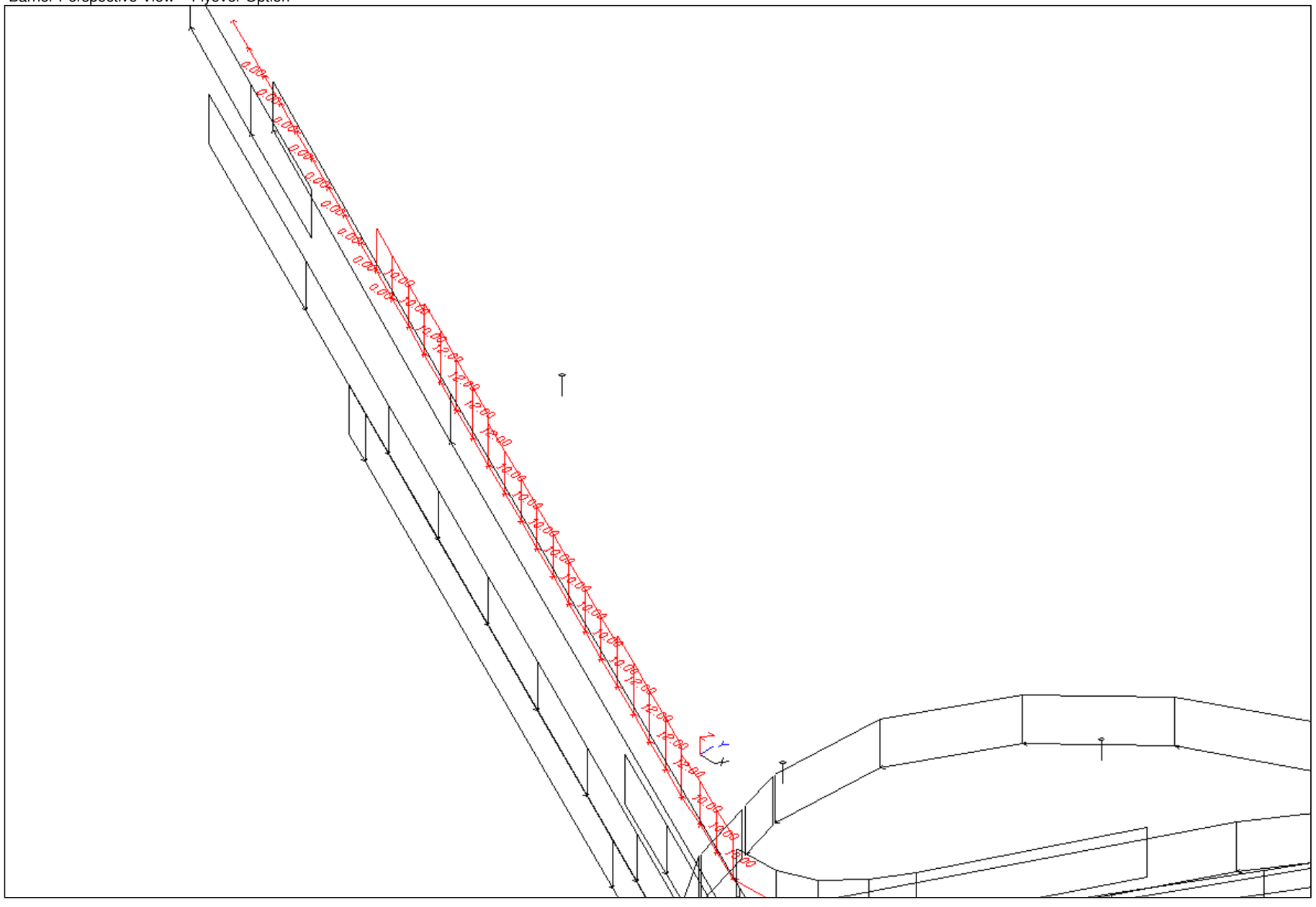
	Flyover OPTION
Area (square feet) (From TNM)	13,192
Length (feet)	1,101
Average Height (feet)	10.73
Minimum Height (feet)	10.00
Maximum Height (feet)	12.00

TNM Tables

Reproductions of the TNM Tables pertinent to this Appendix begin on the following pages:

TNM Table/Figure	TNM Run
Barrier Perspective View – Flyover Option	*Build Barrier_2030PM_Flyover*
Barrier Description – Flyover Option	*Build Barrier_2030PM_Flyover*
Barrier-Segment Description – Flyover Option	*Build Barrier_2030PM_Flyover*
Sound Levels – Flyover Option	*Build Barrier_2030PM_Flyover*

Barrier Perspective View – Flyover Option



Barrier Description – Flyover Option

RESULTS: BARRIER DESCRIPTIONS **MD4**

JMT **27 July 2009**
Run Date: July 22, 2009 **TNM 2.5**

RESULTS: BARRIER DESCRIPTIONS
PROJECT/CONTRACT: **MD4**
RUN: **BUILD BARRIER PM - MD4-FLYOVER**
BARRIER DESIGN: **FLY NSA14**

Barriers

Name	Type	Heights along Barrier			Length	If Wall	If Berm			Cost
		Min	Avg	Max		Area	Volume	Top Width	Run:Rise	
		ft	ft	ft	ft	sq ft	cu yd	ft	ft:ft	$
Barrier FLYOVER	W	10.00	10.73	12.00	1101	11816				0
									Total Cost:	0

Barrier-Segment Description – Flyover Option

RESULTS: BARRIER-SEGMENT DESCRIPTIONS MD4

JMT 27 July 2009
Run Date: July 22, 2009 TNM 2.5

RESULTS: BARRIER-SEGMENT DESCRIPTIONS
PROJECT/CONTRACT: MD4
RUN: BUILD BARRIER PM - MD4-FLYOVER
BARRIER DESIGN: FLY NSA14

Barriers		Segments										
Name	Type	Name	No.	Heights First Point	Average	Second Point	Length	If Wall Area	On Struc?	Important Reflections?	If Berm Volume	Cost
				ft	ft	ft	ft	sq ft			cu yd	$
Barrier FLYOVER	W	BRPSBMDB4	33	0.00	0.00	0.00	0	0				0
		BBFLY100	1	10.00	10.00	10.00	49	490				0
		point4	4	10.00	10.00	10.00	50	504				0
		point5	5	10.00	10.00	10.00	50	500				0
		point6	6	12.00	12.00	12.00	50	599				0
		point7	7	12.00	12.00	12.00	50	598				0
		point8	8	12.00	12.00	12.00	50	599				0
		point9	9	12.00	12.00	12.00	50	598				0
		point10	10	10.00	10.00	10.00	50	499				0
		point11	11	10.00	10.00	10.00	50	498				0
		point12	12	10.00	10.00	10.00	50	498				0
		point13	13	10.00	10.00	10.00	50	499				0
		point14	14	10.00	10.00	10.00	50	498				0
		point15	15	10.00	10.00	10.00	50	499				0
		point16	16	10.00	10.00	10.00	50	498				0
		point17	17	10.00	10.00	10.00	50	499				0
		point18	18	12.00	12.00	12.00	50	598				0
		BBFLY101	2	12.00	12.00	12.00	51	608				0
		point19	19	12.00	12.00	12.00	51	606				0
		point20	20	12.00	12.00	12.00	51	608				0
		point21	21	10.00	10.00	10.00	51	507				0
		point22	22	10.00	10.00	10.00	51	505				0
		point23	23	10.00	10.00	10.00	51	506				0
		point24	24	0.00	0.00	0.00	0	0				0
		point25	25	0.00	0.00	0.00	0	0				0
		point26	26	0.00	0.00	0.00	0	0				0

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RESULTS: BARRIER-SEGMENT DESCRIPTIONS MD4

		point27	27	0.00	0.00	0.00	0	0				0
		point28	28	0.00	0.00	0.00	0	0				0
		point29	29	0.00	0.00	0.00	0	0				0
		point30	30	0.00	0.00	0.00	0	0				0
		point31	31	0.00	0.00	0.00	0	0				0
		point32	32	0.00	0.00	0.00	0	0				0

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Sound Levels – Flyover Option

RESULTS: SOUND LEVELS MD4

JMT 27 July 2009
Run Date: July 22, 2009 TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: MD4
RUN: BUILD BARRIER PM - MD4-FLYOVER
BARRIER DESIGN: FLY NSA14
ATMOSPHERICS: 68 deg F, 50% RH

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

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over existing Calculated	Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
R01	10	1	0.0	71.9	66	71.9	10	Snd Lvl	62.2	9.7	8	1.7
R02	11	1	0.0	71.6	66	71.6	10	Snd Lvl	62.2	9.4	8	1.4
R05	13	1	0.0	60.8	66	60.8	10	----	58.6	2.2	8	-5.8

Dwelling Units	# DUs	Noise Reduction Min	Avg	Max
		dB	dB	dB
All Selected	3	2.2	7.1	9.7
All Impacted	2	9.4	9.5	9.7
All that meet NR Goal	2	9.4	9.5	9.7

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SOUND BARRIER DESIGN – SPUI OPTION

Sound Barrier Design Goal Compliance

SPUI barrier option is located in NSA 14 of the MD 4 study area. The barrier design selected is *SPUII-NSA14* within TNM Run *Build Barrier_2030PM_SPUI*. *SPUI-NSA14* was evaluated according to the SHA Design Goals[8]. TABLE G.19 summarizes *SPUI-NSA14* compliance to each goal. Design Goals 1, 2, 3 and 5 are primarily targeted at critical sensitive receptors. Design Goal 4 deals more with the physical aspects of the sound barrier. All five Design Goals were achieved.

TABLE G.19 Sound Barrier Design Goal Compliance – SPUI Option

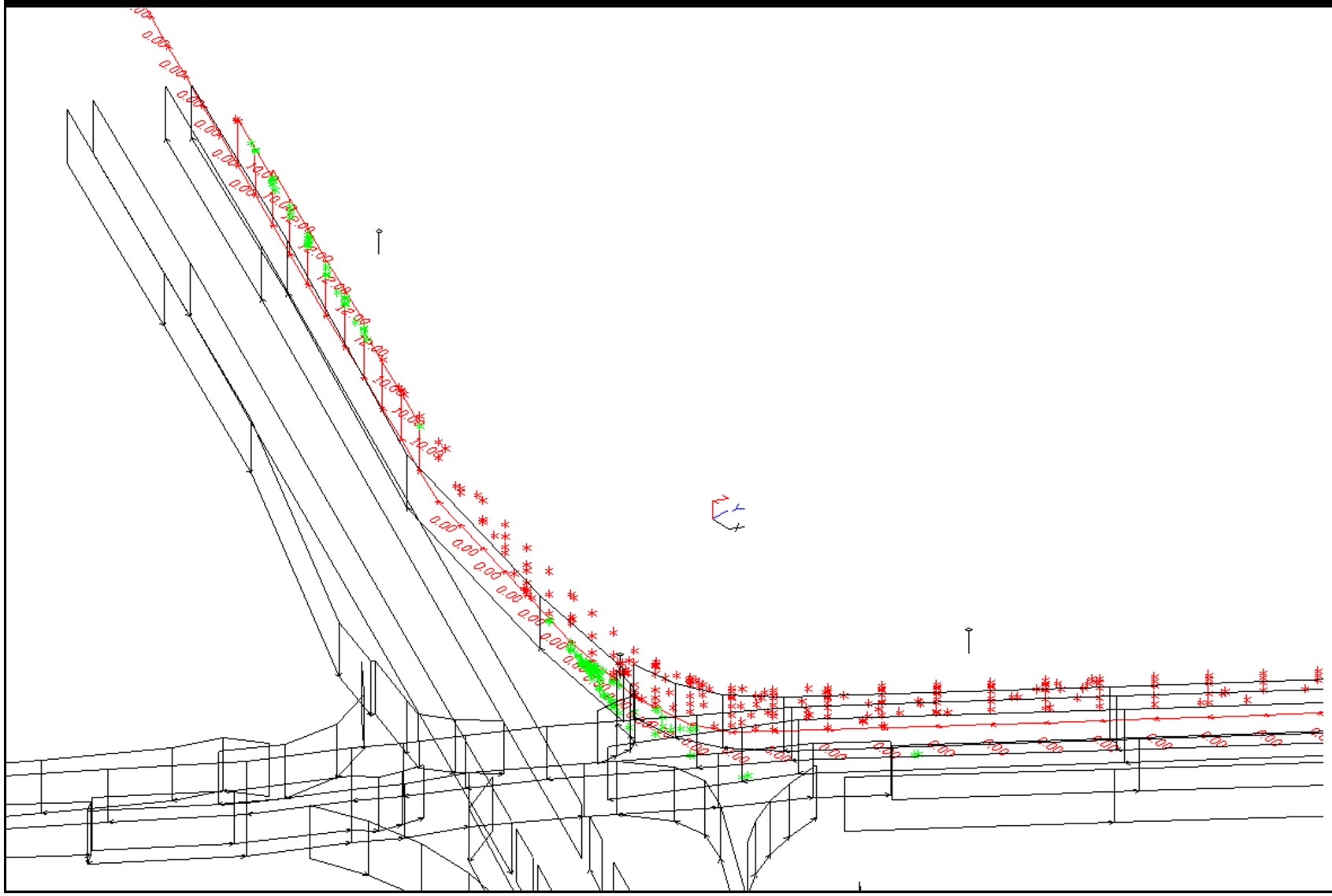
Design Goal	Meets Goal	Comments
1. Achieve 10 dB(A) insertion loss (noise reduction) at all critical sensitive receptors. If 10 dB(A) insertion loss is not practical, 7-9 dB(A) insertion loss is considered acceptable.	Yes	One (1) critical sensitive receptors received 10 dB(A) insertion loss.
2. Achieve "With-Barrier" Modeled Noise Levels below the SHA Noise Impact Threshold (NIT) level of 66 dB(A) at all critical sensitive receptors.	Yes	All "With-Barrier" Modeled Noise Levels are below the SHA Noise Impact Threshold.
3. Achieve a certain degree of uniformity [within approximately 3 dB(A)] of "With-Barrier" Modeled Noise Levels throughout the project area at critical sensitive receptors. If the "With-Barrier" Modeled Noise Levels for any of the critical sensitive receptors are outside of the 3 dB(A) uniformity range, then it is considered acceptable if those levels are below the uniformity range.	Yes	The degree of uniformity for the "With-Barrier" Modeled Noise Levels was within 2 dB(A) [Range: 56 to 58 dB(A)] for all critical sensitive receptors.
4. The optimum barrier height should not exceed 24 feet. When necessary to achieve design and performance goals, a maximum barrier height of 34 feet is acceptable. Sound barriers in excess of 34 feet are only acceptable in short segments to account for terrain changes (i.e. swale crossing).	Yes	The maximum barrier height as optimized in TNM is 12 feet.
5. Noise barriers should break the line-of-sight between critical sensitive receptors (5 feet above ground) and the exhaust stack of a heavy-duty truck (typically 12 feet above pavement level).	Yes	The sound barrier breaks the Line-of-Sight at all critical sensitive receptors.

[8] Maryland Department of Transportation, State Highway Administration, Office of Environmental Design, Noise Abatement Team. 2000. Appendix C – Technical Design and Performance Criteria for Highway Sound Barrier Projects. Guidelines and Procedures for Program Administration and Technical Analysis and Reporting: C-1 – C-2.

Line of Sight Check

FIGURE G.7 below illustrates the Line-of-Sight Barrier Analysis performed in TNM. This shows that the line of sight from the top of truck stacks to all of the receivers is being blocked by the barrier.

FIGURE G.7 Line of Sight Barrier Analysis – SPUI Option



Sound Barrier Analysis Data

TABLE G.20 documents the Sound Barrier Analysis Data for *Build Barrier_2030PM_SPUI*. This table was used to develop the Sound Barrier Analysis and Modeled Noise Level Mapping.

TABLE G.20 Sound Barrier Analysis Summary – SPUI Option

Modeled Receptor Number[1]	"No Barrier" Modeled Noise Level [2]	"With-Barrier" Modeled Noise Level [3]	"With-Barrier" Noise Level + Background Noise (Rounded)	Insertion Loss[4]
R-01	72	62	62	10
R-02 [5]	72			
R-05	63	60	60	3
Total Number of Impacted and Benefited Residences (receiving a 3 dB(A) or greater benefit)				**1**
Total Number of Non-Impacted and Benefited Residences (receiving a 5 dB(A) or greater benefit)				**0**
Total Number of Benefited Residences				**1**

LEGEND

Critical Sensitive Receptor

1. *The Receptor Number represents the TNM Modeled Receptor Site and corresponds to the Receiver Name in the TNM Model.*
2. *The "No-Barrier" Modeled Noise Level is the Noise Level (Leq[h]) generated by TNM Run 2030 BuildPM_SPUI, for the "No-Barrier" condition.*
3. *The "With-Barrier" Modeled Noise Level is the Noise Level (Leq[h]) generated by the SPUI-NSA14 barrier within TNM Run Build Barrier_2030PM_SPUI, for the "With Barrier" condition.*
4. *The Insertion Loss is the amount of Noise Reduction [dB(A)] from "No Barrier" 2030 Build Noise Level to "With Barrier" Noise Level + Background Noise (TNM Build Barrier_2030PM_SPUI).*
5. *The residential address associated with this receptor is a displacement in the 2030 Build SPUI Option.*

TABLE G.21 below summarizes the Sound Barrier Description for *SPUI-NSA 14* within TNM Run *Build Barrier_2030PM_SPUI.*

TABLE G.21 Sound Barrier Description – SPUI Option

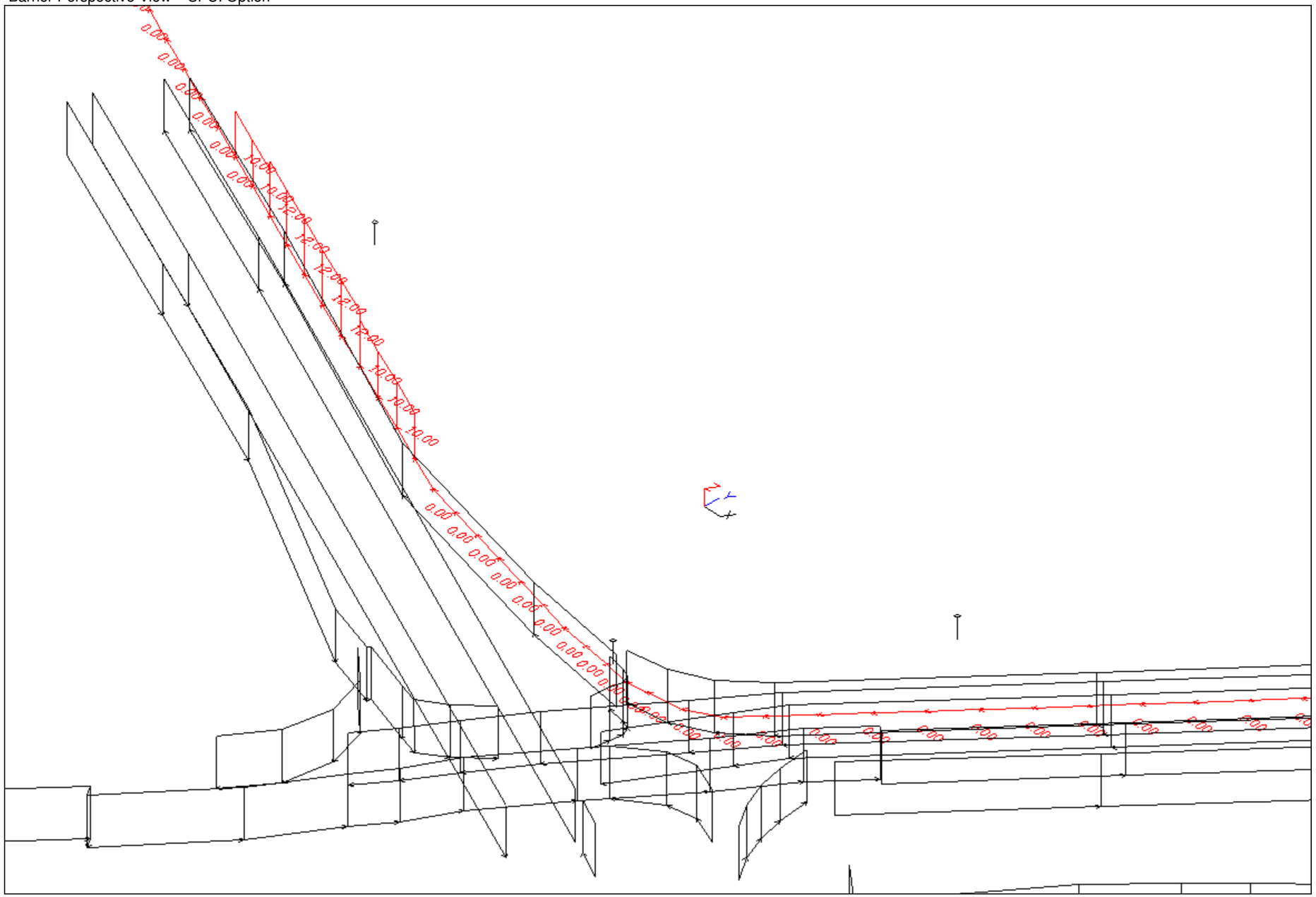
	SPUI OPTION
Area (square feet) (From TNM)	6,132
Length (feet)	501
Average Height (feet)	11.00
Minimum Height (feet)	10.00
Maximum Height (feet)	12.00

TNM Tables

Reproductions of the TNM Tables pertinent to this Appendix begin on the following pages:

TNM Table/Figure	TNM Run
Barrier Perspective View – SPUI Option	*Build Barrier_2030PM_SPUI*
Barrier Description – SPUI Option	*Build Barrier_2030PM_SPUI*
Barrier-Segment Description – SPUI Option	*Build Barrier_2030PM_SPUI*
Sound Levels – SPUI Option	*Build Barrier_2030PM_SPUI*

Barrier Perspective View – SPUI Option



Barrier Description – SPUI Option

RESULTS: BARRIER DESCRIPTIONS **MD4**

JMT **27 July 2009**
Run Date: July 24, 2009 **TNM 2.5**

RESULTS: BARRIER DESCRIPTIONS
PROJECT/CONTRACT: **MD4**
RUN: **BUILD BARRIER PM - MD4-SPUI**
BARRIER DESIGN: **INPUT HEIGHTS**

Barriers

Name	Type	Heights along Barrier			Length	If Wall	If Berm			Cost
		Min	Avg	Max		Area	Volume	Top Width	Run:Rise	
		ft	ft	ft	ft	sq ft	cu yd	ft	ft:ft	$
Barrier SPUI	W	20.00	20.00	20.00	2702	54039				0
									Total Cost:	0

Barrier-Segment Description – SPUI Option

RESULTS: BARRIER-SEGMENT DESCRIPTIONS MD4

JMT 27 July 2009
Run Date: July 24, 2009 TNM 2.5

RESULTS: BARRIER-SEGMENT DESCRIPTIONS
PROJECT/CONTRACT: MD4
RUN: BUILD BARRIER PM - MD4-SPUI
BARRIER DESIGN: INPUT HEIGHTS

Barriers		Segments										
Name	Type	Name	No.	Heights First Point	Average	Second Point	Length	If Wall Area	On Struc?	Important Reflections?	If Berm Volume	Cost
				ft	ft	ft	ft	sq ft			cu yd	$
Barrier SPUI	W	BBSPUI100	1	20.00	20.00	20.00	51	1010				0
		point9	9	20.00	20.00	20.00	51	1010				0
		point10	10	20.00	20.00	20.00	51	1010				0
		point11	11	20.00	20.00	20.00	51	1010				0
		point12	12	20.00	20.00	20.00	51	1010				0
		point13	13	20.00	20.00	20.00	51	1010				0
		point14	14	20.00	20.00	20.00	51	1010				0
		BBSPUI101	2	20.00	20.00	20.00	50	1001				0
		point15	15	20.00	20.00	20.00	50	1001				0
		point16	16	20.00	20.00	20.00	50	1001				0
		point17	17	20.00	20.00	20.00	50	1002				0
		point18	18	20.00	20.00	20.00	50	1001				0
		point19	19	20.00	20.00	20.00	50	1001				0
		point20	20	20.00	20.00	20.00	50	1001				0
		BBSPUI102	3	20.00	20.00	20.00	50	999				0
		point21	21	20.00	20.00	20.00	50	998				0
		point22	22	20.00	20.00	20.00	50	999				0
		point23	23	20.00	20.00	20.00	50	999				0
		point24	24	20.00	20.00	20.00	50	998				0
		point25	25	20.00	20.00	20.00	50	999				0
		BBSPUI103	4	20.00	20.00	20.00	37	738				0
		point56	56	20.00	20.00	20.00	40	796				0
		point54	54	20.00	20.00	20.00	43	850				0
		point55	55	20.00	20.00	20.00	38	756				0
		point51	51	20.00	20.00	20.00	49	985				0
		point52	52	20.00	20.00	20.00	49	983				0

G:\WORKING DATA\TNM RUNS\2030 BUILD BARRIER\2030PM\SPUI 1

RESULTS: BARRIER-SEGMENT DESCRIPTIONS MD4

		point53	53	20.00	20.00	20.00	49	985				0
		BBSPUI104	5	20.00	20.00	20.00	49	974				0
		point46	46	20.00	20.00	20.00	49	976				0
		point47	47	20.00	20.00	20.00	49	974				0
		point48	48	20.00	20.00	20.00	49	974				0
		point49	49	20.00	20.00	20.00	49	976				0
		point50	50	20.00	20.00	20.00	49	974				0
		BBSPUI105	6	20.00	20.00	20.00	50	1001				0
		point40	40	20.00	20.00	20.00	50	1001				0
		point41	41	20.00	20.00	20.00	50	1001				0
		point42	42	20.00	20.00	20.00	50	1003				0
		point43	43	20.00	20.00	20.00	50	1001				0
		point44	44	20.00	20.00	20.00	50	1001				0
		point45	45	20.00	20.00	20.00	50	1001				0
		BBSPUI106	7	20.00	20.00	20.00	50	1001				0
		point26	26	20.00	20.00	20.00	50	1003				0
		point27	27	20.00	20.00	20.00	50	1001				0
		point28	28	20.00	20.00	20.00	50	1001				0
		point29	29	20.00	20.00	20.00	50	1003				0
		point30	30	20.00	20.00	20.00	50	1001				0
		point31	31	20.00	20.00	20.00	50	1001				0
		point32	32	20.00	20.00	20.00	50	1003				0
		point33	33	20.00	20.00	20.00	50	1001				0
		point34	34	20.00	20.00	20.00	50	1001				0
		point35	35	20.00	20.00	20.00	50	1003				0
		point36	36	20.00	20.00	20.00	50	1001				0
		point37	37	20.00	20.00	20.00	50	1001				0
		point38	38	20.00	20.00	20.00	50	1003				0
		point39	39	20.00	20.00	20.00	50	1001				0

G:\WORKING DATA\TNM RUNS\2030 BUILD BARRIER\2030PM\SPUI 2

Sound Levels – SPUI Option

RESULTS: SOUND LEVELS MD4

JMT 27 July 2009
Run Date: July 24, 2009 TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: MD4
RUN: BUILD BARRIER PM - MD4-SPUI
BARRIER DESIGN: SPUI NSA14
ATMOSPHERICS: 68 deg F, 50% RH

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

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over existing Calculated	Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
M27	4	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
R01	10	1	0.0	71.8	66	71.8	10	Snd Lvl	61.9	9.9	8	1.9
R02	11	1	0.0	63.6	66	63.6	10	----	63.4	0.2	8	-7.8
R05	13	1	0.0	59.7	66	59.7	10	----	59.6	0.1	8	-7.9

Dwelling Units	# DUs	Noise Reduction Min	Avg	Max
		dB	dB	dB
All Selected	4	0.0	2.6	9.9
All Impacted	1	9.9	9.9	9.9
All that meet NR Goal	1	9.9	9.9	9.9

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REFERENCE FILES

Appendix G

http:\\projectcenter.jmt.com\01\01-0456-029\ProjectFiles\00-JMT\Report\Final\ MD4 Final_Appendix G 08-19-2009.doc

Q:\SMD\010456_029_MD 4 Noise Study\Working Data\Report\images for report\appx G

http:\\projectcenter.jmt.com\01\01-0456-029\ProjectFiles\00-JMT\TNM\ BarrierAnalysis.xls