

Final Noise Abatement Design Report Technical Memorandum Noise Barriers 13D and 13E

495 Express Lanes Northern Extension (NEXT) Project

Fairfax County, Virginia

VDOT Project No. 0495-029-419; UPC 113414
Federal Project No. NHPP-495-5(095)

HMMH Report No. 312870.000
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1 Purpose and Background

This Technical Memorandum for Noise Barrier 13D and Noise Barrier 13E is an addendum to the 495 Express Lanes Northern Extension (NEXT) Final Noise Abatement Design Report (NADR), dated April 2023. These noise barriers, along with the related analyses, were removed from the NADR to allow for additional noise barrier analyses to be conducted in this area. The following sections detail the evaluation of design year noise levels, results of the noise impact assessment, and evaluation of noise abatement and recommended noise barrier configurations.

2 Evaluation of Design Year Noise Levels (2045) and Noise Impact Assessment

2.1 CNE K and CNE S

CNE K and CNE S are located on the northbound side of I-495, between Old Dominion Drive and Lewinsville Road. CNE K is located along Scotts Run Road, north of Lewinsville Road and contains 98 receptors including 70 single-family residences (Activity Category B) and 27 recreational receptors along a hiking trail in Scott's Run Preserve (Activity Category C). Additionally, one church (Activity Category D) is located within CNE K. For receptors classified as Activity Category D, indoor (interior) noise levels are based on the TNM-computed outdoor (exterior) traffic noise level along that façade closest to the highway and an estimated outdoor-to-indoor noise level reduction (OINLR) for the building. The OINLR is based on the values in Table 6 of the FHWA "Highway Traffic Noise: Analysis and Abatement Guidance"¹ for the construction of the building and the condition of the windows. For Category D land use in the study area, an OINLR value of 25 dB was used, which assumes the building is of masonry construction and has single-glazed windows. CNE S is comprised of 30 receptors all of which are single-family residences (Activity Category B) located between Old Dominion Drive and Dulany Drive. CNE K and CNE S are shown on Figure 1, Sheet 3 and 4.

An existing noise barrier, Noise Barrier 13D, is located within this area and provides noise abatement to receptors located within CNE K and CNE S. Noise Barrier 13D is located along I-495 northbound, between Lewinsville Road and Old Dominion Drive. Due to the proposed widening along I-495 northbound, Noise Barrier 13D would be physically impacted by the Project and would therefore require the full length of the barrier to be replaced in kind. To determine the effectiveness of the existing barrier with construction of the Project, the full in-kind replacement of Noise Barrier 13D was used during the evaluation of Design Year 2045 traffic-noise levels for receptors within CNE K and S. Design Year traffic-noise levels with the in-kind replacement of Noise Barrier 13D are predicted to range between 41 and 67 dBA, with noise impacts predicted at eight residential receptors within CNE K and 10 residential receptors within CNE S. These results are summarized within Table 2 of Appendix A. Per VDOT guidance, when additional receptors are impacted as a result of the project, modifications to the in-kind barrier

¹ "Highway Traffic Noise: Analysis and Abatement Guidance," Federal Highway Administration, U.S. DOT, June 2010, revised January 2011. Available at (accessed on 4/4/2022): http://www.fhwa.dot.gov/environment/noise/regulations_and_guidance/analysis_and_abatement_guidance/revguidance.pdf

replacement must be evaluated to protect the remaining impacted receptors. These modifications and results of the noise abatement analyses are discussed in Section 3 below.

2.2 CNE I and CNE T

CNE I and CNE T are located on the northbound side of I-495 between Georgetown Pike and Old Dominion Drive. CNE I is bounded by Georgetown Pike and Westerly Lane and contains 64 receptors, including 60 single-family residences (Activity Category B), two places of worship represented by three receptors (I-033, I-045, and I-046), and one receptor at the Cooper Middle School (Activity Category C).² CNE T is located between Westerly Lane and Old Dominion Drive and is comprised of 22 receptors, all of which are single-family residences (Activity Category B). CNE I and CNE T are shown in Figure 1, Sheet 1 and 2.

An existing noise barrier, Noise Barrier 13E, is located within this area and provides noise abatement to receptors located within CNE I and CNE T. Noise Barrier 13E is located along I-495 northbound, between Old Dominion Drive and Georgetown Pike. Due to the proposed widening along I-495 northbound, the southern section of Noise Barrier 13E would be physically impacted by the Project and would therefore require approximately 2,411 feet of the barrier between Old Dominion Drive and the McLean Presbyterian Church to be replaced in kind. Approximately 1,576 feet of Noise Barrier 13E will remain in place without modification. To determine the effectiveness of the existing barrier with construction of the Project, the partial in-kind replacement of Noise Barrier 13E was used during the evaluation of Design Year 2045 traffic-noise levels for receptors within CNE I and T. For receptors within CNE I that are located behind the section of the existing Noise Barrier 13E that would remain in place, design year noise levels are predicted to range between 33 and 65 dBA. Per VDOT policy, since traffic-noise levels with construction of the Project would be below the applicable FHWA NAC, this section of Noise Barrier 13E would remain in place without modification. For receptors located within CNE I and CNE T that are located behind the section of existing Noise Barrier 13E that would be replaced in kind, traffic-noise levels in the Build condition are predicted to range between 52 and 67 dBA, with noise impacts predicted at six residential receptors located within CNE I. Design Year traffic-noise levels at receptors located within CNE T are predicted to be below the applicable FHWA NAC and therefore would not be impacted by the Project. These results are summarized within Table 3 of Appendix A. Per VDOT guidance, when additional receptors are impacted as a result of the project, modifications to the in-kind barrier replacement must be evaluated to protect the remaining impacted receptors. These modifications and results of the noise abatement analyses are discussed in Section 3 below.

2.3 Noise Barrier Reflections

It should be noted that the study area includes existing noise barriers on either side of I-495. Therefore, supplemental analyses to account for the effects of reflected sound were evaluated for Noise Barrier 13D and Noise Barrier 13E. For receptors located behind Noise Barrier 13D, the analysis of this barrier considers the potential effects of reflected sound from Barrier 13B located on the southbound side of I-495, opposite Barrier 13D. Using the image roadway method, the design year noise levels increased by approximately 1 dBA for several noise-sensitive residential receptors in CNEs K and S. The outcome of the image roadway method as implemented for this evaluation likely overestimates the effects of

² The 2020 Preliminary Noise Study had one Activity Category C receptor and one Activity Category D receptor at the front of the Cooper Middle School. Based on the latest aerial imagery and the observations of field staff during the monitoring program, the school was under construction. So, while an Activity Category D receptor was modeled at the school for the current study, an exterior activity area with frequent human use could not be identified and so no Activity Category C receptor was modeled for the Cooper Middle School.

reflected sound experienced by receptors in CNE K. Opposite CNE K, Noise Barrier 13B is located at the top of a slope that is several feet above the elevation of the southbound lanes of I-495. As a result, the sound path from the image roadway source to receptors of interest in CNE K “misses” Noise Barrier 13B. The effects of reflected sound between parallel barriers 13A and 13E was evaluated using the TNM’s Parallel Barrier module. Because both barriers are absorptive and very far apart, the potential increases due to reflected sound were typically 0 dB, and less than 1 dB. Therefore, since the effects were negligible, they were not directly accounted for in the analysis. Additional details from this analysis can be found within Section 3.4 of the Final Noise Abatement Design Report (April 2023).

3 Noise Abatement Evaluation

As described within VDOT Noise Policy, when an existing noise barrier is physically impacted by a project, the relocated noise barrier must, at a minimum, provide the same level of protection as the existing noise barrier. Proposed modifications to an existing noise barrier shall not be subject to the reasonableness criterion if the site conditions require such modification. However, should additional modifications to the noise barrier be required to protect additional receptors impacted as a result of the 495 NEXT project, those additional modifications would be subject to the cost-effectiveness criterion, and only the additional benefited receptors would be subject to the reasonableness calculation. If the additional modifications are not reasonable for the additional benefited receptors, the new noise barrier would be constructed in a manner to provide the same level of protection as the existing noise barrier, by maintaining either the same sound attenuation line or the same height above ground, depending on site conditions. The effectiveness of the in-kind replacement barriers was evaluated and are described below. Since traffic-noise impacts are predicted in the Build condition at receptors behind the in-kind replacement of Noise Barrier 13D and partial in-kind replacement of Noise Barrier 13E, modifications to the existing noise barrier design were also evaluated.

3.1 Modified In-Kind Replacement of Noise Barrier 13D

As mentioned within Section 2, existing Noise Barrier 13D will be physically impacted by the Project and therefore, an in-kind replacement of the noise barrier in its entirety is required. The in-kind replacement of Noise Barrier 13D has a length of 3,815 feet and ranges between 11 and 32 feet (average height of 18 feet), for a total surface area of 68,563 square feet. Per VDOT Noise Policy, to determine the effectiveness of the in-kind replacement of Noise Barrier 13D, the noise barrier was removed from the noise model to determine the “no barrier” noise levels (i.e. traffic-noise levels if a noise barrier was not present) at receptors within CNE K and CNE S. Without Noise Barrier 13D, a total of 82 receptors would be exposed to Design Year traffic-noise levels that exceed the applicable FHWA NAC. The in-kind replacement of Noise Barrier 13D provides a noise level reduction of 5 decibels or greater at 36 impacted receptors and would therefore be considered not feasible since less than 50% of the impacted receptors would be benefited. The in-kind replacement of Noise Barrier 13D would also provide noise level reductions of 7 decibels or greater for at least one impacted receptor. With the in-kind replacement of Noise Barrier 13D, traffic-noise impacts are predicted at seven receptors in CNE K (Receptors K-001 (deck), K-005 (deck), K-008, K-014 (deck), K-020 (deck), K-021, and K-023) and 10 receptors in CNE S (Receptors S-001, S002, S-003, S-004, S-009, S-010, S-022, S-023, S-024, and S-026) with construction of the Project.

Since impacts were predicted behind the in-kind replacement of Noise Barrier 13D, additional modifications were evaluated to protect the 17 remaining impacted receptors within CNE K and S under Design Year 2045 conditions. The modified replacement of Noise Barrier 13D would be 3,815 feet long, range between 20 and 34 feet in height (average height of 27 feet), for a total surface area of 105,911 square feet. Heights along modified Noise Barrier 13D were increased between 2 and 18 feet across its entire length and results in an additional 37,347 square feet of surface area. These increases in heights are summarized in Table 1. The modified Noise Barrier 13D obtains new benefits to 12 of the 17 remaining impacted receptors from the in-kind replacement barrier (K-005 (deck), K-008, K-020 (deck), K-021, S-002, S-003, S-004, S-009, S-022, S-023, S-024, and S-026) and an additional 74 non-impacted receptors³. It should be noted that four of the remaining impacted receptors from the in-kind replacement barrier (K-001 (deck), K-014 (deck), S001, and S-010) are already benefited by the in-kind replacement of Noise Barrier 13D. However, modifications to the barrier provide enough protection to reduce Design Year traffic-noise levels at these remaining impacted receptors to below the applicable FHWA noise abatement criteria. These modifications would not provide a noise benefit to Receptor K-023 and is discussed in more detail below.

The proposed modifications to Noise Barrier 13D would add an additional 37,348 square feet, which would provide benefit to another 50 receptors, when compared to the in-kind replacement of Noise Barrier 13D (12 remaining impacted receptors and 38 non-impacted receptors with construction of the project). On an incremental basis, modifications to Noise Barrier 13D result in a square foot per benefited receptor value of 747 and would be considered reasonable.

Table 1. Increases in Heights with Modifications for Noise Barrier 13D

Approximate Barrier Station No.	Increases in Barrier Height with Modifications (feet)
Barrier 13D 1078+50	8
Barrier 13D 1079+75	10
Barrier 13D 1081+00	8
Barrier 13D 1082+50 to 1090+75	10
Barrier 13D 1092+00	16
Barrier 13D 590+00 to 591+50	18
Barrier 13D 593+00	16
Barrier 13D 594+00	18
Barrier 13D 595+00	14
Barrier 13D 596+00 to 598+00	10
Barrier 13D 598+50	12
Barrier 13D 600+00	10
Barrier 13D 602+00	2
Barrier 13D 604+00	13
Barrier 13D 605+00	4
Barrier 13D 606+00	6
Barrier 13D 607+50 to 610+00	4
Barrier 13D 610+25	2
Barrier 13D 610+75	4
Barrier 13D 612+50 to 613+50	6

³ For this analysis, the total for non-impacted receptors is based on results of the impact analysis when the Project is constructed. When considering a “no barrier” condition (i.e. if Noise Barrier 13D did not exist), 25 of these receptors would be exposed to noise levels above the applicable NAC.



With the proposed modifications to Noise Barrier 13D, Receptor K-023 would be the only remaining impact not benefited. Therefore, additional modifications to the modified replacement of Noise Barrier 13D were evaluated. These modifications included increases in heights up to VDOT's maximum allowable height of 30 feet for portions of the in-kind replacement barrier that were lower than 30 feet. Increases in barrier height were not able to provide enough noise level reduction to benefit K-023. As a result, a noise barrier to the south of Lewinsville Road (denoted as Barrier 13F in Figure 1) was then considered. Noise Barrier 13F would be 547 feet long and was evaluated at a height of 28 feet, which totals an approximate surface area of 15,315 square feet. An additional four-foot increase for approximately 248 feet of the southern end of Noise Barrier 13D, equating to an addition 6,856 square feet of surface area, was also considered in this evaluation. With these modifications, Receptor K-023 would receive 5 decibels of noise reduction and the barrier modifications would be considered feasible. No other receptors can benefit by these modifications as they are already benefited by the modified replacement of Noise Barrier 13D. Receptor K-023 is unable to achieve the noise reduction design goal, even when maximum heights of 30 feet are evaluated. Additionally, with the total surface area of the modifications equating to 22,171, the square foot per benefited receptor value would far exceed VDOT's allowable value of 1,600. Therefore, these modifications would not be recommended for construction. It should be noted that with the modified replacement of Noise Barrier 13D, Design Year traffic-noise levels at Receptor K-023 are reduced to below the applicable FHWA NAC.

Table 2 within Appendix A provides the predicted 2045 Design Year noise levels with and without the modified replacement of Noise Barrier 13D, along with the predicted insertion loss and the benefit/impact status for receptors located behind the barrier. Table 4 in Appendix B includes barrier details for the modified replacement of Noise Barrier 13D. The Warranted, Feasible, and Reasonable worksheet for Noise Barrier 13D is included in Appendix C.

3.2 Partial In-Kind Replacement of Noise Barrier 13E

As mentioned within Section 2, a portion of existing Noise Barrier 13E will be physically impacted by the Project and therefore, an in-kind replacement for that section is required. The partial in-kind replacement of Noise Barrier 13E has a length of 1,231 feet and ranges between 18 and 32 feet (average height of 23 feet), for a total surface area of 55,388 square feet. Per VDOT Noise Policy, to determine the effectiveness of the partial in-kind replacement of Noise Barrier 13E, the noise barrier was removed from the noise model to determine the "no barrier" noise levels (i.e. traffic-noise levels if a noise barrier was not present) at receptors within CNE I and CNE T. Without Noise Barrier 13E, a total of 31 receptors would be exposed to Design Year traffic-noise levels that exceed the applicable FHWA NAC. The in-kind replacement of Noise Barrier 13E provides a noise level reduction of 5 decibels or greater at 30 impacted receptors and would therefore be considered feasible since 50% or more of the impacted receptors would be benefited. An additional 15 non-impacted receptors would also receive noise level reductions of 5 decibels or greater. The partial in-kind replacement of Noise Barrier 13E would also provide noise level reductions of 7 decibels or greater for at least one impacted receptor. With the in-kind replacement barrier in place, a total of six receptors (Receptors I-062, I-079, I-081, I-084, I-085, and I-090) would remain impacted as a result of the Project. In addition, although Receptor T-006 would have noise levels below the applicable NAC with the in-kind replacement barrier, it would not be benefited.

Since impacts were predicted behind the portion of Noise Barrier 13E to be replaced in kind, additional modifications were evaluated in an effort to protect the six remaining impacted receptors within CNE I. Modifications to the barrier included increases in heights up to VDOT's maximum allowable height of 30 feet for portions of the in-kind replacement barrier that were lower than 30 feet. Increases in barrier

height were able to reduce Design Year traffic-noise levels below the applicable FHWA NAC, however, no additional receptors were able to be benefited by the barrier since the six remaining impacted receptors are already benefited by the in-kind replacement of Noise Barrier 13E. Therefore, additional modifications to the in-kind replacement would not be cost-reasonable. As a result, per VDOT Noise Policy, the in-kind replacement barrier would be constructed without modification. A connection between Noise Barrier 13D and Noise Barrier 13E under Old Dominion Drive and a ground-mounted barrier on the north side of Old Dominion Drive was also evaluated in an effort to provide noise level reduction to remaining impacted receptors within CNE I, however, for similar reasons as stated above, although noise levels were able to be reduced to below the applicable FHWA NAC, no additional receptors were able to be benefited, therefore making the modifications not cost-reasonable.

Table 3 within Appendix A provides the predicted 2045 Design Year noise levels with and without the modified replacement of Noise Barrier 13E, along with the predicted insertion loss and the benefit/impact status for receptors located behind the barrier. Table 5 in Appendix B includes barrier details for the in-kind replacement of Noise Barrier 13E. The Warranted, Feasible, and Reasonable worksheet for Noise Barrier 13E is included in Appendix C.

Figure 1
Location Map for Common Noise
Environments, Receptors,
Build Contours and Barriers

I-495 Express Lanes
Northern Extension Project

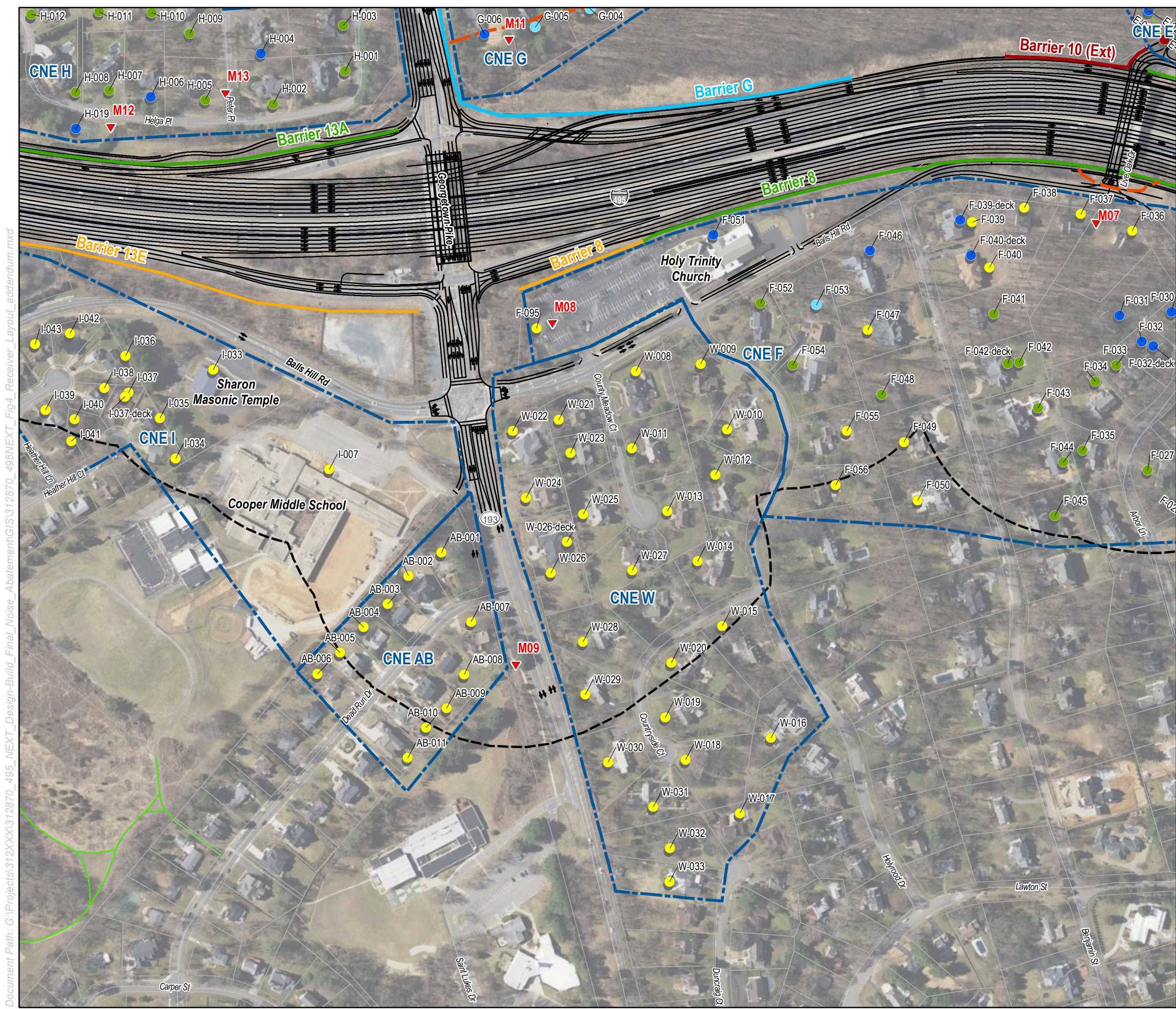
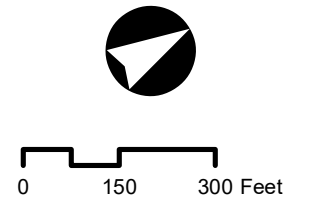
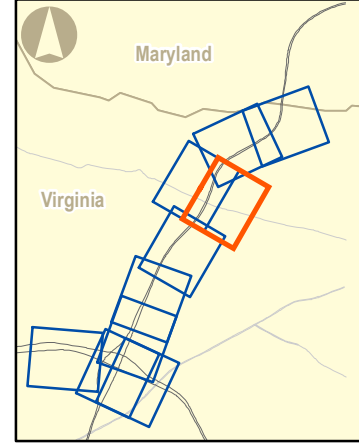
Fairfax County, Virginia

- Receiver Site and Number**
- Impacted and 5 or 6 dBA Insertion Loss
 - Impacted and 7 dBA or more Insertion Loss
 - Impacted but Not Benefited
 - Benefited but Not Impacted
 - Not Benefited or Impacted
 - Not Impacted, Benefit Not Determined
 - Not Use for the Determination
- Top Floor Noise Prediction Result
- Bottom Floor Noise Prediction Result

Note: Grouped Receiver Labels are in order of Leader Occurrence.

- ▲ **M#** Measurement Site
 - ▬ CNE Boundary
 - 500' Noise Study Area
 - ★ Project Limit
 - ▬ 66 dBA Noise Contour with Recommended Barrier
 - ▬ Trails
- Noise Barriers**
- ▬ Feasible and Reasonable
 - ▬ Feasible and Not Reasonable
 - ▬ Not Feasible
 - ▬ Not Reasonable
 - ▬ Existing Barrier to Remain
 - ▬ Existing Barrier to be Replaced
 - ▬ To Be Addressed in Addendum

Sheet 1 of 4

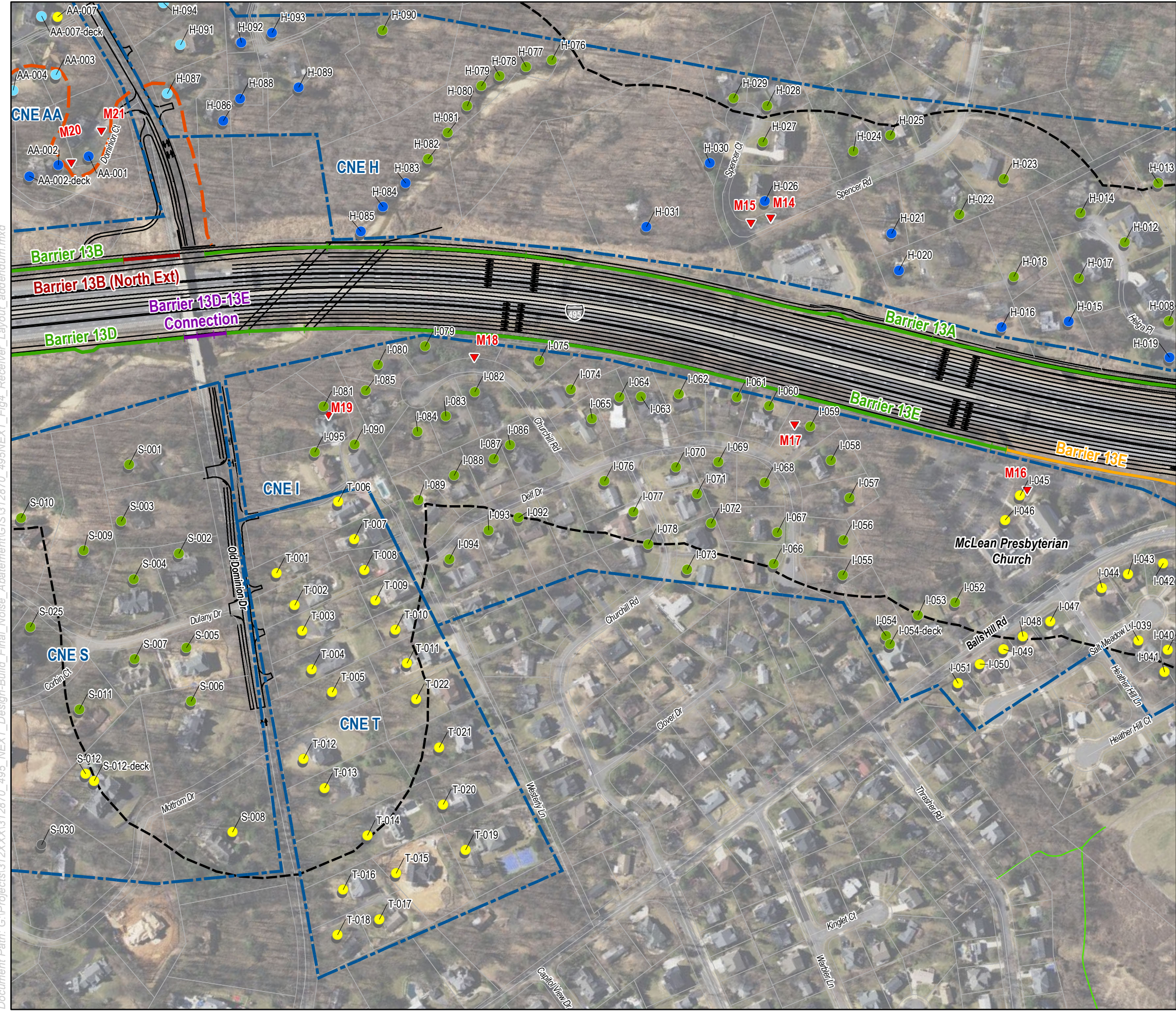


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Figure 1
Location Map for Common Noise
Environments, Receptors,
Build Contours and Barriers

I-95 Express Lanes
Northern Extension Project

Fairfax County, Virginia

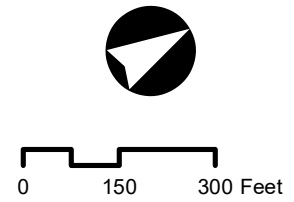
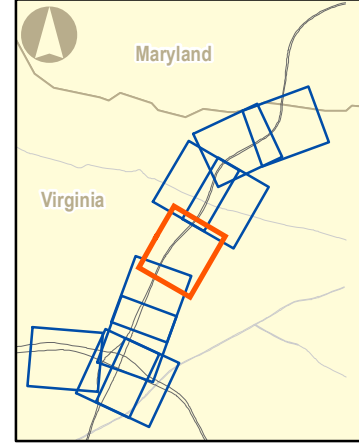


- Receiver Site and Number
- Impacted and 5 or 6 dBA Insertion Loss
 - Impacted and 7 dBA or more Insertion Loss
 - Impacted but Not Benefited
 - Benefited but Not Impacted
 - Not Benefited or Impacted
 - Not Impacted, Benefit Not Determined
 - Not Use for the Determination
- Top Floor Noise Prediction Result
 Bottom Floor Noise Prediction Result

Note: Grouped Receiver Labels are in order of Leader Occurrence.

- ▲ M# Measurement Site
 - ⬮ CNE Boundary
 - 500' Noise Study Area
 - ★ Project Limit
 - ⬮ 66 dBA Noise Contour with Recommended Barrier
 - ⬮ Trails
- Noise Barriers
- ⬮ Feasible and Reasonable
 - ⬮ Feasible and Not Reasonable
 - ⬮ Not Feasible
 - ⬮ Not Reasonable
 - ⬮ Existing Barrier to Remain
 - ⬮ Existing Barrier to be Replaced
 - ⬮ To Be Addressed in Addendum

Sheet 2 of 4

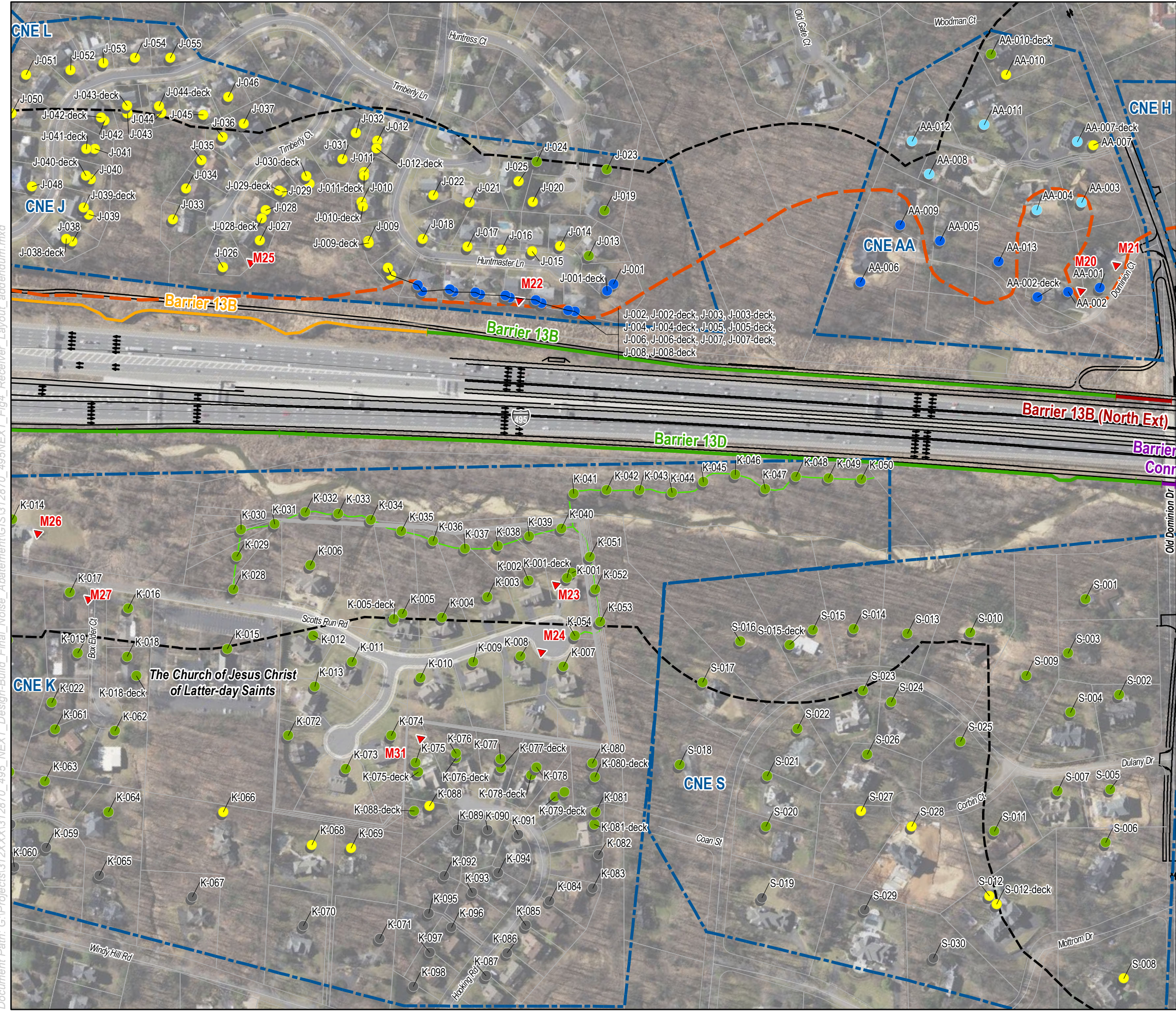


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Figure 1
Location Map for Common Noise
Environments, Receptors,
Build Contours and Barriers

I-95 Express Lanes
Northern Extension Project

Fairfax County, Virginia



Receiver Site and Number

- Impacted and 5 or 6 dBA Insertion Loss
- Impacted and 7 dBA or more Insertion Loss
- Impacted but Not Benefited
- Benefited but Not Impacted
- Not Benefited or Impacted
- Not Impacted, Benefit Not Determined
- Not Use for the Determination

- Top Floor Noise Prediction Result
- Bottom Floor Noise Prediction Result

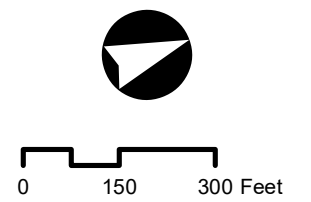
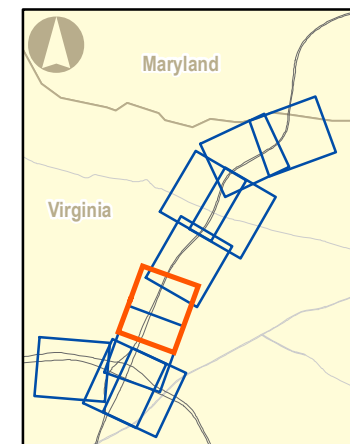
Note: Grouped Receiver Labels are in order of Leader Occurrence.

- ▲ M# Measurement Site
- ⚡ CNE Boundary
- ⚡ 500' Noise Study Area
- ★ Project Limit
- ⚡ 66 dBA Noise Contour with Recommended Barrier
- ⚡ Trails

Noise Barriers

- ⚡ Feasible and Reasonable
- ⚡ Feasible and Not Reasonable
- ⚡ Not Feasible
- ⚡ Not Reasonable
- ⚡ Existing Barrier to Remain
- ⚡ Existing Barrier to be Replaced
- ⚡ To Be Addressed in Addendum

Sheet 3 of 4

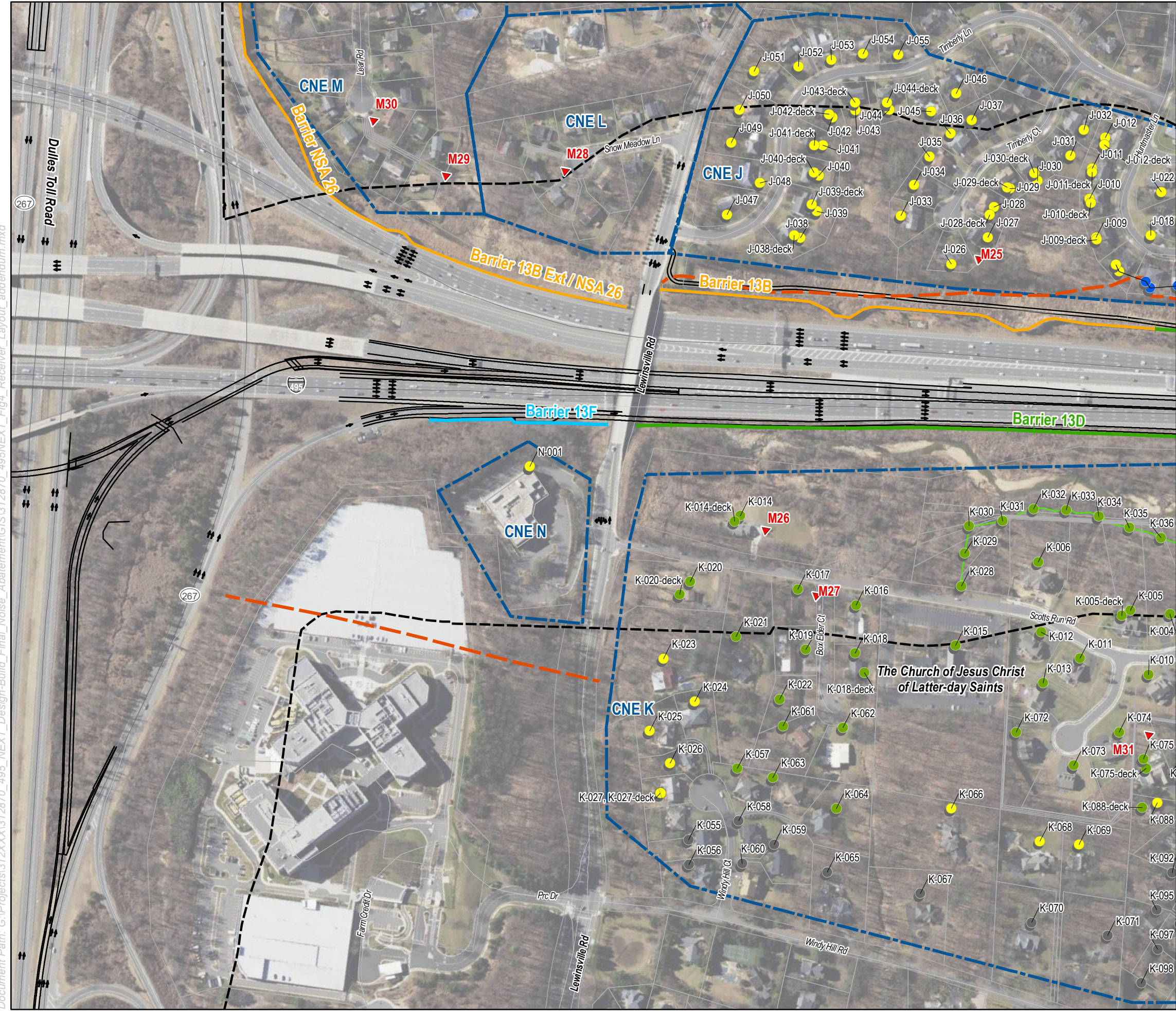


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Figure 1
Location Map for Common Noise
Environments, Receptors,
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I-495 Express Lanes
Northern Extension Project

Fairfax County, Virginia



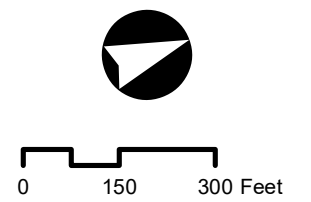
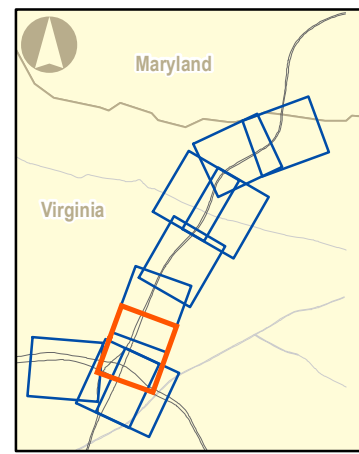
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- ▲ M# Measurement Site
- ★ Project Limit
- CNE Boundary
- 500' Noise Study Area
- 66 dBA Noise Contour with Recommended Barrier
- Trails

- Noise Barriers
- Feasible and Reasonable
 - Feasible and Not Reasonable
 - Not Feasible
 - Not Reasonable
 - Existing Barrier to Remain
 - Existing Barrier to be Replaced
 - To Be Addressed in Addendum

Sheet 4 of 4



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Appendix A Results Tables

Table 2 Predicted Traffic Noise Levels for the Modified Replacement of Noise Barrier 13D

Rec. ID	Address/ Location ¹	No. of Units ³	FHWA NAC	Floor	2045 Noise Levels, dBA L_{eq}^4				
					No-Barrier Noise Level	In-Kind Replacement		Modified Replacement	
						Noise Level dBA	Insertion Loss ²	Noise Level dBA	Insertion Loss ²
K-001	1294 Scotts Run Rd	1	B	0	71	64	6	60	10
K-001-deck	1294 Scotts Run Rd	1	B	1	72	67	5	61	11
K-002	1296 Scotts Run Rd	1	B	1	70	65	5	60	10
K-003	1298 Scotts Run Rd	1	B	1	70	65	4	60	10
K-004	1300 Scotts Run Rd	1	B	1	68	65	4	59	9
K-005	1302 Scotts Run Rd	1	B	0	68	64	4	58	9
K-005-deck	1302 Scotts Run Rd	1	B	1	70	66	4	60	10
K-006	1304 Scotts Run Rd	1	B	1	69	65	4	60	9
K-007	1293 Scotts Run Rd	1	B	1	68	64	4	59	9
K-008	1299 Scotts Run Rd	1	B	1	69	66	4	60	9
K-009	1301 Scotts Run Rd	1	B	1	69	65	3	60	9
K-010	1303 Scotts Run Rd	1	B	1	68	65	3	59	8
K-011	1305 Scotts Run Rd	1	B	1	67	65	3	59	8
K-012	1307 Scotts Run Rd	1	B	1	68	65	3	60	8
K-013	7483 Preserve Crest Way	1	B	1	66	64	2	60	7
K-014	1310 Scotts Run Rd	1	B	0	70	64	5	62	7
K-014-deck	1310 Scotts Run Rd	1	B	1	72	67	5	64	8
K-015	1325 Scotts Run Rd	1	D	1	68 (Ext.) 43 (Int.)	66 (Ext.) 41 (Int.)	2	62 (Ext.) 37 (Int.)	6
K-016	7506 Box Elder Ct	1	B	1	68	64	3	60	8
K-017	7507 Box Elder Ct	1	B	1	68	64	4	60	8
K-018	7504 Box Elder Ct	1	B	1	67	64	2	60	7
K-018-deck	7504 Box Elder Ct	1	B	0	67	64	2	60	7
K-019	7505 Box Elder Ct	1	B	1	67	64	2	60	7
K-020	1355 Scotts Run Rd	1	B	0	69	67	2	64	6
K-020-deck	1355 Scotts Run Rd	1	B	1	70	67	2	65	5
K-021	1343 Scotts Run Rd	1	B	1	68	66	2	62	6
K-022	7503 Box Elder Ct	1	B	1	61	59	2	56	5
K-023	1351 Scotts Run Rd	1	B	1	68	67	1	65	3
K-024	7412 Windy Hill Ct	1	B	1	67	65	2	63	3
K-025	7411 Windy Hill Ct	1	B	1	58	58	0	58	1
K-026	7409 Windy Hill Ct	1	B	1	59	58	1	57	2
K-027	7407 Windy Hill Ct	1	B	0	58	57	1	56	2
K-027-deck	7407 Windy Hill Ct	1	B	1	61	60	1	59	2

Rec. ID	Address/ Location ¹	No. of Units ³	FHWA NAC	Floor	2045 Noise Levels, dBA L_{eq}^4				
					No-Barrier Noise Level	In-Kind Replacement		Modified Replacement	
						Noise Level dBA	Insertion Loss ²	Noise Level dBA	Insertion Loss ²
K-028	Scott's Run Preserve	1	C	1	68	64	4	59	9
K-029	Scott's Run Preserve	1	C	1	69	64	5	60	9
K-030	Scott's Run Preserve	1	C	1	70	64	6	61	10
K-031	Scott's Run Preserve	1	C	1	71	64	7	61	10
K-032	Scott's Run Preserve	1	C	1	71	64	6	61	10
K-033	Scott's Run Preserve	1	C	1	69	64	5	61	9
K-034	Scott's Run Preserve	1	C	1	69	64	5	60	9
K-035	Scott's Run Preserve	1	C	1	70	64	6	60	10
K-036	Scott's Run Preserve	1	C	1	70	64	6	60	10
K-037	Scott's Run Preserve	1	C	1	70	64	6	60	10
K-038	Scott's Run Preserve	1	C	1	70	64	6	60	10
K-039	Scott's Run Preserve	1	C	1	71	64	7	60	11
K-040	Scott's Run Preserve	1	C	1	71	64	8	60	11
K-041	Scott's Run Preserve	1	C	1	71	64	7	61	10
K-042	Scott's Run Preserve	1	C	1	71	64	7	61	10
K-043	Scott's Run Preserve	1	C	1	71	63	8	61	10
K-044	Scott's Run Preserve	1	C	1	71	63	8	61	10
K-045	Scott's Run Preserve	1	C	1	73	64	9	62	11
K-046	Scott's Run Preserve	1	C	1	73	64	9	62	11
K-047	Scott's Run Preserve	1	C	1	73	64	9	62	11
K-048	Scott's Run Preserve	1	C	1	74	64	10	63	12
K-049	1294 Scotts Run Rd	1	C	1	74	64	10	63	11
K-050	1294 Scotts Run Rd	1	C	1	74	64	10	63	11
K-051	1296 Scotts Run Rd	1	C	1	71	64	7	60	11
K-052	1298 Scotts Run Rd	1	C	1	70	64	6	60	10
K-053	1300 Scotts Run Rd	1	C	1	68	63	6	59	10
K-054	1302 Scotts Run Rd	1	C	1	69	65	5	60	10
K-057	7410 WINDY WILL CT	1	B	1	65	63	2	60	5
K-061	7501 BOX ELDER CT	1	B	1	62	60	2	57	5



Rec. ID	Address/ Location ¹	No. of Units ³	FHWA NAC	Floor	2045 Noise Levels, dBA L_{eq}^4				
					No-Barrier Noise Level	In-Kind Replacement		Modified Replacement	
						Noise Level dBA	Insertion Loss ²	Noise Level dBA	Insertion Loss ²
K-062	7500 BOX ELDER CT	1	B	1	64	62	2	58	5
K-063	7408 WINDY WILL CT	1	B	1	64	62	2	59	5
K-064	7406 WINDY HILL CT	1	B	1	63	62	1	58	5
K-066	1336 WINDY HILL RD	1	B	1	66	65	2	62	4
K-068	1330 WINDY HILL RD	1	B	1	66	64	2	62	4
K-069	1328 WINDY HILL RD	1	B	1	66	64	2	61	4
K-072	7481 PRESERVE CREST WAY	1	B	1	67	65	2	60	6
K-073	7480 PRESERVE CREST WAY	1	B	1	65	63	2	59	6
K-074	7482 PRESERVE CREST WAY	1	B	1	67	64	2	60	7
K-075	7350 HOOKING RD	1	B	1	66	64	2	60	7
K-075-deck	7350 HOOKING RD	1	B	0	67	65	2	61	6
K-076	7348 HOOKING RD	1	B	0	66	64	2	60	7
K-076-deck	7348 HOOKING RD	1	B	1	68	65	2	61	6
K-077	7346 HOOKING RD	1	B	0	66	64	2	60	7
K-077-deck	7346 HOOKING RD	1	B	1	68	65	2	62	6
K-078	7344 HOOKING RD	1	B	0	66	64	2	59	7
K-078-deck	7344 HOOKING RD	1	B	1	67	65	2	62	6
K-079	7342 HOOKING RD	1	B	0	65	63	2	58	7
K-079-deck	7342 HOOKING RD	1	B	1	66	64	3	60	6
K-080	7340 HOOKING RD	1	B	0	65	61	3	57	8
K-080-deck	7340 HOOKING RD	1	B	1	66	63	3	59	8
K-081	7338 HOOKING RD	1	B	0	64	61	3	57	7
K-081-deck	7338 HOOKING RD	1	B	1	66	63	3	59	7
K-088	7349 HOOKING RD	1	B	0	63	62	2	59	4
K-088-deck	7349 HOOKING RD	1	B	1	66	64	2	61	5
S-001	7409 Old Dominion Dr	1	B	1	72	66	6	65	7
S-002	7449 Dulany Dr	1	B	1	69	66	3	65	5
S-003	7405 Old Dominion Dr	1	B	1	71	67	4	65	6
S-004	7445 Dulany Dr	1	B	1	69	66	3	65	5
S-005	7448 Dulany Dr	1	B	1	67	64	3	62	5
S-006	1200 Mottrom Dr	1	B	1	64	60	4	59	5



Rec. ID	Address/ Location ¹	No. of Units ³	FHWA NAC	Floor	2045 Noise Levels, dBA L _{eq} ⁴				
					No-Barrier Noise Level	In-Kind Replacement		Modified Replacement	
						Noise Level dBA	Insertion Loss ²	Noise Level dBA	Insertion Loss ²
S-007	7444 Dulany Dr	1	B	1	67	64	3	62	5
S-008	1201 Mottrom Dr	1	B	1	58	55	3	54	4
S-009	7441 Dulany Dr	1	B	1	70	67	3	65	5
S-010	7437 Dulany Dr	1	B	1	71	67	5	64	8
S-011	1203 Corbin Ct	1	B	1	63	60	3	58	5
S-012	1210 Mottrom Dr	1	B	1	61	59	3	57	4
S-012-deck	1210 Mottrom Dr	1	B	0	64	62	2	60	4
S-013	7433 Dulany Dr	1	B	1	70	64	6	61	9
S-014	7429 Dulany Dr	1	B	1	70	64	6	61	9
S-015	7425 Dulany Dr	1	B	1	70	64	6	61	9
S-015-deck	7425 Dulany Dr	1	B	0	69	64	5	60	9
S-016	7421 Dulany Dr	1	B	1	70	65	5	61	9
S-017	7417 Dulany Dr	1	B	1	69	65	4	61	8
S-018	7411 Dulany Dr	1	B	1	63	60	3	55	8
S-020	7410 Dulany Dr	1	B	1	64	62	2	59	5
S-021	7414 Dulany Dr	1	B	1	67	65	2	61	6
S-022	7418 Dulany Dr	1	B	1	69	66	3	63	6
S-023	7426 Dulany Dr	1	B	1	70	67	3	64	6
S-024	7434 Dulany Dr	1	B	1	69	67	2	65	5
S-025	1200 Corbin Ct	1	B	1	66	62	4	60	6
S-026	1210 Corbin Ct	1	B	1	68	66	2	63	5
S-027	1211 Corbin Ct	1	B	1	67	65	2	63	4
S-028	1207 Corbin Ct	1	B	1	65	62	2	61	4

Notes:

- 1.) All receptors are located in McLean, VA.
- 2.) Rounding of decibels may make some subtractions appear incorrect.
- 3.) For locations where multiple receptors were analyzed, the receptor with the loudest “No Barrier” noise levels were used when determining feasibility and reasonableness.
- 4.) For Category D receptors, exterior noise levels are provided for informational purposes only. Predicted interior noise levels were used for determining noise impact and benefit from noise barrier.

Source: HMMH, 2023.

Table 3 Predicted Traffic Noise Levels for Noise Barrier 13E

Rec. ID	Address/ Location ¹	No. of Units ³	FHWA NAC	Floor	2045 Noise Levels, dBA L _{eq} ⁴		
					No-Barrier Noise Level	In-Kind Replacement	
						Noise Level dBA	Insertion Loss ²
I-052	1034 Balls Hill Rd	1	B	1	65	58	7
I-053	1034 Balls Hill Rd	1	B	1	65	58	7
I-054	1038 Balls Hill Rd	0	B	1	64	57	7
I-054-deck	1038 Balls Hill Rd	1	B	1	66	59	7
I-055	1024 Delf Dr	1	B	1	64	56	8
I-056	1026 Delf Dr	1	B	1	67	58	9
I-057	1028 Delf Dr	1	B	1	70	60	10
I-058	1030 Delf Dr	1	B	1	72	62	11
I-059	1032 Delf Dr	1	B	1	76	63	13
I-060	1034 Delf Dr	1	B	1	78	64	14
I-061	1036 Delf Dr	1	B	1	78	65	13
I-062	1038 Delf Dr	1	B	1	75	66	10
I-063	1040 Delf Dr	1	B	1	74	65	9
I-064	1042 Delf Dr	1	B	1	73	64	9
I-065	7400 Churchill Rd	1	B	1	69	59	9
I-066	1025 Delf Dr	1	B	1	64	56	8
I-067	1027 Delf Dr	1	B	1	67	58	9
I-068	1031 Delf Dr	1	B	1	70	61	9
I-069	1037 Delf Dr	1	B	1	70	62	9
I-070	1041 Delf Dr	1	B	1	67	60	7
I-071	7322 Churchill Rd	1	B	1	65	59	7
I-072	7320 Churchill Rd	1	B	1	65	57	8
I-073	7318 Churchill Rd	1	B	1	62	56	7
I-074	7404 Churchill Rd	1	B	1	73	61	11
I-075	7408 Churchill Rd	1	B	1	74	63	11
I-076	7325 Churchill Rd	2	B	1	64	57	7
I-077	7323 Churchill Rd	1	B	1	61	55	7
I-078	7317 Churchill Rd	1	B	1	59	53	6
I-079	7412 Churchill Rd	1	B	1	80	66	14
I-080	7416 Churchill Rd	1	B	1	77	65	12
I-081	7428 Old Dominion Dr	1	B	1	74	67	7
I-082	7407 Churchill Rd	1	B	1	72	62	10
I-083	7413 Churchill Rd	1	B	1	73	64	9
I-084	7415 Churchill Rd	1	B	1	73	66	7
I-085	7424 Old Dominion Dr	1	B	1	75	67	8
I-086	1100 Delf Dr	1	B	1	67	57	10
I-087	1102 Delf Dr	1	B	1	67	58	10
I-088	1104 Delf Dr	1	B	1	68	60	7
I-089	1106 Delf Dr	1	B	1	68	63	5
I-090	7424 Old Dominion Dr	1	B	1	72	66	6
I-092	1103 Delf Dr	2	B	1	64	56	8
I-093	1105 Delf Dr	1	B	1	63	56	7
I-094	1107 Delf Dr	1	B	1	65	60	5
I-095	7432 Old Dominion Dr	1	B	1	69	64	5
T-001	7400 Old Dominion Dr	1	B	1	61	58	3

Rec. ID	Address/ Location ¹	No. of Units ³	FHWA NAC	Floor	2045 Noise Levels, dBA L _{eq} ⁴		
					No-Barrier Noise Level	In-Kind Replacement	
						Noise Level dBA	Insertion Loss ²
T-002	7332 Old Dominion Dr	1	B	1	59	57	2
T-003	7330 Old Dominion Dr	1	B	1	60	58	2
T-004	7328 Old Dominion Dr	1	B	1	60	58	2
T-005	7326 Old Dominion Dr	1	B	1	60	58	2
T-006	7420 Old Dominion Dr	1	B	1	67	64	3
T-007	7329 Westerly Ln	1	B	1	63	61	2
T-008	7327 Westerly Ln	1	B	1	61	59	2
T-009	7325 Westerly Ln	1	B	1	61	59	2
T-010	7323 Westerly Ln	1	B	1	60	59	2
T-011	7315 Westerly Ln	1	B	1	60	58	2
T-012	7318 Old Dominion Dr	1	B	1	56	54	2
T-013	7312 Old Dominion Dr	1	B	1	56	54	1
T-014	7306 Old Dominion Dr	1	B	1	56	54	2
T-015	7227 Westerly Ln	1	B	1	57	55	2
T-016	7304 Old Dominion Dr	1	B	1	54	53	2
T-017	7302 Old Dominion Dr	1	B	1	54	53	2
T-018	7300 Old Dominion Dr	1	B	1	54	52	2
T-019	7225 Westerly Ln	1	B	1	57	55	2
T-020	7301 Westerly Ln	1	B	1	57	55	2
T-021	7307 Westerly Ln	1	B	1	56	55	1
T-022	7311 Westerly Ln	1	B	1	58	57	1

Notes:

- 1.) All receptors are located in McLean, VA.
- 2.) Rounding of decibels may make some subtractions appear incorrect.
- 3.) For locations where multiple receptors were analyzed, the receptor with the loudest “No Barrier” noise levels were used when determining feasibility and reasonableness.
- 4.) For Category D receptors, exterior noise levels are provided for informational purposes only. Predicted interior noise levels were used for determining noise impact and benefit from noise barrier.

Source: HMMH, 2023.

Appendix B Noise Barrier Profiles – Sound Attenuation Lines and Barrier Station Details

Table 4 Sound Attenuation Line for the Modified Replacement of Noise Barrier 13D – with Reflected Sound

Approximate Barrier Station No.	Plan Equivalent Station No.	Barrier Coordinates in TNM (NAD83 VA State Plane South US Survey Feet)			Top of Barrier Elevation (feet)	Estimated Height Above Ground (feet)
		East (X)	North (Y)	Ground		
		Barrier 13D 1078+50	10+00.00 (NB-13D-1)	11,850,546.00		
Barrier 13D 1079+75	11+11.27 (NB-13D-1)	11,850,581.00	7,026,532.50	272.2	293.7	21.5
Barrier 13D 1081+00	12+53.59 (NB-13D-2)	11,850,633.00	7,026,665.00	261.7	291.6	29.9
Barrier 13D 1082+50	13+86.09 (NB-13D-2)	11,850,681.00	7,026,788.50	263.2	290.9	27.7
Barrier 13D 1085+00	16+39.11 (NB-13D-3)	11,850,771.00	7,027,025.00	267.3	290.9	23.6
Barrier 13D 1085+75	17+23.87 (NB-13D-3)	11,850,799.00	7,027,105.00	266.5	287.5	21.0
Barrier 13D 1086+50	17+94.23 (NB-13D-3)	11,850,822.00	7,027,171.50	266.1	287.7	21.6
Barrier 13D 1087+25	18+71.94 (NB-13D-3)	11,850,847.00	7,027,245.00	265.5	287.8	22.3
Barrier 13D 1088+75	20+17.25 (NB-13D-3)	11,850,902.00	7,027,379.50	264.2	287.8	23.6
Barrier 13D 1090+00	21+32.66 (NB-13D-3)	11,850,944.00	7,027,487.00	263.1	285.1	22.0
Barrier 13D 1090+75	22+13.81 (NB-13D-4)	11,850,975.00	7,027,562.00	262.2	283.7	21.5
Barrier 13D 1092+00	23+17.81 (NB-13D-5)	11,851,015.00	7,027,658.00	261.2	288.2	27.0
Barrier 13D 590+00	24+77.06 (NB-13D-5)	11,851,075.00	7,027,805.50	260.1	289.1	29.0
Barrier 13D 591+50	26+26.92 (NB-13D-5)	11,851,131.00	7,027,944.50	258.5	288.5	30.0
Barrier 13D 593+00	27+88.39 (NB-13D-5)	11,851,192.00	7,028,094.00	257.2	286.5	29.3
Barrier 13D 594+00	28+88.70 (NB-13D-5)	11,851,232.00	7,028,186.00	256.2	287.1	30.9
Barrier 13D 595+00	30+06.17 (NB-13D-5)	11,851,277.00	7,028,294.50	255.1	283.5	28.4
Barrier 13D 596+00	30+95.19 (NB-13D-5)	11,851,314.00	7,028,375.50	254.0	280.0	26.0
Barrier 13D 598+00	32+59.74 (NB-13D-5)	11,851,377.00	7,028,527.50	252.4	280.6	28.2
Barrier 13D 598+50	33+17.19 (NB-13D-5)	11,851,398.00	7,028,581.00	252.2	280.5	28.3
Barrier 13D 600+00	35+05.76 (NB-13D-5)	11,851,473.00	7,028,754.00	250.2	278.4	28.2
Barrier 13D 602+00	36+85.85 (NB-13D-6)	11,851,544.00	7,028,919.50	236.8	270.5	33.7
Barrier 13D 604+00	38+68.68 (NB-13D-6)	11,851,615.00	7,029,088.00	247.0	270.5	30.5
Barrier 13D 605+00	39+86.82 (NB-13D-6)	11,851,664.00	7,029,195.50	237.0	266.5	30.0
Barrier 13D 606+00	40+86.22 (NB-13D-6)	11,851,704.00	7,029,286.50	238.2	266.5	30.0
Barrier 13D 607+50	42+20.91 (NB-13D-6)	11,851,760.00	7,029,409.00	235.0	266.5	31.0
Barrier 13D 608+75	43+55.65 (NB-13D-6)	11,851,815.00	7,029,532.00	234.0	264.9	31.0
Barrier 13D 610+00	44+82.21 (NB-13D-6)	11,851,867.00	7,029,647.00	233.7	264.9	31.0
Barrier 13D 610+25	45+06.36 (NB-13D-6)	11,851,888.00	7,029,663.50	233.5	262.9	29.0
Barrier 13D 610+75	45+41.48 (NB-13D-6)	11,851,900.00	7,029,695.50	233.3	263.0	30.0
Barrier 13D 610+75	45+65.35 (NB-13D-6)	11,851,898.00	7,029,717.50	233.9	263.0	29.0
Barrier 13D 612+50	47+44.81 (NB-13D-7)	11,851,972.00	7,029,881.50	234.5	262.9	28.0
Barrier 13D 613+50	48+23.14 (NB-13D-7)	11,852,004.00	7,029,953.00	236.7	262.5	25.8

Source: HMMH, 2023.

Table 5 Sound Attenuation Line for Partial Replacement of Noise Barrier 13E

Approximate Barrier Station No.	Plan Equivalent Station No.	Barrier Coordinates in TNM (NAD83 VA State Plane South US Survey Feet)			Top of Barrier Elevation (feet)	Estimated Height Above Ground (feet)
		East (X)	North (Y)	Ground		
		Barrier 13E 614+75	49+50.69 (NB-13E-1)	11,852,057.00		
Barrier 13E 615+00	49+91.62 (NB-13E-1)	11,852,073.00	7,030,107.50	233.0	261.5	28.5
Barrier 13E 615+25	N/A BRIDGE PLAN (NB-13E-2)	11,852,086.00	7,030,134.50	239.0	257.5	18.5
Barrier 13E 615-75	N/A BRIDGE PLAN (NB-13E-2)	11,852,102.00	7,030,164.50	239.0	257.5	18.5
Barrier 13E 616+75	N/A BRIDGE PLAN (NB-13E-2)	11,852,146.00	7,030,250.50	239.1	261.5	22.5
Barrier 13E 617+00	N/A BRIDGE PLAN (NB-13E-2)	11,852,164.00	7,030,283.00	239.0	263.0	24.0
Barrier 13E 617+50	10+27.18 (NB-13E-3)	11,852,177.00	7,030,307.50	234.0	264.3	30.3
Barrier 13E 618+75	11+68.72 (NB-13E-3)	11,852,243.00	7,030,425.00	241.9	269.3	27.4
Barrier 13E 619+75	12+65.92 (NB-13E-3)	11,852,293.00	7,030,508.50	242.4	272.4	29.9
Barrier 13E 620+75	13+62.46 (NB-13E-3)	11,852,345.00	7,030,590.00	244.8	275.4	30.6
Barrier 13E 621+75	14+61.76 (NB-13E-3)	11,852,399.00	7,030,673.50	249.0	278.1	29.1
Barrier 13E 622+75	15+61.07 (NB-13E-3)	11,852,456.00	7,030,755.00	248.6	280.6	32.1
Barrier 13E 623+75	16+52.95 (NB-13E-3)	11,852,510.00	7,030,829.50	253.8	283.5	29.6
Barrier 13E 624+75	17+50.61 (NB-13E-3)	11,852,569.00	7,030,907.50	259.9	286.4	26.5
Barrier 13E 625+75	10+64.20 (NB-13E-4)	11,852,631.00	7,030,986.00	271.0	289.3	18.3
Barrier 13E 626+75	11+59.36 (NB-13E-4)	11,852,692.00	7,031,059.00	280.0	298.5	18.5
Barrier 13E 627+75	12+64.29 (NB-13E-4)	11,852,761.00	7,031,138.00	289.0	307.5	18.5
Barrier 13E 628+75	13+61.70 (NB-13E-4)	11,852,826.00	7,031,210.50	291.0	309.5	18.5
Barrier 13E 629+75	14+55.12 (NB-13E-4)	11,852,890.00	7,031,278.50	285.0	303.5	18.5
Barrier 13E 630+75	15+53.77 (NB-13E-4)	11,852,959.00	7,031,349.00	283.0	302.5	19.5
Barrier 13E 631+50	10+04.17 (NB-13E-5)	11,853,000.00	7,031,393.50	282.1	301.9	19.8
Barrier 13E 632+75	11+39.53 (NB-13E-5)	11,853,097.00	7,031,488.00	287.4	308.8	21.4
Barrier 13E 633+75	12+39.26 (NB-13E-5)	11,853,166.00	7,031,560.00	291.6	310.5	18.9
Barrier 13E 634+50	13+38.94 (NB-13E-5)	11,853,237.00	7,031,630.00	292.8	312.2	19.4
Barrier 13E 635+50	14+35.81 (NB-13E-5)	11,853,305.00	7,031,699.00	295.6	315.1	19.5
Barrier 13E 636+50	15+35.09 (NB-13E-5)	11,853,377.00	7,031,767.50	297.4	317.5	20.0
Barrier 13E 637+50	16+32.95 (NB-13E-5)	11,853,445.00	7,031,838.00	301.0	320.7	19.7
Barrier 13E 638+50	17+35.69 (NB-13E-5)	11,853,516.00	7,031,911.50	303.6	323.6	20.0
Barrier 13E 638+75	17+83.69 (NB-13E-5)	11,853,528.00	7,031,924.50	304.0	329.8	25.8
Barrier 13E 639+00	17+37.02 (NB-13E-5)	11,853,548.00	7,031,946.50	304.4	329.3	24.9

Source: HMMH, 2023.

Appendix C Warranted, Feasible, and Reasonable Worksheets

**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:	9-Jun-23
Project No. and UPC:	VDOT Project No. 0495-029-419; UPC 113414
County:	Fairfax
District:	Northern Virginia
Barrier System ID:	Replacement of Barrier 13D
Community Name and/or CNE#	CNE K and CNE S
Noise Abatement Category(s)	B, C
Design phase:	Final design

Warranted

1	Community Documentation (if applicable)	
a.	Date community was permitted. (Per 23CFR 772 this is the date the building permit was issued).	_____
b.	Date of approval for the Categorical Exclusion (CE), Record of Decision (ROD), or Finding of No Significant Impact (FONSI):	_____
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."	_____
		Yes
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:	80
b.	Number of impacted receptor units receiving 5 dB(A) or more insertion loss (IL):	74
c.	Percentage of impacted receptor units receiving 5 dB(A) or more IL	93%
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?	NA
3	Will placement of the noise barrier restrict access to vehicular or pedestrian travel?	NA
4	Will placement of the noise barrier conflict with existing utility locations?	NA

Reasonableness

1 Surface Area (Square foot)-Benefit Factors

a. Surface Area (Total square foot) of the proposed noise barrier. (ft ²)	105,911 SF
b. Impacted noise sensitive receptor(s) receiving 5 dB(A) IL or more.	74
c. Non-impacted noise sensitive receptor(s) receiving 5 dB(A) IL or more.	12
d. Total number of benefited receptors.	86
e. Surface Area per benefited receptor unit. (ft ² /BR)	1,232 SF/BR
f. Is (1e) less than or equal to the maximum square feet per benefited receptor (MaxSF/BR) value of 1600?	Yes
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)	3,815 ft
b. Height range of the proposed noise barrier. (ft)	20-34
c. Average height of the proposed noise barrier. (ft)	27 ft
d. Cost per square foot. (\$/ft ²)	\$42/SF
e. Total Barrier Cost (\$)	\$4,448,262
f. Barrier Material	Absorptive

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?	Yes

Additional Reasons for Decision:

Impacted receptors includes 12 remaining impacted with project and 62 "impacted" in no-barrier con.

On incremental basis, barrier mod. Benefits 12 remaining impacts + 38 non impacted recs (based on Build condition). Total addl sqft equals 37,348, giving an incremental increases of 747 sqft/bene rec.

Therefore modifications to Barrier 13D are cost reasonable. Analysis considers reflect. From Barrier 13B.

**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:	22-May-23
Project No. and UPC:	VDOT Project No. 0495-029-419; UPC 113414
County:	Fairfax
District:	Northern Virginia
Barrier System ID:	Barrier 13E
Community Name and/or CNE#	CNE AB, CNE I, and CNE T
Noise Abatement Category(s)	B and C
Design phase:	Final design

Warranted

1	Community Documentation (if applicable)	
a.	Date community was permitted. (Per 23CFR 772 this is the date the building permit was issued).	_____
b.	Date of approval for the Categorical Exclusion (CE), Record of Decision (ROD), or Finding of No Significant Impact (FONSI):	_____
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."	_____
		Yes
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?	_____
		Yes

Feasibility

1	Impacted receptor units	
a.	Number of impacted receptor units:	31
b.	Number of impacted receptor units receiving 5 dB(A) or more insertion loss (IL):	30
c.	Percentage of impacted receptor units receiving 5 dB(A) or more IL	97%
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?	NA
3	Will placement of the noise barrier restrict access to vehicular or pedestrian travel?	NA
4	Will placement of the noise barrier conflict with existing utility locations?	NA

Reasonableness**1 Surface Area (Square foot)-Benefit Factors**

a. Surface Area (Total square foot) of the proposed noise barrier. (ft ²)	55,388 SF
b. Impacted noise sensitive receptor(s) receiving 5 dB(A) IL or more.	30
c. Non-impacted noise sensitive receptor(s) receiving 5 dB(A) IL or more.	15
d. Total number of benefited receptors.	45
e. Surface Area per benefited receptor unit. (ft ² /BR)	1,231 SF/BR
f. Is (1e) less than or equal to the maximum square feet per benefited receptor (MaxSF/BR) value of 1600?	Yes
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)	2,411 ft
b. Height range of the proposed noise barrier. (ft)	18-32
c. Average height of the proposed noise barrier. (ft)	23 ft
d. Cost per square foot. (\$/ft ²)	\$42/SF
e. Total Barrier Cost (\$)	\$2,326,296
f. Barrier Material	Absorptive

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?	Yes

Additional Reasons for Decision:

This is a modified partial in-kind replacement of an existing noise barrier that will be physically impacted by the 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:	9-Jun-23
Project No. and UPC:	VDOT Project No. 0495-029-419; UPC 113414
County:	Fairfax
District:	Northern Virginia
Barrier System ID:	Barrier 13F
Community Name and/or CNE#	CNE K
Noise Abatement Category(s)	B
Design phase:	Final design

Warranted

1	Community Documentation (if applicable)	
a.	Date community was permitted. (Per 23CFR 772 this is the date the building permit was issued).	_____
b.	Date of approval for the Categorical Exclusion (CE), Record of Decision (ROD), or Finding of No Significant Impact (FONSI):	_____
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."	_____
		Yes
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?	_____
		Yes

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?	NA
3	Will placement of the noise barrier restrict access to vehicular or pedestrian travel?	NA
4	Will placement of the noise barrier conflict with existing utility locations?	NA

Reasonableness

1 Surface Area (Square foot)-Benefit Factors

a. Surface Area (Total square foot) of the proposed noise barrier. (ft ²)	15,315 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)	15,315 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)	547 ft
b. Height range of the proposed noise barrier. (ft)	28 ft
c. Average height of the proposed noise barrier. (ft)	28 ft
d. Cost per square foot. (\$/ft ²)	\$42/SF
e. Total Barrier Cost (\$)	\$643,230
f. Barrier Material	Absorptive

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 13F was evaluated in an effort to benefit receptor K-023 and provide F&R noise mitigation.
