Montgomery County
Department of Transportation

Middlebrook Road Noise Study

West of I-270: From Great Seneca Highway to I-270
and
East of I-270 : at Twinflower Circle

Please Hold Questions

We will answer all questions at the end of the presentation.

WHO ARE WE?

Department of Transportation

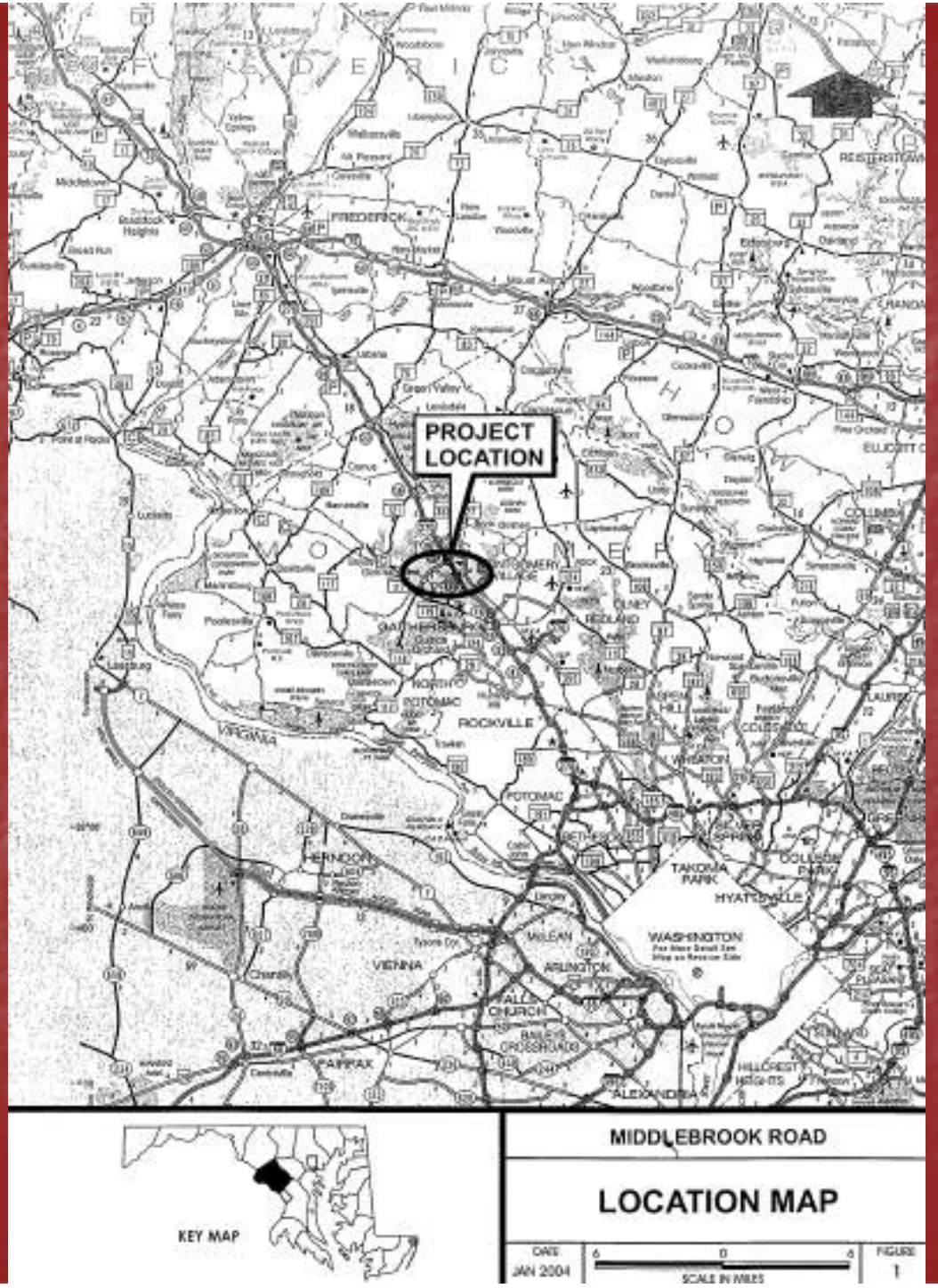
Division of Transportation Engineering

Bruce Johnston
Sogand Seirafi
Michael Mitchell (Program Manager)

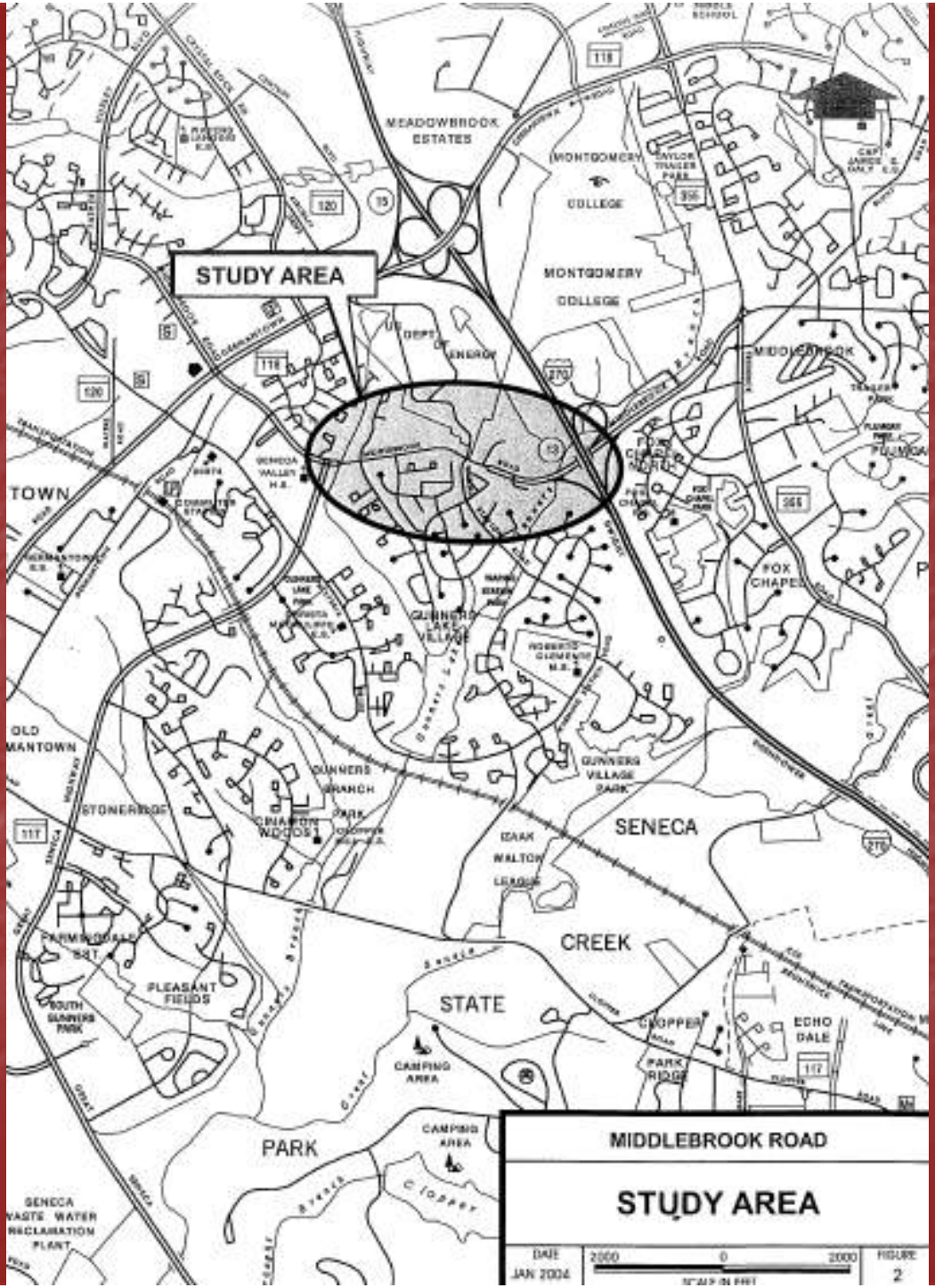
PURPOSE OF THIS MEETING ?

- Present the results of the noise study.
- Answer Community's questions.
- Receive feedback from the public on the findings of the study.

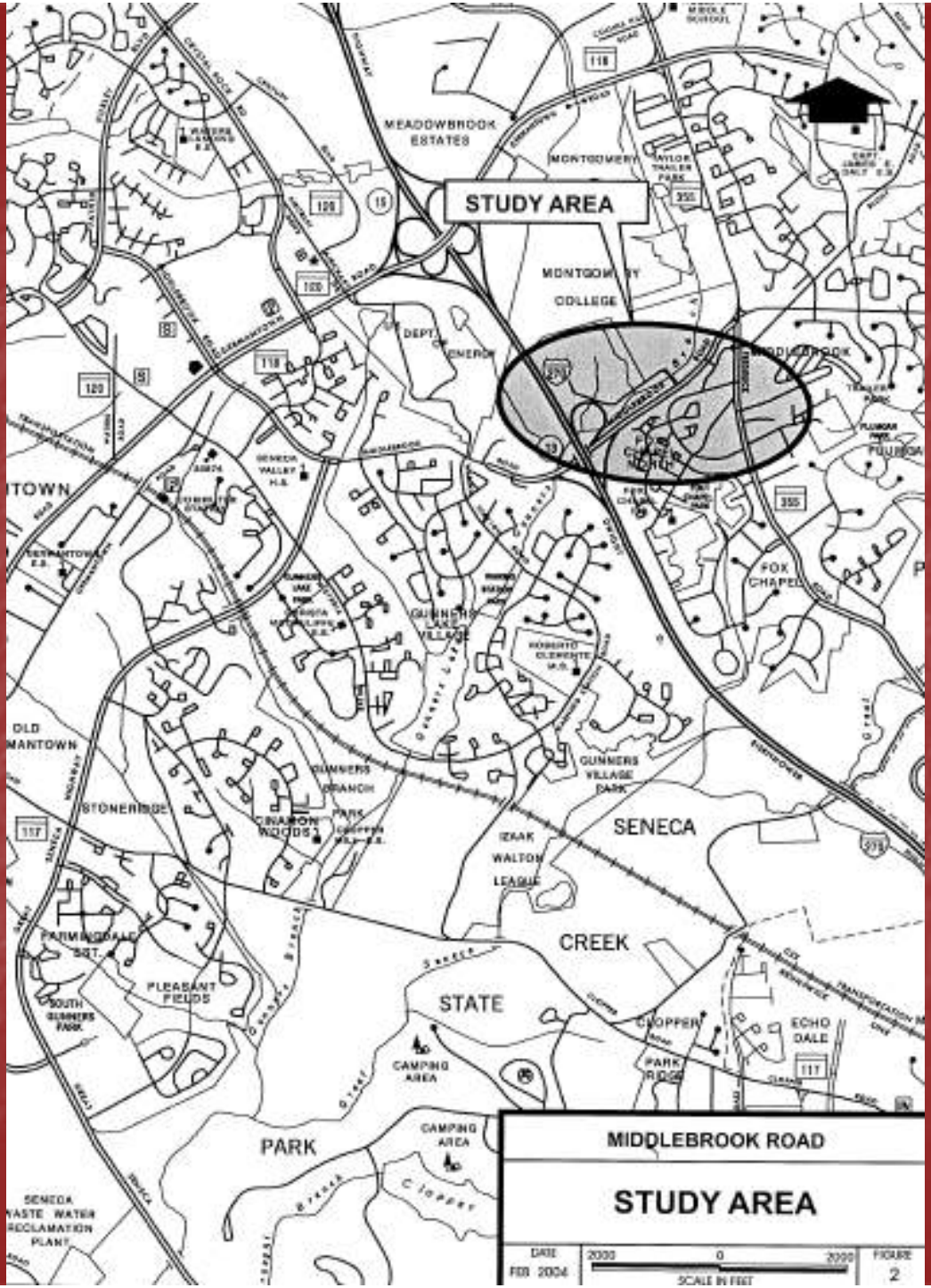
Vicinity Map



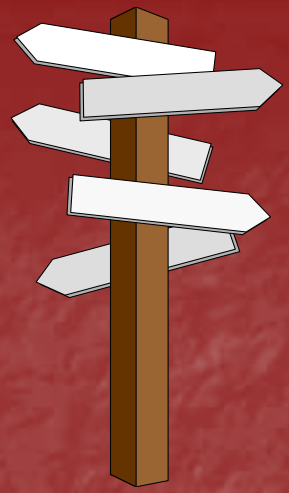
STUDY AREA
West of I-270



STUDY AREA
East of I-270



Project Need:



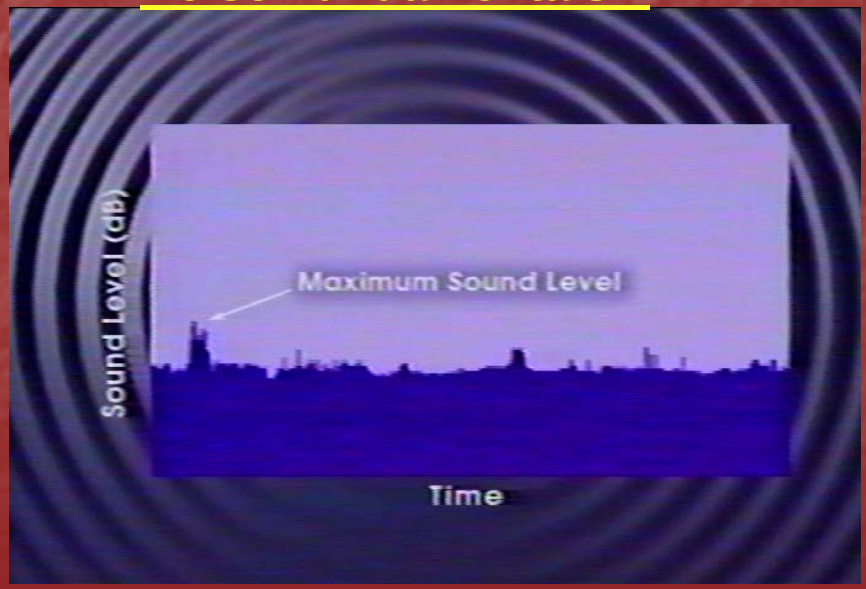
- This project is a study to assess noise levels generated by road traffic only.
- The study determines the need, qualification and feasibility of noise mitigation measures.

Noise Fundamentals

- Two short videos on fundamentals of quantifying and measuring highway noise and designing barriers.

Noise Fundamentals 1

Noise Fundamentals 2



Noise Fundamentals

- Concerned with traffic noise (trucks, cars, buses, and motorcycles). Noise is generated by the stack, engine, and tires and increases with speed and volumes.
- Background noise (rustling leaves, aircraft, children playing, insects, etc.)
- Unit of noise measurement is DECIBEL, a logarithmic scale based on energy.
- A doubling of sound energy, as would be a doubling of traffic volume, would be 3 dBA change.
- Human Hearing ability affects how noise is heard.
  - **3 dBA change generally barely perceptible**
  - **5 dBA change readily noticeable**
  - **10 dBA change 'sounds' twice as loud to most people**

Study Criteria

- The Noise Study was done as per the County's Highway Noise Abatement Policy

  The County's noise study criteria is very similar to noise study criteria used by the Federal government and other state governments

- Noise Measurements are taken at outdoor ground level (i.e. rear useable yard) 25 feet from the house, five feet above ground (approx. human ear level).

  Typically the noise inside the dwelling is 15 to 20 dBA below that outside the dwelling

Methodology
How The Study Was Conducted

- **Logical Implementation Segments (LIS)**

  LIS is a Logical assessment area that has similar noise characteristics. An LIS is generally selected such that protection would be provided by an individual noise barrier wall.

- **Receptor Locations**

  Receptor locations selected to accurately show noise levels within each LIS.

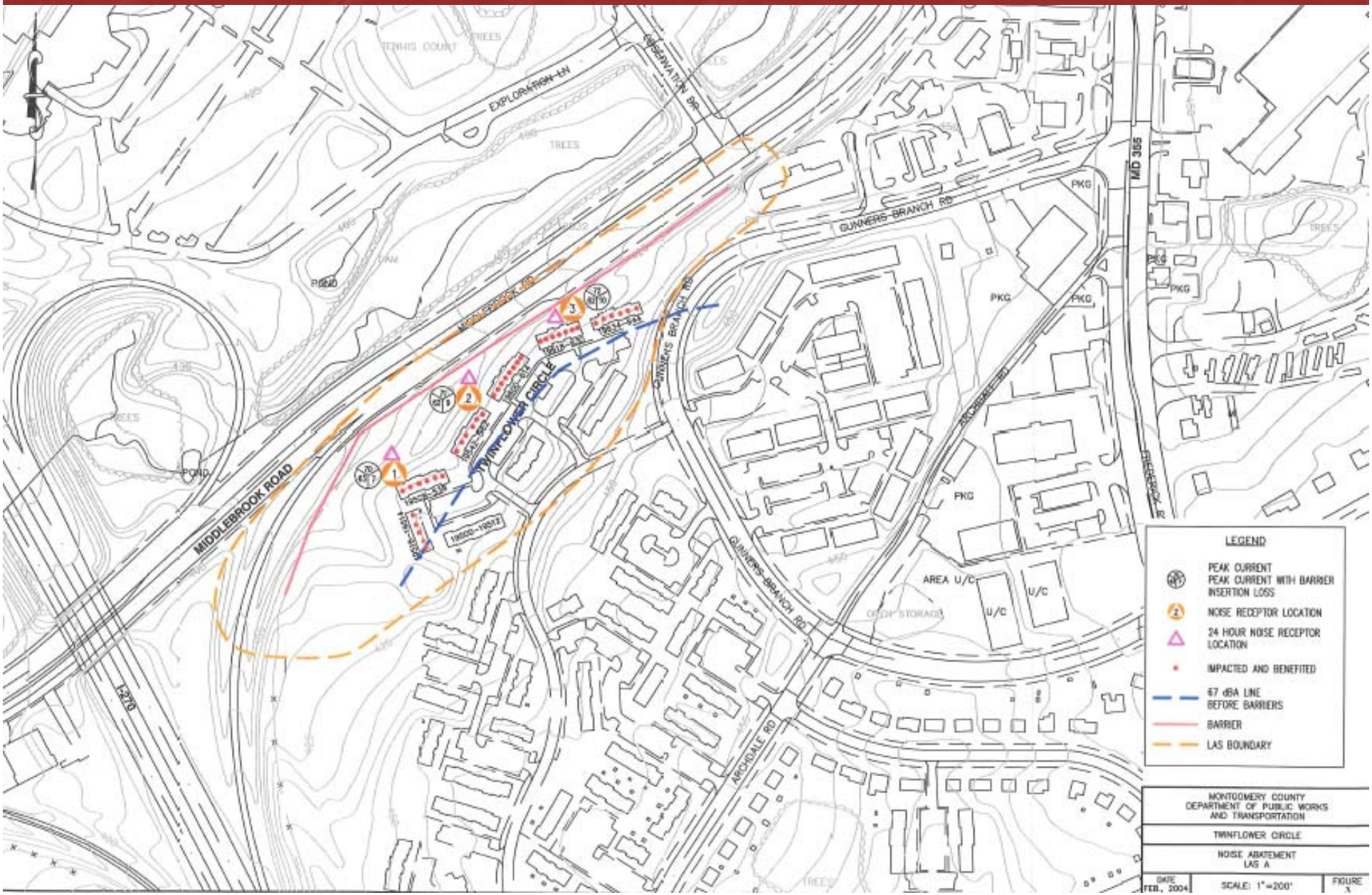
- **Scope of Study (Noise Measurements & Modeling)**

  Investigate current noise levels as well as noise levels projected to occur within the next 20 years (at Level of Service ‘D’)

LIS Map


LAS 1
LAS 1A
LAS 2
LAS 3
LAS 4
LAS 5
LEGEND
AMBIENT
AMBIENT WITH BARRIER INSERTION LOSS
NOISE RECEPTOR LOCATION
24 HOUR NOISE RECEPTOR LOCATION
IMPACTED AND BENEFITTED
BARRIER
LAS BOUNDARY
RECEPTOR NUMBER
ADDRESS
RECEPTOR 1
37 CROSS RIDGE COURT
RECEPTOR 2
12531 RIDGECREST PLACE
RECEPTOR 2A
19424 RIDGECREST DRIVE
RECEPTOR 3
12415 HICKORY TREE WAY
RECEPTOR 4
12306 QUAIL WOODS DRIVE
RECEPTOR 5
19365 HOTTINGER CIRCLE
RECEPTOR 6
19340 CHURUBUSCO CIRCLE
RECEPTOR 7
12020 MIDDLEBROOK ROAD
RECEPTOR 8
12501 MIDDLEBROOK ROAD
MONTGOMERY COUNTY DEPARTMENT OF PUBLIC WORKS AND TRANSPORTATION
MIDDLEBROOK ROAD
NOISE ABATEMENT PLAN
DATE
JULY, 2006
SCALE: 1"=300'
FIGURE
3

LIS Map continued



Terms (More Fundamentals)

- Impacted: A receptor experiencing a peak-noise hour equivalent sound level of 67 dBA or higher due to vehicular traffic noise.
- Affected (By Construction): Properties on which the implementation of the noise mitigation measures created temporary or permanent property impacts.
- Benefited: Receptors (or homeowners) which are noise impacted and experience barrier insertion loss of at least 3 dBA.
- Insertion Loss: The decrease in the sound level measured at a receptor location when a noise barrier is placed in the noise propagation path between the receptor and a roadway
- Level of Service (LOS-D): A qualitative measure of traffic flow conditions (primarily traffic volume and average speed), differentiated into six levels and given letter designations (‘A’ through ‘F’) where ‘A’ represents the best operating conditions (low volume/high speed) and ‘F’ the worst. The greatest noise generation from a roadway generally occurs at LOS-D, characterized by high traffic density with stable, high speeds.

Scope of Noise Study

1. Review study area and select LIS and receptor sites.

2. Take short term (20 minute) and long term (24 hour) noise measurements.

   * Traffic counts taken with short term measurements. Noise measurements and traffic counts used to calibrate computer model used for acoustical analysis

   * 24-hour noise measurements used to determine sound variations over a day and to determine noisiest hours

3. Set up and calibrate computer model used to determine noise levels in the future design year. Transportation Noise Model (TNM) of Federal Highway Administration used to model noise levels. Input includes traffic types, volumes and speeds; locations and types of roadways and receivers; intervening objects that would affect the noise levels such as buildings, trees, ground, and grass.

Scope of Noise Study continued

5. Run calibrated model based on projected traffic levels expected to occur within 20 years (use LOS-D traffic volume if expected to occur within 20 years). Where noise levels exceed 67 dBA analyze barriers.

6. Input proposed barrier locations, lengths and heights into TNM computer program.

7. Vary barrier heights as required until desired noise reduction is obtained.

8. Estimate cost and perform cost/benefit analysis

9. Prepare report

Ambient Noise Measurements

LIS	Receiver	Location	Description	Adjusted Ambient (dBA)
1	R2	12531 Ridgecrest Place	Residence	61
1A	R2A	19424 Ridgecrest Drive	Residence	67
2	R4	12308 Quail Woods Dr	Townhouse	68
3	R5	19365 Hottinger Circle	Residence	68
4	R7	12020 Middlebrook Road	Residence	67
5	R8	12501 Middlebrook Road	Residence	69
Twin.	R-3	19630 Twinflower Circle	Townhouse	72

Note: Adjusted ambient is peak ambient noise level to be expected during a 24-hour period.

Noise Mitigation Criteria

Feasibility Criteria

- The barrier can be built to provide an insertion loss of at least 7 dBA for the most seriously traffic-noise impacted receptors.
- The barrier can be built without either unduly restricting pedestrian or vehicular access, or without interfering with safe sight distances for motorists.
- Any right-of-way required for the construction and maintenance of the barrier must either be dedicated to the County at no cost or the County is granted permanent easement.

Noise Mitigation Criteria continued

Reasonableness Criteria

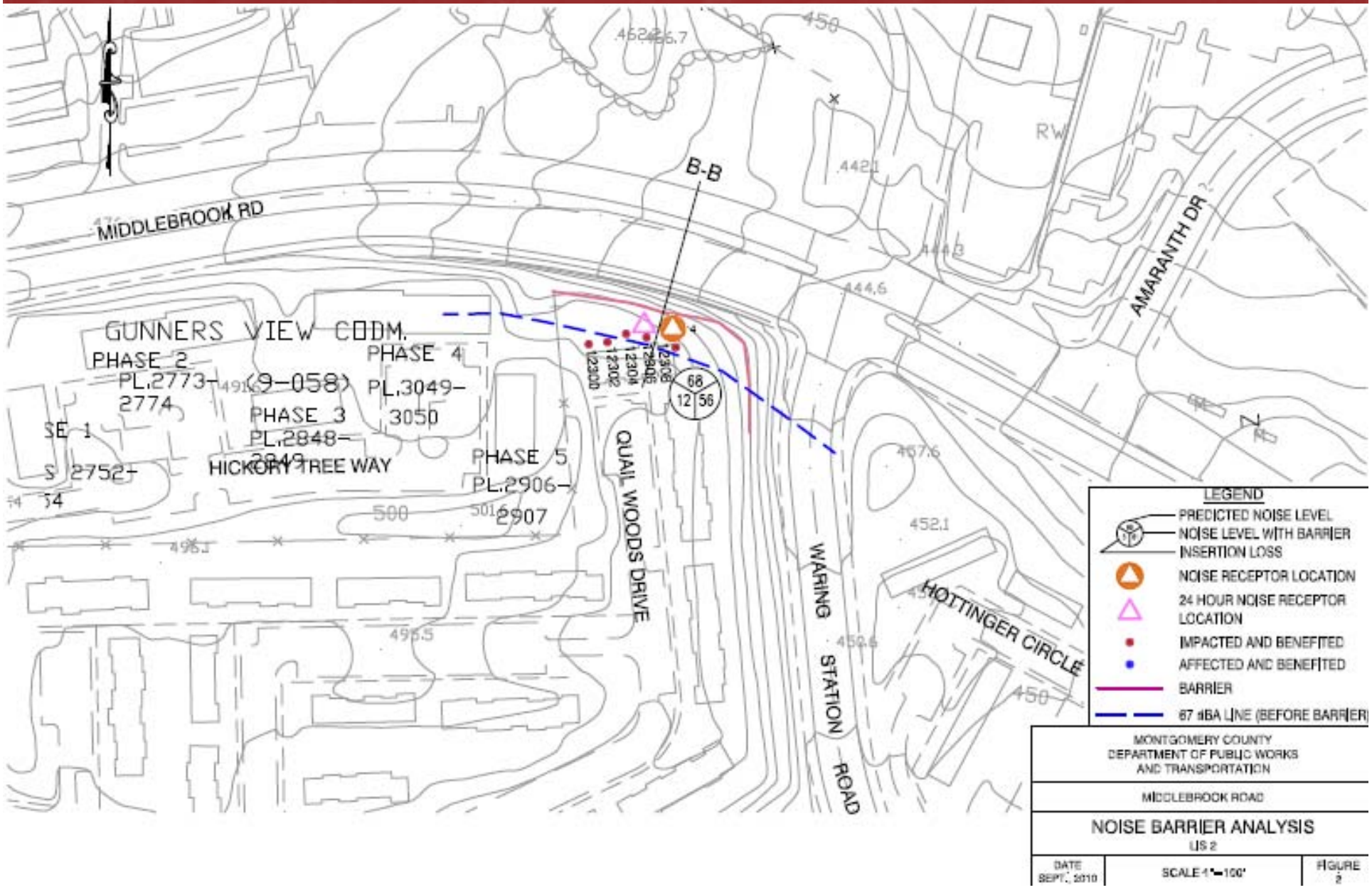
- The measured or projected sound level must equal or exceed 67 dBA.
- The barrier will not result in undue negative impacts on the environment or historical resources.
- The County costs to install the barrier will not exceed $100,000* per benefited receptor (where benefited receptors are considered to be the owners of those dwellings which will enjoy a barrier loss of at least 3 dBA).
- The barrier designs and payment responsibility, if any, are approved by the benefited property owners.

Summary of Results

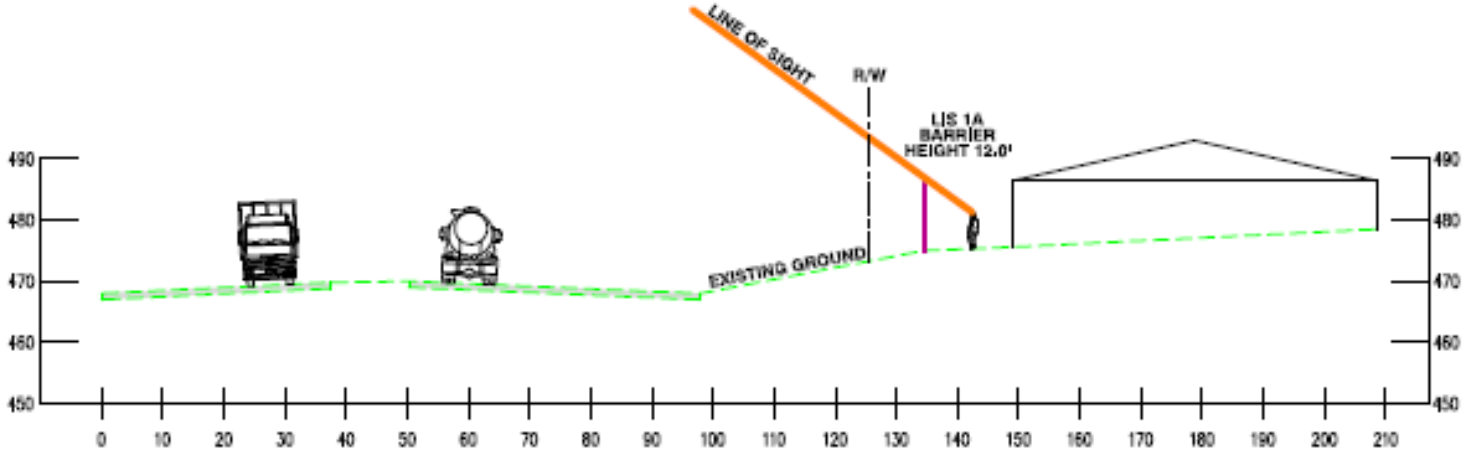
- **All LISs within the study area meet the criteria for noise mitigation except LIS 1.**

LIS 1A with proposed barrier

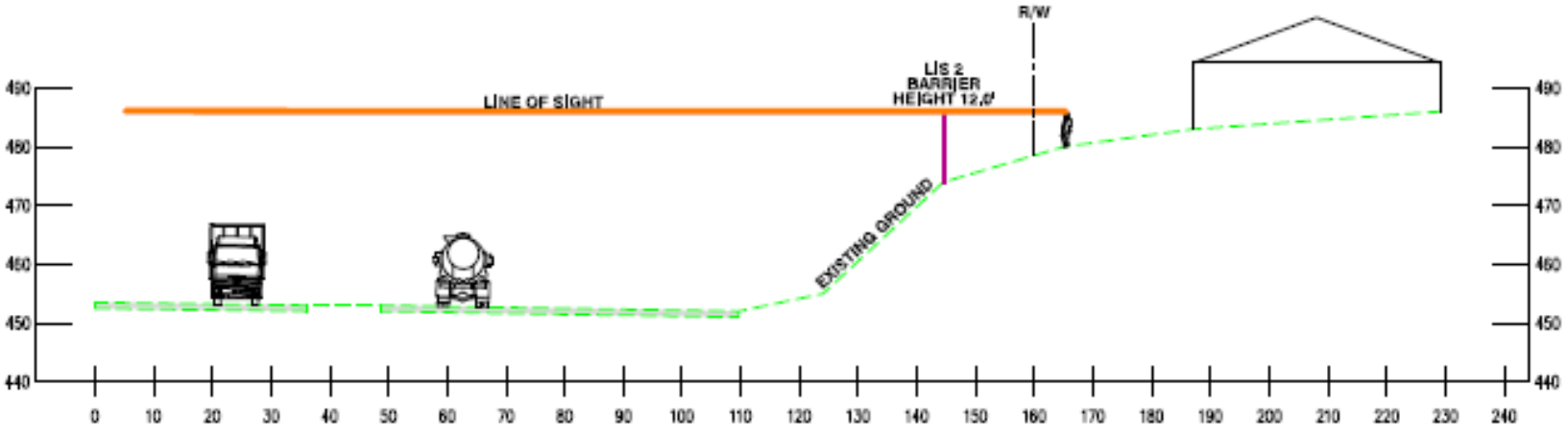
LIS 2 with proposed barrier



LIS 1A & 2 proposed typical sections



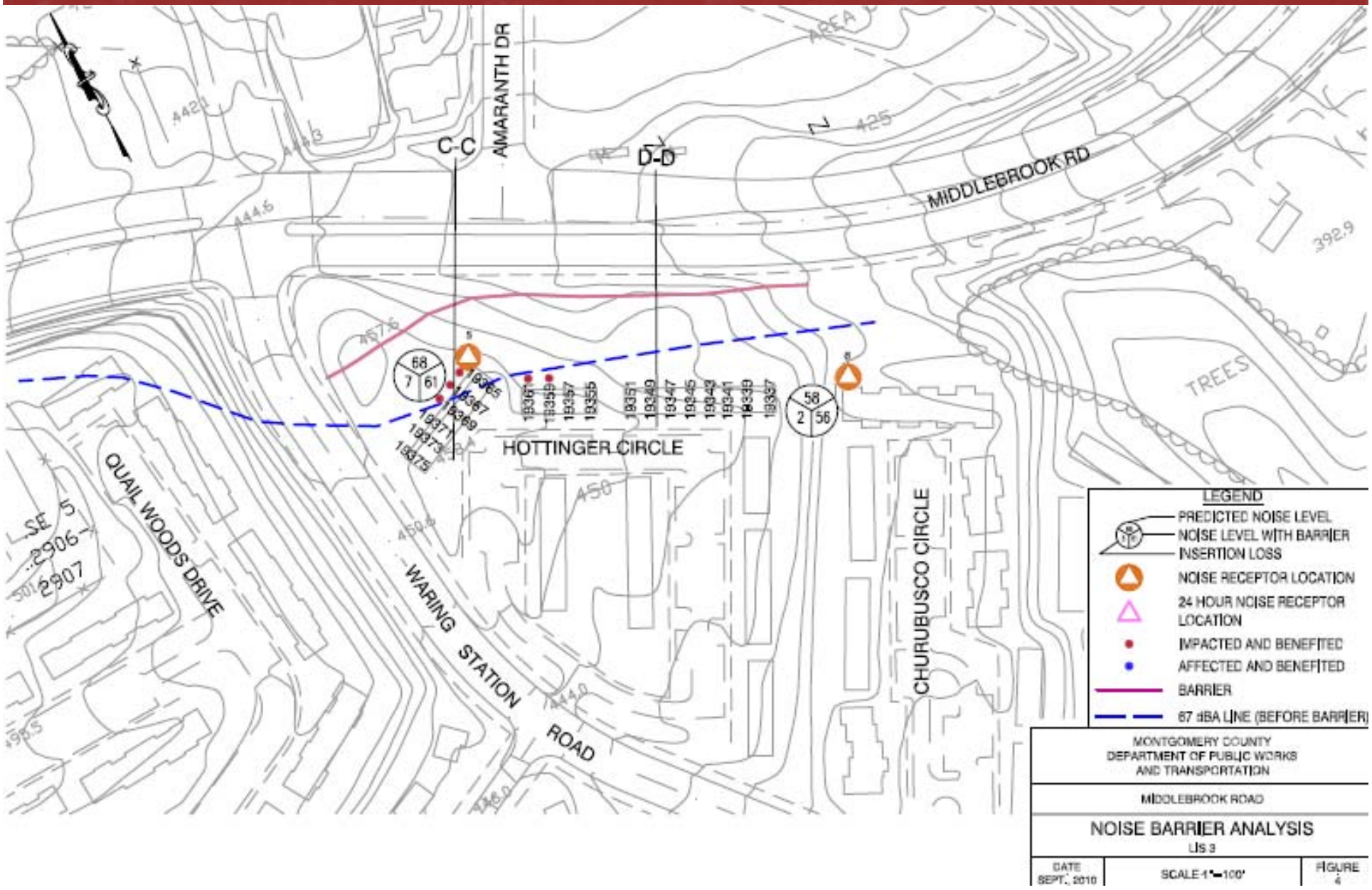
SECTION A-A



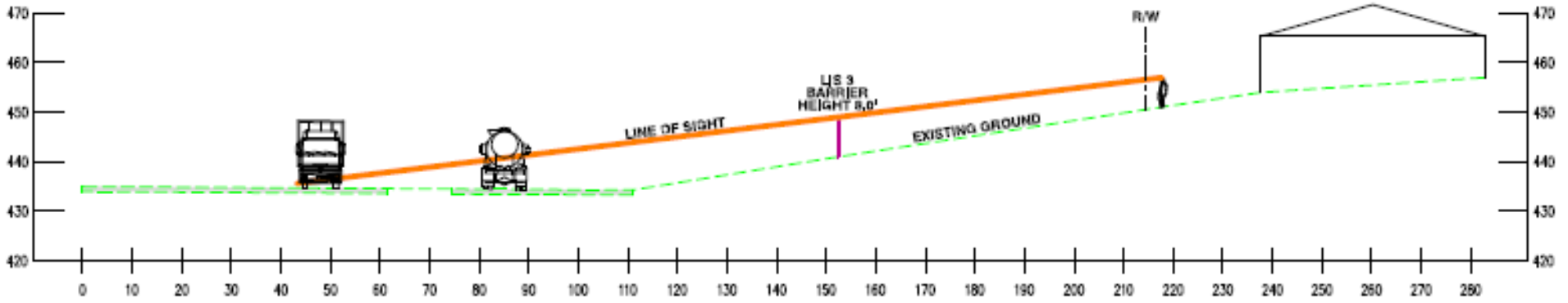
SECTION B-B

MONTGOMERY COUNTY DEPARTMENT OF PUBLIC WORKS AND TRANSPORTATION		
MIDDLEBROOK ROAD		
NOISE ABATEMENT BARRIER LIS 1A & 2		
DATE SEPT., 2010	10 0 10 20	FIGURE 3

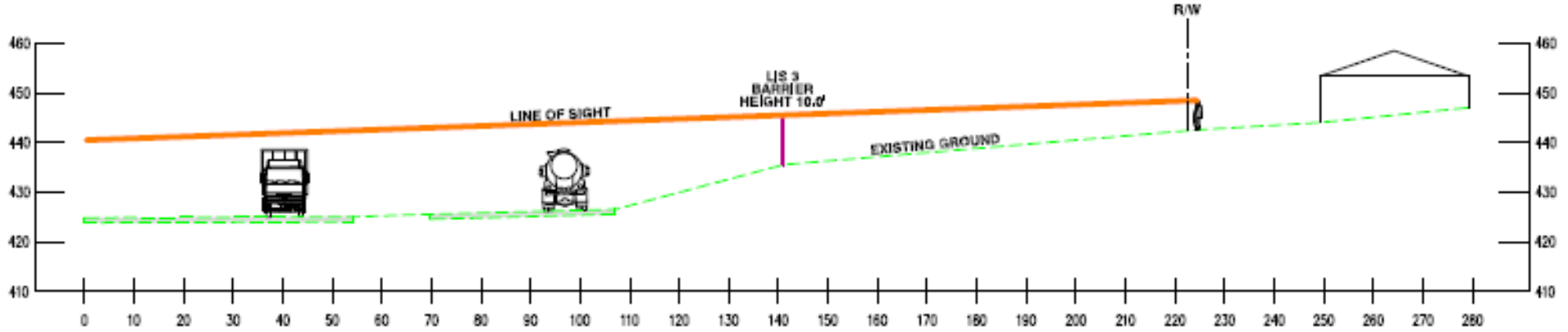
LIS 3 with proposed barrier



LIS 3 proposed typical sections



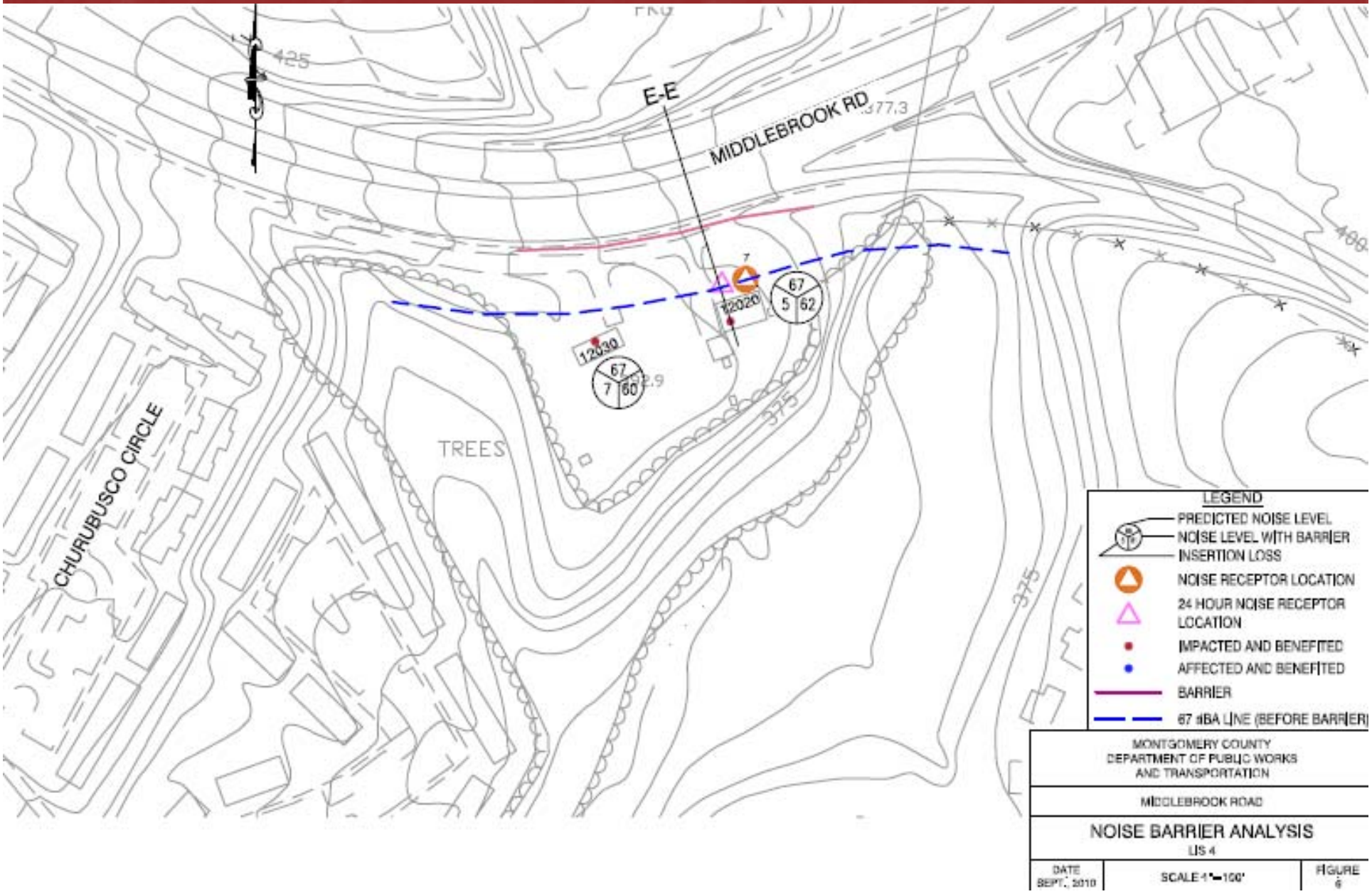
SECTION C-C



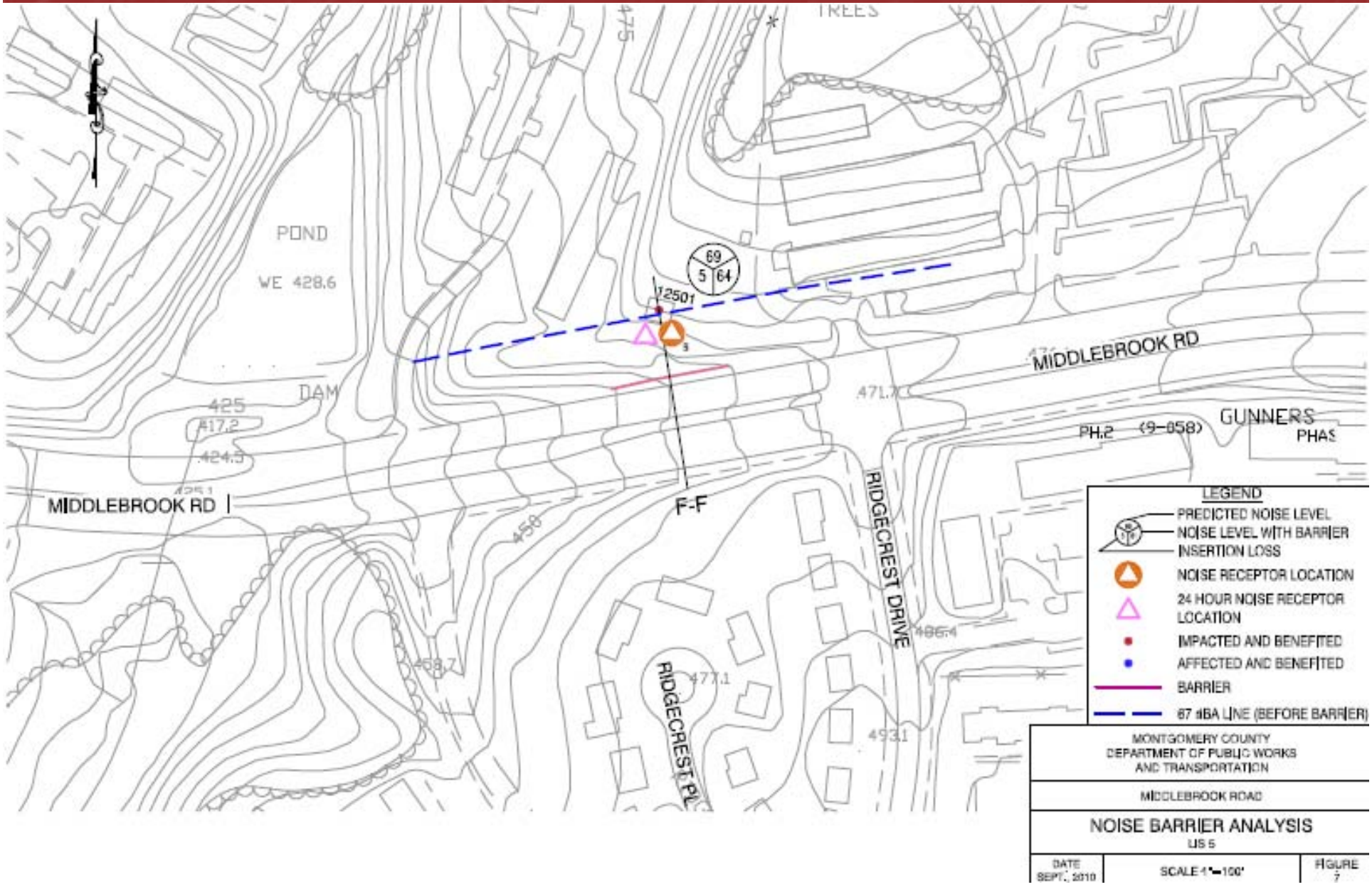
SECTION D-D

MONTGOMERY COUNTY DEPARTMENT OF PUBLIC WORKS AND TRANSPORTATION
MIDDLEBROOK ROAD
NOISE ABATEMENT BARRIER LIS 3
DATE SEPT., 2010 — 10 0 10 20 — FIGURE 5

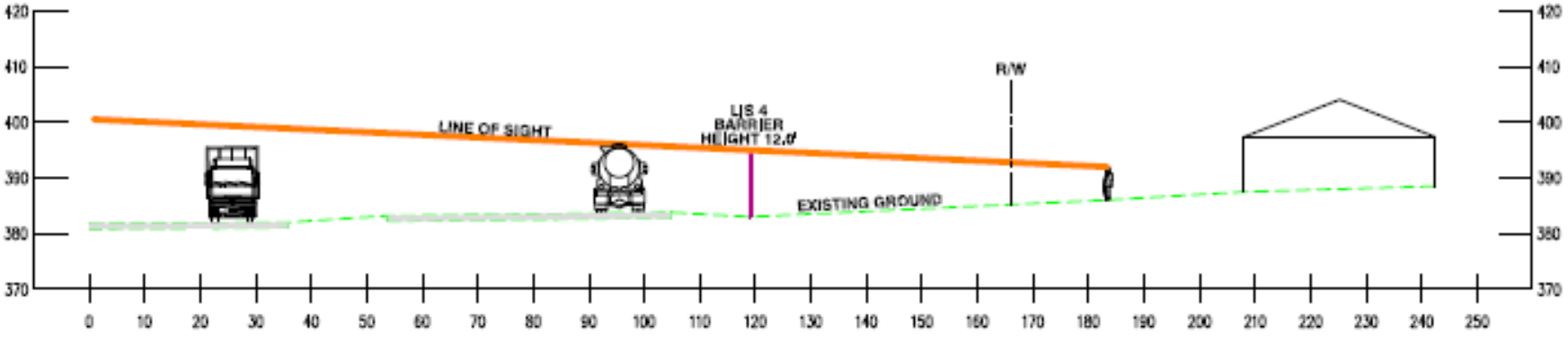
LIS 4 with proposed barrier



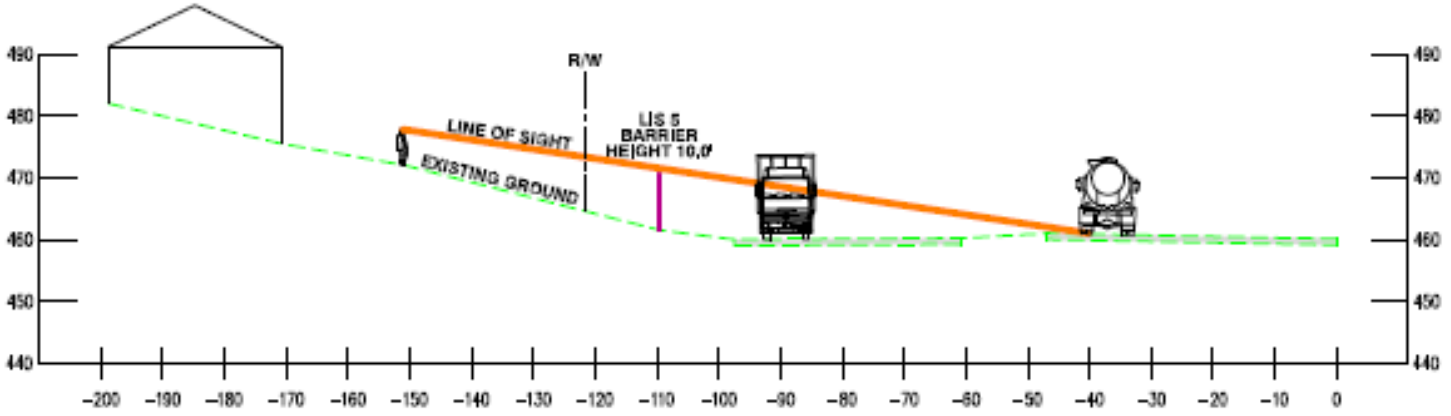
LIS 5 with proposed barrier



LIS 4 & 5 proposed typical sections



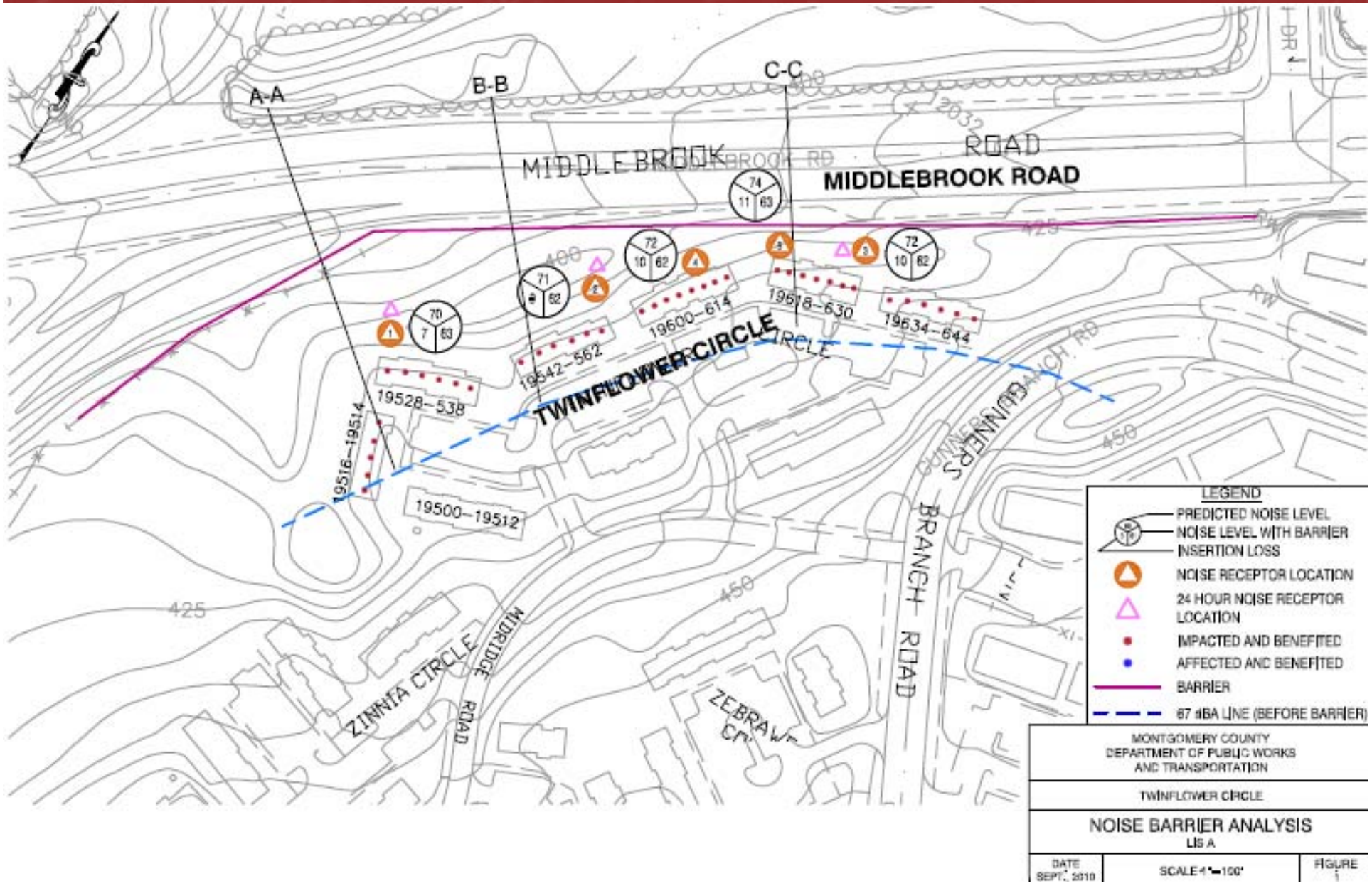
SECTION E-E



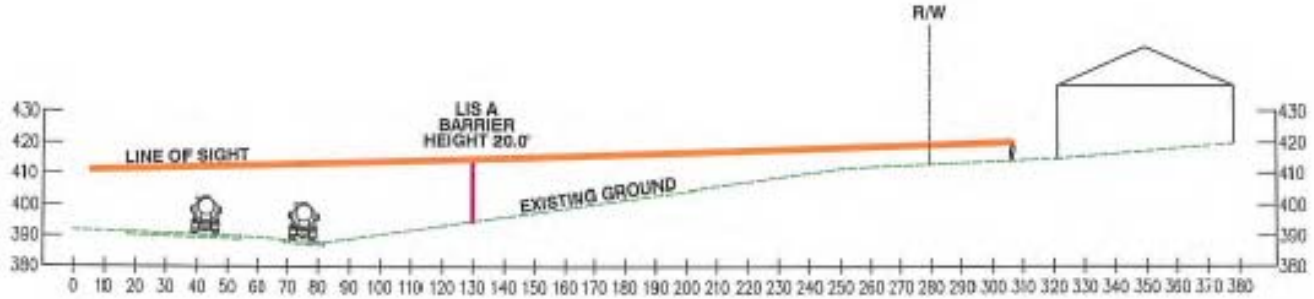
SECTION F-F

MONTGOMERY COUNTY DEPARTMENT OF PUBLIC WORKS AND TRANSPORTATION		
MIDDLEBROOK ROAD		
NOISE ABATEMENT BARRIER LIS 4 AND 5		
DATE SEPT., 2010		FIGURE 6

Twinflower with proposed barrier



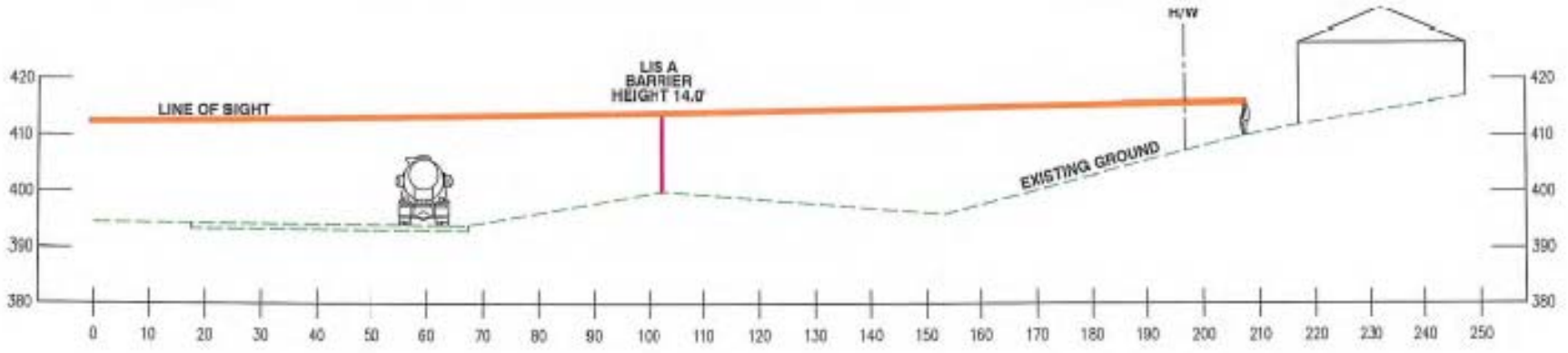
Twinflower proposed typical sections



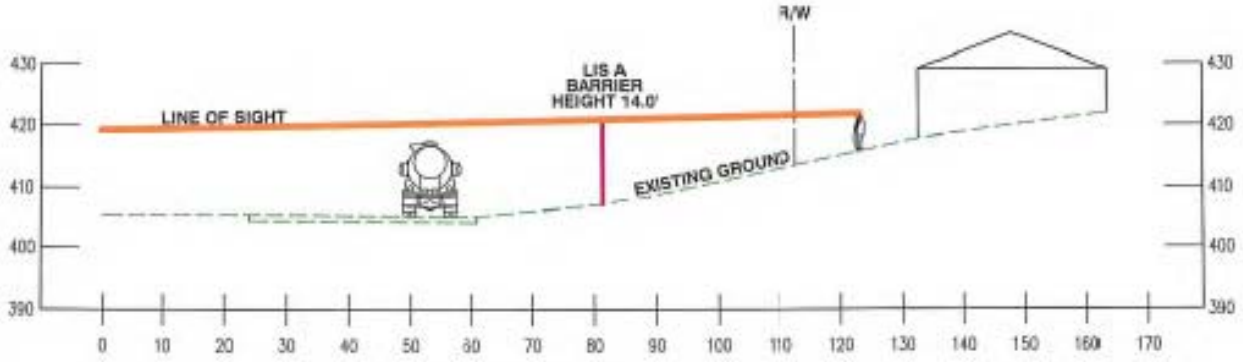
SECTION A-A

MONTGOMERY COUNTY DEPARTMENT OF PUBLIC WORKS AND TRANSPORTATION	
TWINFLOWER CIRCLE	
NOISE ABATEMENT BARRIER LIS A	
DATE SEPT., 2010	FIGURE 2

Twinflower proposed typical sections



SECTION B-B



SECTION C-C

MONTGOMERY COUNTY DEPARTMENT OF PUBLIC WORKS AND TRANSPORTATION	
TWINFLOWER CIRCLE	
NOISE ABATEMENT BARRIER LIS A	
DATE SEPT., 2010	FIGURE 3

Summary of Estimated Costs

LIS	Avg Peak Hour Noise ($L_{Aeq\ 1hrpk}$) dBA	Est. Total Cost*	Number of Benefited Homes	Avg Cost per Benf. Home	Date Built [Master Plan]	Total Per Resident Co-Pay
1A	67	$223,345	1	$223,345	’82-’84 [’89]	$123,345
2	68	$449,825	5	$89,965	’84 [’89]	$0
3	67	$444,125	5	$88,825	’84 [’89]	$0
4	67	$295,165	2	$147,583	’61-’69 [’89]	$47,583
5	69	$148,580	1	$148,580	’72 [’89]	$48,580
Twin.	74	$2,337,950	38	$61,525	’86 [’89]	$0

* Average Cost based on $95/s.f. for full implementation cost

Rankings & Funding Priority

The "Score"

S = NIP + TLOSD + HCD + HPD + NBH + CBH + EOB

- MC-DOT provides County Council with rankings of eligible communities biennially
- Council selects which LISs will be funded for mitigation

Rankings

Ranking of Feasible and Reasonable Noise Wall Candidates

Current Rank	Score	Road	Segment (LIS: Logical Implementation Segments)	Est S.F.	Estimated Total Cost
1	72.0	Middlebrook Road-E of I270	**LIS 1**: Twinflower Circle	24,610	$2,337,950
2	45.0	Shady Grove Road-North	**LIS 8A:** East side, Tupelo Drive to "Mid County Hwy"	1,335	$126,825
3	35.0	E. Randolph Road	**LIS 3**: south side, Tamarack Rd to Billington Rd	9,971	$947,245
4	32.0	Shady Grove Road-North	**LIS 7A**: east side, Briardale Rd to ICC right-of-way	4,366	$414,770
5	31.5	E. Randolph Road	**LIS 12A:** north side, Appleby Dr to Partridge Dr	8,381	$796,195
6	29.5	E. Randolph Road	**LIS 4A:** south side, Billington Rd to Laurie Dr	7,842	$744,990
7	28.0	E. Randolph Road	**LIS 1:** south side, Burkhart St to Broadmore Rd	5,102	$484,690
8	27.5	E. Randolph Road	**LIS 7A:** south side of Tufa Terrace	3,177	$301,815
9	27.0	Shady Grove Road-North	**LIS 9:** east side, Mill Run Drive to Muncaster Mill Rd	7,040	$668,800
10	26.5	E. Randolph Road	**LIS 9:** north side, east of Tamarack Road	19,380	$1,841,100
11	23.5	E. Randolph Road	**LIS 10:** north side, Tamarack Rd to Smith Village Rd	11,966	$1,136,770
11	23.5	Middlebrook Road	**LIS 5:** north side, near Ridgecrest Drive	1,564	$148,580
13	23.0	Midcounty Highway	**LIS D:** south side, For. Oak MS to Saybr. Oaks Blvd	26,421	$2,509,995
14	20.5	Middlebrook Road	**LIS 2:** south side, Ridgecrest Dr to Waring Sta. Rd	4,735	$449,825
15	17.5	E. Randolph Road	**LIS 11:** north side, Smith Village Rd to Appleby Dr	7,975	$757,625
16	17.0	Shady Grove Road-North	**LIS 5:** West side, Mill Run Drive to Munaster Mill Rd	9,452	$897,940
16	17.0	E. Randolph Road	**LIS 6:** north side, Serpentine Way to Sandstone Ct	4,565	$433,675
18	16.5	Shady Grove Road-North	**LIS 8B:** East side, "Mid County Hwy" to Mill Run Drive	3,329	$316,255
19	16.0	E. Randolph Road	**LIS 12B:** north side, Partridge Dr to Burkhart St	2,137	$203,015
19	16.0	E. Randolph Road	**LIS 4B:** south side, East Side of Laurie Dr	1,785	$169,575
21	15.5	Middlebrook Road	**LIS 3:** south side, Waring Sta. Rd to I-270 on-ramp	4,675	$444,125
22	15.0	E. Randolph Road	**LIS 7B:** north side, Tourmaline Ct & Aventurine Way	4,613	$438,235
23	14.0	Shady Grove Road-North	**LIS 7B:** East side, ICC right-of-way to Tupelo Drive	1,538	$146,110
24	12.0	Shady Grove Road-North	**LIS 4:** West side, Mid County Hwy to Mill Run Drive	7,796	$740,620
25	11.5	Middlebrook Road	**LIS 4:** south side, at I-270 on-ramp	3,107	$295,165
26	11.0	E. Randolph Road	**LIS 5:** north side, Old Columbia Pike to Serpentine Way	4,714	$447,830
27	10.5	Middlebrook Road	**LIS 1A:** west of Ridgecrest Drive	2,351	$223,345
28	6.5	Shady Grove Road-South	**LIS E:** east side, Sweetwood Ave to Shinning Willow Dr	6,456	$613,320
29	5.5	Midcounty Highway	**LIS H-2:** south side, Miller Fall Rd to Wash. Grove La	4,321	$410,495
29	5.5	Shady Grove Road-South	**LIS B:** west side at Procera Drive	5,580	$530,100

Your Choices

1. Mitigation (Noise Barrier): agree to the co-pay amount and provide fee simple property or easement to build barrier, where necessary. 60% of the each LIS community has to agree. 100% of property owners from whom property is needed have to agree.

   If an LIS community rejects a barrier, it has to wait at least six 6 years before requesting reconsideration for barriers.

2. Non-Mitigating measures (fences or vegetative landscaping): will not reduce the noise impact, but provide visual obstruction of the road and give the *perception* that traffic noise is less objectionable.

   If an LIS community requests non-mitigating measures, it has to wait 12 years before requesting consideration for mitigation (barriers).

Next Steps:

- Get Community Input
- Conduct Survey (Voting) for all eligible LISs
- Present the Study and the “Voting” results to the County Council along with results of studies/voting for other locations around the County
- County Council will decide which locations will be funded for Final Design and Construction

QUESTIONS?