NOISE IMPACT ANALYSIS TECHNICAL REPORT

Route 7- Construct Westbound Climbing Lane

Loudoun County

PROJECT: 6007-053-133, C501, P101, R201

UPC: 58599
From: Route 9
To: West Market Street

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1. Executive Summary

Potential traffic noise impacts associated with the proposed Route 7 westbound climbing lane project in Loudoun County, Virginia, were assessed in accordance with the procedures and criteria approved by the Federal Highway Administration (FHWA) and the Virginia Department of Transportation (VDOT). The proposed project would accommodate heavily loaded vehicles, facilitate the passage of following vehicles, and reduce the risk of rear end collisions along a long upgrade on westbound Route 7 between the Town of Leesburg and Route 9. The study corridor extends along Route 7 from Route 9 to West Market Street. A project location map is shown in ***Figure 1***.

Noise sensitive sites in the project study area include residential sites and three church buildings. A total of 69 sites were studied. Nine sites are predicted to be impacted as a result of approaching or exceeding the Noise Abatement Criteria (NAC) in the design year (2036) build condition. No sites are predicted to be impacted due to substantial noise increase. For all sites studied, the existing year noise levels range from 45 to 70 dBA. The design year (2036) no-build noise levels range from 46 to 71 dBA. The design year (2036) build noise levels range from 46 to 72 dBA.

Noise abatement was evaluated where future noise impacts are predicted to occur. Seven barriers were found to be feasible but not reasonable. A preliminary noise evaluation was performed and a more detailed review will be completed during final design. As such, noise barriers that are found to be feasible and reasonable during the preliminary noise analysis may also not be found to be feasible and reasonable during the final design noise analysis. Conversely, noise barriers that were not considered feasible and reasonable may meet the established criteria and be recommended for construction.

Construction activity may cause intermittent fluctuations in noise levels. During the construction phase of the project, all reasonable measures will be taken to minimize noise impact from these activities.

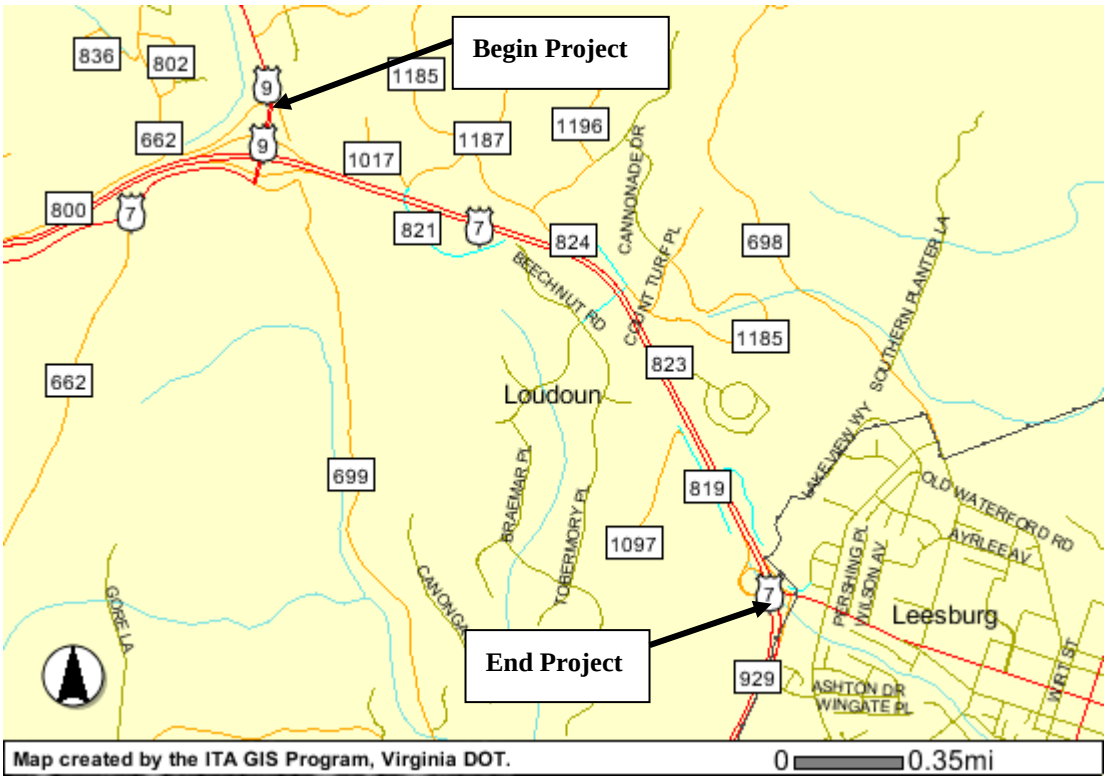


Figure 1: Project Location

2. Introduction

The objective of this analysis is to assess the potential traffic noise impact associated with the proposed roadway improvement project, and to evaluate potential noise abatement measures wherever impact is predicted to occur.

Noise impact assessment has been performed for all noise sensitive properties within the project corridor, including residential properties and three church facilities. Nine noise impacts are predicted to occur under the design year (2036) build condition as a result of levels approaching or exceeding the NAC. Eight sites are predicted to experience noise impacts in the no build condition. Three sites are predicted to experience noise impacts in the existing condition.

This report presents a description of noise terminology, the applicable standards and criteria, a description of the computations of existing and future noise levels, a projection of future noise levels, noise abatement, and a discussion of construction noise.

3. Methodology

3.1 Guidelines and Criteria

The potential noise impact of the proposed project has been assessed in accordance with FHWA guidelines published in the Code of Federal Regulations (23 CFR Part 772) and with the State Noise Abatement Policy. In order to determine the degree of impact of highway traffic noise on human activity, the NAC, ***Table 1***, established by 23 CFR Part 772 is used. The NAC, listed in ***Table 1*** for various activities, represent the upper limit of acceptable traffic noise conditions and also a balancing of that which may be desirable with that which may be achievable. The NAC applies to areas having regular human use and where lowered noise levels are desired. They do not apply to the entire tract of land on which the activity is based, but only to that portion where the activity takes place.

The NAC is given in terms of the hourly, A-weighted, equivalent sound level in decibels (dBA). The A-weighted sound level is a single number measure of sound intensity with weighted frequency characteristics that correspond to human subjective response to noise. However, since most environmental noise fluctuates from moment to moment, it is common practice to condense all of this information into a single number called the energy equivalent sound level (Leq). The Leq is the value of a steady sound level that would represent the same sound energy as the actual time-varying sound evaluated over the same time period. For highway traffic noise assessment, Leq is typically evaluated over a one-hour time period, and is denoted as Leq(h).

The noise impact assessment is made using the guidelines listed in ***Table 1***. Noise-sensitive land uses potentially affected by this project are in Category B, C and D. In situations where there are no exterior activities that would be affected by traffic noise (such as may occur at places of worship or schools), noise impact is assessed with respect to the FHWA NAC for Activity Category D.

If, for a given activity, the design year noise levels "approach or exceed" the NAC, then the activity is impacted and a series of abatement measures must be considered. The VDOT State Noise Abatement Policy defines "approach" as 1 dBA less than the NAC.

There is another criterion for assessing noise impact provided in the Federal guidelines. A receptor can be noise impacted if the design year build noise levels are substantially higher than existing levels. The VDOT State Noise Abatement Policy defines a substantial increase as 10 dBA or more, even though the levels may not reach the NAC.

If traffic noise impact is identified as a result of the project, then consideration of noise abatement measures is necessary. The final decision on whether or not to provide noise abatement along a project corridor will take into account the feasibility of the design and overall cost weighted against the environmental benefit.

Table 1: FHWA Noise Abatement Criteria

Hourly A-Weighted Sound Level Decibels (dBA)			
Activity Category	**Activity Leq(h)**	**Evaluation Location**	**Description Of Activity Category**
A	57	Exterior	Lands on which serenity and quiet are of extraordinary significance and serve an important public need and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose.
B*	67	Exterior	Residential
C*	67	Exterior	Active sport areas, amphitheaters, auditoriums, campgrounds, cemeteries, day care centers, hospitals, libraries, medical facilities, parks, picnic areas, places of worship, playgrounds, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, recreation areas, Section 4(f) sites, schools, television studios, trails, and trail crossings.
D	52	Interior	Auditoriums, day care centers, hospitals, libraries, medical facilities, places of worship, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, schools, and television studios.
E*	72	Exterior	Hotels, motels, offices, restaurants/bars, and other developed lands, properties or activities not included in A-D or F.
F	---	Exterior	Agriculture, airports, bus yards, emergency services, industrial, logging, maintenance facilities, manufacturing, mining, rail yards, retail facilities, shipyards, utilities (water resources, water treatment, electrical) and warehousing
G	---	---	Undeveloped lands that are not permitted
Source: 23 CFR Part 772			
*: Includes undeveloped lands permitted for this activity category			

3.2 Highway Noise Computation Model

A review of the project corridor has established roadway traffic as the dominant source of noise for the build alternative. Since roadway noise can be determined accurately through computer modeling techniques for areas that are dominated by road traffic, design year traffic noise calculations have been performed using the Federal Highway Administration's Traffic Noise Model (FHWA TNM®) Version 2.5. The FHWA TNM ® was developed and sponsored by the U. S. Department of Transportation and John A. Volpe National Transportation Systems Center, Acoustics facility. The TNM computer model can account for such factors as ground absorption, roadway geometry, receptor distance, shielding from local terrain and structures, vehicle volume, operating speed, and volumes of medium trucks (vehicles with 2 axles and 6 tires) and heavy trucks.

3.3 Traffic Data for Traffic Noise Computations

Traffic data for traffic noise computations were supplied as hourly volumes and operating speeds by roadway segment for the 2011 existing condition, and design-year 2036 no-build and build conditions. Separate medium and heavy truck percentages were provided by roadway segment. As required by FHWA and VDOT, the noise analysis was performed for the loudest hour of the day. Noise levels have been predicted for that hour of the day when the vehicle volume, operating speed, and number of trucks (vehicles with 3 or more axles) combine to produce the worst noise conditions. According to FHWA guidance, the "worst hourly traffic noise impact" occurs at a time when truck volumes and vehicle speeds are the greatest, typically when traffic is free flowing. For the design year build condition, the worst noise hour used in this study was 4 to 5 p.m.

4. Existing Noise Environment

To assess existing noise conditions within the project study area, short term noise monitoring was conducted. During the noise monitoring, a windshield survey of noise-sensitive land uses and identification of major sources of acoustical shielding was conducted to supplement the mapping provided.

Noise monitoring was conducted in the vicinity of noise-sensitive land uses near the proposed project alignment. The noise monitoring characterized existing noise levels in the study area but were not necessarily conducted during the loudest hour of the day. The monitoring data can be used as the baseline against which probable future noise levels are compared and potential impacts assessed. A validation exercise was carried out to evaluate the accuracy of the noise prediction model, and is presented in ***Section 4.2***, along with additional information about the computation methods.

4.1 Short Term Noise Monitoring

The purpose of noise monitoring is to gather data that is used to develop a comparison between the monitored results and the output obtained from the noise prediction model. This exercise is performed to validate the model so that it can be used with confidence to determine the worst hour noise levels, and predict the future noise levels.

Short-term noise measurements of 10 minutes duration were obtained at a total of four sites on April 25 and May 23, 2011 within the project corridor. These short-term measurements were collected using a Larson Davis System 824 Type I (precision) noise meter. Prior to noise monitoring, the noise meter was calibrated to 114 dB using CAL200 precision acoustic calibrator. Readings were in the A-weighted scale and were reported in decibels (dBA). The data collection procedure involved the Leq measurements in consecutive 10 seconds intervals. This method allows individual time intervals that include noise events unrelated to traffic noise (such as aircraft over flights) to be excluded from consideration. Data collected by the noise meter included time, average noise level (Leq), maximum noise level (Lmax), and instantaneous peak noise level (Lpk) for each interval. Hourly average noise levels (Leq (h)) were derived at each location from the 10 minute Leq values. Additional data collected at each monitoring location included atmospheric conditions such as wind speed humidity and ambient temperature.

A summary of the short-term noise monitoring results are presented in ***Table 2***. For each site, the table lists the assigned site number, the location and a description of the associated land use for each site, the monitored sound level, and the dominant sources of noise at each site. Ten minute traffic data (vehicle volume composition and speed) were also recorded on all roadways which were visible from the monitoring site and significantly contributed to the overall noise level. Traffic was grouped into one of the three categories: automobiles, medium trucks and heavy trucks, per VDOT procedure. The 10 minute traffic data was converted to one hour traffic data for validation of the noise model.

The location of each noise monitoring site in relation to the project roadway is shown on the graphics located in ***Appendix A***. The field data sheets are presented in ***Appendix B***. The monitored Leq in the study corridor ranged from 59.7 dBA to 62.7 dBA. Traffic noise from Route 7 was the dominant source of noise within the study area.

Table 2: Short-term Noise Monitoring Summary

Site	Location	Land-use Description	Dominant Sources of Noise	Leq (dBA)
M1	Leeland Orchard Rd	Residential	Route 7	62.7
M2	Fort Johnston Rd	Residential	Route 7	60.1
M3	Beechnut Rd	Residential	Route 7	61.9
M4	Silver Charm Pl	Residential	Route 7	59.7

NOTE: Short-term noise monitoring is not a process to determine design year noise impacts or barrier locations. Short-term noise monitoring provides a level of consistency between what is present in real-world situations and how that is represented in the computer noise model. Short-term monitoring does not need to occur within every CNE to validate the computer noise model.

4.2 Noise Model Validation

The modeling process began with model validation, as per VDOT requirements. This was accomplished by comparing the monitored noise levels and the noise levels generated by the computer model, using traffic volumes and speeds that were encountered during the monitoring process. This validation ensures that reported changes between the existing and future conditions are due to changes in traffic conditions, and not discrepancies between monitoring and modeling techniques. A difference of 3 dBA or less between the monitored and modeled levels is considered acceptable, since this is the limit of change detectable by a typical human ear.

The model validation was performed for the existing traffic conditions. However, since no 24-hour monitoring was performed to obtain the existing loudest hour, the existing noise levels obtained during the 10 minute monitoring sessions were not reported as the project's existing noise levels. Instead, existing worst case hour noise levels obtained from TNM after model validation were used as the existing noise levels for the project area.

A summary of the model validation is provided in ***Table 3***. As shown, for the validated sites, the difference between the modeled and monitored noise levels ranges from -0.9 to 2.9 dBA. This is within the acceptable ±3 dBA. With the sites validated, the existing condition model is considered to be calibrated for the observed site conditions.

Table 3: Noise Model Validation

Site	Monitored Noise Level (dBA)	Computed Noise Level (dBA)	Difference (Computed – Monitored)
M1	62.7	62.8	0.1
M2	60.1	61.7	1.6
M3	61.9	64.8	2.9
M4	59.7	58.8	-0.9

4.3 Modeled Existing Environment

For reporting purposes, the project area was divided into areas of Common Noise Environment (CNE). CNEs are defined as a group of receptors within the same Activity Category in ***Table 1*** that are exposed to similar noise sources and levels; traffic volumes, traffic mix, and speed; and topographic features. In accordance with VDOT guidance, noise sensitive receptors within 500 feet of the construction limits are considered as part of the evaluation.

Three sites are predicted to experience noise impact under the existing condition due to levels approaching or exceeding the NAC. For all studied sites, the existing year noise levels range from 45 to 70 dBA. A description of the CNEs is provided below.

NOTE: There are no undeveloped permitted lands within the project corridor.

CNE A – West of Route 9
CNE A is located north of Route 7 and west of Route 9 near the western terminus of the project corridor. CNE A contains three sites, A1-A3, representing three residential properties. Existing noise levels within CNE A range from 57 to 60 dBA. Noise impact is not predicted to occur under the existing condition.

CNE B – Between Route 9 and Silver Charm Road
CNE B is located north of Route 7 between Route 9 and Silver Charm Road. CNE B contains eight sites, B1–B8, representing seven residential properties and the Jehovah's Witness Leesburg church. Monitoring site M4 is within CNE B. Existing noise levels within CNE B range from 55 to 61 dBA. Noise impact is not predicted to occur under the existing condition.

CNE C – Between Silver Charm Road and Alysheba Drive
CNE C is located north of Route 7 between Silver Charm Road and Alysheba Drive. CNE C contains 13 sites, C1-C13, representing 13 residential properties. Existing noise levels within CNE C range from 45 to 65 dBA. Noise impact is not predicted to occur under the existing condition.

CNE D – Between Alysheba Drive and End of Project Limits
CNE D is located north of Route 7 between Alysheba Drive and the southern terminus of the project corridor. CNE D contains 17 sites, D1-D17, representing 30 residential properties, and the Holy Trinity Lutheran Church. Monitoring sites M1 and M2 are within CNE D. Existing noise levels within CNE D range from 51 to 65 dBA. Noise impact is not predicted to occur under the existing condition.

CNE E – Between West Market Street and Sunrise View Ct
CNE E is located south of Route 7 between West Market Street and Sunrise View Ct. CNE E contains three sites, E1-E3, representing two residential properties and the Church of Nazarene. Existing noise levels within CNE E range from 59 to 64 dBA. Noise impact is not predicted to occur under the existing condition.

CNE F – Between Sunrise View Ct and Route 9
CNE F is located south of Route 7 between Sunrise View Ct and Route 9. CNE F contains 25 sites, F1-F25, representing 29 residential properties. Existing noise levels within CNE F range from 50 to 70 dBA. Three noise sensitive sites are predicted to experience noise impacts due to levels approaching or exceeding the NAC, under the existing condition.

5. Future Noise Environment

Noise levels in the study area have been predicted for the design year (2036) no-build condition, and the design year (2036) build condition.

Assessment of traffic noise impact requires three comparisons:

(1) The noise levels under existing conditions must be compared to those under design year build conditions. This comparison shows the change in noise levels that will occur between the existing year and the design year if the project is constructed, to determine if the substantial increase impact criteria has been met.

(2) The noise levels under design year no-build conditions must be compared to those under design year build conditions. This comparison shows how much of the change in noise levels can actually be attributed to the proposed project.

(3) The noise levels under design year build conditions must be compared to the applicable NAC. This comparison determines if the impact criteria has been met under future build conditions and can be used to assist in noise compatible land use planning.

Noise impacts are predicted under the no-build and the build condition due to levels approaching or exceeding the NAC. Computed noise levels for all sites and conditions are listed in ***Table 4***. Descriptions of each CNE are included in ***section 4.3***.

5.1 No Build Alternative

Noise impact is predicted to occur at eight sites under the design year (2036) no-build condition. The no-build (2036) noise levels are predicted to range from 46 to 71 dBA.

CNE A – West of Route 9
No- build noise levels within CNE A are predicted to range from 58 to 61 dBA. Noise impact is not predicted to occur under the no-build condition.

CNE B – Between Route 9 and Silver Charm Road
No-build noise levels within CNE B are predicted to range from 56 to 62 dBA. Noise impact is not predicted to occur under the no-build condition.

CNE C – Between Silver Charm Road and Alysheba Drive
No-build noise levels within CNE C are predicted to range from 46 to 66 dBA. Noise impact is not predicted to occur under the no-build condition.

CNE D – Between Alysheba Drive and End of Project Limits
No-build noise levels within CNE D are predicted to range from 52 to 66 dBA. Two noise sensitive sites are predicted to experience noise impacts due to levels approaching or exceeding the NAC criteria, under the no-build condition.

CNE E – Between West Market Street and Sunrise View Ct
No-build noise levels within CNE E are predicted to range from 61 to 65 dBA. Noise impact is not predicted to occur under the no-build condition.

CNE F – Between Sunrise View Ct and Route 9
No-build noise levels within CNE F are predicted to range from 51 to 71 dBA. Five noise sensitive sites are predicted to experience noise impacts due to levels approaching or exceeding the NAC, under the no-build condition.

5.2 Build Alternative

Nine noise sensitive sites are impacted by traffic noise under the predicted future design build noise levels. Noise levels are predicted to range from 46 to 72 dBA.

CNE A – West of Route 9
Build noise levels within CNE A are predicted to range from 59 to 63 dBA. These noise sensitive locations are not impacted by traffic noise, Noise impact is not predicted to occur under the future design build condition.

CNE B – Between Route 9 and Silver Charm Road
Build noise levels within CNE B are predicted to range from 57 to 63 dBA. These noise sensitive sites are not impacted by traffic noise, under the future design build condition.

The Jehovah's Witnesses Leesburg Church is represented by site B1. The church has no regular outdoor activities. Indoor noise levels for the church were evaluated under Activity Category D in ***Table 1*** (FHWA Noise Abatement Criteria). Receptor site B1 was used to evaluate the building's interior noise levels. The design year build (2036) noise level for the exterior is predicted to be 59 dBA. Since the church exterior is composed of masonry material and modern air conditioning is installed, the reduction in noise levels in the interior as a result of the building is predicted to be 25 dBA (FHWA "Highway Traffic Noise Analysis and Abatement Policy and Guidance," January 2011). Therefore the indoor noise level for the church is not predicted to be impacted by traffic noise (Under Activity Category D indoor NAC) in the design year build (2036) condition.

CNE C – Between Silver Charm Road and Alysheba Drive
Build noise levels within CNE C are predicted to range from 46 to 67 dBA. Site C1 is predicted to experience noise impacts due to levels approaching or exceeding the NAC.

CNE D – Between Alysheba Drive and End of Project Limits
Build noise levels within CNE D are predicted to range from 53 to 66 dBA. Two sites are predicted to experience noise impacts due to levels approaching or exceeding the NAC.

The Holy Trinity Lutheran Church is represented by site D17. The church has no regular outdoor activities. Indoor noise levels for the church were evaluated under Activity Category D in ***Table 1*** (FHWA Noise Abatement Criteria). Receptor site D17 was used to evaluate the building's interior noise levels. The design year build (2036) noise level for the exterior is predicted to be 59 dBA. Since the church exterior is composed of masonry material and modern air conditioning is installed, the reduction in noise levels in the interior as a result of the building is predicted to be 25 dBA (FHWA "Highway Traffic Noise Analysis and Abatement Policy and

Guidance," January 2011). Therefore the indoor noise level for the church is not predicted to be impacted by traffic noise (Under Activity Category D indoor NAC) in the design year build (2036) condition.

CNE E – Between Sunrise View Ct and Route 9

Build noise levels within CNE E are predicted to range from 62 to 66 dBA. One site is predicted to experience noise impacts due to levels approaching or exceeding the NAC.

The Church of Nazarene has an outdoor playground represented by site E3. The design year build (2036) noise level for the playground is predicted to be 62 dBA which is not considered to be impacted by traffic noise. Indoor noise levels for the church were evaluated under Activity Category D in ***Table 1*** (FHWA Noise Abatement Criteria) using site E3. Since the church exterior is composed of masonry material and modern air conditioning is installed, the reduction in noise levels in the interior as a result of the building is predicted to be 25 dBA (FHWA "Highway Traffic Noise Analysis and Abatement Policy and Guidance," January 2011). Therefore the indoor noise level for the church is not predicted to be impacted by traffic noise (Under Activity Category D indoor NAC) in the design year build (2036) condition.

CNE F – Between White Gate Place and Route 9

Build noise levels within CNE F are predicted to range from 52 to 72 dBA. Five sites are predicted to experience noise impacts due to levels approaching or exceeding the NAC.

Site F22 and F23 are approximately the same distance from Route 7. However, site F23 is predicted to be noise impacted while F22 is not impacted. This variation can be attributed to the different terrain features at the two sites. The terrain features at site F22 act as natural shield which break the line of site between the receiver and the roadway, consequently reducing roadway noise. Site 23, on the other hand, is impacted because the topography between the site and the route 7 is flat, thus exposing the site to roadway noise.

Table 4: Computed Noise Levels

Receptor Number	Land Use	No. of Dwelling Units	Modeled Noise Levels			Noise Abatement Criteria*	Abatement Considered
			Existing	No-Build	Build 2036		
CNE A – West of Route 9							
A1	Residential	1	60	61	63	66	No
A2	Residential	1	59	60	61	66	No
A3	Residential	1	57	58	59	66	No
CNE B – Between Route 9 and Silver Charm Road							
B1	Jehovah's Witnesses Leesburg	N/A	58	59	59	66	No
			(33)	(34)	(34)	(52)	No
B2	Residential	1	59	60	61	66	No
B3	Residential	1	59	60	60	66	No
B4	Residential	1	58	59	60	66	No
B5	Residential	1	55	56	57	65	No
B6	Residential	1	57	59	59	66	No

Receptor Number	Land Use	No. of Dwelling Units	Modeled Noise Levels			Noise Abatement Criteria*	Abatement Considered
			Existing	No-Build	Build 2036		
B7	Residential	1	61	62	63	66	No
B8	Residential	1	56	57	58	66	No
CNE C – Between Silver Charm Road and Alysheba Drive							
C1	Residential	1	65	66	67	66	Yes
C2	Residential	1	60	61	62	66	No
C3	Residential	1	59	60	60	66	No
C4	Residential	1	63	64	64	66	No
C5	Residential	1	62	63	62	66	No
C6	Residential	1	45	46	46	55	No
C7	Residential	1	48	49	49	58	No
C8	Residential	1	48	49	49	58	No
C9	Residential	1	60	62	62	66	No
C10	Residential	1	59	60	61	66	No
C11	Residential	1	60	62	61	66	No
C12	Residential	1	53	54	55	63	No
C13	Residential	1	57	58	59	66	No
CNE D – Between Alysheba Drive and West Market Street							
D1	Residential	1	55	56	56	65	No
D2	Residential	1	65	66	66	66	Yes
D3	Residential	1	51	52	53	61	No
D4	Residential	1	52	53	54	62	No
D5	Residential	1	58	59	61	66	No
D6	Residential	5	61	62	62	66	No
D7	Residential	1	55	56	56	65	No
D8	Residential	1	59	60	61	66	No
D9	Residential	1	65	66	66	66	Yes
D10	Residential	1	52	53	54	62	No
D11	Residential	2	61	62	63	66	No
D12	Residential	5	53	53	54	63	No
D13	Residential	2	58	58	59	66	No
D14	Residential	4	60	61	61	66	No
D15	Residential	2	56	57	57	66	No
D16	Residential	1	58	58	59	66	No
D17	Holy Trinity Lutheran Church	N/A	58	58	59	66	No
			(33)	(33)	(34)	(52)	No
CNE E – Between West Market Street and White Gate Place							
E1	Residential	1	63	65	65	66	No
E2	Residential	1	64	65	66	66	Yes
E3	Church of Nazarene	N/A	59	61	62	66	No
			(34)	(36)	(37)	(52)	No
CNE F – Between White Gate Place and Route 9							
F1	Residential	1	50	51	52	60	No
F2	Residential	1	60	61	62	66	No
F3	Residential	1	56	57	58	66	No
F4	Residential	1	55	57	57	65	No
F5	Residential	2	58	59	60	66	No
F6	Residential	1	59	60	61	66	No
F7	Residential	1	60	61	62	66	No
F8	Residential	1	59	60	61	66	No

Receptor Number	Land Use	No. of Dwelling Units	Modeled Noise Levels			Noise Abatement Criteria*	Abatement Considered
			Existing	No-Build	Build 2036		
F9	Residential	1	58	59	59	66	No
F10	Residential	1	54	55	55	64	No
F11	Residential	1	54	55	55	64	No
F12	Residential	2	56	57	57	66	No
F13	Residential	1	56	57	58	66	No
F14	Residential	1	69	70	70	66	Yes
F15	Residential	1	61	62	63	66	No
F16	Residential	1	65	66	67	66	Yes
F17	Residential	1	68	69	70	66	Yes
F18	Residential	1	53	55	55	63	No
F19	Residential	1	64	66	67	66	Yes
F20	Residential	1	57	58	59	66	No
F21	Residential	3	58	59	59	66	No
F22	Residential	1	62	64	64	66	No
F23	Residential	1	70	71	72	66	Yes
F24	Residential	1	61	61	61	66	No
F25	Residential	1	61	61	62	66	No
Number of Noise Impacts							
			3	8	9		
Noise Level Ranges							
		Minimum	45	46	46		
		Maximum	70	71	72		
*	Criteria based on NAC or substantial increase, whichever is lower						
(#)	Indicates indoor noise levels						
	Indicates noise impact						

6. Noise Abatement

Predicted future design noise levels were predicted for the design year build condition due to levels approaching or exceeding the NAC. Therefore, per VDOT's State Noise Abatement Policy, noise abatement considerations are warranted for these impacted noise sensitive areas.

VDOT guidelines recommend a variety of mitigation measures that should be considered in response to transportation-related noise impacts. While noise barriers and/or earth berms are generally the most effective form of noise mitigation, additional mitigation measures exist which have the potential to provide considerable noise reductions, under certain circumstances. Mitigation measures considered for this project include:

- Traffic Management
- Alignment modifications;
- Acoustical insulation of public use and non-profit facilities;
- Construction of noise barriers;
- Construction of earth berms;

Additionally, the Noise Policy Code of Virginia (HB 2577, as amended by HB 2025) states: *Requires that whenever the Commonwealth Transportation Board or the Department plan for or undertake any highway construction or improvement project and such project includes or may include the requirement for the mitigation of traffic noise impacts, first consideration should be given to the use of noise reducing design and low noise pavement materials and techniques in lieu of construction of noise walls or sound barriers. Vegetative screening, such as the planting of appropriate conifers, in such a design would be utilized to act as a visual screen if visual screening is required.* Consideration will be given to these measures during the final design stage, where feasible. The response from project management is included in ***Appendix D.***

6.1 Alignment Modification and Traffic Management

The alteration of the horizontal and vertical alignment has been considered to reduce or eliminate the impacts created by the proposed project. Shifting the horizontal alignment to the outside or inside will create undesirable impacts such as right-of-way acquisition, temporary/permanent easements, and retaining walls. The vertical alignment for this project was developed with the intent of holding the existing grade as much as possible. The current design holds closely to the existing grade and provides room for milling/overlaying operations and cross slope correction. Placing the roadway in a deep cut is not feasible given that it would require a total reconstruction of the corridor.

Traffic management measures that may be considered in conjunction with this project include reduced speeds and truck restrictions. However, truck restrictions are not practical since the proposed west bound climbing lanes are intended for trucks. Reducing speeds will not be an effective noise mitigation measure since a substantial decrease in speed is necessary to provide adequate noise reduction. Typically, a 10 mph reduction in speed will result in only a 2 dBA decrease in noise level, which would not eliminate all impacts.

6.2 Noise Barriers

Noise walls and earth berms are often implemented into the highway design in response to the identified noise impacts. The effectiveness of a freestanding (post and panel) noise barrier and an earth berm of equivalent height are relatively consistent; however an earth berm is perceived as a more aesthetically pleasing option. The use of earth berms is not always an option due to the excessive space they require adjacent to the roadway corridor. At a standard slope of 2:1, every one-foot in height would require four feet of horizontal width. This requirement becomes more complex in urban settings where residential properties often abut the proposed roadway corridor. In these situations, implementation of earth berms can require significant property acquisitions to accommodate noise mitigation. The cost associated with the acquisition of property to construct a berm can significantly increase the total costs to implement this form of noise mitigation.

Availability of fill material to construct the berm also needs to be considered. On proposed projects where proposed grading yields excess waste material, earth berms are often cost effective mitigation options. On balance or borrow projects the implementation of earth berms is

often an expensive solution due to the need to identify, acquire, and transport the material to the project site. Earth berms may be considered a viable mitigation option throughout the project area, and would be evaluated further where possible in the final design stage.

As a general practice, noise barriers are most effective when placed at a relatively high point between the roadway and the impacted noise sensitive land use. To achieve the greatest benefit from a potential noise barrier, the goal of the barrier should focus on breaking the line-of-sight (to the greatest degree possible) from the roadway to the receptor. In roadway fill conditions, where the highway is above the natural grade, noise barriers are typically most effective when placed on the edge of the roadway shoulder or on top of the fill slope. In roadway cut conditions, where the roadway is located below the natural grade, barriers are typically most effective when placed at the top of the cut slope. Engineering and safety issues have the potential to alter these typical barrier locations.

The effectiveness of a noise barrier is measured by examining the barrier's capability to reduce future noise levels. Noise reduction is measured by comparing design year pre- and post-barrier noise levels. This difference between unabated and abated noise levels is known as insertion loss (IL). The following discussion presents potential mitigation measures for each of the impacted noise sensitive land uses.

According to VDOT guidelines, potential mitigation measures must also be assessed for feasibility and reasonableness. Noise barrier feasibility deals specifically with acoustical and engineering considerations such as:

- Noise barriers must reduce design year noise levels by 5 dBA (or more) for fifty percent (50%) (or more) of impacted sites;
- The barrier must be possible to design and construct, based on factors such as safety, barrier height, topography, drainage, utilities, maintenance, and access to adjacent properties.

Noise barrier reasonableness is determined by assessing multiple issues including:

- The viewpoints of the benefited receptors
- Cost effectiveness value, based on a square foot cost ceiling (maximum square footage of abatement per benefited receptor)
- Noise reduction design goal of 7 dBA of insertion loss for at least one impacted receptor

Typically, the limiting factor related to barrier reasonableness is the cost effectiveness value, where the total surface area of the barrier is divided by the number of benefited receptors receiving at least a 5 dBA reduction in noise level. VDOT's approved cost is based on a maximum square footage of abatement per benefited receptor, a value of 1,600 square feet per benefited receptor.

For non-residential properties such as parks and public use facilities, a special calculation is preformed in order to quantify the type and duration of activity and compare to the cost effectiveness criterion. The determination is based on cost, severity of impact (both in terms of

noise levels and the size of the impacted area and the activity it contains), and amount of noise reduction.

Noise barriers were evaluated in all areas predicted to experience noise impact in the build condition. Seven noise barriers were evaluated at seven different locations. The evaluated barriers were feasible but not reasonable because they exceeded the VDOT cost criteria and or they did not meet the VDOT 7 dBA design goal. Discussions of the individual barriers are listed below. The barrier locations are shown in ***Appendix A***. An overview of the evaluated barrier parameters is shown in ***Table 5***. Details of the barrier insertion loss are listed in ***Table 6***.

Barrier 1
Barrier 1 is located in CNE C, along the Route 7 west bound lane, approximately from Station 166+00 to 177+00. Barrier 1 has a uniform height of 12 feet and total length of 1,000 feet, resulting in a surface area of 12,000 square feet. The barrier would benefit one impacted property (Sites C1), and benefit two additional non-impacted properties, represented by site C2 and C3. This results in a ratio of 4,000 square feet per benefited receptor. This barrier is considered feasible, but not reasonable. The barrier is not reasonable because it exceeds the VDOT cost criteria for maximum square foot per benefited receptor.

Barrier 2
Barrier 2 is located in CNE D, along the Route 7 west bound lane, approximately from Station 217+50 to 223+00. Barrier 2 has a uniform height of 30 feet and total length of 539 feet, resulting in a surface area of 16,170 square feet. The barrier would benefit one impacted property, represented by site D2. This results in a ratio of 16,170 square feet per benefited receptor. This barrier is considered feasible, but not reasonable. The barrier is not reasonable because it exceeds the VDOT cost criteria for maximum square foot per benefited receptor, and at 30 feet height, does not meet the VDOT 7 dBA design goal. The barrier could not be designed any taller since VDOT allows a maximum barrier height of 30 feet.

Barrier 3
Barrier 3 is located in CNE D, on a slope top from the West Market Street on ramp to Route 7 west bound lane, approximately from Station 253+00 to 258+50. Barrier 3 has a uniform height of 16 feet and total length of 542 feet, resulting in a surface area of 8,672 square feet. The barrier would benefit one impacted property, represented by site D9. This results in a ratio of 8,672 square feet per benefited receptor. This barrier is considered feasible, but not reasonable. The barrier is not reasonable because it exceeds the VDOT cost criteria for maximum square foot per benefited receptor.

Barrier 4
Barrier 4 is located in CNE E, along Route 7 east bound lane, approximately from Station 240+00 to 247+00. Barrier 4 has a uniform height of 30 feet and total length of 700 feet, resulting in a surface area of 21,000 square feet. The barrier would benefit one impacted properties, represented by site E2. This results in a ratio of 21,000 square feet per benefited receptor. This barrier is considered feasible, but not reasonable. The barrier is not reasonable because it exceeds the VDOT cost criteria for maximum square foot per benefited receptor, and

at 30 feet height, does not meet the VDOT 7 dBA design goal. The barrier could not be designed any taller since VDOT allows a maximum barrier height of 30 feet.

Barrier 5

Barrier 5 is located in CNE F, along the Route 7 east bound lane, approximately from Station 178+00 to 184+00. Barrier 5 has a uniform height of 20 feet and total length of 600 feet, resulting in a surface area of 12,000 square feet. The barrier would benefit one impacted properties, represented by site F14. This results in a ratio of 12,000 square feet per benefited receptor. This barrier is considered feasible, but not reasonable. The barrier is not reasonable because it exceeds the VDOT cost criteria for maximum square foot per benefited receptor.

Barrier 6

Barrier 6 is located in CNE F, along the Route 7 east bound lane, approximately from Station 166+50 to 173+00. Barrier 6 has a uniform height of 16 feet and total length of 650 feet, resulting in a surface area of 10,400 square feet. The barrier would benefit two impacted properties, represented by sites F16 and F17. This results in a ratio of 5,200 square feet per benefited receptor. This barrier is considered feasible, but not reasonable. The barrier is not reasonable because it exceeds the VDOT cost criteria for maximum square foot per benefited receptor.

Barrier 7

Barrier 7 is located in CNE F, from the Route 9 on ramp to the Route 7 east bound lane, approximately from Station 36+00 to 161+00. Barrier 7 would have a uniform height of 12 feet and total length of 1,445 feet, resulting in a surface area of 17,340 square feet. The barrier would benefit two impacted properties, represented by sites F19 and F23 and benefit an addition non-impacted site represented by site F22. This results in a ratio of 5,780 square feet per benefited receptor. This barrier is considered feasible, but not reasonable. The barrier is not reasonable because it exceeds the VDOT cost criteria for maximum square foot per benefited receptor.

Table 5: Evaluated Noise Barrier Parameters

Barrier	Insertion Loss (IL)	Height (ft)	Length (ft)	Area (SF)	Benefitted	Area/Benefitted	Cost ($)
Barrier 1	5-7	12	1,000	12,000	3	4,000	$540,000
Barrier 2	5	30	539	16,170	1	16,170	$727,650
Barrier 3	2-7	16	542	8,672	1	8,672	$390,240
Barrier 4	5	30	700	21,000	1	21,000	$945,000
Barrier 5	7	20	600	12,000	1	12,000	$540,000
Barrier 6	3-9	16	650	10,400	2	5,200	$468,000
Barrier 7	5-9	12	1,445	17,340	3	5,780	$780,300

Table 6: Noise Barrier Insertion Loss

Receptor	Build Noise Level	Build With Barrier Noise Level	Insertion Loss (IL)*
Barrier 1			
C1	67	60	7
C2	62	57	5
C3	60	55	5
Barrier 2			

Receptor	Build Noise Level	Build With Barrier Noise Level	Insertion Loss (IL)*
D2	66	61	5
Barrier 3			
D8	61	59	2
D9	66	60	7
Barrier 4			
E2	66	61	5
Barrier 5			
F14	70	63	7
Barrier 6			
F15	63	60	3
F16	67	62	6
F17	70	61	9
Barrier 7			
F19	67	62	5
F22	64	58	7
F23	72	63	9
	Indicates noise impact		
*The calculated IL's might appear to be off due to rounding errors			

7. Construction Noise Considerations

Land uses that are sensitive to traffic noise, are also be sensitive to construction noise. A method of controlling construction noise is to establish the maximum level of noise that construction operations can generate. In view of this, VDOT has developed and FHWA has approved a specification that establishes construction noise limits. This specification can be found in VDOT's 2007 *Road and Bridge Specifications*, Section 107.16(b.3), "Noise". The contractor will be required to conform to this specification to reduce the impact of construction noise on the surrounding community.

8. Public Involvement Process

8.1 Public Involvement Efforts

For noise barriers determined to be feasible and reasonable, the affected public will be given an opportunity to decide whether they are in favor of construction of the noise barrier. A final determination as to the construction of barriers will be made after the public hearing process. Before final decisions and approvals can be made to construct a noise barrier, a final design noise analysis will be performed. For barriers that are determined to be feasible and reasonable, input from the impacted property owners and renters must be obtained through citizen surveys. Of the votes tallied, 50% or more must be in favor of a proposed noise barrier in order for that barrier to be considered further. Upon completion of the citizen survey, the VDOT Noise Abatement staff will make recommendations to the Chief Engineer for approval. Approved barriers will be incorporated into the road project plans.

8.2 Information for local government officials

FHWA and VDOT policies require that VDOT provides certain information to local officials within whose jurisdiction the highway project is located, to minimize future traffic noise impacts of Type I projects on currently undeveloped lands. (Type I projects involve highway improvements with noise analysis.) This information must include information on noise-compatible land-use planning, noise impact zones in undeveloped land in the highway project corridor. This section of the report provides that information, as well as information about VDOT's noise abatement program.

Noise-Compatible Land-Use Planning

Sections 12.1 and 12.2 of VDOT's 2011 Highway Traffic Noise Impact Analysis Guidance Manual outline VDOT's approach to communication with local officials, and provide information and resources on highway noise and noise-compatible land-use planning. VDOT's intention is to assist local officials in planning the uses of undeveloped land adjacent to highways to minimize the potential impacts of highway traffic noise.

Entering the Quiet Zone is a brochure that provides general information and examples to elected officials, planners, developers, and the general public about the problem of traffic noise and effective responses to it. A link to this brochure on FHWA's website is provided: http://www.fhwa.dot.gov/environment/noise/noise_compatible_planning/federal_approach/land_use/qz00.cfm

A wide variety of administrative strategies may be used to minimize or eliminate potential highway noise impacts, thereby preventing the need or desire for costly noise abatement structures such as noise barriers in future years. There are five broad categories of such strategies:

- Zoning,
- Other legal restrictions (subdivision control, building codes, health codes),
- Municipal ownership or control of the land,
- Financial incentives for compatible development, and
- Educational and advisory services.

The Audible Landscape: A Manual for Highway and Land Use is a very well-written and comprehensive guide addressing these noise-compatible land use planning strategies, with significant detailed information. This document is available through FHWA's Website, at http://www.fhwa.dot.gov/environment/noise/noise_compatible_planning/federal_approach/audible_landscape/al00.cfm

Noise Impact Zones in Undeveloped Land along the Study Corridor

Also required under the revised 2011 FHWA and VDOT noise policies is information on the noise impact zones adjacent to project roadways in undeveloped lands. To determine these zones, noise levels are computed at various distances from the edge of the project roadways in

each of the undeveloped areas of the project study area. Then, the distances from the edge of the roadway to the Noise Abatement Criteria sound levels are determined through interpolation. Distances vary in the project corridor due to changes in traffic volumes, or terrain features. These distances are given for this project in ***Table 7***. Any noise sensitive sites within these zones should be considered noise impacted if no barrier is present to reduce sound levels.

Table 7: Noise Impact Zones in Undeveloped Land for Local Government Officials

Section of Study Area	Distance from project roadway edge to Noise Abatement Criteria
	Build Condition
CNE A	<25 ft from edge of ramp
CBE B	165 ft from edge of pavement
CBE C	165-400 ft from edge of pavement
CBE D	160-250 ft from edge of pavement
CBE E	135-375 ft from edge of pavement
CBE F	60-220 ft from edge of pavement

VDOT's Noise Abatement Program

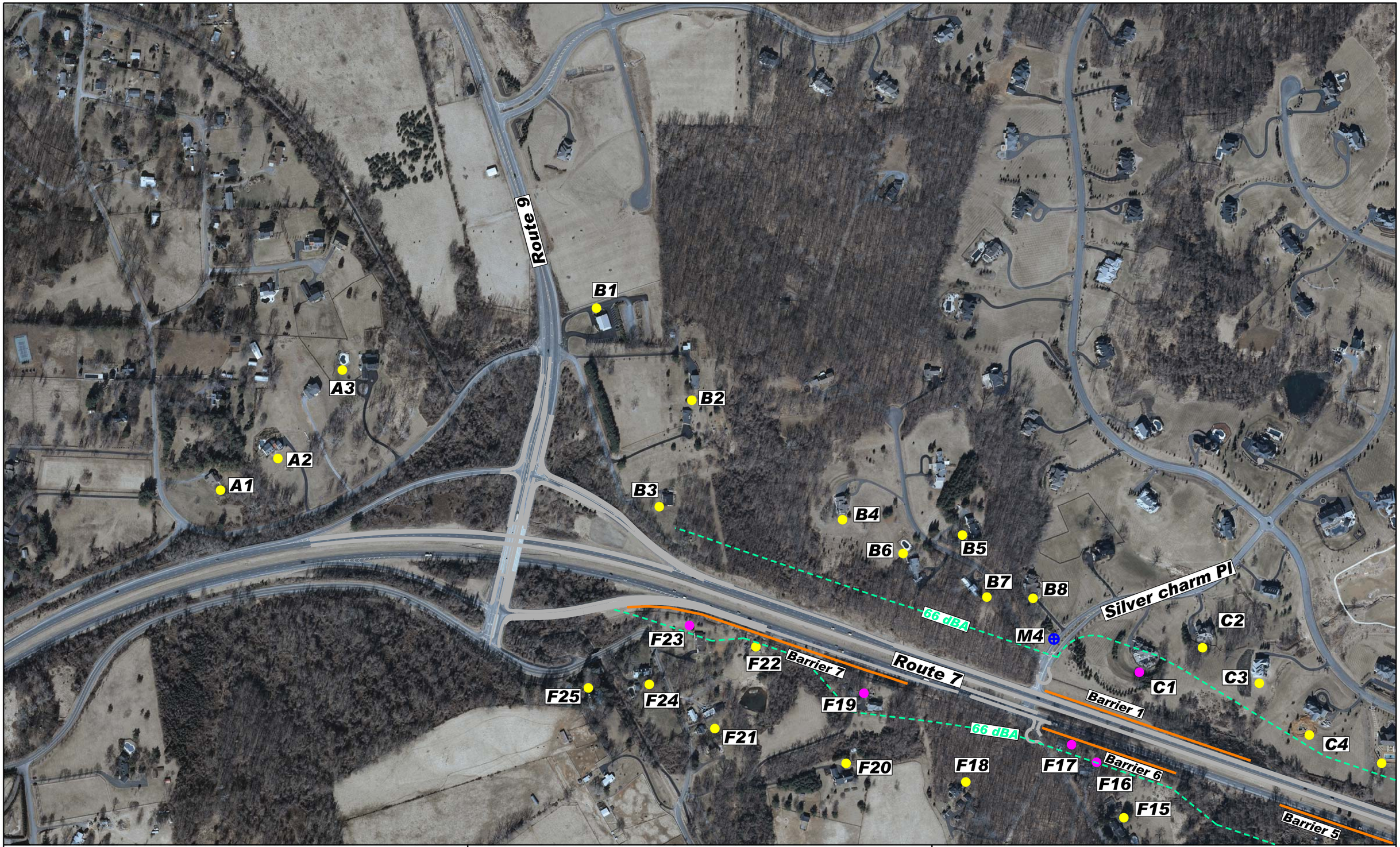
Information on VDOT's noise abatement program is available on VDOT's Website, at: http://www.virginiadot.org/projects/pr-noise-walls-about.asp . The site provides information on VDOT's noise program and policies, noise walls, and a downloadable noise wall brochure.

Appendix A

Coversheet

UPC: 58599 (Route 7 Construct West Bound Climbing Lane)
State Project Number: 6007-053-133, C501, P101, R201
VDOT

Sheet 1 of 4 Date: October 2011

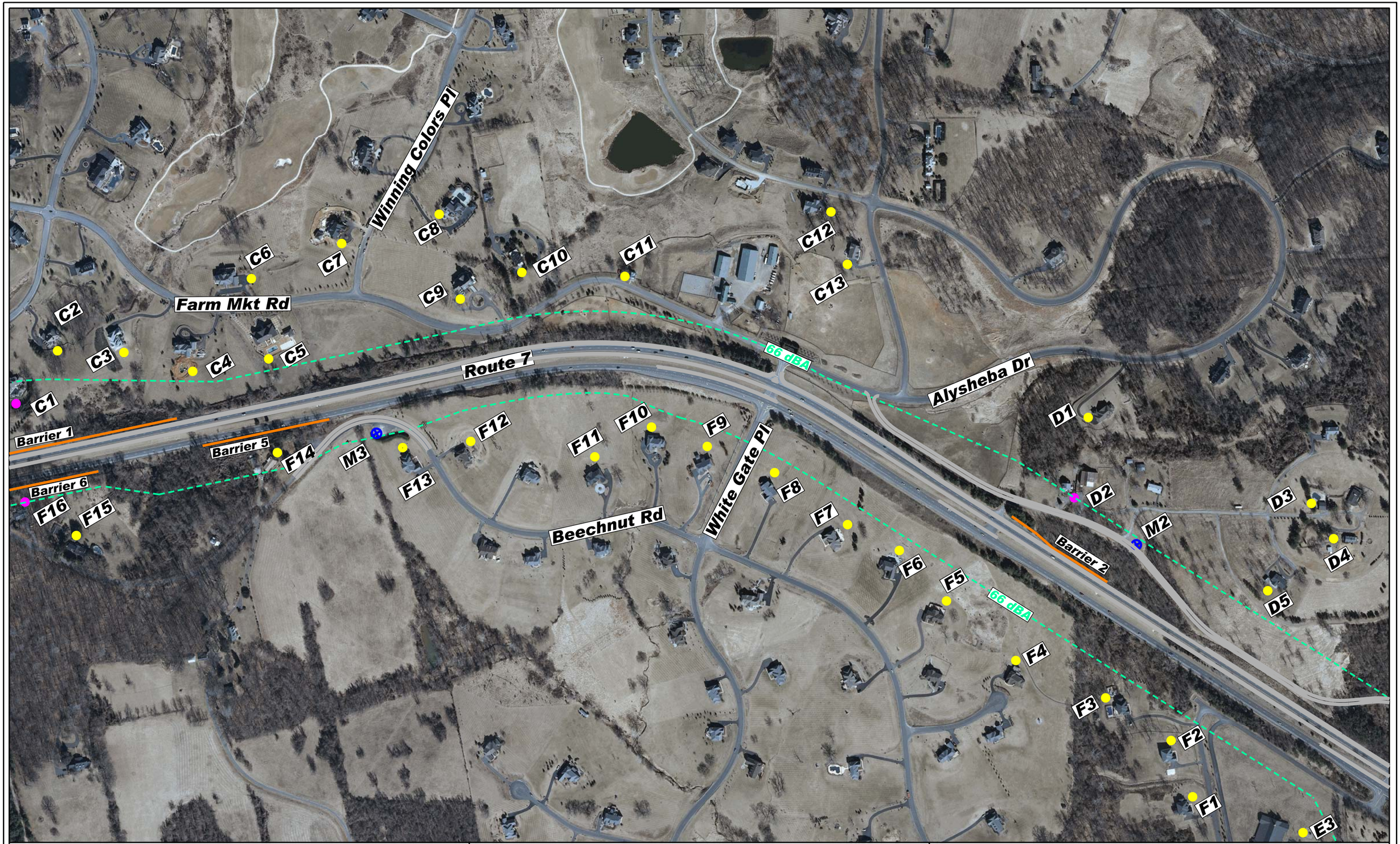


Receptor Site (Non-Impacted)
Receptor Site (Impacted)
Noise Monitoring Site
Proposed Alignment
Proposed Noise Barrier
66 dBA Contour

SCALE
0 200' 400'

UPC: 58599 (Route 7 Construct West Bound Climbing Lane)
State Project Number: 6007-053-133, C501, P101, R201
VDOT

 Date: October 2011

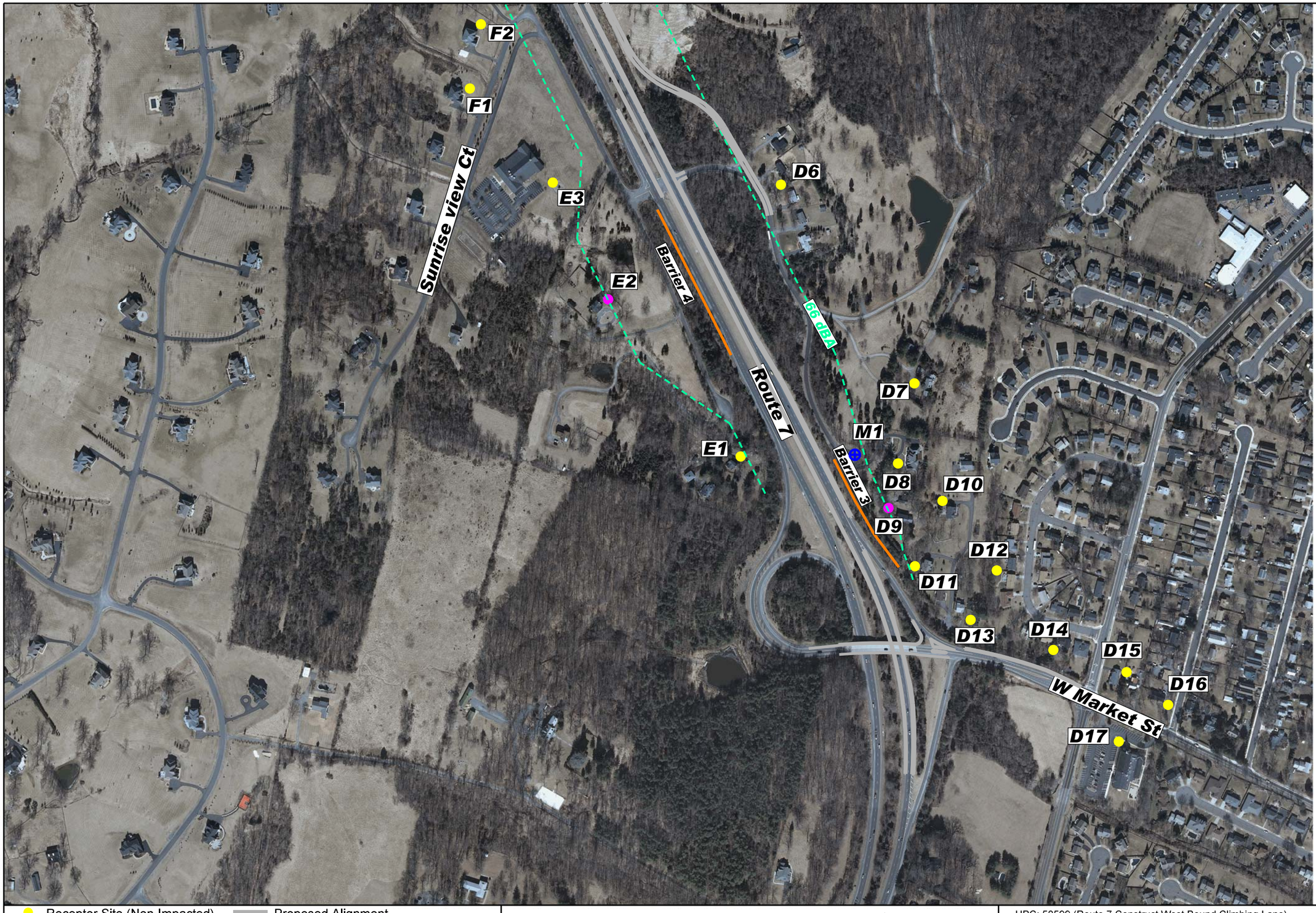


Receptor Site (Non-Impacted)
Receptor Site (Impacted)
Noise Monitoring Site
Proposed Alignment
Proposed Noise Barrier
66 dBA Contour

SCALE
0 200' 400'

UPC: 58599 (Route 7 Construct West Bound Climbing Lane)
State Project Number: 6007-053-133, C501, P101, R201
VDOT

Sheet 3 of 4 Date: October 2011



Receptor Site (Non-Impacted)
Receptor Site (Impacted)
Noise Monitoring Site
Proposed Alignment
Proposed Noise Barrier
66 dBA Contour

AERIAL IMAGERY COPYRIGHT 2006/2007 COMMONWEALTH OF VIRGINIA

SCALE
0 200' 400'

UPC: 58599 (Route 7 Construct West Bound Climbing Lane)
State Project Number: 6007-053-133, C501, P101, R201
VDOT

Sheet 4 of 4 Date: October 2011

Appendix B

State Project:6007-053-133, C501, P101, R201 (UPC 58599)
Route 7

Site # M1 **Description:** Leeland Orchard Rd
Meter # LD 824
Done by LJ

Monitoring Data:

Date	05/23/11
Start Time	10:00 AM
End time	10:10 AM
Duration	10 min
Peak/OffPeak	
Leq.	**62.4 dBA**

Calibration Data:

Begin Check	114 dBA
End Check	

Atmospheric Data

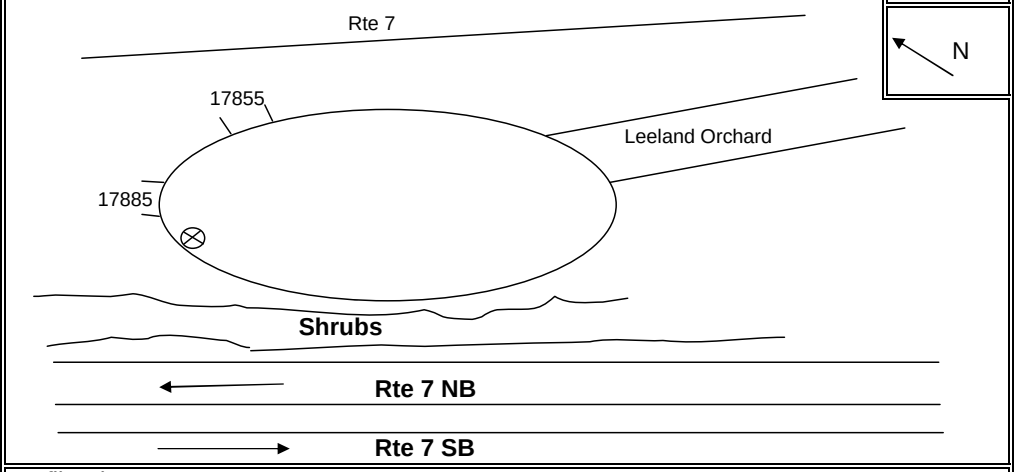
Wind Speed	Calm
Temp	69 F
Humidity	60%
Weather Conditions	Sunny

Traffic Counts:

	Rte 7 NB		Rte 7 SB			
Roadway						
Cars	152		305			
MT	5		14			
HT	2		13			
Speed	55 mph		55 mph			

Site Data: **Pavement Type:**

Plan View:



Profile View:

Monitoring Notes:

Time	Comment
10:00	
10:01	
10:02	
10:03	
10:04	
10:05	
10:06	
10:07	
10:08	
10:09	
10:10	

State Project:6007-053-133, C501, P101, R201 (UPC 58599)
Route 7

Site # M2 **Description:** Fort Johnston Rd
Meter # LD 824
Done by LJ

Monitoring Data:

Date	04/25/11
Start Time	11:35 AM
End time	11:45 AM
Duration	10 min
Peak/OffPeak	
Leq.	**60.1 dBA**

Calibration Data:

Begin Check	
End Check	

Atmospheric Data

Wind Speed	Calm
Temp	69 F
Humidity	60%

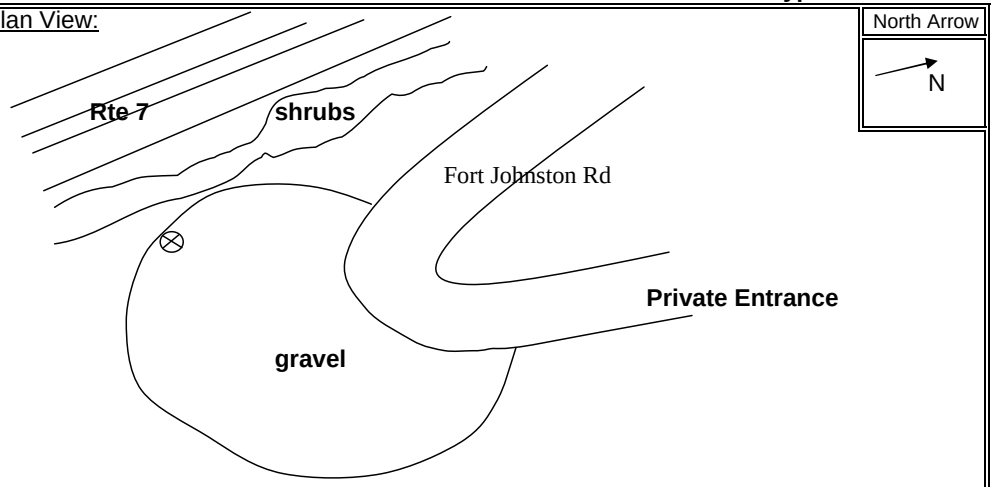
Weather Conditions
Sunny

Traffic Counts:

Roadway	Rte 7 NB		Rte 7 SB			
Cars	176		203			
MT	11		10			
HT	1		11			
Speed	55mph		5mph			

Site Data: **Pavement Type:**

Plan View:



Profile View:

Monitoring Notes:

Time	**Comment**

State Project:6007-053-133, C501, P101, R201 (UPC 58599)
Route 7

Site # M3 **Description:** Beechnut Rd
Meter # LD 824
Done by LJ

Monitoring Data:

Date	04/25/11
Start Time	12:00 AM
End time	12:10 PM
Duration	10 min
Peak/OffPeak	
Leq.	**61.9 dBA**

Calibration Data:

Begin Check	
End Check	

Atmospheric Data

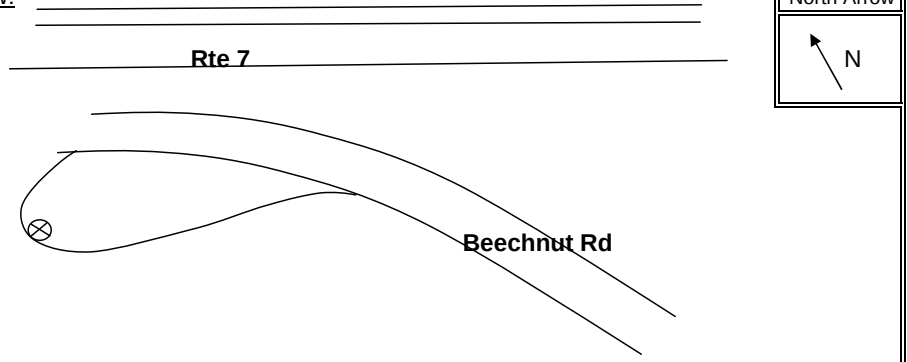
Wind Speed	Calm
Temp	69 F
Humidity	60%
Weather Conditions	Sunny

Traffic Counts:

Roadway	Rte 7 NB		Rte 7 SB			
Cars	117		188			
MT	12		6			
HT	6		4			
Speed	55mph		55mph			

Site Data: **Pavement Type:**

Plan View:



North Arrow

Profile View:

Monitoring Notes:

Time	**Comment**

State Project:6007-053-133, C501, P101, R201 (UPC 58599)
Route 7

Site # M4 **Description:** Silver Charm Pl
Meter # LD 824
Done by LJ

Monitoring Data:

Date	04/25/11
Start Time	12:35 PM
End time	12:45 PM
Duration	10 min
Peak/OffPeak	
Leq.	**59.7 dBA**

Calibration Data:

Begin Check	
End Check	114.2 dBA

Atmospheric Data

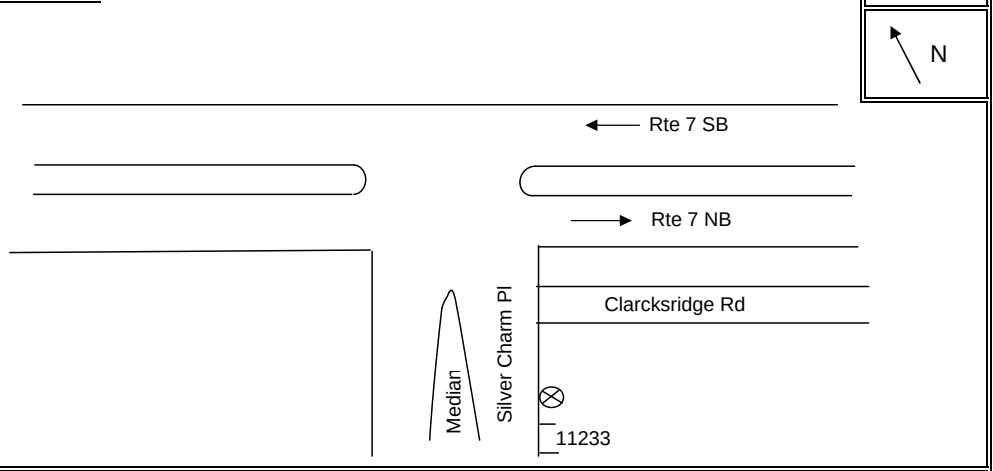
Wind Speed	Calm
Temp	69 F
Humidity	60%
Weather Conditions	Sunny

Traffic Counts:

Roadway	Rte 7 NB		Rte 7 SB			
Cars	189		197			
MT	12		13			
HT	11		7			
Speed	55mph		55mph			

Site Data: **Pavement Type:**

Plan View:



Profile View:

Monitoring Notes:

Time	**Comment**

Appendix C

VDOT Highway Traffic Noise Abatement
Warranted, Feasible, and Reasonable Worksheet

Note: Not all questions apply depending on the design phase which may cause differing answers between preliminary and final design phase. Answers to the questions may change depending on the design phase of the project.

Date:	31-Oct-11
Project No. and UPC:	58599
County:	Loudoun
District:	NOVA
Barrier System ID:	1
Community Name and/or CNE#	C
Noise Abatement Category(s)	B
Design phase:	Preliminary design

Warranted

1	Community Documentation (if applicable)	
a.	Date community was permitted. (Per 23CFR 772 this is the date the building permit was issued).	NA
b.	Date of approval for the Categorical Exclusion (CE), Record of Decision (ROD), or Finding of No Significant Impact (FONSI):	NA
c.	Does the date in 1.a precede the date in 1.b? If yes, proceed to Warranted Item 2. If no, consideration of noise abatement is not warranted. Proceed to "Decision" block and answer "no" to warranted question. As the reason for this decision, state that "Community was permitted after the date of approval of CE, ROD, or FONSI, as appropriate."	NA
2	Criteria requiring consideration of noise abatement	
a.	Project causes design year noise levels to approach or exceed the Noise Abatement Criteria?	Yes
b.	Project causes a substantial noise increase of 10 dB(A) or more?	No

Feasibility

1	Impacted receptor units	
a.	Number of impacted receptor units:	1
b.	Number of impacted receptor units receiving 5 dB(A) or more insertion loss (IL):	1
c.	Percentage of impacted receptor units receiving 5 dB(A) or more IL	100%
d.	Is the percentage 50 or greater?	Yes
2	Will placement of the noise barrier cause engineering or safety conflicts, e.g drainage issues or site distance issues?	No
3	Will placement of the noise barrier restrict access to vehicular or pedestrian travel?	No
4	Will placement of the noise barrier conflict with existing utility locations?	No

	Reasonableness	
1	**Surface Area (Square foot)-Benefit Factors**	
a.	Surface Area (Total square foot) of the proposed noise barrier. (ft^2)	12,000 SF
b.	Impacted noise sensitive receptor(s) receiving 5 dB(A) IL or more.	1
c.	Non-impacted noise sensitive receptor(s) receiving 5 dB(A) IL or more.	2
d.	Total number of benefited receptors.	3
e.	Surface Area per benefited receptor unit. (ft^2/BR)	4,000 SF/BR
f.	Is (1e) less than or equal to the maximum square feet per benefited receptor (MaxSF/BR) value of 1600?	No
g.	Does the barrier provide an IL of at least 7 dB(A) for at least one impacted receptor in the design year?	Yes
2	**Additional Noise Barrier Details**	
a.	Length of the proposed noise barrier. (ft)	1,000 ft
b.	Height range of the proposed noise barrier. (ft)	12-12 ft
c.	Average height of the proposed noise barrier. (ft)	12 ft
d.	Cost per square foot. ($/$ft^2$)	$45/SF
e.	Total Barrier Cost ($)	$540,000
f.	Barrier Material	NA
3	**Community Desires Related to the Barrier**	
	Do at least 50 percent of the benefited receptor unit owner(s) and renters desire the noise barrier? If yes, continue to "decision" block. If no, the barrier can be considered not to be reasonable. Proceed to “decision” block and answer “no” to reasonableness question. As the reason for this decision, state that “The majority of the impacted receptor unit owners do not desire the barrier.”	

Decision	
Is the Noise Barrier(s) WARRANTED?	Yes
Is the Noise Barrier(s) FEASIBLE?	Yes
Is the Noise Barrier(s) REASONABLE?	No

Additional Reasons for Decision:

Barrier not resonable. However, barrier will be further evaluated during final design phase of project.

VDOT Highway Traffic Noise Abatement
Warranted, Feasible, and Reasonable Worksheet

Note: Not all questions apply depending on the design phase which may cause differing answers between preliminary and final design phase. Answers to the questions may change depending on the design phase of the project.

Date:	31-Oct-11
Project No. and UPC:	58599
County:	Loudoun
District:	NOVA
Barrier System ID:	2
Community Name and/or CNE#	D
Noise Abatement Category(s)	B
Design phase:	Preliminary design

Warranted

1	Community Documentation (if applicable)	
a.	Date community was permitted. (Per 23CFR 772 this is the date the building permit was issued).	NA
b.	Date of approval for the Categorical Exclusion (CE), Record of Decision (ROD), or Finding of No Significant Impact (FONSI):	NA
c.	Does the date in 1.a precede the date in 1.b? If yes, proceed to Warranted Item 2. If no, consideration of noise abatement is not warranted. Proceed to "Decision" block and answer "no" to warranted question. As the reason for this decision, state that "Community was permitted after the date of approval of CE, ROD, or FONSI, as appropriate."	NA
2	Criteria requiring consideration of noise abatement	
a.	Project causes design year noise levels to approach or exceed the Noise Abatement Criteria?	Yes
b.	Project causes a substantial noise increase of 10 dB(A) or more?	No

Feasibility

1	Impacted receptor units	
a.	Number of impacted receptor units:	1
b.	Number of impacted receptor units receiving 5 dB(A) or more insertion loss (IL):	1
c.	Percentage of impacted receptor units receiving 5 dB(A) or more IL	100%
d.	Is the percentage 50 or greater?	Yes
2	Will placement of the noise barrier cause engineering or safety conflicts, e.g drainage issues or site distance issues?	No
3	Will placement of the noise barrier restrict access to vehicular or pedestrian travel?	No
4	Will placement of the noise barrier conflict with existing utility locations?	No

	Reasonableness	
1	**Surface Area (Square foot)-Benefit Factors**	
a.	Surface Area (Total square foot) of the proposed noise barrier. (ft^2)	16,170 SF
b.	Impacted noise sensitive receptor(s) receiving 5 dB(A) IL or more.	1
c.	Non-impacted noise sensitive receptor(s) receiving 5 dB(A) IL or more.	0
d.	Total number of benefited receptors.	1
e.	Surface Area per benefited receptor unit. (ft^2/BR)	16,170 SF/BR
f.	Is (1e) less than or equal to the maximum square feet per benefited receptor (MaxSF/BR) value of 1600?	No
g.	Does the barrier provide an IL of at least 7 dB(A) for at least one impacted receptor in the design year?	No
2	**Additional Noise Barrier Details**	
a.	Length of the proposed noise barrier. (ft)	539 ft
b.	Height range of the proposed noise barrier. (ft)	30-30 ft
c.	Average height of the proposed noise barrier. (ft)	30 ft
d.	Cost per square foot. ($/$ft^2$)	$45/SF
e.	Total Barrier Cost ($)	$727,650
f.	Barrier Material	NA
3	**Community Desires Related to the Barrier**	
	Do at least 50 percent of the benefited receptor unit owner(s) and renters desire the noise barrier? If yes, continue to "decision" block. If no, the barrier can be considered not to be reasonable. Proceed to “decision” block and answer “no” to reasonableness question. As the reason for this decision, state that “The majority of the impacted receptor unit owners do not desire the barrier.”	

Decision	
Is the Noise Barrier(s) WARRANTED?	Yes
Is the Noise Barrier(s) FEASIBLE?	Yes
Is the Noise Barrier(s) REASONABLE?	No

Additional Reasons for Decision:

Barrier not resonable. However, barrier will be further evaluated during final design phase of project.

VDOT Highway Traffic Noise Abatement
Warranted, Feasible, and Reasonable Worksheet

Note: Not all questions apply depending on the design phase which may cause differing answers between preliminary and final design phase. Answers to the questions may change depending on the design phase of the project.

Date:	31-Oct-11
Project No. and UPC:	58599
County:	Loudoun
District:	NOVA
Barrier System ID:	3
Community Name and/or CNE#	D
Noise Abatement Category(s)	B
Design phase:	Preliminary design

Warranted

1	Community Documentation (if applicable)	
a.	Date community was permitted. (Per 23CFR 772 this is the date the building permit was issued).	NA
b.	Date of approval for the Categorical Exclusion (CE), Record of Decision (ROD), or Finding of No Significant Impact (FONSI):	NA
c.	Does the date in 1.a precede the date in 1.b? If yes, proceed to Warranted Item 2. If no, consideration of noise abatement is not warranted. Proceed to "Decision" block and answer "no" to warranted question. As the reason for this decision, state that "Community was permitted after the date of approval of CE, ROD, or FONSI, as appropriate."	NA
2	Criteria requiring consideration of noise abatement	
a.	Project causes design year noise levels to approach or exceed the Noise Abatement Criteria?	Yes
b.	Project causes a substantial noise increase of 10 dB(A) or more?	No

Feasibility

1	Impacted receptor units	
a.	Number of impacted receptor units:	1
b.	Number of impacted receptor units receiving 5 dB(A) or more insertion loss (IL):	1
c.	Percentage of impacted receptor units receiving 5 dB(A) or more IL	100%
d.	Is the percentage 50 or greater?	Yes
2	Will placement of the noise barrier cause engineering or safety conflicts, e.g drainage issues or site distance issues?	No
3	Will placement of the noise barrier restrict access to vehicular or pedestrian travel?	No
4	Will placement of the noise barrier conflict with existing utility locations?	No

	Reasonableness	
1	**Surface Area (Square foot)-Benefit Factors**	
a.	Surface Area (Total square foot) of the proposed noise barrier. (ft^2)	8,672 SF
b.	Impacted noise sensitive receptor(s) receiving 5 dB(A) IL or more.	1
c.	Non-impacted noise sensitive receptor(s) receiving 5 dB(A) IL or more.	0
d.	Total number of benefited receptors.	1
e.	Surface Area per benefited receptor unit. (ft^2/BR)	8,672 SF/BR
f.	Is (1e) less than or equal to the maximum square feet per benefited receptor (MaxSF/BR) value of 1600?	No
g.	Does the barrier provide an IL of at least 7 dB(A) for at least one impacted receptor in the design year?	Yes
2	**Additional Noise Barrier Details**	
a.	Length of the proposed noise barrier. (ft)	542 ft
b.	Height range of the proposed noise barrier. (ft)	16-16 ft
c.	Average height of the proposed noise barrier. (ft)	16 ft
d.	Cost per square foot. ($/$ft^2$)	$45/SF
e.	Total Barrier Cost ($)	$390,240
f.	Barrier Material	NA
3	**Community Desires Related to the Barrier**	
	Do at least 50 percent of the benefited receptor unit owner(s) and renters desire the noise barrier? If yes, continue to "decision" block. If no, the barrier can be considered not to be reasonable. Proceed to “decision” block and answer “no” to reasonableness question. As the reason for this decision, state that “The majority of the impacted receptor unit owners do not desire the barrier.”	

Decision	
Is the Noise Barrier(s) WARRANTED?	Yes
Is the Noise Barrier(s) FEASIBLE?	Yes
Is the Noise Barrier(s) REASONABLE?	No

Additional Reasons for Decision:

Barrier not resonable. However, barrier will be further evaluated during final design phase of project.

VDOT Highway Traffic Noise Abatement
Warranted, Feasible, and Reasonable Worksheet

Note: Not all questions apply depending on the design phase which may cause differing answers between preliminary and final design phase. Answers to the questions may change depending on the design phase of the project.

Date:	31-Oct-11
Project No. and UPC:	58599
County:	Loudoun
District:	NOVA
Barrier System ID:	4
Community Name and/or CNE#	E
Noise Abatement Category(s)	B
Design phase:	Preliminary design

Warranted

1	Community Documentation (if applicable)	
a.	Date community was permitted. (Per 23CFR 772 this is the date the building permit was issued).	NA
b.	Date of approval for the Categorical Exclusion (CE), Record of Decision (ROD), or Finding of No Significant Impact (FONSI):	NA
c.	Does the date in 1.a precede the date in 1.b? If yes, proceed to Warranted Item 2. If no, consideration of noise abatement is not warranted. Proceed to "Decision" block and answer "no" to warranted question. As the reason for this decision, state that "Community was permitted after the date of approval of CE, ROD, or FONSI, as appropriate."	NA
2	Criteria requiring consideration of noise abatement	
a.	Project causes design year noise levels to approach or exceed the Noise Abatement Criteria?	Yes
b.	Project causes a substantial noise increase of 10 dB(A) or more?	No

Feasibility

1	Impacted receptor units	
a.	Number of impacted receptor units:	1
b.	Number of impacted receptor units receiving 5 dB(A) or more insertion loss (IL):	1
c.	Percentage of impacted receptor units receiving 5 dB(A) or more IL	100%
d.	Is the percentage 50 or greater?	Yes
2	Will placement of the noise barrier cause engineering or safety conflicts, e.g drainage issues or site distance issues?	No
3	Will placement of the noise barrier restrict access to vehicular or pedestrian travel?	No
4	Will placement of the noise barrier conflict with existing utility locations?	No

	Reasonableness	
1	**Surface Area (Square foot)-Benefit Factors**	
a.	Surface Area (Total square foot) of the proposed noise barrier. (ft^2)	21,000 SF
b.	Impacted noise sensitive receptor(s) receiving 5 dB(A) IL or more.	1
c.	Non-impacted noise sensitive receptor(s) receiving 5 dB(A) IL or more.	0
d.	Total number of benefited receptors.	1
e.	Surface Area per benefited receptor unit. (ft^2/BR)	21,000 SF/BR
f.	Is (1e) less than or equal to the maximum square feet per benefited receptor (MaxSF/BR) value of 1600?	No
g.	Does the barrier provide an IL of at least 7 dB(A) for at least one impacted receptor in the design year?	No
2	**Additional Noise Barrier Details**	
a.	Length of the proposed noise barrier. (ft)	700 ft
b.	Height range of the proposed noise barrier. (ft)	30-30 ft
c.	Average height of the proposed noise barrier. (ft)	30 ft
d.	Cost per square foot. ($/$ft^2$)	$45/SF
e.	Total Barrier Cost ($)	$945,000
f.	Barrier Material	NA
3	**Community Desires Related to the Barrier**	
	Do at least 50 percent of the benefited receptor unit owner(s) and renters desire the noise barrier? If yes, continue to "decision" block. If no, the barrier can be considered not to be reasonable. Proceed to “decision” block and answer “no” to reasonableness question. As the reason for this decision, state that “The majority of the impacted receptor unit owners do not desire the barrier.”	

Decision	
Is the Noise Barrier(s) WARRANTED?	Yes
Is the Noise Barrier(s) FEASIBLE?	Yes
Is the Noise Barrier(s) REASONABLE?	No

Additional Reasons for Decision:

Barrier not resonable. However, barrier will be further evaluated during final design phase of project.

VDOT Highway Traffic Noise Abatement
Warranted, Feasible, and Reasonable Worksheet

Note: Not all questions apply depending on the design phase which may cause differing answers between preliminary and final design phase. Answers to the questions may change depending on the design phase of the project.

Date:	31-Oct-11
Project No. and UPC:	58599
County:	Loudoun
District:	NOVA
Barrier System ID:	5
Community Name and/or CNE#	F
Noise Abatement Category(s)	B
Design phase:	Preliminary design

Warranted

1	Community Documentation (if applicable)	
a.	Date community was permitted. (Per 23CFR 772 this is the date the building permit was issued).	NA
b.	Date of approval for the Categorical Exclusion (CE), Record of Decision (ROD), or Finding of No Significant Impact (FONSI):	NA
c.	Does the date in 1.a precede the date in 1.b? If yes, proceed to Warranted Item 2. If no, consideration of noise abatement is not warranted. Proceed to "Decision" block and answer "no" to warranted question. As the reason for this decision, state that "Community was permitted after the date of approval of CE, ROD, or FONSI, as appropriate."	NA
2	Criteria requiring consideration of noise abatement	
a.	Project causes design year noise levels to approach or exceed the Noise Abatement Criteria?	Yes
b.	Project causes a substantial noise increase of 10 dB(A) or more?	No

Feasibility

1	Impacted receptor units	
a.	Number of impacted receptor units:	1
b.	Number of impacted receptor units receiving 5 dB(A) or more insertion loss (IL):	1
c.	Percentage of impacted receptor units receiving 5 dB(A) or more IL	100%
d.	Is the percentage 50 or greater?	Yes
2	Will placement of the noise barrier cause engineering or safety conflicts, e.g drainage issues or site distance issues?	No
3	Will placement of the noise barrier restrict access to vehicular or pedestrian travel?	No
4	Will placement of the noise barrier conflict with existing utility locations?	No

	Reasonableness	
1	**Surface Area (Square foot)-Benefit Factors**	
a.	Surface Area (Total square foot) of the proposed noise barrier. (ft^2)	12,000 SF
b.	Impacted noise sensitive receptor(s) receiving 5 dB(A) IL or more.	1
c.	Non-impacted noise sensitive receptor(s) receiving 5 dB(A) IL or more.	0
d.	Total number of benefited receptors.	1
e.	Surface Area per benefited receptor unit. (ft^2/BR)	12,000 SF/BR
f.	Is (1e) less than or equal to the maximum square feet per benefited receptor (MaxSF/BR) value of 1600?	No
g.	Does the barrier provide an IL of at least 7 dB(A) for at least one impacted receptor in the design year?	Yes
2	**Additional Noise Barrier Details**	
a.	Length of the proposed noise barrier. (ft)	600 ft
b.	Height range of the proposed noise barrier. (ft)	20-20 ft
c.	Average height of the proposed noise barrier. (ft)	20 ft
d.	Cost per square foot. ($/$ft^2$)	$45/SF
e.	Total Barrier Cost ($)	$540,000
f.	Barrier Material	NA
3	**Community Desires Related to the Barrier**	
	Do at least 50 percent of the benefited receptor unit owner(s) and renters desire the noise barrier? If yes, continue to "decision" block. If no, the barrier can be considered not to be reasonable. Proceed to “decision” block and answer “no” to reasonableness question. As the reason for this decision, state that “The majority of the impacted receptor unit owners do not desire the barrier.”	

Decision	
Is the Noise Barrier(s) WARRANTED?	Yes
Is the Noise Barrier(s) FEASIBLE?	Yes
Is the Noise Barrier(s) REASONABLE?	No

Additional Reasons for Decision:

Barrier not resonable. However, barrier will be further evaluated during final design phase of project.

VDOT Highway Traffic Noise Abatement
Warranted, Feasible, and Reasonable Worksheet

Note: Not all questions apply depending on the design phase which may cause differing answers between preliminary and final design phase. Answers to the questions may change depending on the design phase of the project.

Date:	31-Oct-11
Project No. and UPC:	58599
County:	Loudoun
District:	NOVA
Barrier System ID:	6
Community Name and/or CNE#	F
Noise Abatement Category(s)	B
Design phase:	Preliminary design

Warranted

1	Community Documentation (if applicable)	
a.	Date community was permitted. (Per 23CFR 772 this is the date the building permit was issued).	NA
b.	Date of approval for the Categorical Exclusion (CE), Record of Decision (ROD), or Finding of No Significant Impact (FONSI):	NA
c.	Does the date in 1.a precede the date in 1.b? If yes, proceed to Warranted Item 2. If no, consideration of noise abatement is not warranted. Proceed to "Decision" block and answer "no" to warranted question. As the reason for this decision, state that "Community was permitted after the date of approval of CE, ROD, or FONSI, as appropriate."	NA
2	Criteria requiring consideration of noise abatement	
a.	Project causes design year noise levels to approach or exceed the Noise Abatement Criteria?	Yes
b.	Project causes a substantial noise increase of 10 dB(A) or more?	No

Feasibility

1	Impacted receptor units	
a.	Number of impacted receptor units:	2
b.	Number of impacted receptor units receiving 5 dB(A) or more insertion loss (IL):	2
c.	Percentage of impacted receptor units receiving 5 dB(A) or more IL	100%
d.	Is the percentage 50 or greater?	Yes
2	Will placement of the noise barrier cause engineering or safety conflicts, e.g drainage issues or site distance issues?	No
3	Will placement of the noise barrier restrict access to vehicular or pedestrian travel?	No
4	Will placement of the noise barrier conflict with existing utility locations?	No

	Reasonableness	
1	**Surface Area (Square foot)-Benefit Factors**	
a.	Surface Area (Total square foot) of the proposed noise barrier. (ft^2)	10,400 SF
b.	Impacted noise sensitive receptor(s) receiving 5 dB(A) IL or more.	2
c.	Non-impacted noise sensitive receptor(s) receiving 5 dB(A) IL or more.	0
d.	Total number of benefited receptors.	2
e.	Surface Area per benefited receptor unit. (ft^2/BR)	5,200 SF/BR
f.	Is (1e) less than or equal to the maximum square feet per benefited receptor (MaxSF/BR) value of 1600?	No
g.	Does the barrier provide an IL of at least 7 dB(A) for at least one impacted receptor in the design year?	Yes
2	**Additional Noise Barrier Details**	
a.	Length of the proposed noise barrier. (ft)	650 ft
b.	Height range of the proposed noise barrier. (ft)	16-16 ft
c.	Average height of the proposed noise barrier. (ft)	16 ft
d.	Cost per square foot. ($/$ft^2$)	$45/SF
e.	Total Barrier Cost ($)	$468,000
f.	Barrier Material	NA
3	**Community Desires Related to the Barrier**	
	Do at least 50 percent of the benefited receptor unit owner(s) and renters desire the noise barrier? If yes, continue to "decision" block. If no, the barrier can be considered not to be reasonable. Proceed to “decision” block and answer “no” to reasonableness question. As the reason for this decision, state that “The majority of the impacted receptor unit owners do not desire the barrier.”	

Decision	
Is the Noise Barrier(s) WARRANTED?	Yes
Is the Noise Barrier(s) FEASIBLE?	Yes
Is the Noise Barrier(s) REASONABLE?	No

Additional Reasons for Decision:

Barrier not resonable. However, barrier will be further evaluated during final design phase of project.

VDOT Highway Traffic Noise Abatement
Warranted, Feasible, and Reasonable Worksheet

Note: Not all questions apply depending on the design phase which may cause differing answers between preliminary and final design phase. Answers to the questions may change depending on the design phase of the project.

Date:	31-Oct-11
Project No. and UPC:	58599
County:	Loudoun
District:	NOVA
Barrier System ID:	7
Community Name and/or CNE#	F
Noise Abatement Category(s)	B
Design phase:	Preliminary design

Warranted

1	Community Documentation (if applicable)	
a.	Date community was permitted. (Per 23CFR 772 this is the date the building permit was issued).	NA
b.	Date of approval for the Categorical Exclusion (CE), Record of Decision (ROD), or Finding of No Significant Impact (FONSI):	NA
c.	Does the date in 1.a precede the date in 1.b? If yes, proceed to Warranted Item 2. If no, consideration of noise abatement is not warranted. Proceed to "Decision" block and answer "no" to warranted question. As the reason for this decision, state that "Community was permitted after the date of approval of CE, ROD, or FONSI, as appropriate."	NA
2	Criteria requiring consideration of noise abatement	
a.	Project causes design year noise levels to approach or exceed the Noise Abatement Criteria?	Yes
b.	Project causes a substantial noise increase of 10 dB(A) or more?	No

Feasibility

1	Impacted receptor units	
a.	Number of impacted receptor units:	2
b.	Number of impacted receptor units receiving 5 dB(A) or more insertion loss (IL):	2
c.	Percentage of impacted receptor units receiving 5 dB(A) or more IL	100%
d.	Is the percentage 50 or greater?	Yes
2	Will placement of the noise barrier cause engineering or safety conflicts, e.g drainage issues or site distance issues?	No
3	Will placement of the noise barrier restrict access to vehicular or pedestrian travel?	No
4	Will placement of the noise barrier conflict with existing utility locations?	No

	Reasonableness	
1	**Surface Area (Square foot)-Benefit Factors**	
a.	Surface Area (Total square foot) of the proposed noise barrier. (ft^2)	17,340 SF
b.	Impacted noise sensitive receptor(s) receiving 5 dB(A) IL or more.	2
c.	Non-impacted noise sensitive receptor(s) receiving 5 dB(A) IL or more.	1
d.	Total number of benefited receptors.	3
e.	Surface Area per benefited receptor unit. (ft^2/BR)	5,780 SF/BR
f.	Is (1e) less than or equal to the maximum square feet per benefited receptor (MaxSF/BR) value of 1600?	No
g.	Does the barrier provide an IL of at least 7 dB(A) for at least one impacted receptor in the design year?	Yes
2	**Additional Noise Barrier Details**	
a.	Length of the proposed noise barrier. (ft)	1,345 ft
b.	Height range of the proposed noise barrier. (ft)	12-12 ft
c.	Average height of the proposed noise barrier. (ft)	12 ft
d.	Cost per square foot. ($/$ft^2$)	$45/SF
e.	Total Barrier Cost ($)	$780,300
f.	Barrier Material	NA
3	**Community Desires Related to the Barrier**	
	Do at least 50 percent of the benefited receptor unit owner(s) and renters desire the noise barrier? If yes, continue to "decision" block. If no, the barrier can be considered not to be reasonable. Proceed to “decision” block and answer “no” to reasonableness question. As the reason for this decision, state that “The majority of the impacted receptor unit owners do not desire the barrier.”	

Decision	
Is the Noise Barrier(s) WARRANTED?	Yes
Is the Noise Barrier(s) FEASIBLE?	Yes
Is the Noise Barrier(s) REASONABLE?	No

Additional Reasons for Decision:

Barrier not resonable. However, barrier will be further evaluated during final design phase of project.

Appendix D

COMMONWEALTH of VIRGINIA

DEPARTMENT OF TRANSPORTATION
1401 EAST BROAD STREET
RICHMOND, VIRGINIA 23219-2000

Gregory A. Whirley
Commissioner

September 06, 2011

MEMORANDUM

TO: Mark Gibney PE, Project Manager
Steven Varner, Environmental Contact

FROM: Lovejoy (LJ) Muchenje PE, Noise Abatement Engineer

SUBJECT: UPC 58599

The 2009 General Assembly passed Chapter 120 (HB 2577, as amended by HB2025), which amends the Code of Virginia by adding in Article 15 of Chapter 1 of Title 33.1 a section numbered 33.1-223.2:21, relating to highway noise abatement.

House Bill 2025 States: Requires that whenever the Commonwealth Transportation Board or the Department plan for or undertake any highway construction or improvement project and such project includes or may include the requirement for the mitigation of traffic noise impacts, first consideration should be given to the use of noise reducing design and low noise pavement materials and techniques in lieu of construction of noise walls or sound barriers. Vegetative screening, such as the planting of appropriate conifers, in such a design would be utilized to act as a visual screen if visual screening is required.

In an effort to honor the intent of HB 2025 we are asking for your input (per Chapter VI of Materials Division's Manual of Instruction and Section 2B-3 Determination of Roadway Design of the VDOT Road Design manual (pages 2B-5 and 2B-6)). As part of the Noise Technical Report and technical files, we are seeking your professional opinion by providing comments for the project noted above. Please distribute this memorandum to the appropriate District staff and combine all responses into one response.

Should you have any questions, please contact me at (804) 371-6768. Thank you for your time and consideration regarding this request.

Comment: Is noise reducing design feasible in lieu of construction of noise walls or sound barriers? For example, the roadway alignment can be shifted away from noise sensitive receptors or the roadway can be placed in deep cut (Location & Design to address)

Response: The horizontal alignment for this project was developed with the intent of limiting impacts to the outside and providing enough room to the inside for an additional lane. The current design, arrived through alternative studies and public input, provides the best solution to meet these goals. Shifting the horizontal alignment to the outside or inside will create undesirable impacts such as right-of-way acquisition, temporary/permanent easements, and retaining walls.

The vertical alignment for this project was developed with the intent of holding the existing grade as much as possible. The current design holds closely to the existing grade and provides room for milling/overlaying operations and cross slope correction. Placing the roadway in a deep cut is not feasible given that it would require a total reconstruction of the corridor. (Mark Gibney, NOVA Location & Design)

Comment: Can the project support the use of low noise pavement in lieu of construction of noise walls or sound barriers? (Materials Division to address)

Response: The Virginia Department of Transportation is not authorized by the Federal Highway Administration to use "quiet pavement" at this time as a form of noise mitigation. Upon completion of the Quiet Pavement Pilot Program and approval from FHWA, the use of "quiet pavement" will be given additional consideration. (LJ Muchenje, C.O. Environmental)

Comment: Can landscaping be utilized to act as a visual screen if visual screening is required? (Location & Design to address)

Response: Landscaping can be used as a visual screen if it is required. The landscaping must be placed outside of the clear zone, must not decrease driver sight distance, and must not require additional right of way. (Mark Gibney, NOVA Location & Design)

Note: Please provide the name of each responder.