APPENDIX D
NOISE MONITORING DATA FORMS

Route 29 Widening Project

Site # M-01 **Description :** 5521 Quail Court

Done By: JCL/TJB

Meter: → Meter 9 | 2904

Monitoring Data:	AM Peak	Off-Peak	PM Peak
Date	10/10/18		
Start Time	11:45 AM		
End Time	12:05 PM		
Duration	20 MIN	MIN	MIN
Leq.	**55.0**		
Traffic Data			
Roadway	Rt. 29		
Direction	EB / WB		
Traffic Total:	236 / 208	0 / 0	0 / 0
Cars	230 / 203		
MT	2 / 2		
HT	4 / 3		
Weather Conditions			

Atmospheric Data	
Wind Speed (mph)	7
Temp. (°F)	77
Humidity (%)	84

Site Data: Site Surface (alpha): ____ Shielding Factor : ____ Pavement Type : ____

Plan View

NORTH

Profile View:

Monitoring Notes

AM Peak:

Off-Peak:

PM Peak

McCormick Taylor, Inc

Route 29 Widening Project

Site # M-02 **Description :** 13426 Matthews Vista Dr.

Done By: AJN

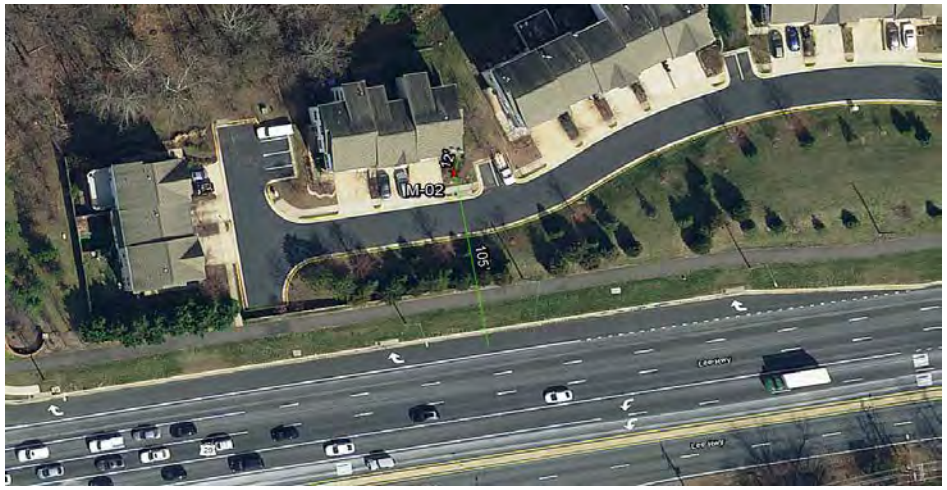
Meter: → Meter 10 | 2902

Monitoring Data:	AM Peak	Off-Peak	PM Peak
Date	10/10/18		
Start Time	11:45 AM		
End Time	12:05 PM		
Duration	20 MIN	MIN	MIN
Leq.	**58.0**		
Traffic Data			
Roadway	Rt. 29		
Direction	EB / WB		
Traffic Total:	236 / 208	0 / 0	0 / 0
Cars	230 / 203		
MT	2 / 2		
HT	4 / 3		
Weather Conditions			

Atmospheric Data	
Wind Speed (mph)	7
Temp. (°F)	77
Humidity (%)	84

Site Data: Site Surface (alpha): ____ Shielding Factor : ____ Pavement Type : ____

Plan View



NORTH

N

Profile View:

Monitoring Notes

AM Peak:

Off-Peak:

PM Peak

McCormick Taylor, Inc

Route 29 Widening Project

Site # M-03 **Description :** 5519 Bent Maple

Done By: AJN

Meter: → Meter 8 | 2903

Monitoring Data:	AM Peak	Off-Peak	PM Peak
Date	10/10/18		
Start Time	11:45 AM		
End Time	12:05 PM		
Duration	20 MIN	MIN	MIN
Leq.	**55.5**		
Traffic Data			
Roadway	Rt. 29		
Direction	EB / WB		
Traffic Total:	236 / 208	0 / 0	0 / 0
Cars	230 / 203		
MT	2 / 2		
HT	4 / 3		
Weather Conditions			

Atmospheric Data	
Wind Speed (mph)	7
Temp. (°F)	77
Humidity (%)	84

Site Data: Site Surface (alpha): ____ Shielding Factor : ____ Pavement Type : ____

Plan View

NORTH

Profile View:

Monitoring Notes

AM Peak:

Off-Peak:

PM Peak

McCormick Taylor, Inc

Route 29 Widening Project

Site # M-04 **Description :** 13336 Regal Crest Drive

Done By: JCL/TJB

Meter: → Meter 7 | 3003

Monitoring Data:	AM Peak	Off-Peak	PM Peak
Date	10/10/18		
Start Time	11:45 AM		
End Time	12:05 PM		
Duration	20 MIN	MIN	MIN
Leq.	**54.5**		
Traffic Data			
Roadway	Rt. 29		
Direction	EB / WB		
Traffic Total:	236 / 208	0 / 0	0 / 0
Cars	230 / 203		
MT	2 / 2		
HT	4 / 3		
Weather Conditions			

Atmospheric Data	
Wind Speed (mph)	7
Temp. (°F)	77
Humidity (%)	84

Site Data: Site Surface (alpha): _____ Shielding Factor : _____ Pavement Type : _____

Plan View

NORTH

Profile View:

Monitoring Notes

AM Peak:

Off-Peak:

PM Peak

Route 29 Widening Project

Site # M-05 **Description :** 5326 Sandy Point Lane

Done By: JCL/TJB

Meter: → Meter 7 | 3000

Monitoring Data:	AM Peak	Off-Peak	PM Peak
Date	10/10/18		
Start Time	9:31 AM		
End Time	9:51 AM		
Duration	20 MIN	MIN	MIN
Leq.	57.7		
Traffic Data Roadway			
Direction			
Traffic Total:	0 0	0 0	0 0
Cars			
MT			
HT			
Weather Conditions			

Atmospheric Data
Wind Speed (mph) 6
Temp. (°F) 74
Humidity (%) 87

Site Data: Site Surface (alpha): ____ Shielding Factor : ____ Pavement Type : ____

Plan View

NORTH

N

Profile View:

Monitoring Notes

AM Peak:

Off-Peak:

PM Peak

Route 29 Widening Project

Site # M-06 **Description :** 5290 Meadow Estates Dr.

Done By: AJN

Meter: → Meter 10 | 2907

Monitoring Data:	AM Peak	Off-Peak	PM Peak
Date	10/10/18		
Start Time	11:00 AM		
End Time	11:20 AM		
Duration	20 MIN	MIN	MIN
Leq.	**59.3**		
Traffic Data			
Roadway			
Direction			
Traffic Total:	0 0	0 0	0 0
Cars			
MT			
HT			
Weather Conditions			

Atmospheric Data
Wind Speed (mph) 5
Temp. (°F) 73
Humidity (%) 93

Site Data: Site Surface (alpha): ____ Shielding Factor : ____ Pavement Type : ____

Plan View

NORTH

N

Profile View:

Monitoring Notes

AM Peak:

Off-Peak: Public A/C noise

PM Peak

McCormick Taylor, Inc

Route 29 Widening Project

Site # M-07 **Description :** 12869 Knight Arch Rd

Done By: AJN

Meter: → Meter 8 | 2907

Monitoring Data:	AM Peak	Off-Peak	PM Peak
Date	10/10/18		
Start Time	11:00 AM		
End Time	11:20 AM		
Duration	20 MIN	MIN	MIN
Leq.	58.5		
Traffic Data			
Roadway			
Direction			
Traffic Total:	0 0	0 0	0 0
Cars			
MT			
HT			
Weather Conditions			

Atmospheric Data
Wind Speed (mph) 5
Temp. (°F) 73
Humidity (%) 93

Site Data: Site Surface (alpha): ____ Shielding Factor : ____ Pavement Type : ____

Plan View

NORTH

N

Profile View:

Monitoring Notes

AM Peak:

Off-Peak:

PM Peak

McCormick Taylor, Inc

Route 29 Widening Project

Site # M-08 **Description :** 1278 Lee Highway

Done By: JCL/TJB

Meter: →

	Meter 7	3002	
Monitoring Data:	AM Peak	Off-Peak	PM Peak
Date	10/10/18		
Start Time	11:00 AM		
End Time	11:20 AM		
Duration	20 MIN	MIN	MIN
Leq.	58.3		
Traffic Data			
Roadway			
Direction			
Traffic Total:	0 0	0 0	0 0
Cars			
MT			
HT			
Weather Conditions			

Atmospheric Data
Wind Speed (mph) 5
Temp. (°F) 73
Humidity (%) 93

Site Data: Site Surface (alpha): ____ Shielding Factor : ____ Pavement Type : ____

Plan View

NORTH

N

Profile View:

Monitoring Notes

AM Peak: Lawn Mower noise.

Off-Peak:

PM Peak

Route 29 Widening Project

Site # M-09 **Description :** 5278 Tractor Lane

Done By: JCL/TJB

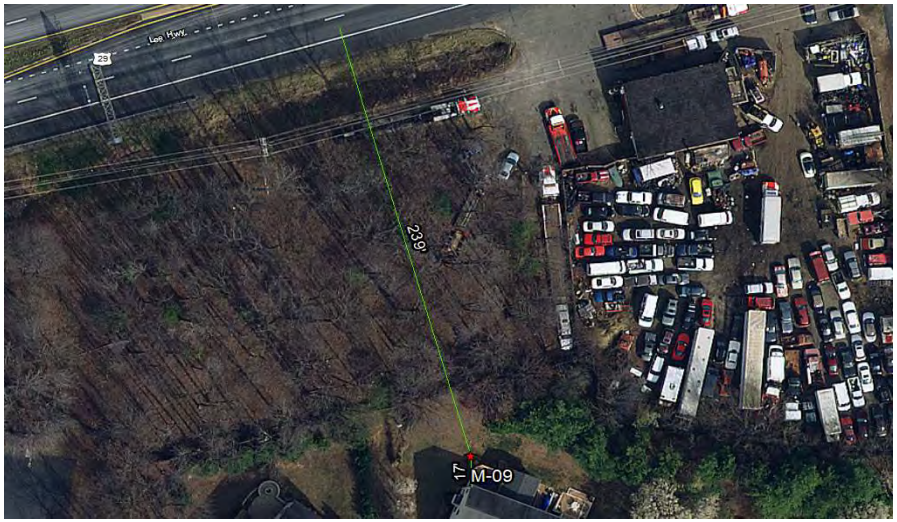
Meter: → Meter 9 | 2903

Monitoring Data:	AM Peak	Off-Peak	PM Peak
Date	10/10/18		
Start Time	11:00 AM		
End Time	11:20 AM		
Duration	20 MIN	MIN	MIN
Leq.	53.4		
Traffic Data Roadway			
Direction			
Traffic Total:	0 0	0 0	0 0
Cars			
MT			
HT			
Weather Conditions			

Atmospheric Data
Wind Speed (mph) 5
Temp. (°F) 73
Humidity (%) 93

Site Data: Site Surface (alpha): ____ Shielding Factor : ____ Pavement Type : ____

Plan View



NORTH

N

Profile View:

Monitoring Notes

AM Peak: Lawn Mower noise.

Off-Peak:

PM Peak

Route 29 Widening Project

Site # M-10 **Description :** Hazel Furguson Dr.

Done By: AJN

Meter: → Meter 8 | 2908

Monitoring Data:	AM Peak	Off-Peak	PM Peak
Date	10/10/18		
Start Time	10:15 AM		
End Time	10:35 AM		
Duration	20 MIN	MIN	MIN
Leq.	55.6		
Traffic Data Roadway			
Direction			
Traffic Total:	0 0	0 0	0 0
Cars			
MT			
HT			
Weather Conditions			

Atmospheric Data
Wind Speed (mph) 7
Temp. (°F) 70
Humidity (%) 87

Site Data: Site Surface (alpha): ____ Shielding Factor : ____ Pavement Type : ____

Plan View

NORTH

Profile View:

Monitoring Notes

AM Peak:

Off-Peak:

PM Peak

Route 29 Widening Project

Site # M-11 **Description :** 12645 Buckleys Gate Drive

Done By: JCL/TJB

Meter: → Meter 9 2902

Monitoring Data:	AM Peak	Off-Peak	PM Peak
Date	10/10/18		
Start Time	10:15 AM		
End Time	10:35 AM		
Duration	20 MIN	MIN	MIN
Leq.	**56.7**		
Traffic Data Roadway			
Direction			
Traffic Total:	0 0	0 0	0 0
Cars			
MT			
HT			
Weather Conditions			

Atmospheric Data
Wind Speed (mph) 7
Temp. (°F) 70
Humidity (%) 87

Site Data: Site Surface (alpha): ____ Shielding Factor : ____ Pavement Type : ____

Plan View

NORTH

N

Profile View:

Monitoring Notes

AM Peak:

Off-Peak:

PM Peak

McCormick Taylor, Inc

Route 29 Widening Project

Site # M-12 **Description :** 12739 Heron Ridge Drive

Done By: JCL/TJB

Meter: → Meter 7 | 3001

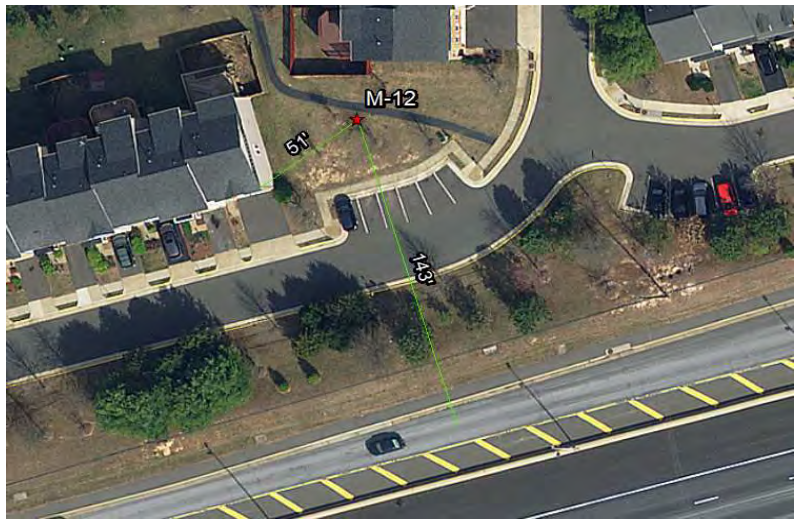
Monitoring Data:	AM Peak	Off-Peak	PM Peak
Date	10/10/18		
Start Time	10:15 AM		
End Time	10:35 AM		
Duration	20 MIN	MIN	MIN
Leq.	**56.6**		
Traffic Data Roadway			
Direction			
Traffic Total:	0 0	0 0	0 0
Cars			
MT			
HT			
Weather Conditions			

Atmospheric Data	
Wind Speed (mph)	7
Temp. (°F)	70
Humidity (%)	87

Site Data: Site Surface (alpha): ____ Shielding Factor : ____ Pavement Type : ____

Plan View

NORTH



Profile View:

Monitoring Notes

AM Peak:

Off-Peak:

PM Peak

APPENDIX E
TRAFFIC DATA SUMMARY

LOUDEST HOUR MEMORANDUM

McCORMICK TAYLOR

MEMORANDUM

DATE: October 2, 2018

TO: LJ Muchenje, VDOT

FROM: Alexander Nies, Noise Analyst

SUBJECT: UPC 110329 - Loudest Hour Determination

The purpose of this memo is to discuss the methodology for determining the loudest hour for Existing (2017), No-Build (2043), and Build (2043) noise modeling conditions, for the Route 29 Widening Project. This memo is being submitted for VDOT concurrence, prior to the calculation of sound levels for the Existing, No-Build, and Build scenarios as part of the preliminary design noise study.

Loudest Hour Determination

The Environmental Traffic Data (ENTRADA) was linked into VDOT's "Loudest Hour Spreadsheet", version 2.0 for determination and identification of the loudest hour for noise modeling purposes. This predictive tool calculates reference Leqs at 50 feet for each TNM vehicle type, utilizing interrupted operation speeds and hourly peak-hour volumes over flat ground. Since Route 29 is the dominant noise source within the project area and carries the largest volumes of traffic, this determination focused solely on this roadway in an attempt to define a single loudest hour for the project area.

Build Conditions

For the purpose of calculating the loudest hour, the project corridor was divided into six zones, i.e Zone 1 through Zone 6. The zones were based on the ENTRADA links that were provided for the project. Zone 1 represented the segment of Lee Highway from union Mill Road to Buckelys Gate Drive. Zone 2 represented Centreville Farm Road from US-29 to the North. Zone 3 represented Clifton Road from US-29 to the South. Zone 4 represented Hampton Forest Way from US-29 to the South. Zone 5 represented Stringfellow Road from US-29 to the North. Zone 6 represented Union Mill Road from US-29 to the South. The analysis for the Build (2043) conditions indicates that the loudest hour for Zone 1 (Lee Highway (US 29)) is the 8:00 AM hour. The loudest hour for Zone 2 (Centerville Farm Road (Route 659)) is the 6:00 PM hour. Due to the lower traffic volumes in Zones 3 and 4, loudest hours were not analyzed for these areas. The loudest hour for Zone 5 (Stringfellow Road (Route 645)) is the 8:00 AM hour. The loudest hour

for Zone 6 (Union Mill Road (Route 659)) is the 5:00 PM hour. The combined Leqs for all roadway loudest hours are shown below in ***Table 1***.

Since the proposed project is primarily located in Zone 1, it was decided that the loudest hour for the project be based on this zone. In addition, further analysis showed that when evaluating a combined Leq for the 8:00 AM hour of Zones 2 and 6, it represented a decrease in acoustic energy of 0.9 dB(A) respectively. The differences in peak hour acoustic energies within Zones 2 and 6 are minimal and will not have significant impacts upon overall Project noise levels.

The directional loudest hour was also analyzed to determine if it would result in a substantive difference in noise levels compared to the combined 8:00 AM hour. The results of this analysis showed that there was no substantive difference between the directional and combined loudest hours for this project.

Table 1

1	2	3	4	5
Zone	Loudest Hour	Combined Leq	8:00 AM Hour	Difference
1	8:00 AM	**70.7**	**----**	**----**
2	6:00 PM	**63.5**	**62.6**	**0.9**
3	**Roadway Not Considered**			
4	**Roadway Not Considered**			
5	8:00 AM	**65.4**	**----**	**----**
6	5:00 PM	**62.8**	**61.9**	**0.9**

Summary

After evaluating these differences, McCormick Taylor Inc., (MT) recommends the 8:00 AM hour be used as the loudest hour for prediction of Build noise levels. Use of the 8:00 AM hour will provide consistent and balanced traffic volumes across the Project. For consistency purposes, the 8:00 AM hour will also be used for the Existing and No-Build scenarios. Upon concurrence with this memo, MT will continue refinement of the noise models and will begin noise level prediction for the Existing, No-Build and Build conditions.

EXISTING ENTRADA - PROECESSED

VERSION 2.0		FINAL ADJUSTED FREE FLOW SPEEDS			TRAFFIC INPUTS FOR WORST CASE NOISE HOUR CALCUATION					
		EXISTING			is section calculates volumes for each each vehicle type for each direction of tra					
Compatible with ENTRADA v. 2017-01					Existing					
					EB or NB			WB or SB		
Roadway	HOURS	EB or NB Hourly Un-interrupted Speed (mph)	WB or SB Hourly Un-interrupted Speed (mph)	FFS Speed (two way) (mph)	Autos	Med	Heavy	Autos	Med	Heavy
Zone 1 Lee Hway, US-29 From Union Mill Road To Buckleys Gate Drive	0:00	45.0	46.1	47.6	45	0	2	71	2	5
	1:00	45.0	45.9	47.6	34	1	4	35	2	3
	2:00	45.0	45.1	47.6	25	2	3	30	2	3
	3:00	45.0	45.1	47.6	43	2	1	34	3	2
	4:00	45.1	45.0	47.6	142	8	0	83	6	3
	5:00	45.0	45.0	47.6	636	38	10	191	9	5
	6:00	45.0	45.0	47.6	1572	50	38	325	21	8
	7:00	45.0	45.0	47.6	1885	48	54	524	28	12
	8:00	45.0	45.0	47.6	1914	53	51	578	26	14
	9:00	45.0	45.0	47.6	1406	52	44	595	28	16
	10:00	45.0	45.0	47.6	808	30	24	608	27	18
	11:00	45.0	45.0	47.6	695	26	20	704	31	18
	12:00	45.0	45.0	47.6	715	25	18	796	36	21
	13:00	45.0	45.0	47.6	682	26	16	1007	40	26
	14:00	45.0	45.0	47.6	650	23	19	1157	39	34
	15:00	45.0	45.0	47.6	629	25	13	1520	45	46
	16:00	45.0	45.0	47.6	660	19	11	1587	34	37
	17:00	45.0	45.0	47.6	701	21	8	1424	25	38
	18:00	45.0	45.0	47.6	696	15	8	1346	21	23
	19:00	45.0	45.0	47.6	630	13	8	954	17	11
	20:00	45.0	45.0	47.6	489	11	5	689	12	8
	21:00	45.0	45.4	47.6	341	5	3	449	4	4
	22:00	45.0	45.0	47.6	223	2	3	279	3	8
	23:00	45.0	45.3	47.6	128	1	3	161	2	4

		EXISTING			is section calculates volumes for each each vehicle type for each direction of tra					
					Existing					
Compatible with ENTRADA v. 2017-01		EB or NB	WB or SB		EB or NB			WB or SB		
Zone 2	0:00	40.7	40.7	42.0	19	0	0	28	0	0
	1:00	40.7	40.7	42.0	11	0	0	18	0	0
	2:00	40.7	40.7	42.0	4	0	0	8	0	0
Centreville Farm Road, Route 659 From US-31 To to the North	3:00	40.7	40.7	42.0	12	0	0	8	0	0
	4:00	40.7	40.7	42.0	27	1	1	13	0	0
	5:00	40.7	40.7	42.0	98	3	1	31	1	0
	6:00	40.7	40.7	42.0	206	7	3	102	3	1
	7:00	40.7	40.7	42.0	309	8	8	199	5	2
	8:00	40.7	40.7	42.0	330	8	7	203	5	3
	9:00	40.7	40.7	42.0	280	8	4	199	5	3
	10:00	40.7	40.7	42.0	190	5	4	181	3	4
	11:00	40.7	40.7	42.0	196	6	4	205	6	4
	12:00	40.7	40.7	42.0	215	6	5	225	5	5
	13:00	40.7	40.7	42.0	204	8	3	251	7	4
	14:00	40.7	40.7	42.0	207	6	2	304	7	6
	15:00	40.7	40.6	42.0	240	9	3	382	11	9
	16:00	40.7	40.6	42.0	248	3	4	415	7	7
	17:00	40.7	40.6	42.0	246	5	4	365	4	7
	18:00	40.7	40.6	42.0	282	5	6	394	7	8
	19:00	40.7	40.7	42.0	260	4	2	346	5	4
	20:00	40.7	40.7	42.0	188	3	1	279	2	3
	21:00	40.7	40.7	42.0	122	1	0	197	3	2
	22:00	40.7	40.7	42.0	77	0	0	147	1	0
	23:00	40.7	40.7	42.0	42	0	0	68	1	0
Zone 3	0:00	45.0	45.0	51.8	28	0	0	60	1	0
	1:00	45.0	45.0	51.8	17	0	0	26	0	1
	2:00	45.0	45.0	51.8	8	0	0	19	1	1
	3:00	45.0	45.0	51.8	19	1	0	12	1	0
	4:00	45.0	45.0	51.8	89	4	1	22	1	0
	5:00	45.0	45.0	51.8	304	20	4	73	3	1
	6:00	45.0	45.0	51.8	625	21	10	208	12	5

Compatible with ENTRADA v. 2017-01		EXISTING			is section calculates volumes for each each vehicle type for each direction of tra					
					Existing					
		EB or NB	WB or SB		EB or NB			WB or SB		
Clifton Road, Route 645 From US-31 To to the South	7:00	45.0	45.0	51.8	915	34	22	288	17	10
	8:00	45.0	45.0	51.8	1005	21	20	307	19	7
	9:00	45.0	45.0	51.8	685	19	14	313	15	8
	10:00	45.0	45.0	51.8	372	11	7	298	9	5
	11:00	45.0	45.0	51.8	341	15	6	369	16	4
	12:00	45.0	45.0	51.8	343	18	7	382	15	6
	13:00	45.0	45.0	51.8	339	13	7	443	14	8
	14:00	45.0	45.0	51.8	329	14	7	614	18	11
	15:00	45.0	45.0	51.8	414	20	4	839	21	14
	16:00	45.0	45.0	51.8	478	14	3	990	19	11
	17:00	45.0	45.0	51.8	456	12	6	1015	13	13
	18:00	45.0	45.0	51.8	491	12	5	956	16	14
	19:00	45.0	45.0	51.8	386	9	3	661	7	6
	20:00	45.0	45.0	51.8	260	5	0	542	6	5
	21:00	45.0	45.0	51.8	191	1	0	379	3	2
	22:00	45.0	45.0	51.8	120	3	0	253	3	0
	23:00	45.0	45.0	51.8	72	1	1	131	1	0
Zone 4	0:00	29.7	30.2	32.2	3	0	0	9	0	0
	1:00	30.1	25.0	32.2	2	0	0	4	0	0
	2:00	33.0	25.0	32.2	1	0	0	1	0	0
Hampton Forest Way From US-31 To to the South	3:00	28.8	29.3	32.2	2	0	0	1	0	0
	4:00	30.4	29.3	32.2	11	0	0	3	0	0
	5:00	30.8	28.8	32.2	51	0	0	4	0	0
	6:00	29.9	26.3	32.2	83	3	0	11	1	0
	7:00	31.1	26.1	32.2	198	3	0	30	1	1
	8:00	31.1	25.5	32.2	162	4	0	45	4	1
	9:00	31.2	26.2	32.2	109	4	1	52	4	0
	10:00	30.5	26.5	32.2	82	2	0	58	2	0
	11:00	30.0	27.6	32.2	76	4	1	64	2	1
	12:00	30.2	26.0	32.2	79	3	1	82	4	0
	13:00	29.9	26.3	32.2	74	3	1	89	3	1
	14:00	28.3	26.8	32.2	76	2	1	98	3	1

		EXISTING			is section calculates volumes for each each vehicle type for each direction of tra					
					Existing					
Compatible with ENTRADA v. 2017-01		EB or NB	WB or SB		EB or NB			WB or SB		
	15:00	28.1	27.6	32.2	77	1	1	152	2	1
	16:00	28.5	27.3	32.2	89	2	1	260	8	3
	17:00	29.5	27.1	32.2	90	2	1	295	4	1
	18:00	30.3	26.5	32.2	100	2	1	266	3	0
	19:00	29.4	27.9	32.2	75	3	1	147	1	1
	20:00	29.8	27.7	32.2	54	1	0	141	2	0
	21:00	31.1	27.5	32.2	27	0	0	88	0	0
	22:00	28.8	27.9	32.2	19	0	0	44	0	0
	23:00	30.5	27.7	32.2	12	0	0	25	0	0
Zone 5	0:00	45.0	46.1	51.8	36	0	0	53	1	1
	1:00	45.0	45.7	51.8	21	0	0	34	1	1
	2:00	45.0	45.0	51.8	8	0	0	15	1	0
Stringfellow Road, Route 645 From US-31 To to the North	3:00	45.0	45.0	51.8	22	1	0	15	1	0
	4:00	45.0	45.0	51.8	52	1	2	25	0	0
	5:00	45.0	45.0	51.8	186	6	1	58	2	0
	6:00	45.0	45.0	51.8	390	13	6	192	6	1
	7:00	45.0	45.0	51.8	585	16	16	377	9	4
	8:00	45.0	45.0	51.8	624	14	14	383	10	6
	9:00	45.0	45.0	51.8	529	14	8	375	9	5
	10:00	45.0	45.0	51.8	359	9	8	342	5	8
	11:00	45.0	45.0	51.8	371	11	7	386	11	7
	12:00	45.0	45.0	51.8	406	11	9	425	10	9
	13:00	45.0	45.0	51.8	386	15	6	474	12	7
	14:00	45.0	45.0	51.8	392	10	4	575	13	11
	15:00	45.0	45.0	51.8	452	17	6	722	20	17
	16:00	45.0	45.0	51.8	468	7	7	783	14	13
	17:00	45.0	45.0	51.8	465	9	7	689	8	14
	18:00	45.0	45.0	51.8	533	9	10	744	13	16
	19:00	45.0	45.0	51.8	490	8	3	653	10	7
	20:00	45.0	45.0	51.8	355	5	2	527	4	5
	21:00	45.0	45.0	51.8	231	2	1	371	5	3
	22:00	45.0	45.0	51.8	145	1	1	278	3	1

Compatible with ENTRADA v. 2017-01		EXISTING			is section calculates volumes for each each vehicle type for each direction of tra					
					Existing					
		EB or NB	WB or SB		EB or NB			WB or SB		
	23:00	45.0	45.0	51.8	80	1	0	128	1	0
Zone 6	0:00	38.9	35.0	42.0	17	0	0	40	0	1
	1:00	40.2	35.0	42.0	9	0	1	17	0	0
	2:00	39.1	35.0	42.0	8	1	0	12	0	1
Union Mill Road, Route 659 From US-31 To to the South	3:00	40.0	35.0	42.0	13	1	1	10	0	1
	4:00	40.2	35.0	42.0	36	3	1	17	0	2
	5:00	39.3	35.0	42.0	153	10	1	33	3	1
	6:00	35.0	35.0	42.0	327	17	5	131	4	4
	7:00	35.0	35.0	42.0	594	16	6	421	15	7
	8:00	35.0	35.0	42.0	625	21	6	327	11	6
	9:00	35.8	35.0	42.0	440	18	6	284	13	4
	10:00	37.8	35.0	42.0	286	12	6	245	7	4
	11:00	37.7	35.0	42.0	264	12	5	283	8	3
	12:00	37.0	35.0	42.0	314	12	4	357	7	3
	13:00	38.3	35.0	42.0	307	13	3	354	7	4
	14:00	37.6	35.0	42.0	285	13	4	388	8	5
	15:00	35.0	35.0	42.0	379	14	6	481	8	7
	16:00	36.9	35.0	42.0	360	10	3	633	11	8
	17:00	36.4	35.0	42.0	411	12	5	797	9	8
	18:00	35.2	35.0	42.0	380	10	2	752	6	9
	19:00	36.7	35.0	42.0	343	7	1	577	6	3
	20:00	37.5	35.0	42.0	260	4	0	432	5	3
	21:00	38.6	35.0	42.0	184	4	1	296	1	1
	22:00	39.2	35.0	42.0	86	3	0	185	1	1
	23:00	40.2	35.0	42.0	50	1	0	100	0	0

NO BUILD ENTRADA - PROECESSED

VERSION 2.0		FINAL ADJUSTED FREE FLOW SPEEDS			TRAFFIC INPUTS FOR WORST CASE NOISE HOUR CALCUATION					
		NO-BUILD			is section calculates volumes for each each vehicle type for each direction of tra					
Compatible with ENTRADA v. 2017-01					No Build					
					EB or NB			WB or SB		
Roadway	HOURS	EB or NB Hourly Un-interrupted Speed (mph)	WB or SB Hourly Un-interrupted Speed (mph)	FFS Speed (two way) (mph)	Autos	Med	Heavy	Autos	Med	Heavy
Zone 1 Lee Hway, US-29 From Union Mill Road To Buckleys Gate Drive	0:00	45.0	45.0	47.6	59	0	3	95	3	7
	1:00	45.0	45.0	47.6	45	1	5	47	2	4
	2:00	45.0	45.0	47.6	33	3	3	39	3	4
	3:00	45.0	45.0	47.6	57	3	1	45	4	2
	4:00	45.0	45.0	47.6	190	10	1	111	7	4
	5:00	45.0	45.0	47.6	848	50	13	254	12	6
	6:00	45.0	45.0	47.6	2096	67	51	434	28	11
	7:00	45.0	45.0	47.6	2514	64	72	698	37	16
	8:00	45.0	45.0	47.6	2552	71	69	771	34	18
	9:00	45.0	45.0	47.6	1875	70	59	793	38	21
	10:00	45.0	45.0	47.6	1077	40	32	811	37	24
	11:00	45.0	45.0	47.6	926	34	27	938	41	24
	12:00	45.0	45.0	47.6	953	33	25	1061	47	28
	13:00	45.0	45.0	47.6	909	35	21	1343	53	35
	14:00	45.0	45.0	47.6	867	31	25	1542	52	45
	15:00	45.0	45.0	47.6	838	33	17	2027	59	61
	16:00	45.0	45.0	47.6	879	25	15	2116	46	49
	17:00	45.0	45.0	47.6	935	28	11	1898	33	50
	18:00	45.0	45.0	47.6	927	21	10	1795	29	30
	19:00	45.0	45.0	47.6	840	17	10	1272	23	14
	20:00	45.0	45.0	47.6	652	14	6	919	16	11
	21:00	45.0	45.0	47.6	455	7	4	598	5	5
	22:00	45.0	45.0	47.6	297	3	4	372	4	11
	23:00	45.0	45.0	47.6	171	2	4	214	3	5

		NO-BUILD			is section calculates volumes for each each vehicle type for each direction of tra					
					No Build					
Compatible with ENTRADA v. 2017-01		EB or NB	WB or SB		EB or NB			WB or SB		
Zone 2	0:00	40.7	40.7	42.0	26	0	0	38	0	1
	1:00	40.7	40.7	42.0	15	0	0	24	1	0
	2:00	40.7	40.7	42.0	6	0	0	10	1	0
Centreville Farm Road, Route 659 From US-31 To to the North	3:00	40.7	40.7	42.0	16	0	0	11	0	0
	4:00	40.7	40.7	42.0	37	1	1	17	0	0
	5:00	40.7	40.7	42.0	131	4	1	41	2	0
	6:00	40.7	40.7	42.0	275	9	4	136	4	1
	7:00	40.6	40.7	42.0	413	11	11	266	7	3
	8:00	40.5	40.7	42.0	440	10	10	270	7	4
	9:00	40.6	40.7	42.0	374	10	6	265	7	3
	10:00	40.7	40.7	42.0	254	7	6	241	4	6
	11:00	40.7	40.7	42.0	262	8	5	273	8	5
	12:00	40.7	40.7	42.0	286	8	6	300	7	7
	13:00	40.7	40.7	42.0	272	11	4	335	9	5
	14:00	40.7	40.6	42.0	276	7	3	406	9	8
	15:00	40.7	40.3	42.0	319	12	4	510	14	12
	16:00	40.7	40.3	42.0	330	5	5	553	10	9
	17:00	40.7	40.5	42.0	328	6	5	486	6	10
	18:00	40.6	40.3	42.0	376	6	7	525	9	11
	19:00	40.7	40.5	42.0	346	6	2	461	7	5
	20:00	40.7	40.7	42.0	250	3	2	372	3	4
	21:00	40.7	40.7	42.0	163	2	1	262	4	2
	22:00	40.7	40.7	42.0	103	1	0	196	2	0
	23:00	40.7	40.7	42.0	57	1	0	90	1	0
Zone 3	0:00	45.0	45.0	51.8	38	0	0	79	1	0
	1:00	45.0	45.0	51.8	23	0	0	34	0	1
	2:00	45.0	45.0	51.8	10	0	0	25	1	1
	3:00	45.0	45.0	51.8	25	2	0	16	1	0
	4:00	45.0	45.0	51.8	118	5	1	30	1	0
	5:00	45.0	45.0	51.8	406	27	5	97	4	1
	6:00	45.0	45.0	51.8	834	28	13	278	16	6

Compatible with ENTRADA v. 2017-01		NO-BUILD			is section calculates volumes for each each vehicle type for each direction of tra					
					No Build					
					EB or NB			WB or SB		
Clifton Road, Route 645 From US-31 To to the South	7:00	45.0	45.0	51.8	1220	45	30	384	22	14
	8:00	45.0	45.0	51.8	1340	28	27	409	25	9
	9:00	45.0	45.0	51.8	914	25	19	418	20	11
	10:00	45.0	45.0	51.8	496	14	9	397	12	6
	11:00	45.0	45.0	51.8	455	20	8	492	22	6
	12:00	45.0	45.0	51.8	458	24	9	510	20	8
	13:00	45.0	45.0	51.8	452	17	9	590	18	10
	14:00	45.0	45.0	51.8	438	18	10	819	24	15
	15:00	45.0	45.0	51.8	552	27	5	1118	28	19
	16:00	45.0	45.0	51.8	638	19	4	1320	26	14
	17:00	45.0	45.0	51.8	608	16	8	1353	17	17
	18:00	45.0	45.0	51.8	654	16	6	1275	21	19
	19:00	45.0	45.0	51.8	515	12	4	882	9	8
	20:00	45.0	45.0	51.8	347	7	0	723	8	6
	21:00	45.0	45.0	51.8	255	1	0	505	4	3
	22:00	45.0	45.0	51.8	160	4	0	337	4	0
	23:00	45.0	45.0	51.8	96	2	1	175	1	0
Zone 4	0:00	27.8	27.8	32.2	3	0	0	10	0	0
	1:00	27.8	25.0	32.2	3	0	0	5	0	0
	2:00	27.8	25.0	32.2	1	0	0	2	0	0
Hampton Forest Way From US-31 To to the South	3:00	27.8	27.8	32.2	2	0	0	2	0	0
	4:00	27.8	27.8	32.2	13	0	0	3	0	0
	5:00	27.8	27.8	32.2	59	0	0	5	0	0
	6:00	27.8	26.3	32.2	95	3	0	13	1	0
	7:00	27.8	26.1	32.2	228	4	0	35	1	1
	8:00	27.8	25.5	32.2	186	5	0	51	4	1
	9:00	27.8	26.2	32.2	125	5	1	60	4	0
	10:00	27.8	26.5	32.2	94	3	0	66	3	0
	11:00	27.8	27.6	32.2	88	5	1	74	3	1
	12:00	27.8	26.0	32.2	90	3	1	94	4	0
	13:00	27.8	26.3	32.2	85	4	1	102	4	1
	14:00	27.8	26.8	32.2	87	3	1	113	3	1

		NO-BUILD			is section calculates volumes for each each vehicle type for each direction of tra					
					No Build					
Compatible with ENTRADA v. 2017-01					EB or NB			WB or SB		
	15:00	27.8	27.6	32.2	89	1	1	175	3	1
	16:00	27.8	27.1	32.2	103	2	1	299	9	3
	17:00	27.8	26.8	32.2	103	3	1	340	5	1
	18:00	27.8	26.4	32.2	115	2	1	306	3	0
	19:00	27.8	27.8	32.2	86	4	1	169	1	1
	20:00	27.8	27.6	32.2	62	1	0	163	2	0
	21:00	27.8	27.5	32.2	31	0	0	101	0	0
	22:00	27.8	27.8	32.2	22	0	0	51	0	0
	23:00	27.8	27.7	32.2	14	0	0	29	0	0
Zone 5	0:00	45.0	46.1	51.8	49	0	0	72	1	1
	1:00	45.0	45.7	51.8	28	0	0	46	1	1
	2:00	45.0	45.0	51.8	11	0	0	20	1	0
Stringfellow Road, Route 645 From US-31 To to the North	3:00	45.0	45.0	51.8	30	1	0	21	1	0
	4:00	45.0	45.0	51.8	70	2	2	33	0	0
	5:00	45.0	45.0	51.8	251	8	2	79	3	0
	6:00	45.0	45.0	51.8	527	17	8	260	8	2
	7:00	45.0	45.0	51.8	791	21	21	509	13	5
	8:00	45.0	45.0	51.8	844	19	18	518	13	8
	9:00	45.0	45.0	51.8	716	20	11	508	13	7
	10:00	45.0	45.0	51.8	486	13	11	462	7	11
	11:00	45.0	45.0	51.8	502	15	10	523	15	10
	12:00	45.0	45.0	51.8	549	15	12	575	14	13
	13:00	45.0	45.0	51.8	522	21	8	641	17	10
	14:00	45.0	45.0	51.8	530	14	5	778	17	15
	15:00	45.0	45.0	51.8	612	23	8	977	27	23
	16:00	45.0	45.0	51.8	633	9	9	1060	19	17
	17:00	45.0	45.0	51.8	629	12	10	932	11	18
	18:00	45.0	45.0	51.8	721	12	14	1006	18	21
	19:00	45.0	45.0	51.8	664	11	4	884	14	9
	20:00	45.0	45.0	51.8	480	7	3	713	5	7
	21:00	45.0	45.0	51.8	312	3	1	502	7	5
	22:00	45.0	45.0	51.8	197	1	1	376	3	1

Compatible with ENTRADA v. 2017-01		NO-BUILD			is section calculates volumes for each each vehicle type for each direction of tra					
					No Build					
		EB or NB	WB or SB		EB or NB			WB or SB		
	23:00	45.0	45.0	51.8	108	1	0	173	2	0
Zone 6	0:00	38.9	35.0	42.0	23	0	0	55	0	1
	1:00	40.2	35.0	42.0	12	0	1	24	0	0
	2:00	39.1	35.0	42.0	10	1	0	17	0	1
Union Mill Road, Route 659 From US-31 To to the South	3:00	40.0	35.0	42.0	18	2	1	14	0	1
	4:00	40.2	35.0	42.0	49	5	2	23	0	3
	5:00	39.3	35.0	42.0	207	14	2	44	4	1
	6:00	35.0	35.0	42.0	443	23	7	177	6	6
	7:00	35.0	35.0	42.0	806	22	9	571	20	10
	8:00	35.0	35.0	42.0	848	29	8	444	14	9
	9:00	35.2	35.0	42.0	597	24	8	386	18	5
	10:00	37.7	35.0	42.0	388	16	8	333	10	6
	11:00	37.6	35.0	42.0	359	16	7	385	10	4
	12:00	36.9	35.0	42.0	426	17	6	484	9	4
	13:00	38.2	35.0	42.0	417	17	5	481	9	5
	14:00	37.5	35.0	42.0	386	18	5	527	11	7
	15:00	35.0	35.0	42.0	515	19	8	652	11	10
	16:00	36.7	35.0	42.0	489	13	4	860	14	11
	17:00	36.0	35.0	42.0	558	16	7	1082	12	11
	18:00	35.0	35.0	42.0	516	14	3	1021	8	12
	19:00	36.5	35.0	42.0	465	10	2	783	8	4
	20:00	37.4	35.0	42.0	353	6	0	587	7	4
	21:00	38.6	35.0	42.0	250	5	1	402	1	1
	22:00	39.2	35.0	42.0	117	4	0	252	1	1
	23:00	40.2	35.0	42.0	68	1	0	136	0	0

BUILD ENTRADA - PROECESSED

VERSION 2.0		FINAL ADJUSTED FREE FLOW SPEEDS			TRAFFIC INPUTS FOR WORST CASE NOISE HOUR CALCUATION					
		BUILD			is section calculates volumes for each each vehicle type for each direction of tra					
Compatible with ENTRADA v. 2017-01					Build					
					EB or NB			WB or SB		
Roadway	HOURS	EB or NB Hourly Un-interrupted Speed (mph)	WB or SB Hourly Un-interrupted Speed (mph)	FFS Speed (two way) (mph)	Autos	Med	Heavy	Autos	Med	Heavy
Zone 1	0:00	45.0	45.0	47.6	59	0	3	95	3	7
	1:00	45.0	45.0	47.6	45	1	5	47	2	4
	2:00	45.0	45.0	47.6	33	3	3	39	3	4
	3:00	45.0	45.0	47.6	57	3	1	45	4	2
	4:00	45.0	45.0	47.6	190	10	1	111	7	4
	5:00	45.0	45.0	47.6	848	50	13	254	12	6
	6:00	45.0	45.0	47.6	2096	67	51	434	28	11
	7:00	45.0	45.0	47.6	2514	64	72	698	37	16
	8:00	45.0	45.0	47.6	2552	71	69	771	34	18
	9:00	45.0	45.0	47.6	1875	70	59	793	38	21
Lee Hway, US-29 From Union Mill Road To Buckleys Gate Drive	10:00	45.0	45.0	47.6	1077	40	32	811	37	24
	11:00	45.0	45.0	47.6	926	34	27	938	41	24
	12:00	45.0	45.0	47.6	953	33	25	1061	47	28
	13:00	45.0	45.0	47.6	909	35	21	1343	53	35
	14:00	45.0	45.0	47.6	867	31	25	1542	52	45
	15:00	45.0	45.0	47.6	838	33	17	2027	59	61
	16:00	45.0	45.0	47.6	879	25	15	2116	46	49
	17:00	45.0	45.0	47.6	935	28	11	1898	33	50
	18:00	45.0	45.0	47.6	927	21	10	1795	29	30
	19:00	45.0	45.0	47.6	840	17	10	1272	23	14
	20:00	45.0	45.0	47.6	652	14	6	919	16	11
	21:00	45.0	45.0	47.6	455	7	4	598	5	5
	22:00	45.0	45.0	47.6	297	3	4	372	4	11
	23:00	45.0	45.0	47.6	171	2	4	214	3	5

		BUILD			is section calculates volumes for each each vehicle type for each direction of tra					
					Build					
Compatible with ENTRADA v. 2017-01		EB or NB	WB or SB		EB or NB			WB or SB		
Zone 2	0:00	40.7	40.7	42.0	26	0	0	38	0	1
	1:00	40.7	40.7	42.0	15	0	0	24	1	0
	2:00	40.7	40.7	42.0	6	0	0	10	1	0
Centreville Farm Road, Route 659 From US-31 To to the North	3:00	40.7	40.7	42.0	16	0	0	11	0	0
	4:00	40.7	40.7	42.0	37	1	1	17	0	0
	5:00	40.7	40.7	42.0	131	4	1	41	2	0
	6:00	40.7	40.7	42.0	275	9	4	136	4	1
	7:00	40.6	40.7	42.0	413	11	11	266	7	3
	8:00	40.5	40.7	42.0	440	10	10	270	7	4
	9:00	40.6	40.7	42.0	374	10	6	265	7	3
	10:00	40.7	40.7	42.0	254	7	6	241	4	6
	11:00	40.7	40.7	42.0	262	8	5	273	8	5
	12:00	40.7	40.7	42.0	286	8	6	300	7	7
	13:00	40.7	40.7	42.0	272	11	4	335	9	5
	14:00	40.7	40.6	42.0	276	7	3	406	9	8
	15:00	40.7	40.3	42.0	319	12	4	510	14	12
	16:00	40.7	40.3	42.0	330	5	5	553	10	9
	17:00	40.7	40.5	42.0	328	6	5	486	6	10
	18:00	40.6	40.3	42.0	376	6	7	525	9	11
	19:00	40.7	40.5	42.0	346	6	2	461	7	5
	20:00	40.7	40.7	42.0	250	3	2	372	3	4
	21:00	40.7	40.7	42.0	163	2	1	262	4	2
	22:00	40.7	40.7	42.0	103	1	0	196	2	0
	23:00	40.7	40.7	42.0	57	1	0	90	1	0
Zone 3	0:00	45.0	45.0	51.8	38	0	0	79	1	0
	1:00	45.0	45.0	51.8	23	0	0	34	0	1
	2:00	45.0	45.0	51.8	10	0	0	25	1	1
	3:00	45.0	45.0	51.8	25	2	0	16	1	0
	4:00	45.0	45.0	51.8	118	5	1	30	1	0
	5:00	45.0	45.0	51.8	406	27	5	97	4	1
	6:00	45.0	45.0	51.8	834	28	13	278	16	6

		BUILD			is section calculates volumes for each each vehicle type for each direction of tra					
					Build					
Compatible with ENTRADA v. 2017-01		EB or NB	WB or SB		EB or NB			WB or SB		
Clifton Road, Route 645 From US-31 To to the South	7:00	45.0	45.0	51.8	1220	45	30	384	22	14
	8:00	45.0	45.0	51.8	1340	28	27	409	25	9
	9:00	45.0	45.0	51.8	914	25	19	418	20	11
	10:00	45.0	45.0	51.8	496	14	9	397	12	6
	11:00	45.0	45.0	51.8	455	20	8	492	22	6
	12:00	45.0	45.0	51.8	458	24	9	510	20	8
	13:00	45.0	45.0	51.8	452	17	9	590	18	10
	14:00	45.0	45.0	51.8	438	18	10	819	24	15
	15:00	45.0	45.0	51.8	552	27	5	1118	28	19
	16:00	45.0	45.0	51.8	638	19	4	1320	26	14
	17:00	45.0	45.0	51.8	608	16	8	1353	17	17
	18:00	45.0	45.0	51.8	654	16	6	1275	21	19
	19:00	45.0	45.0	51.8	515	12	4	882	9	8
	20:00	45.0	45.0	51.8	347	7	0	723	8	6
	21:00	45.0	45.0	51.8	255	1	0	505	4	3
	22:00	45.0	45.0	51.8	160	4	0	337	4	0
	23:00	45.0	45.0	51.8	96	2	1	175	1	0
Zone 4	0:00	27.8	27.8	32.2	3	0	0	10	0	0
	1:00	27.8	25.0	32.2	3	0	0	5	0	0
	2:00	27.8	25.0	32.2	1	0	0	2	0	0
Hampton Forest Way From US-31 To to the South	3:00	27.8	27.8	32.2	2	0	0	2	0	0
	4:00	27.8	27.8	32.2	13	0	0	3	0	0
	5:00	27.8	27.8	32.2	59	0	0	5	0	0
	6:00	27.8	26.3	32.2	95	3	0	13	1	0
	7:00	27.8	26.1	32.2	228	4	0	35	1	1
	8:00	27.8	25.5	32.2	186	5	0	51	4	1
	9:00	27.8	26.2	32.2	125	5	1	60	4	0
	10:00	27.8	26.5	32.2	94	3	0	66	3	0
	11:00	27.8	27.6	32.2	88	5	1	74	3	1
	12:00	27.8	26.0	32.2	90	3	1	94	4	0
	13:00	27.8	26.3	32.2	85	4	1	102	4	1
	14:00	27.8	26.8	32.2	87	3	1	113	3	1

Compatible with ENTRADA v. 2017-01		BUILD			is section calculates volumes for each each vehicle type for each direction of tra					
					Build					
		EB or NB	WB or SB		EB or NB			WB or SB		
	15:00	27.8	27.6	32.2	89	1	1	175	3	1
	16:00	27.8	27.1	32.2	103	2	1	299	9	3
	17:00	27.8	26.8	32.2	103	3	1	340	5	1
	18:00	27.8	26.4	32.2	115	2	1	306	3	0
	19:00	27.8	27.8	32.2	86	4	1	169	1	1
	20:00	27.8	27.6	32.2	62	1	0	163	2	0
	21:00	27.8	27.5	32.2	31	0	0	101	0	0
	22:00	27.8	27.8	32.2	22	0	0	51	0	0
	23:00	27.8	27.7	32.2	14	0	0	29	0	0
Zone 5	0:00	45.0	46.1	51.8	49	0	0	72	1	1
	1:00	45.0	45.7	51.8	28	0	0	46	1	1
	2:00	45.0	45.0	51.8	11	0	0	20	1	0
Stringfellow Road, Route 645 From US-31 To to the North	3:00	45.0	45.0	51.8	30	1	0	21	1	0
	4:00	45.0	45.0	51.8	70	2	2	33	0	0
	5:00	45.0	45.0	51.8	251	8	2	79	3	0
	6:00	45.0	45.0	51.8	527	17	8	260	8	2
	7:00	45.0	45.0	51.8	791	21	21	509	13	5
	8:00	45.0	45.0	51.8	844	19	18	518	13	8
	9:00	45.0	45.0	51.8	716	20	11	508	13	7
	10:00	45.0	45.0	51.8	486	13	11	462	7	11
	11:00	45.0	45.0	51.8	502	15	10	523	15	10
	12:00	45.0	45.0	51.8	549	15	12	575	14	13
	13:00	45.0	45.0	51.8	522	21	8	641	17	10
	14:00	45.0	45.0	51.8	530	14	5	778	17	15
	15:00	45.0	45.0	51.8	612	23	8	977	27	23
	16:00	45.0	45.0	51.8	633	9	9	1060	19	17
	17:00	45.0	45.0	51.8	629	12	10	932	11	18
	18:00	45.0	45.0	51.8	721	12	14	1006	18	21
	19:00	45.0	45.0	51.8	664	11	4	884	14	9
	20:00	45.0	45.0	51.8	480	7	3	713	5	7
	21:00	45.0	45.0	51.8	312	3	1	502	7	5
	22:00	45.0	45.0	51.8	197	1	1	376	3	1

		BUILD			is section calculates volumes for each each vehicle type for each direction of tra					
					Build					
Compatible with ENTRADA v. 2017-01		EB or NB	WB or SB		EB or NB			WB or SB		
	23:00	45.0	45.0	51.8	108	1	0	173	2	0
Zone 6	0:00	38.9	35.0	42.0	23	0	0	55	0	1
	1:00	40.2	35.0	42.0	12	0	1	24	0	0
	2:00	39.1	35.0	42.0	10	1	0	17	0	1
Union Mill Road, Route 659 From US-31 To to the South	3:00	40.0	35.0	42.0	18	2	1	14	0	1
	4:00	40.2	35.0	42.0	49	5	2	23	0	3
	5:00	39.3	35.0	42.0	207	14	2	44	4	1
	6:00	35.0	35.0	42.0	443	23	7	177	6	6
	7:00	35.0	35.0	42.0	806	22	9	571	20	10
	8:00	35.0	35.0	42.0	848	29	8	444	14	9
	9:00	35.2	35.0	42.0	597	24	8	386	18	5
	10:00	37.7	35.0	42.0	388	16	8	333	10	6
	11:00	37.6	35.0	42.0	359	16	7	385	10	4
	12:00	36.9	35.0	42.0	426	17	6	484	9	4
	13:00	38.2	35.0	42.0	417	17	5	481	9	5
	14:00	37.5	35.0	42.0	386	18	5	527	11	7
	15:00	35.0	35.0	42.0	515	19	8	652	11	10
	16:00	36.7	35.0	42.0	489	13	4	860	14	11
	17:00	36.0	35.0	42.0	558	16	7	1082	12	11
	18:00	35.0	35.0	42.0	516	14	3	1021	8	12
	19:00	36.5	35.0	42.0	465	10	2	783	8	4
	20:00	37.4	35.0	42.0	353	6	0	587	7	4
	21:00	38.6	35.0	42.0	250	5	1	402	1	1
	22:00	39.2	35.0	42.0	117	4	0	252	1	1
	23:00	40.2	35.0	42.0	68	1	0	136	0	0

APPENDIX F

TNM NOISE MODELING DATA

(Retained in VDOT Technical Files)

APPENDIX G
HB2577 DOCUMENTATION

COMMONWEALTH of VIRGINIA

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

Stephen Birch, P.E.
Commissioner

November 6, 2018

MEMORANDUM

TO: Hong Ha, P.E. Project Manager, VDOT
LJ Muchenje, Highway Noise Abatement Coordinator, VDOT

FROM: Alexander Nies, Air Quality & Acoustical Specialist

SUBJECT: Route 29 Widening Project, UPC 110329, Task Order Id: 46803-01

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) 762-5800. 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 project proposes to widen the existing Route 29 corridor between Union Mill Road and Buckleys Gate Drive from a four-lane divided highway to a six-lane divided highway. The proposed roadway's horizontal and vertical geometry is generally predicated on the existing facility, available right-of-way, and constructability. Development adjacent to the corridor is mostly residential with some commercial development on both sides of the corridor. Several businesses and numerous residential access points also exist. Significant changes to the existing horizontal and vertical alignments would result in more right-of-way and property acquisitions resulting in a larger impact adjacent to the corridor. Due to the density of development on either side of the roadway, horizontal shifts in the alignment may not fully eliminate the need for noise attenuation. Furthermore, deep cuts in the vertical geometry would prohibit access and significantly increase project cost beyond the project's budget considering construction of sound barriers are necessary in the final 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.

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 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.

APPENDIX H

WARRANTED, FEASIBLE, & 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

Date:	5-Nov-18
Project No. and UPC:	UPC 110329; Task Order ID: 46803-01
County:	Fairfax County, Virginia
District:	
Barrier System ID:	Barrier A
Community Name and/or CNE#	CNE A
Noise Abatement Category(s)	B, C
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	NA
b.	Date of approval for the Categorical Exclusion (CE), Record of Decision (ROD), or Finding	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	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?	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	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)	11,991 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)	11,991 SF/BR
f.	Is (1e) less than or equal to the maximum square feet per benefited receptor (MaxSF/BR)	No
g.	Does the barrier provide an IL of at least 7 dB(A) for at least one impacted receptor in the	No
2	**Additional Noise Barrier Details**	
a.	Length of the proposed noise barrier. (ft)	400 ft
b.	Height range of the proposed noise barrier. (ft)	30-30
c.	Average height of the proposed noise barrier. (ft)	30.00 ft
d.	Cost per square foot. ($/$ft^2$)	$42/SF
e.	Total Barrier Cost ($)	$503,622
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:	

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

Date:	30-May-19
Project No. and UPC:	UPC 110329; Task Order ID: 46803-01
County:	Fairfax County, Virginia
District:	
Barrier System ID:	Barrier B
Community Name and/or CNE#	CNE B
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	NA
b.	Date of approval for the Categorical Exclusion (CE), Record of Decision (ROD), or Finding	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	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:	4
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	50%
d.	Is the percentage 50 or greater?	Yes
2	Will placement of the noise barrier cause engineering or safety conflicts, e.g drainage 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)	7,294 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.	7
d.	Total number of benefited receptors.	9
e.	Surface Area per benefited receptor unit. (ft^2/BR)	810 SF/BR
f.	Is (1e) less than or equal to the maximum square feet per benefited receptor (MaxSF/BR)	Yes
g.	Does the barrier provide an IL of at least 7 dB(A) for at least one impacted receptor in the	Yes
2	**Additional Noise Barrier Details**	
a.	Length of the proposed noise barrier. (ft)	521 ft
b.	Height range of the proposed noise barrier. (ft)	14 ft
c.	Average height of the proposed noise barrier. (ft)	14.00 ft
d.	Cost per square foot. ($/$ft^2$)	$42/SF
e.	Total Barrier Cost ($)	$306,348
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	

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:	

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

Date:	22-May-19
Project No. and UPC:	UPC 110329; Task Order ID: 46803-01
County:	Fairfax County, Virginia
District:	
Barrier System ID:	Barrier System C
Community Name and/or CNE#	CNE C
Noise Abatement Category(s)	B, C
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	NA
b.	Date of approval for the Categorical Exclusion (CE), Record of Decision (ROD), or Finding	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	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:	4
b.	Number of impacted receptor units receiving 5 dB(A) or more insertion loss (IL):	4
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	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)	12,561 SF
b.	Impacted noise sensitive receptor(s) receiving 5 dB(A) IL or more.	4
c.	Non-impacted noise sensitive receptor(s) receiving 5 dB(A) IL or more.	13
d.	Total number of benefited receptors.	17
e.	Surface Area per benefited receptor unit. (ft^2/BR)	739 SF/BR
f.	Is (1e) less than or equal to the maximum square feet per benefited receptor (MaxSF/BR)	Yes
g.	Does the barrier provide an IL of at least 7 dB(A) for at least one impacted receptor in the	Yes
2	**Additional Noise Barrier Details**	
a.	Length of the proposed noise barrier. (ft)	828 ft
b.	Height range of the proposed noise barrier. (ft)	14-18 ft
c.	Average height of the proposed noise barrier. (ft)	15.00 ft
d.	Cost per square foot. ($/$ft^2$)	$42/SF
e.	Total Barrier Cost ($)	$527,562
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	

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:	

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

Date:	5-Nov-18
Project No. and UPC:	UPC 110329; Task Order ID: 46803-01
County:	Fairfax County, Virginia
District:	
Barrier System ID:	Barrier D
Community Name and/or CNE#	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	NA
b.	Date of approval for the Categorical Exclusion (CE), Record of Decision (ROD), or Finding	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	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?	Yes

Feasibility

1	Impacted receptor units	
a.	Number of impacted receptor units:	9
b.	Number of impacted receptor units receiving 5 dB(A) or more insertion loss (IL):	9
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	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)	18,765 SF
b.	Impacted noise sensitive receptor(s) receiving 5 dB(A) IL or more.	9
c.	Non-impacted noise sensitive receptor(s) receiving 5 dB(A) IL or more.	4
d.	Total number of benefited receptors.	13
e.	Surface Area per benefited receptor unit. (ft^2/BR)	1,443 SF/BR
f.	Is (1e) less than or equal to the maximum square feet per benefited receptor (MaxSF/BR)	Yes
g.	Does the barrier provide an IL of at least 7 dB(A) for at least one impacted receptor in the	Yes
2	**Additional Noise Barrier Details**	
a.	Length of the proposed noise barrier. (ft)	1,251 ft
b.	Height range of the proposed noise barrier. (ft)	15-15
c.	Average height of the proposed noise barrier. (ft)	15.00 ft
d.	Cost per square foot. ($/$ft^2$)	$42/SF
e.	Total Barrier Cost ($)	$788,130
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:	

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

Date:	5-Nov-18
Project No. and UPC:	UPC 110329; Task Order ID: 46803-01
County:	Fairfax County, Virginia
District:	
Barrier System ID:	Barrier E
Community Name and/or CNE#	CNE E
Noise Abatement Category(s)	B, C
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	NA
b.	Date of approval for the Categorical Exclusion (CE), Record of Decision (ROD), or Finding	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	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?	Yes

	Feasibility	
1	Impacted receptor units	
a.	Number of impacted receptor units:	24
b.	Number of impacted receptor units receiving 5 dB(A) or more insertion loss (IL):	23
c.	Percentage of impacted receptor units receiving 5 dB(A) or more IL	96%
d.	Is the percentage 50 or greater?	Yes
2	Will placement of the noise barrier cause engineering or safety conflicts, e.g drainage 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)	48,971 SF
b.	Impacted noise sensitive receptor(s) receiving 5 dB(A) IL or more.	23
c.	Non-impacted noise sensitive receptor(s) receiving 5 dB(A) IL or more.	23
d.	Total number of benefited receptors.	46
e.	Surface Area per benefited receptor unit. (ft^2/BR)	1,065 SF/BR
f.	Is (1e) less than or equal to the maximum square feet per benefited receptor (MaxSF/BR)	Yes
g.	Does the barrier provide an IL of at least 7 dB(A) for at least one impacted receptor in the	Yes
2	**Additional Noise Barrier Details**	
a.	Length of the proposed noise barrier. (ft)	2,449 ft
b.	Height range of the proposed noise barrier. (ft)	20-20
c.	Average height of the proposed noise barrier. (ft)	20.00 ft
d.	Cost per square foot. ($/$ft^2$)	$42/SF
e.	Total Barrier Cost ($)	$2,056,782
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:	

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

Date:	5-Nov-18
Project No. and UPC:	UPC 110329; Task Order ID: 46803-01
County:	Fairfax County, Virginia
District:	
Barrier System ID:	Barrier F1
Community Name and/or CNE#	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	NA
b.	Date of approval for the Categorical Exclusion (CE), Record of Decision (ROD), or Finding	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	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?	Yes

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):	1
c.	Percentage of impacted receptor units receiving 5 dB(A) or more IL	50%
d.	Is the percentage 50 or greater?	Yes
2	Will placement of the noise barrier cause engineering or safety conflicts, e.g drainage 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)	8,998 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)	8,998 SF/BR
f.	Is (1e) less than or equal to the maximum square feet per benefited receptor (MaxSF/BR)	No
g.	Does the barrier provide an IL of at least 7 dB(A) for at least one impacted receptor in the	Yes
2	**Additional Noise Barrier Details**	
a.	Length of the proposed noise barrier. (ft)	450 ft
b.	Height range of the proposed noise barrier. (ft)	20-20
c.	Average height of the proposed noise barrier. (ft)	20.00 ft
d.	Cost per square foot. ($/$ft^2$)	$42/SF
e.	Total Barrier Cost ($)	$377,916
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:	

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

Date:	30-May-19
Project No. and UPC:	UPC 110329; Task Order ID: 46803-01
County:	Fairfax County, Virginia
District:	
Barrier System ID:	Barrier/Berm System F2
Community Name and/or CNE#	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	NA
b.	Date of approval for the Categorical Exclusion (CE), Record of Decision (ROD), or Finding	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	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:	3
b.	Number of impacted receptor units receiving 5 dB(A) or more insertion loss (IL):	3
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	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)	19,920 SF
b.	Impacted noise sensitive receptor(s) receiving 5 dB(A) IL or more.	3
c.	Non-impacted noise sensitive receptor(s) receiving 5 dB(A) IL or more.	7
d.	Total number of benefited receptors.	10
e.	Surface Area per benefited receptor unit. (ft^2/BR)	1,992 SF/BR
f.	Is (1e) less than or equal to the maximum square feet per benefited receptor (MaxSF/BR)	No
g.	Does the barrier provide an IL of at least 7 dB(A) for at least one impacted receptor in the	Yes
2	**Additional Noise Barrier Details**	
a.	Length of the proposed noise barrier. (ft)	724 ft
b.	Height range of the proposed noise barrier. (ft)	20-30 ft
c.	Average height of the proposed noise barrier. (ft)	28.00 ft
d.	Cost per square foot. ($/$ft^2$)	$42/SF
e.	Total Barrier Cost ($)	$836,640
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	

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:

Note: The berm evaluated with this barrier system was not included in the calculation above. It should be noted that the berm evaluated (Length = 125ft / Height = 20 ft / Base 80 ft 2:1 Ratio) = 3,707 Cubic yds Should be included in the reasonableness calculation in Final Design.

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

Date:	5-Nov-18
Project No. and UPC:	UPC 110329; Task Order ID: 46803-01
County:	Fairfax County, Virginia
District:	
Barrier System ID:	Barrier G
Community Name and/or CNE#	CNE G
Noise Abatement Category(s)	B, C, D, E
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	NA
b.	Date of approval for the Categorical Exclusion (CE), Record of Decision (ROD), or Finding	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	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?	Yes

Feasibility

1	Impacted receptor units	
a.	Number of impacted receptor units:	4
b.	Number of impacted receptor units receiving 5 dB(A) or more insertion loss (IL):	4
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	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)	18,982 SF
b.	Impacted noise sensitive receptor(s) receiving 5 dB(A) IL or more.	4
c.	Non-impacted noise sensitive receptor(s) receiving 5 dB(A) IL or more.	12
d.	Total number of benefited receptors.	16
e.	Surface Area per benefited receptor unit. (ft^2/BR)	1,186 SF/BR
f.	Is (1e) less than or equal to the maximum square feet per benefited receptor (MaxSF/BR)	Yes
g.	Does the barrier provide an IL of at least 7 dB(A) for at least one impacted receptor in the	Yes
2	**Additional Noise Barrier Details**	
a.	Length of the proposed noise barrier. (ft)	949 ft
b.	Height range of the proposed noise barrier. (ft)	20-20
c.	Average height of the proposed noise barrier. (ft)	20.00 ft
d.	Cost per square foot. ($/$ft^2$)	$42/SF
e.	Total Barrier Cost ($)	$797,244
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:	

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

Date:	5-Nov-18
Project No. and UPC:	UPC 110329; Task Order ID: 46803-01
County:	Fairfax County, Virginia
District:	
Barrier System ID:	Barrier H1
Community Name and/or CNE#	CNE H
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	NA
b.	Date of approval for the Categorical Exclusion (CE), Record of Decision (ROD), or Finding	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	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?	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	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)	7,247 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.	1
d.	Total number of benefited receptors.	2
e.	Surface Area per benefited receptor unit. (ft^2/BR)	3,624 SF/BR
f.	Is (1e) less than or equal to the maximum square feet per benefited receptor (MaxSF/BR)	No
g.	Does the barrier provide an IL of at least 7 dB(A) for at least one impacted receptor in the	Yes
2	**Additional Noise Barrier Details**	
a.	Length of the proposed noise barrier. (ft)	500 ft
b.	Height range of the proposed noise barrier. (ft)	10-15
c.	Average height of the proposed noise barrier. (ft)	14.51 ft
d.	Cost per square foot. ($/$ft^2$)	$42/SF
e.	Total Barrier Cost ($)	$304,374
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:	

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

Date:	5-Nov-18
Project No. and UPC:	UPC 110329; Task Order ID: 46803-01
County:	Fairfax County, Virginia
District:	
Barrier System ID:	Barrier H2
Community Name and/or CNE#	CNE H
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	NA
b.	Date of approval for the Categorical Exclusion (CE), Record of Decision (ROD), or Finding	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	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?	Yes

Feasibility

1	Impacted receptor units	
a.	Number of impacted receptor units:	3
b.	Number of impacted receptor units receiving 5 dB(A) or more insertion loss (IL):	3
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	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)	10,704 SF
b.	Impacted noise sensitive receptor(s) receiving 5 dB(A) IL or more.	3
c.	Non-impacted noise sensitive receptor(s) receiving 5 dB(A) IL or more.	3
d.	Total number of benefited receptors.	6
e.	Surface Area per benefited receptor unit. (ft^2/BR)	1,784 SF/BR
f.	Is (1e) less than or equal to the maximum square feet per benefited receptor (MaxSF/BR)	No
g.	Does the barrier provide an IL of at least 7 dB(A) for at least one impacted receptor in the	Yes
2	**Additional Noise Barrier Details**	
a.	Length of the proposed noise barrier. (ft)	750 ft
b.	Height range of the proposed noise barrier. (ft)	10-16
c.	Average height of the proposed noise barrier. (ft)	14.27 ft
d.	Cost per square foot. ($/$ft^2$)	$42/SF
e.	Total Barrier Cost ($)	$449,568
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:	

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

Date:	30-May-19
Project No. and UPC:	UPC 110329; Task Order ID: 46803-01
County:	Fairfax County, Virginia
District:	
Barrier System ID:	Barrier I
Community Name and/or CNE#	CNE I
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	NA
b.	Date of approval for the Categorical Exclusion (CE), Record of Decision (ROD), or Finding	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	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:	3
b.	Number of impacted receptor units receiving 5 dB(A) or more insertion loss (IL):	3
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	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)	20,153 SF
b.	Impacted noise sensitive receptor(s) receiving 5 dB(A) IL or more.	3
c.	Non-impacted noise sensitive receptor(s) receiving 5 dB(A) IL or more.	20
d.	Total number of benefited receptors.	23
e.	Surface Area per benefited receptor unit. (ft^2/BR)	876 SF/BR
f.	Is (1e) less than or equal to the maximum square feet per benefited receptor (MaxSF/BR)	Yes
g.	Does the barrier provide an IL of at least 7 dB(A) for at least one impacted receptor in the	Yes
2	**Additional Noise Barrier Details**	
a.	Length of the proposed noise barrier. (ft)	1,058 ft
b.	Height range of the proposed noise barrier. (ft)	18-20 ft
c.	Average height of the proposed noise barrier. (ft)	19.00 ft
d.	Cost per square foot. ($/$ft^2$)	$42/SF
e.	Total Barrier Cost ($)	$846,426
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	

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:	

APPENDIX I
REFERENCES

References

- Procedures for Abatement of Highway Traffic Noise and Construction Noise 23 CFR 772. 2011.

- U.S. Department of Transportation, Federal Highway Administration, *Highway Traffic Noise: Analysis and Abatement Guidance*, FHWA Report No. FHWA-HEP-10-025, December 2011.

- U.S. Department of Transportation, Federal Highway Administration, *Noise Measurement Handbook FHWA* Report No. FHWA-HEP-18-065, June 2018.

- Virginia State Noise Abatement Policy

- Code of Virginia Noise Abatement Practices and Technologies, Section 33.1-223.2:21. 2013, (HB 2577).

- Virginia Department of Transportation, *Highway Traffic Noise Impact Analysis Guidance Manual*, approved March 15, 2011, effective July 13, 2011, updated February 20th, 2018.

- Virginia Department of Transportation, 2016 *Road and Bridge Specifications*, Section 107.16(b.3) "Noise."

APPENDIX J
LIST OF PREPARERS AND REVIEWERS

List of Preparers/ Reviewers

McCormick Taylor, Inc.

Josh J. Wilson
Manager, Acoustic and Air Quality Services
Education: B.S., Geo-Environmental Studies
M.S., Geo-Environmental Studies
Professional Experience: 18 Years
Role: Project Coordination & QA/QC

Jack Cramer
Senior Project Manager, Acoustic and Air Quality Services
Education: B.S., Geo-Environmental Studies
Professional Experience: 18 Years
Role: Report Preparation & QA/QC

Alexander J. Nies
Acoustic & Air Quality Specialist II
Education: B.S., Environmental Science
Professional Experience: 7 Years
Role: Project Coordination, Data Collection, Noise Modeling, Report Preparation & QA/QC

Ethan J. Anderson
Acoustic & Air Quality Specialist I
Education: B.S., Environmental Science
Professional Experience: 2 Years
Role: Data Collection & Noise Modeling

Dylan L. Houseal
Acoustic & Air Quality Specialist I
Education: B.S., Environmental Science
Professional Experience: 1 Year
Role: Data Collection & Noise Modeling

Virginia Department of Transportation (VDOT)

Lovejoy Muchenje P.E
Highway Noise Abatement Coordinator
B.S., Mechanical Engineering
Professional Experience: 8 years
Role in the project: Reviewer/Noise Study Project Manager

T. Ross Hudnall
Senior Highway Noise Specialist
B.A., Geospatial Environmental Analysis
Professional Experience: 10 years
Role in the project: Reviewer

APPENDIX K

NOISE METER AND ACOUSTICAL CALIBRATOR
CALIBRATION CERTIFICATES

Meter 7

Scantek, Inc.
CALIBRATION LABORATORY
ISO 17025: 2005, ANSI/NCSL Z540:1994 Part 1
ACCREDITED by NVLAP (an ILAC MRA signatory)

NVLAP®
CALIBRATION
NVLAP Lab Code: 200625-0

Calibration Certificate No.40956

Instrument: **Sound Level Meter**
Model: **NL42**
Manufacturer: **Rion**
Serial number: **00245571_032381**
Tested with: **Microphone UC52 s/n 150894**
Preamplifier NH24 s/n 35571
Type (class): **2**
Customer: **McCormick Taylor, Inc.**
Tel/Fax: **717-540-6040 / -6049**

Date Calibrated: **6/25/2018** *Cal Due:*

Status:	Received	Sent
In tolerance:	X	X
Out of tolerance:		
See comments:		

Contains non-accredited tests: __Yes _X_ No
Calibration service: __ Basic _X_ Standard
Address: **5 Capital Drive, Suite 400, Harrisburg, PA 17110**

Tested in accordance with the following procedures and standards:
Calibration of Sound Level Meters, Scantek Inc., Rev. 6/26/2015
SLM & Dosimeters – Acoustical Tests, Scantek Inc., Rev. 7/6/2011

Instrumentation used for calibration: Nor-1504 Norsonic Test System:

Instrument - Manufacturer	Description	S/N	Cal. Date	Traceability evidence Cal. Lab / Accreditation	Cal. Due
483B-Norsonic	SME Cal Unit	31052	Oct 30, 2017	Scantek, Inc./ NVLAP	Oct 30, 2018
DS-360-SRS	Function Generator	33584	Oct 24, 2017	ACR Env./ A2LA	Oct 24, 2019
34401A-Agilent Technologies	Digital Voltmeter	US36120731	Oct 25, 2017	ACR Env. / A2LA	Oct 25, 2018
HM30-Thommen	Meteo Station	1040170/39633	Oct 25, 2017	ACR Env./ A2LA	Oct 25, 2018
PC Program 1019 Norsonic	Calibration software	v.6.1T	Validated Nov 2014	Scantek, Inc.	-
1251-Norsonic	Calibrator	30878	Nov 10, 2017	Scantek, Inc./ NVLAP	Nov 10, 2018
4226-Brüel&Kjær	Multifunction calibrator	2305103	Sep 5, 2017	B&K / A2LA	Sep 5, 2018

Instrumentation and test results are traceable to SI (International System of Units) through standards maintained by NIST (USA) and NPL (UK).

Environmental conditions:

Temperature (°C)	Barometric pressure (kPa)	Relative Humidity (%)
22.4	100.30	52.6

Calibrated by:	Lydon Dawkins	**Authorized signatory:**	Steven E. Marshall
Signature	Lydon Dawkins	Signature	Steven E Marshall
Date	6/25/2018	Date	6/26/2018

Meter 8

Scantek, Inc.
CALIBRATION LABORATORY

ISO 17025: 2005, ANSI/NCSL Z540:1994 Part 1
ACCREDITED by NVLAP (an ILAC MRA signatory)

NVLAP®
CALIBRATION
NVLAP Lab Code: 200625-0

Calibration Certificate No.40957

Instrument: **Sound Level Meter**
Model: **NL42**
Manufacturer: **Rion**
Serial number: **00345929**
ID Number: **017998**
Tested with: **Microphone UC52 s/n 150747**
Preamplifier NH24 s/n 36127
Type (class): **2**
Customer: **McCormick Taylor, Inc.**
Tel/Fax: **717-540-6040 / -6049**

Date Calibrated: **6/25/2018** *Cal Due:*

Status:	Received	Sent
In tolerance:	X	X
Out of tolerance:		
See comments:		

Contains non-accredited tests: __Yes X No
Calibration service: __ Basic X Standard
Address: **5 Capital Drive, Suite 400, Harrisburg, PA 17110**

Tested in accordance with the following procedures and standards:
Calibration of Sound Level Meters, Scantek Inc., Rev. 6/26/2015
SLM & Dosimeters – Acoustical Tests, Scantek Inc., Rev. 7/6/2011

Instrumentation used for calibration: Nor-1504 Norsonic Test System:

Instrument - Manufacturer	Description	S/N	Cal. Date	Traceability evidence Cal. Lab / Accreditation	Cal. Due
483B-Norsonic	SME Cal Unit	31052	Oct 30, 2017	Scantek, Inc./ NVLAP	Oct 30, 2018
DS-360-SRS	Function Generator	33584	Oct 24, 2017	ACR Env./ A2LA	Oct 24, 2019
34401A-Agilent Technologies	Digital Voltmeter	US36120731	Oct 25, 2017	ACR Env. / A2LA	Oct 25, 2018
HM30-Thommen	Meteo Station	1040170/39633	Oct 25, 2017	ACR Env./ A2LA	Oct 25, 2018
PC Program 1019 Norsonic	Calibration software	v.6.1T	Validated Nov 2014	Scantek, Inc.	-
1251-Norsonic	Calibrator	30878	Nov 10, 2017	Scantek, Inc./ NVLAP	Nov 10, 2018
4226-Brüel&Kjær	Multifunction calibrator	2305103	Sep 5, 2017	B&K / A2LA	Sep 5, 2018

Instrumentation and test results are traceable to SI (International System of Units) through standards maintained by NIST (USA) and NPL (UK).

Environmental conditions:

Temperature (°C)	Barometric pressure (kPa)	Relative Humidity (%)
22.3	100.31	46.9

Calibrated by:	Lydon Dawkins	Authorized signatory:	Steven E. Marshall
Signature	Lydon Dawkins	Signature	Steven E Marshall
Date	6/25/2018	Date	6/26/2018

Meter #9

Scantek, Inc.
CALIBRATION LABORATORY

ISO 17025: 2005, ANSI/NCSL Z540:1994 Part 1
ACCREDITED by NVLAP (an ILAC MRA signatory)

NVLAP®
CALIBRATION
NVLAP Lab Code: 200625-0

Calibration Certificate No.41057

Instrument: **Sound Level Meter**
Model: **NL42**
Manufacturer: **Rion**
Serial number: **00345928**
ID Number: **032382**
Tested with: **Microphone UC52 s/n 150627**
Preamplifier NH24 s/n 36126
Type (class): **2**
Customer: **McCormick Taylor, Inc.**
Tel/Fax: **717-540-6040 / -6049**

Date Calibrated: **7/13/2018** *Cal Due:*

Status:	Received	Sent
In tolerance:	X	X
Out of tolerance:		
See comments:		

Contains non-accredited tests: __Yes _X_ No
Calibration service: __ Basic _X_ Standard
Address: **5 Capital Drive, Suite 400, Harrisburg, PA 17110**

Tested in accordance with the following procedures and standards:
Calibration of Sound Level Meters, Scantek Inc., Rev. 6/26/2015
SLM & Dosimeters – Acoustical Tests, Scantek Inc., Rev. 7/6/2011

Instrumentation used for calibration: Nor-1504 Norsonic Test System:

Instrument - Manufacturer	Description	S/N	Cal. Date	Traceability evidence Cal. Lab / Accreditation	Cal. Due
483B-Norsonic	SME Cal Unit	31052	Oct 30, 2017	Scantek, Inc./ NVLAP	Oct 30, 2018
DS-360-SRS	Function Generator	33584	Oct 24, 2017	ACR Env./ A2LA	Oct 24, 2019
34401A-Agilent Technologies	Digital Voltmeter	US36120731	Oct 25, 2017	ACR Env. / A2LA	Oct 25, 2018
HM30-Thommen	Meteo Station	1040170/39633	Oct 25, 2017	ACR Env./ A2LA	Oct 25, 2018
PC Program 1019 Norsonic	Calibration software	v.6.1T	Validated Nov 2014	Scantek, Inc.	-
1251-Norsonic	Calibrator	30878	Nov 10, 2017	Scantek, Inc./ NVLAP	Nov 10, 2018
4226-Brüel&Kjær	Multifunction calibrator	2305103	Sep 5, 2017	B&K / A2LA	Sep 5, 2018

Instrumentation and test results are traceable to SI (International System of Units) through standards maintained by NIST (USA) and NPL (UK).

Environmental conditions:

Temperature (°C)	Barometric pressure (kPa)	Relative Humidity (%)
22.1	100.85	53.5

Calibrated by:	Lydon Dawkins	Authorized signatory:	William D. Gallagher
Signature	Lydon Dawkins	Signature	William D. Gallagher
Date	7/13/2018	Date	7/13/2018

Meter #10

Scantek, Inc.
CALIBRATION LABORATORY

ISO 17025: 2005, ANSI/NCSL Z540:1994 Part 1
ACCREDITED by NVLAP (an ILAC MRA signatory)

NVLAP®
CALIBRATION
NVLAP Lab Code: 200625-0

Calibration Certificate No.41058

Instrument:	**Sound Level Meter**
Model:	**NL42**
Manufacturer:	**Rion**
Serial number:	**00145385**
ID Number:	**017999**
Tested with:	**Microphone UC52 s/n 148955** **Preamplifier NH24 s/n 35281**
Type (class):	**2**
Customer:	**McCormick Taylor, Inc.**
Tel/Fax:	**717-540-6040 / -6049**

Date Calibrated: **7/13/2018** *Cal Due:*

Status:	**Received**	**Sent**
In tolerance:	X	X
Out of tolerance:		
See comments:		

Contains non-accredited tests: __Yes _X_ No
Calibration service: ___ Basic _X_ Standard
Address: **5 Capital Drive, Suite 400, Harrisburg, PA 17110**

Tested in accordance with the following procedures and standards:
Calibration of Sound Level Meters, Scantek Inc., Rev. 6/26/2015
SLM & Dosimeters – Acoustical Tests, Scantek Inc., Rev. 7/6/2011

Instrumentation used for calibration: Nor-1504 Norsonic Test System:

Instrument - Manufacturer	Description	S/N	Cal. Date	Traceability evidence Cal. Lab / Accreditation	Cal. Due
483B-Norsonic	SME Cal Unit	31052	Oct 30, 2017	Scantek, Inc./ NVLAP	Oct 30, 2018
DS-360-SRS	Function Generator	33584	Oct 24, 2017	ACR Env./ A2LA	Oct 24, 2019
34401A-Agilent Technologies	Digital Voltmeter	US36120731	Oct 25, 2017	ACR Env. / A2LA	Oct 25, 2018
HM30-Thommen	Meteo Station	1040170/39633	Oct 25, 2017	ACR Env./ A2LA	Oct 25, 2018
PC Program 1019 Norsonic	Calibration software	v.6.1T	Validated Nov 2014	Scantek, Inc.	-
1251-Norsonic	Calibrator	30878	Nov 10, 2017	Scantek, Inc./ NVLAP	Nov 10, 2018
4226-Brüel&Kjær	Multifunction calibrator	2305103	Sep 5, 2017	B&K / A2LA	Sep 5, 2018

Instrumentation and test results are traceable to SI (International System of Units) through standards maintained by NIST (USA) and NPL (UK).

Environmental conditions:

Temperature (°C)	Barometric pressure (kPa)	Relative Humidity (%)
22.4	100.85	53.4

Calibrated by:	Lydon Dawkins	**Authorized signatory:**	William D. Gallagher
Signature	Lydon Dawkins	Signature	William D Gallagher
Date	7/13/2018	Date	7/13/2018

Scantek, Inc.
CALIBRATION LABORATORY

ISO 17025: 2005, ANSI/NCSL Z540:1994 Part 1
ACCREDITED by NVLAP (an ILAC MRA signatory)

NVLAP®
CALIBRATION
NVLAP Lab Code: 200625-0

Calibration Certificate No.41062

Instrument:	**Acoustical Calibrator**	*Date Calibrated:* **7/13/2018** *Cal Due:*	
Model:	**NC-74**	*Status:*	**Received** / **Sent**
Manufacturer:	**Rion**	*In tolerance:*	**X** / **X**
Serial number:	**35125820**	*Out of tolerance:*	
ID Number:	**018000**		
Class (IEC 60942):	**1**	*See comments:*	
Barometer type:		*Contains non-accredited tests:*	**__Yes _X_ No**
Barometer s/n:			
Customer:	**McCormick Taylor, Inc.**	*Address:*	**5 Capital Drive, Suite 400,**
Tel/Fax:	**717-540-6040 / -6049**		**Harrisburg, PA 17110**

Tested in accordance with the following procedures and standards:
Calibration of Acoustical Calibrators, Scantek Inc., Rev. 10/1/2010

Instrumentation used for calibration: Nor-1504 Norsonic Test System:

Instrument - Manufacturer	Description	S/N	Cal. Date	Traceability evidence Cal. Lab / Accreditation	Cal. Due
483B-Norsonic	SME Cal Unit	31052	Oct 30, 2017	Scantek, Inc./ NVLAP	Oct 30, 2018
DS-360-SRS	Function Generator	33584	Oct 24, 2017	ACR Env./ A2LA	Oct 24, 2019
34401A-Agilent Technologies	Digital Voltmeter	US36120731	Oct 25, 2017	ACR Env. / A2LA	Oct 25, 2018
HM30-Thommen	Meteo Station	1040170/39633	Oct 25, 2017	ACR Env./ A2LA	Oct 25, 2018
140-Norsonic	Real Time Analyzer	1406423	Oct 31, 2017	Scantek / NVLAP	Oct 31, 2018
PC Program 1018 Norsonic	Calibration software	v.6.1T	Validated Nov 2014	Scantek, Inc.	-
4134-Brüel&Kjær	Microphone	173368	Nov 10, 2017	Scantek, Inc. / NVLAP	Nov 10, 2018
1203-Norsonic	Preamplifier	14059	Feb 12, 2018	Scantek, Inc./ NVLAP	Feb 12, 2019

Instrumentation and test results are traceable to SI (International System of Units) through standards maintained by NIST (USA) and NPL (UK)

Calibrated by:	Lydon Dawkins	Authorized signatory:	William D. Gallagher
Signature	Lydon Dawkins	Signature	William D. Gallagher
Date	7/13/2018	Date	7/13/2018

Scantek, Inc.
CALIBRATION LABORATORY

ISO 17025: 2005, ANSI/NCSL Z540:1994 Part 1
ACCREDITED by NVLAP (an ILAC MRA signatory)

NVLAP®
CALIBRATION
NVLAP Lab Code: 200625-0

Calibration Certificate No.40955

Instrument:	**Acoustical Calibrator**	*Date Calibrated:* **6/22/2018** *Cal Due:*	
Model:	**NC-74**	*Status:*	**Received** / **Sent**
Manufacturer:	**Rion**	*In tolerance:*	X / X
Serial number:	**35236431**	*Out of tolerance:*	
Class (IEC 60942):	**1**	*See comments:*	
Barometer type:		*Contains non-accredited tests:*	**__Yes _X_ No**
Barometer s/n:			
Customer:	**McCormick Taylor, Inc.**	*Address:*	**5 Capital Drive, Suite 400, Harrisburg, PA 17110**
Tel/Fax:	**717-540-6040 / -6049**		

Tested in accordance with the following procedures and standards:
Calibration of Acoustical Calibrators, Scantek Inc., Rev. 10/1/2010

Instrumentation used for calibration: Nor-1504 Norsonic Test System:

Instrument - Manufacturer	Description	S/N	Cal. Date	Traceability evidence Cal. Lab / Accreditation	Cal. Due
483B-Norsonic	SME Cal Unit	31052	Oct 30, 2017	Scantek, Inc./ NVLAP	Oct 30, 2018
DS-360-SRS	Function Generator	33584	Oct 24, 2017	ACR Env./ A2LA	Oct 24, 2019
34401A-Agilent Technologies	Digital Voltmeter	US36120731	Oct 25, 2017	ACR Env. / A2LA	Oct 25, 2018
HM30-Thommen	Meteo Station	1040170/39633	Oct 25, 2017	ACR Env./ A2LA	Oct 25, 2018
140-Norsonic	Real Time Analyzer	1406423	Oct 31, 2017	Scantek / NVLAP	Oct 31, 2018
PC Program 1018 Norsonic	Calibration software	v.6.1T	Validated Nov 2014	Scantek, Inc.	-
4134-Brüel&Kjær	Microphone	173368	Nov 10, 2017	Scantek, Inc. / NVLAP	Nov 10, 2018
1203-Norsonic	Preamplifier	14059	Feb 12, 2018	Scantek, Inc./ NVLAP	Feb 12, 2019

Instrumentation and test results are traceable to SI (International System of Units) through standards maintained by NIST (USA) and NPL (UK)

Calibrated by:	Lydon Dawkins	Authorized signatory:	Steven E. Marshall
Signature	Lydon Dawkins	Signature	Steven E Marshall
Date	6/22/2018	Date	6/26/2018

Document stored as: Z:\Calibration Lab\Cal 2018\RIONNC74-0.5in_35236431_M1.doc

APPENDIX L
CORRESPONDENCE

FAIRFAX COUNTY PARK AUTHORITY

12055 Government Center Parkway, Suite 927 • Fairfax, VA 22035-5500
703-324-8700 • Fax: 703-324-3974 • www.fairfaxcounty.gov/parks

August 20, 2018

Ms. Hong "Jenny" Ha, P.E.
NOVA District Location & Design
Virginia Department of Transportation
4975 Alliance Drive
Fairfax, VA 22030

SUBJECT: VDOT-0029-029-350, Rt. 29 Widening Phase II, Preliminary Comments

Dear Ms. Ha:

The Fairfax County Park Authority (FCPA) has reviewed the proposed design for the Phase II widening of Rt. 29 from Union Mill Road to Buckleys Gate Drive (VDOT-0029-029-351) and provides the following comments:

FCPA owns parkland in close proximity to the proposed project area, which contains sensitive environmental and cultural features as well as recreational components. Willow Pond Park, on the north side of Rt. 29, will experience direct impacts from the widening project. Willow Pond is classified by the FCPA as a resource-based park containing significant natural resources and the potential for significant cultural resources. The 62-acre park spans east-west in four segments separated by local roads. Although primarily resource-based, the park does contain two recreational components: an unlit basketball court and the Willow Pond Trail.

FCPA has reviewed the preliminary design exhibits provided by Rinker Design Associates to widen Rt. 29 from four lanes to six, with additional turning lanes provided at its intersection with Stringfellow Road. We have determined that the project will require an assessment of impacts to park and recreation resources in accordance with Section 4(f) of the Federal Transportation Act. This Department of Transportation Act specifies that no project be approved that require the use of any publicly owned park, recreation area, wildlife refuge, or historic sites unless there is no feasible and prudent alternative to the project and the project includes all possible planning to minimize harm to the parkland. FCPA will work with VDOT on necessary mitigation strategies and requirements for the project, in order to approach a de minimis determination.

The proposed design depicts several direct impacts to Willow Pond Park. An excess of 2 acres of right-of-way acquisition along the park frontage on Rt. 29 and Stringfellow Road would be taken from the park. This total includes a stormwater management pond that would be necessary if the project addresses all stormwater runoff on-site. If the project acquires off-site credits and the pond is not built, the total taking would drop to approximately 1.6 acres. The land proposed for acquisition, on Tax Map Parcels 55-3 ((1)) 26 A, ((13)) B, ((14)) B, ((10)) C, D, and S were

all conveyed to FCPA by the Fairfax County Board of Supervisors. The conveyance was conditioned such that the Board needs to consent to any public right-of-way that is granted in excess of 30 feet. As depicted in the current design, granting land from Tax Map Parcels 55-3 ((1)) 26 A, ((14)) B, and ((10)) D will require FCPA to grant 30 feet or more of land for right-of way and will require consent from the Board.

The design also depicts both temporary and permanent easements on park property. Any construction easements should be replanted and a corresponding replanting plan should be submitted for FCPA review. Design sheets should also be submitted depicting existing and proposed storm drainage easements, any relocated utility or traffic poles, and associated utilities. Requests for land rights on Park Authority owned property are necessary in order to perform any surveying, clearing, or grading, even within an easement of any sort. As per Park Policies 210 (Easements) and 211 (Stormwater), before performing any activity on parkland, the applicant must first acquire a Right of Entry License, Easement and/or Construction Permit from the Easement Coordinator, Fairfax County Park Authority, Planning and Development Division, 12055 Government Center Parkway, Suite 406, Fairfax, Virginia 22035. The main telephone number is (703) 324-8741. This includes surveying, test boring, wetland flagging, utility relocations, construction, or any other related activities. Please advise any contractors and subcontractors of this requirement.

Willow Pond Trail runs through the park from its eastern extent to Stringfellow Road. The paved trail is parallel to Rt. 29, though not linear. It is separated from the roadway by distances as low as 50 feet at the eastern end of the park and as high as 125 feet at the western end. The trail continues through Board of Supervisors owned property to the sidewalk at the intersection of Rt. 29 and Meadow Estates Drive. The trail is an important pedestrian connection, as there is no sidewalk along this portion of Rt. 29. The Countywide Trails Plan map in the Fairfax County Comprehensive Plan depicts a major paved trail through the park, parallel to Rt. 29. The widening project design would remove a large portion of trail. However, the project does propose a 10-foot wide shared-use path as part of the right-of-way that would serve as the functional equivalent of the existing trail for the purposes of pedestrian and bicycling connectivity. The shared-use path should at a minimum be connected to any remaining portions of the existing trail and VDOT should coordinate with FCDOT on interactivity with the shared-use path and the park, including any proposed landscape plantings. Fill slopes for the right-of-way should be at a 2:1 grade ratio and be maintained in perpetuity by VDOT.

The widening project will significantly impact the natural resources of Willow Pond Park. The park will experience lost land, vegetation, and habitat, and could experience increased storm water discharge, invasive species, and disturbance to remaining resources. In addition to natural resources lost to new right-of-way, the project proposes to re-align the Willow Spring Branch stream, install a new, larger culvert, and construct a new stormwater management pond. FCPA requires any adverse impacts incurred to its natural resources by this project to be restored to the maximum extent feasible in accordance with Policy 201, Natural Resources, of the FCPA Policy Manual (Attachment 1) and the agency-wide Natural Resource Management Plan, recommended management actions eight through thirteen (Attachment 2). VDOT shall agree to rehabilitate any

temporary impacts to natural resources to Park Authority standards and mitigate or compensate for permanent impacts to natural resources on Park Authority managed lands. This requirement shall apply to any natural resource impact—terrestrial or aquatic—that is not regulated under the jurisdiction of any federal or state agency. The Park Authority defines permanent impact as any habitat type conversion, for example, forest to grassland; and temporary impact as replacement of the same habitat type or better, for example, grassland to grassland. Mitigation or compensation for permanent impacts shall be determined using the Fairfax County Land Development Services Unit Price Schedule (https://www.fairfaxcounty.gov/landdevelopment/sites/landdevelopment/files/assets/documents/pdf/publications/unit-price-schedule.pdf) to determine a replacement cost. Total impacts and mitigation or compensation costs shall be determined upon completion of the site design.

If federal permitting or funding is involved with the construction, it will trigger Section 106, requiring VDOT to consult with the Virginia Department of Historic Resources (VDHR). The Park Authority is the designated agency in Fairfax County to deal with Section 106 for archaeological and historic resource impacts. The project site contains a large area and, depending on the level of investigation, will require initial archaeological survey. This could include Phase II archaeological testing (in order to determine National Register of Historic Places eligibility) and Phase III data recovery if sites are determined eligible. Each parcel or group of parcels should be assessed on an individual basis.

At the completion of any cultural resource studies, FCPA staff requests that VDOT provide two copies (one hard copy, one digital copy) of the archaeology report as well as field notes, photographs, and artifacts to the Park Authority's Resource Management Division (Attention: Liz Crowell) within 30 days of completion of the study. Materials can be sent to 2855 Annandale Road, Falls Church, VA 20110 for review and concurrence. For artifact catalogues, please include the database in Access ™ format, as well as digital photography, architectural assessments, including line drawings. If any archaeological, architectural or other sites are found during cultural resources assessments, the applicant should update files at VDHR, using the VCRIS system.

Thank you for the opportunity to comment on this project design. We look forward to participating in the project as it moves forward and working together to achieve the mitigation necessary to come to a de minimis determination pursuant to Section 4(f). Our point of contact for this project is Jonathan Buono, Senior Park Planner, who can be reached by phone at 703-324-8691 or by email at Jonathan.Buono@fairfaxcounty.gov.

Sincerely,

David Bowden, Director
Planning and Development Division

Copy: Barbara Nugent, Director, Resources Management Division
John Stokely, Manager, Natural Resource Protection Branch
Andrea Dorlester, Manager, Park Planning Branch
Cindy McNeal, Project Coordinator, Real Estate Services Branch
Alex Burdick, Engineer, Real Estate Services Branch
Michelle Meadows, Senior Right of Way Agent, Real Estate Services Branch
Suzie Battista, Development Review Supervisor, Park Planning Branch
Michael J. Guarino, Capital Projects Section, FCDOT