



**Montgomery County  
Department of Transportation**

# **Goshen Road Noise Study**

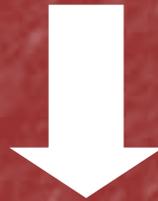
**From Girard Street to North of Warfield Road**

# 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 (Chief)**

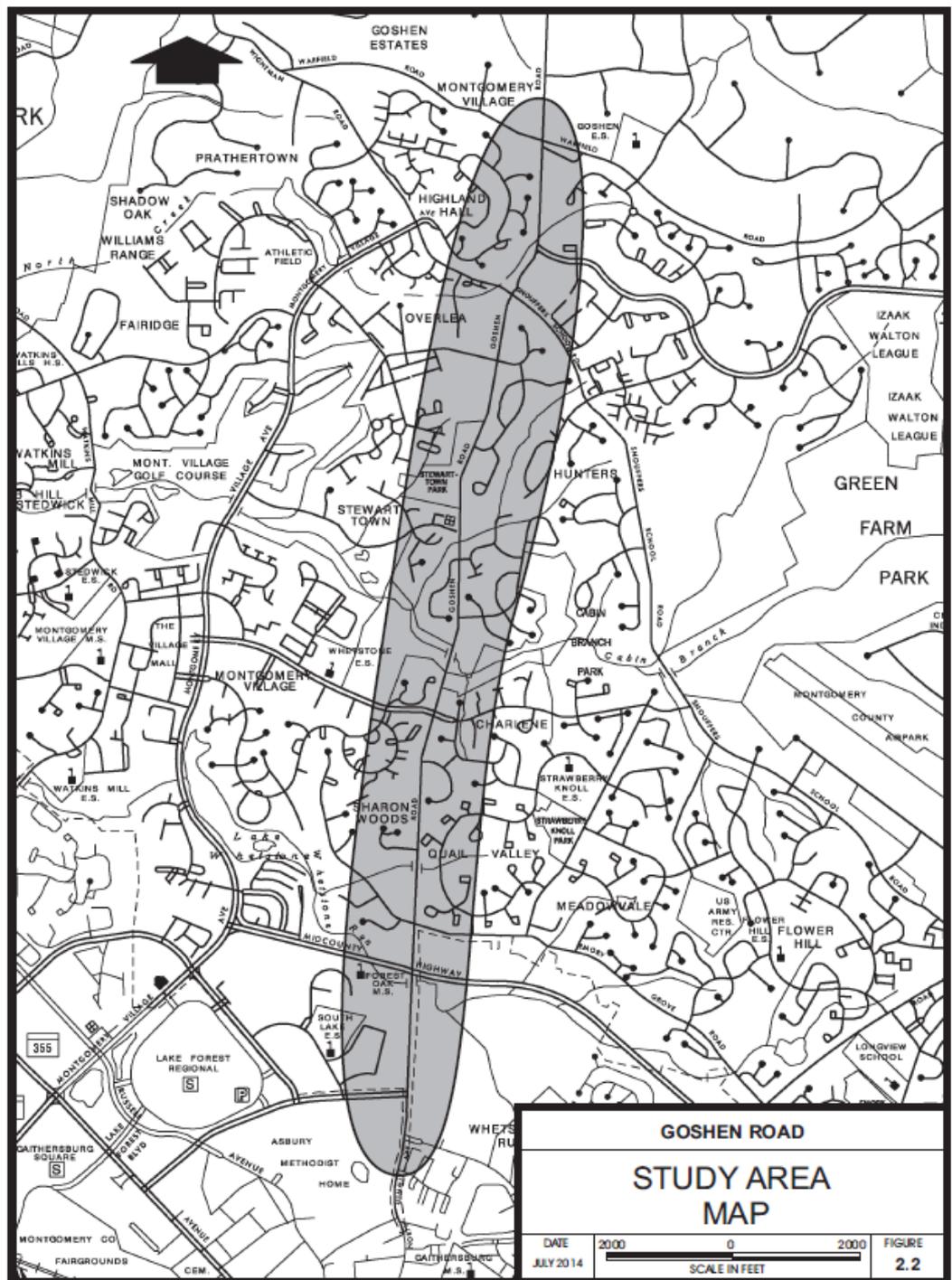
**Michael Mitchell (Program Manager)**

# PURPOSE OF THIS MEETING ?

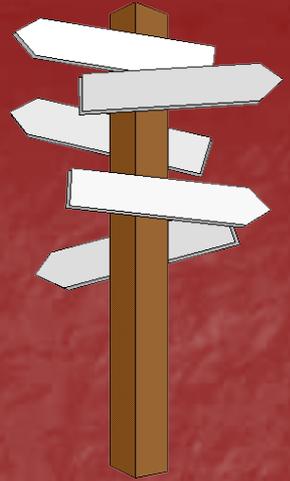


- ❖ Present the results of the noise study.
- ❖ Answer Community's questions.
- ❖ Receive feedback from the public on the findings of the study.

# Study Area



# 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.

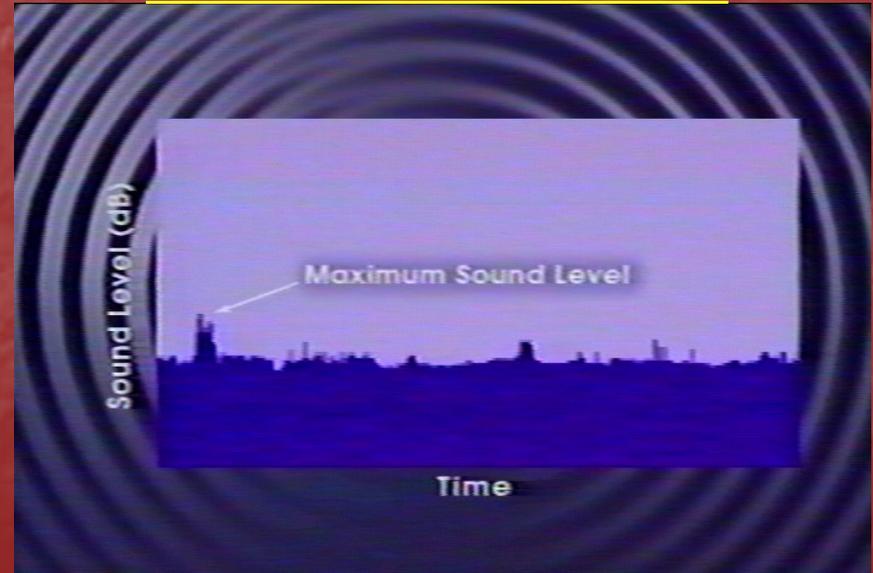
# Noise Fundamentals

- 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, 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**

# 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.

# Study Criteria

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

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

- Noise Measurements are taken at outdoor ground level generally between R.O.W. line and 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.

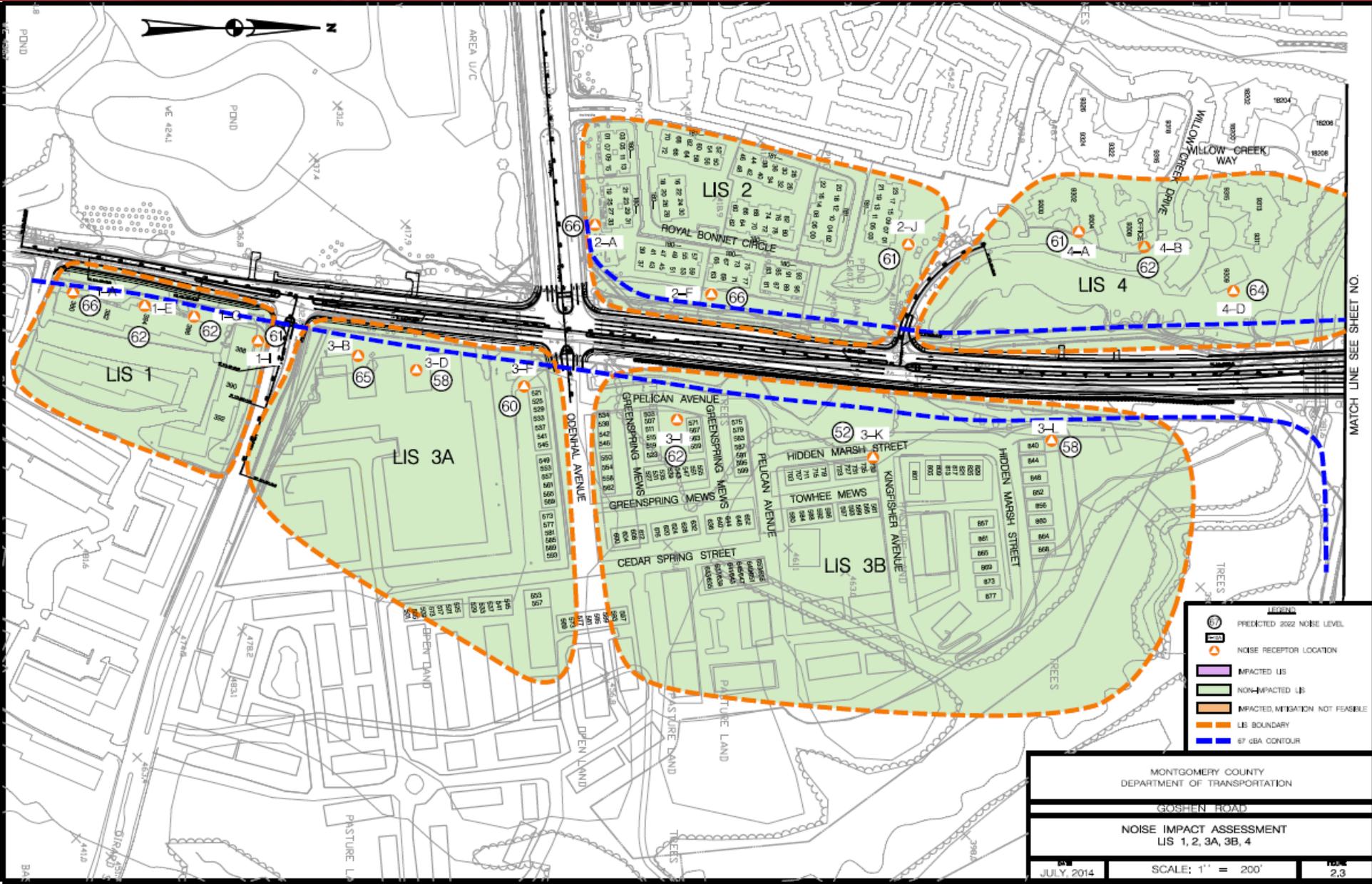
- **Receptor Locations**

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 (if at Level of Service 'D')

# LIS Map



- LEGEND**
- PREDICTED 2022 NOISE LEVEL
  - NOISE RECEPTOR LOCATION
  - IMPACTED LIS
  - NON-IMPACTED LIS
  - IMPACTED, MITIGATION NOT FEASIBLE
  - LIS BOUNDARY
  - 67 dBA CONTOUR

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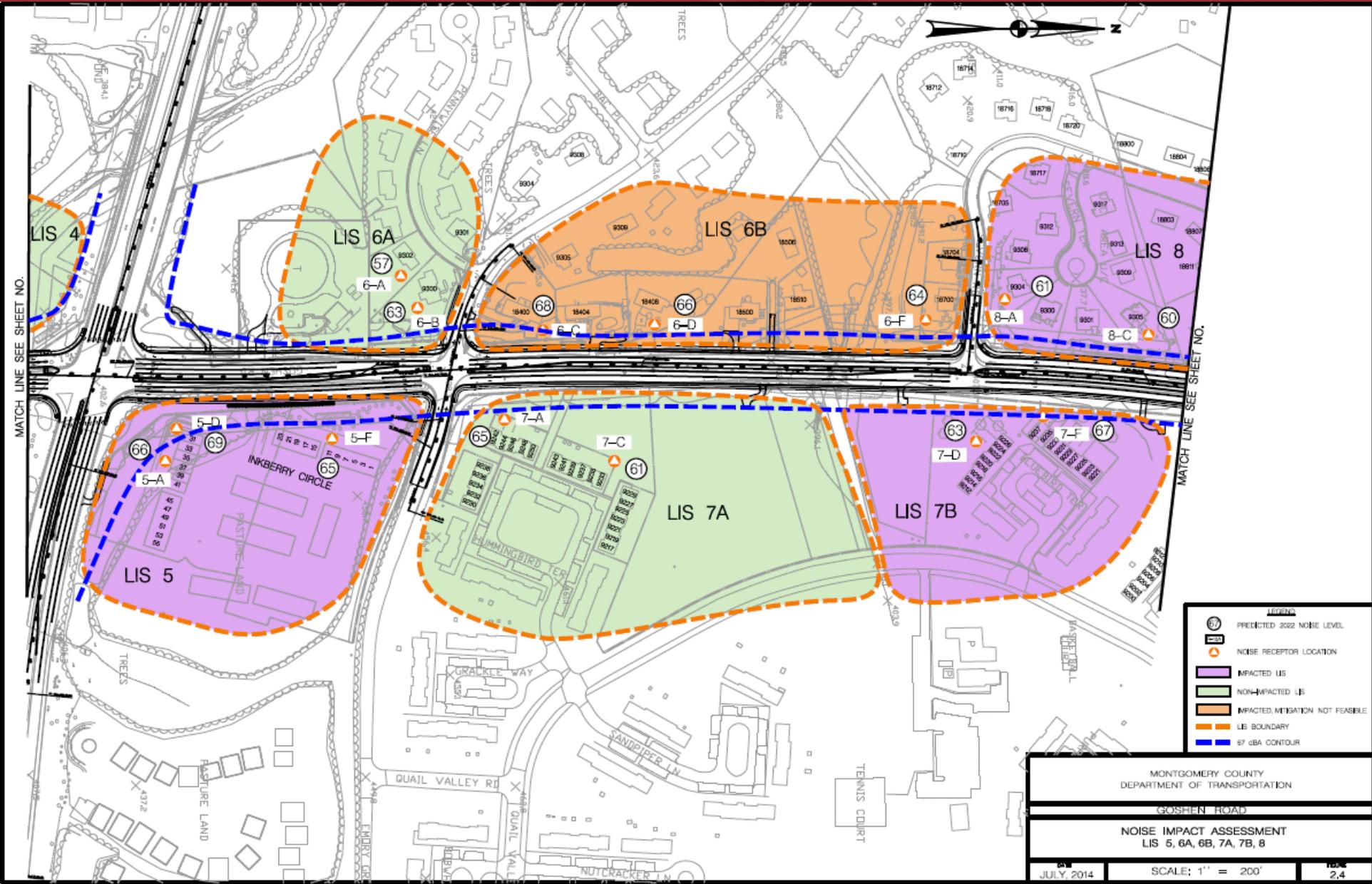
GOSHEN ROAD

NOISE IMPACT ASSESSMENT  
LIS 1, 2, 3A, 3B, 4

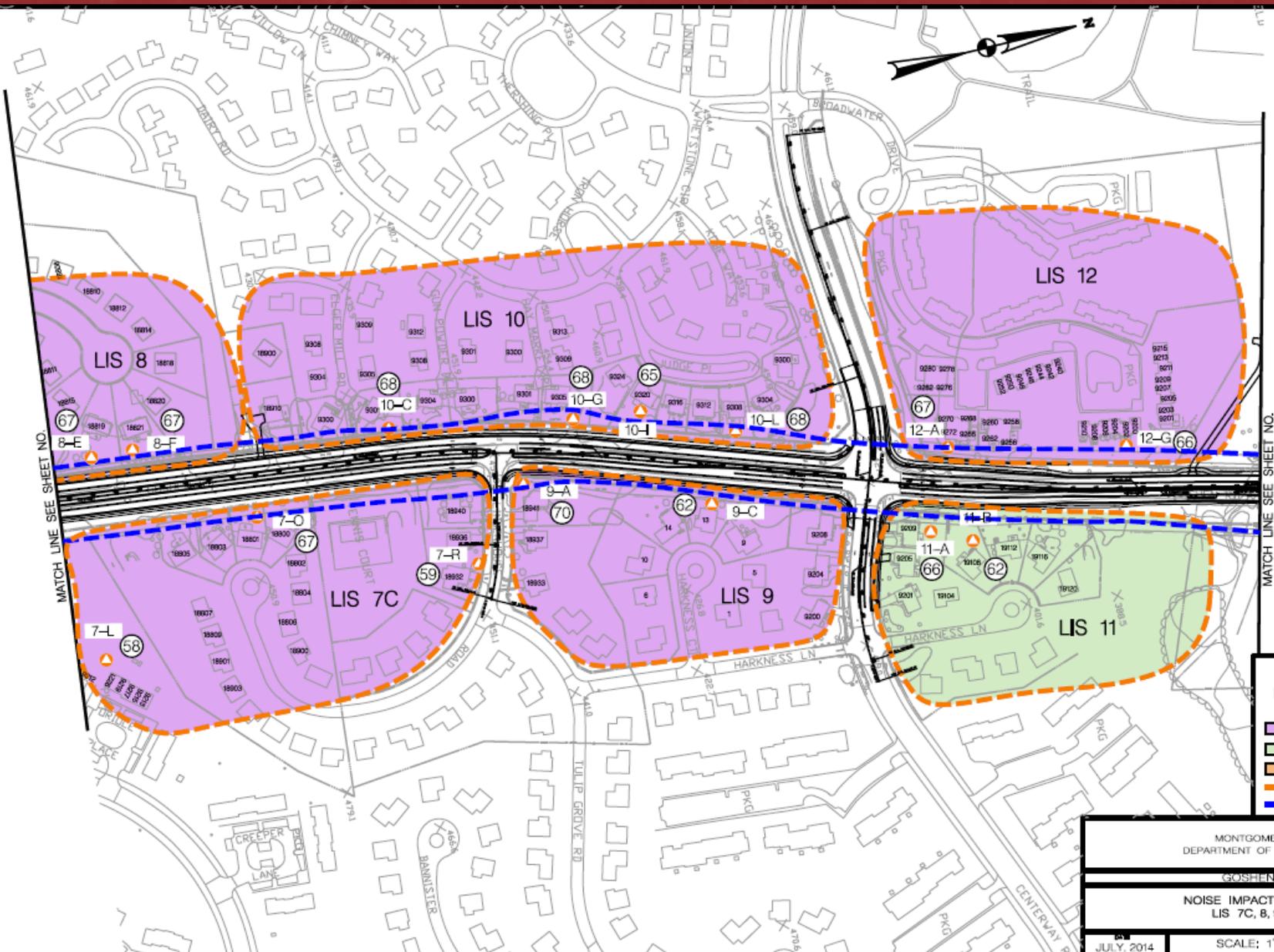
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MATCH LINE SEE SHEET NO.

# LIS Map continued



# LIS Map continued



- LEGEND**
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  - NOISE RECEPTOR LOCATION
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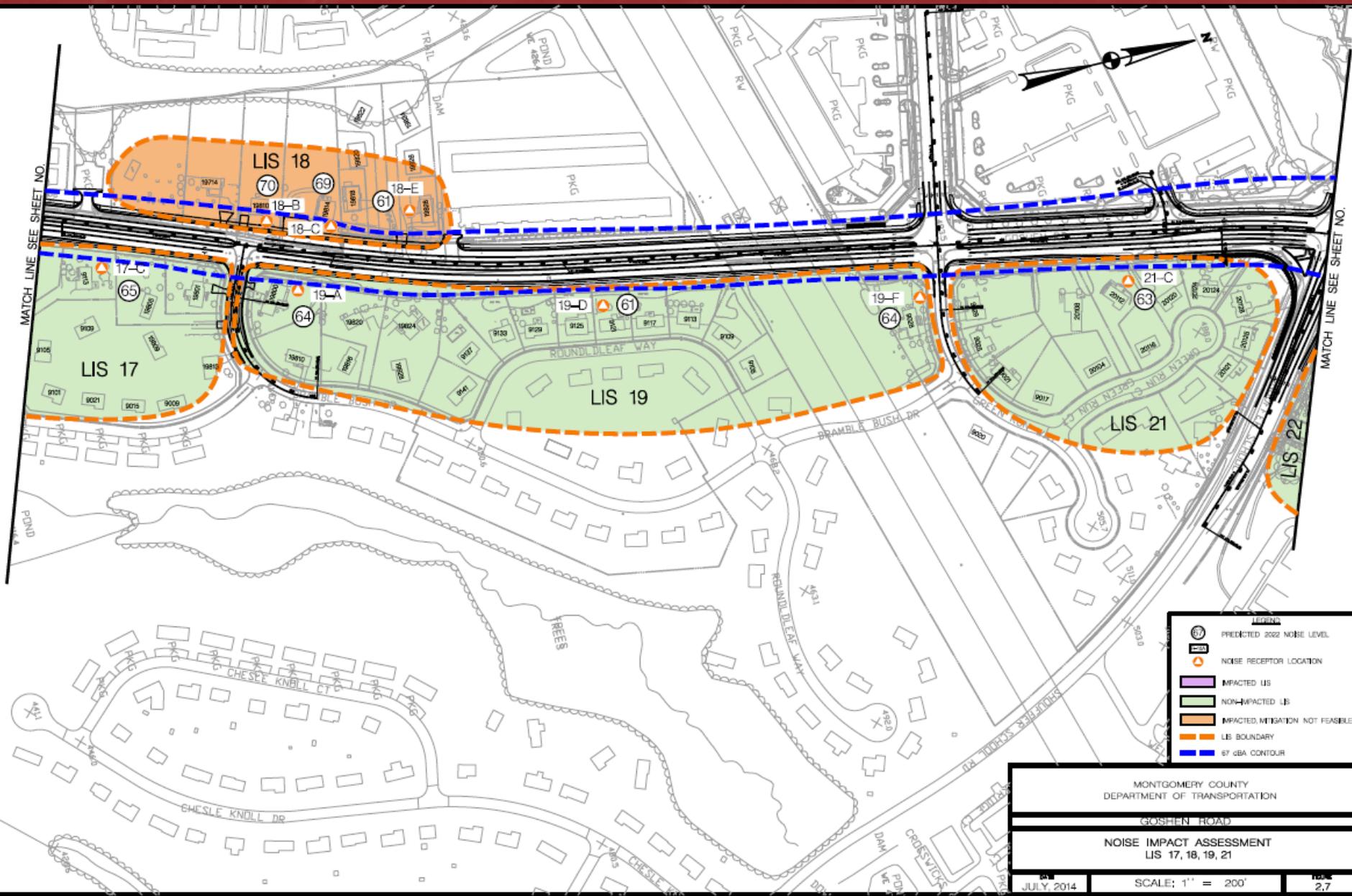
GOSHEN ROAD

NOISE IMPACT ASSESSMENT  
LIS 7C, 8, 9, 10, 11, 12

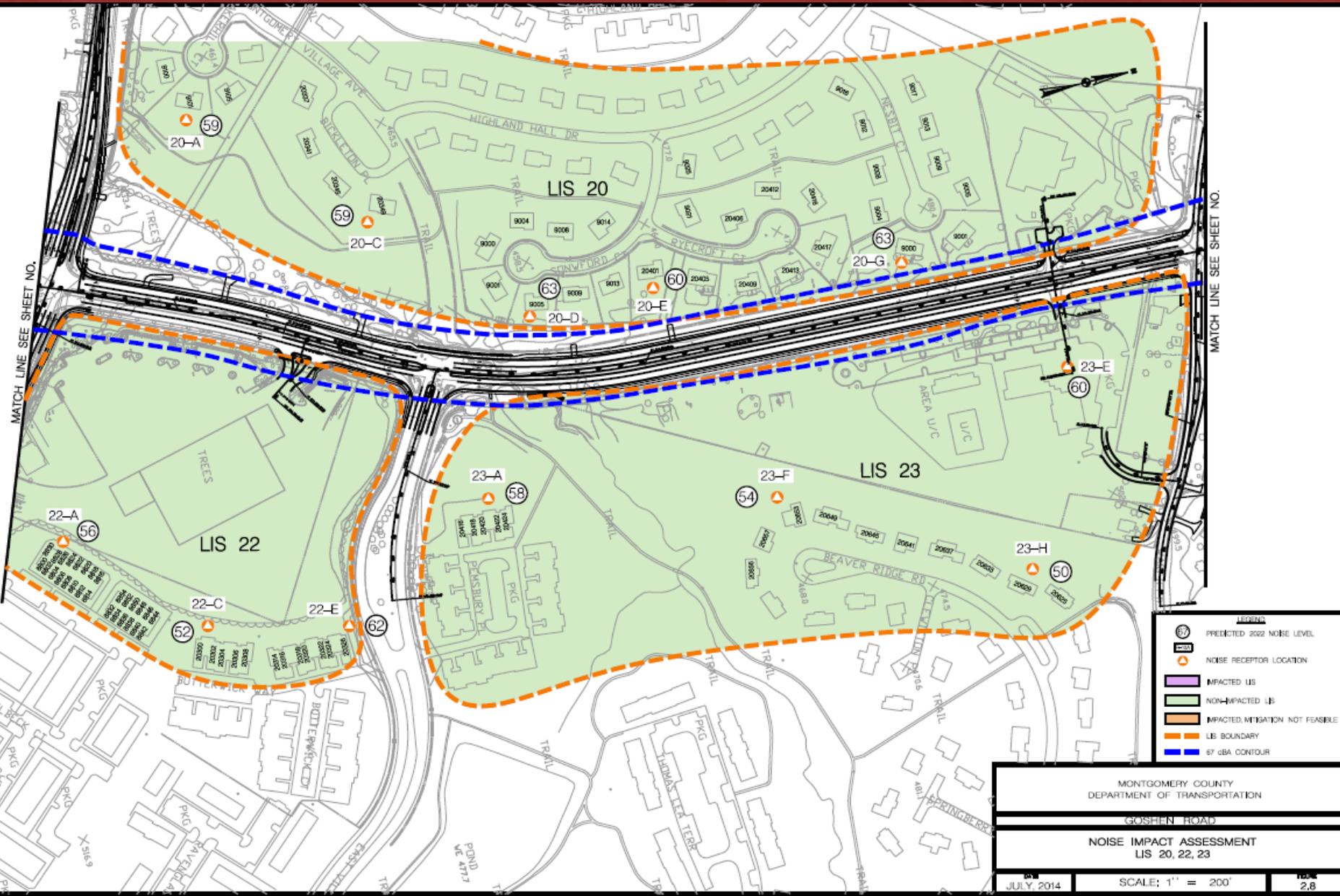
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# LIS Map continued



# LIS Map continued



**LEGEND**

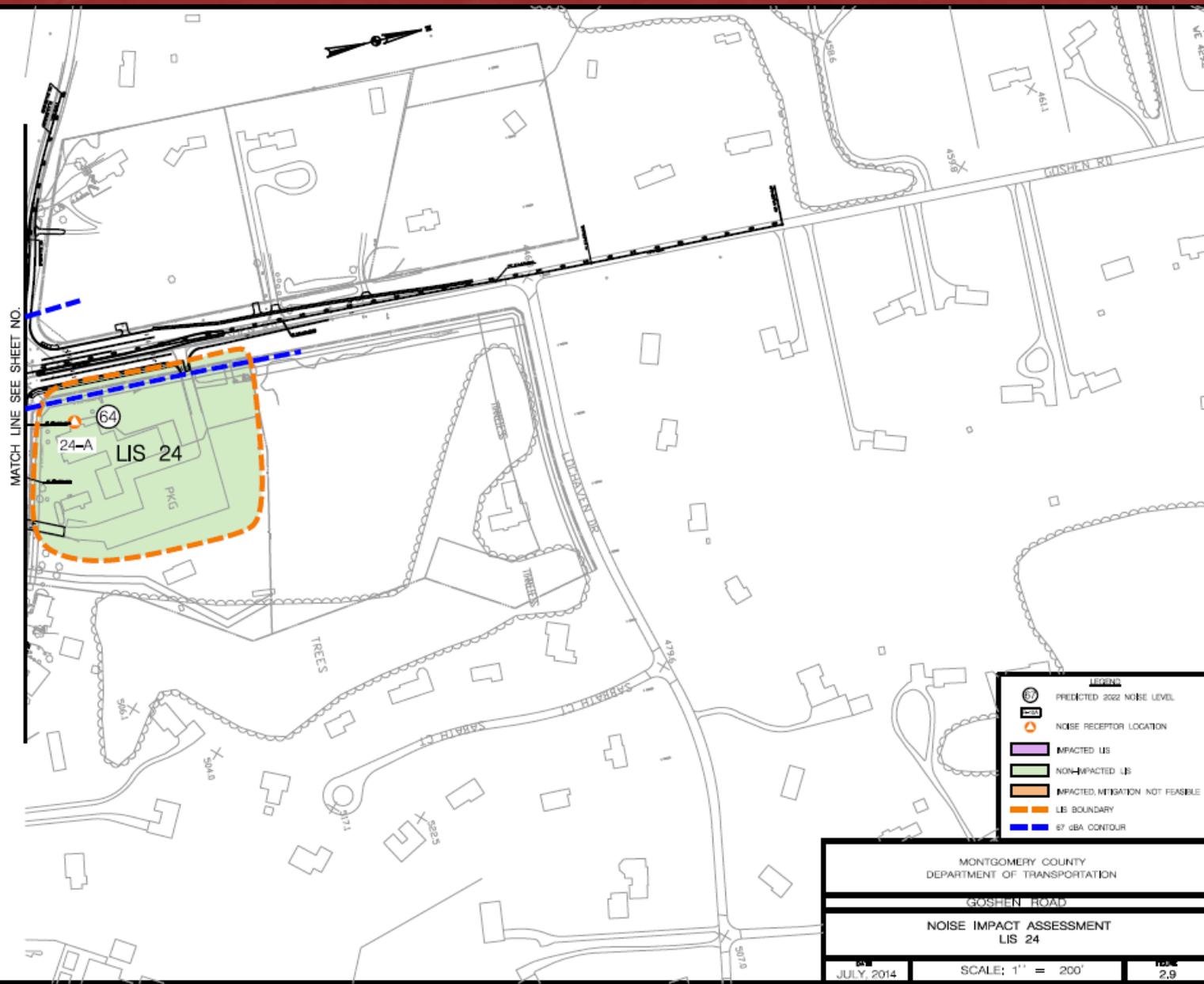
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GOSHEN ROAD

NOISE IMPACT ASSESSMENT  
LIS 20, 22, 23

# LIS Map continued



# LIS Descriptions

LIS	Description	No. of Residences	No. of Monitored Sites
1	Apartment buildings east of Goshen Road, south of Girard Street	42	2
2	Town homes west of Goshen Road, north of Odendhal Avenue	112	3
3A	Town homes east of Goshen Road, between Odendhal Avenue and Willow Creek Drive	49	1
3B	Town homes east of Goshen Road, between Odendhal Avenue and Midcounty Highway	87	1
4	Apartment buildings west of Goshen Road, along Willow Creek Drive	30	2
5	Town homes east of Goshen Road, between Midcounty Highway and Emory Grove Road	23	2
6A	Single-family residences west of Goshen Road, between Midcounty Highway and Emory Grove Road	3	1
6B	Single-family residences west of Goshen Road, between Emory Grove Road and Severn Road	8	2

# LIS Descriptions continued

LIS	Description	No. of Residences	No. of Monitored Sites
7A	Town homes east of Goshen Road, along Bluebird Terrace and Oriole Place	24	2
7B	Town homes east of Goshen Road, along Hummingbird Terrace	30	3
7C	Single-family residences west of Goshen Road, along Lindenhouse Road	10	2
8	Single-family residences west of Goshen Road, north of Emory Grove Road	13	3
9	Single-family residences east of Goshen Road, between Lindenhouse Road and Centerway Road	12	2
10	Single-family residences west of Goshen Road, south of Centerway Road	27	3
11	Single-family residences east of Goshen Road, north of Centerway Road	8	2
12	Town homes west of Goshen Road, north of Centerway Road	34	2

# LIS Descriptions continued

LIS	Description	No. of Residences	No. of Monitored Sites
13A	Single-family residences east of Goshen Road, south of Framingham Road	13	2
13B	Single-family residences east of Goshen Road, between Framingham Road and Turtle Dove Terrace	27	2
14	Town homes west of Goshen Road, along Sandy Lake Drive	50	3
15A	Town homes east of Goshen Road, between Turtle Dove Terrace and Trams Way	11	1
15B	Town homes and a church east of Goshen Road, north of Trams Way	8	2
16A	Town homes west of Goshen Road, south of Stewartown Road	13	1
16B	Town homes west of Goshen Road, north of Stewartown Road	21	1
17	Town homes and single-family residences east of Goshen Road, south of Bramble Bush Drive	23	2

# LIS Descriptions continued

LIS	Description	No. of Residences	No. of Monitored Sites
18	Single-family residences west of Goshen Road, along Goshen Road adjacent to Bramble Bush Drive	9	2
19	Single-family residences east of Goshen Road, east of Bramble Bush Drive and Green Run Way	17	3
20	Single-family residences west of Goshen Road, between Wightman Road and Warfield Road	38	4
21	Single-family residences east of Goshen Road, between Green Run Way and Snouffer School Road	13	1
22	Town homes east of Goshen Road, between Snouffer School Road and East Village Avenue	40	3
23	Town homes, single-family residences, and a church east of Goshen Road, between East Village Avenue and Warfield Road	15	3
24	A church east of Goshen Road, north of Warfield Road	--	1

# Scope of Noise Study

1. Review study area and select LIS and receptor sites.
2. Take long term (24 hour) noise measurements.

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

3. The noise measurements results provide existing noise levels. Set up computer model used to determine noise levels in the future design year. Traffic 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

4. Run the TNM 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.**
5. Input proposed barrier locations, lengths and heights into TNM computer model.
6. Vary barrier heights as required until desired noise reduction is obtained.
7. Estimate cost and perform cost/benefit analysis
8. Prepare report

# Highest Measured and Predicted Noise Levels

LIS	Highest Leq Receptor #	Location	Noise Level	
			Field Ambient	Predicted 2022
1	1-A	380 N. Summit Ave	62	66
2	2-A	18033 Royal Bonnet Cir	61	66
3A	3-B	Hidden Creek Apts.	NA	65
3B	3-H	503 Pelican Ave	NA	64
4	4-C	9309 Willow Creek Dr	NA	65
5	5-D	31 Inkberry Circle	64	69
6A	6-B	9300 Pennywise Lane	NA	63
6B	6-C	18400 Goshen Road	NA	68
7A	7-A	9242 Hummingbird Terr	62	65
7B	7-F	9237 Bluebird Terr	67	67

# Highest Measured and Predicted Noise

## Levels Continued

Levels Continued			Noise Level	
LIS	Highest Leq Receptor #	Location	Field Ambient	Predicted LOS-D
7C	7-M	18805 Lindenhouse Rd	NA	68
8	8-F	18821 Severn Road	59	67
9	9-A	18941 Lindenhouse Road	66	70
10	10-D	9304 Gunpowder Place	NA	69
11	11-A	9209 Centerway Road	63	66
12	12-A	9272 Broadwater Drive	63	67
13A	13-C	19308 Rock Elm Way	62	66
13B	13-L	19501 Turtle Dove Terr	60	66
14	14-A	19306 Sandy Lake Drive	NA	68
15A	15-A	19500 Turtle Dove Terr	65	67
15B	15-E	19615 Goshen Road	66	66

# Highest Measured and Predicted Noise

## Levels Continued

LIS	Highest Leq Receptor #	Location	Noise Level	
			Field Ambient	Predicted LOS-D
16A	16-D	9200 La Belle Lane	65	65
16B	16-G	9227 Stewartown Road	60	65
17	17-E	19801 Bramble Bush Drive	NA	66
18	18-B	19810 Goshen Road	62	70
19	19-A	19800 Bramble Bush Drive	57	64
20	20-F	20409 Ryecroft Court	NA	64
21	21-D	20124 Green Run Court	NA	64
22	22-E	20326 Butterwick Way	58	62
23	23-B	20611 Goshen Road	NA	62
24	24-A	8921 Warfield Road	62	64

# Noise Mitigation Criteria

## Feasibility Criteria

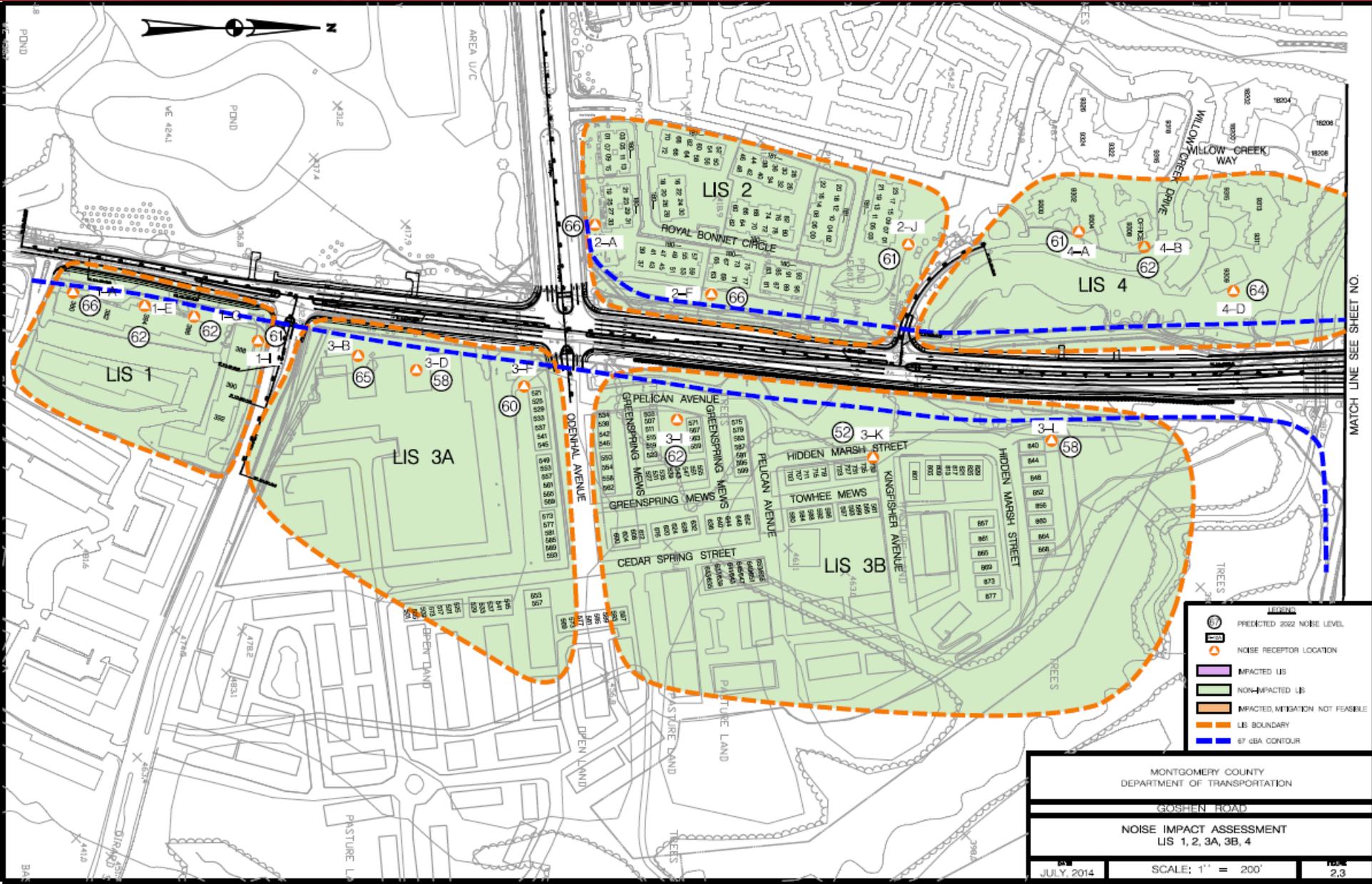
- The barrier can be built to provide an insertion loss of at least 7 dBA for the most seriously traffic-noise impacted receptors.
- The barrier can be built without either unduly restricting pedestrian or vehicular access, or without interfering with safe sight distances for motorists.
- Any right-of-way 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

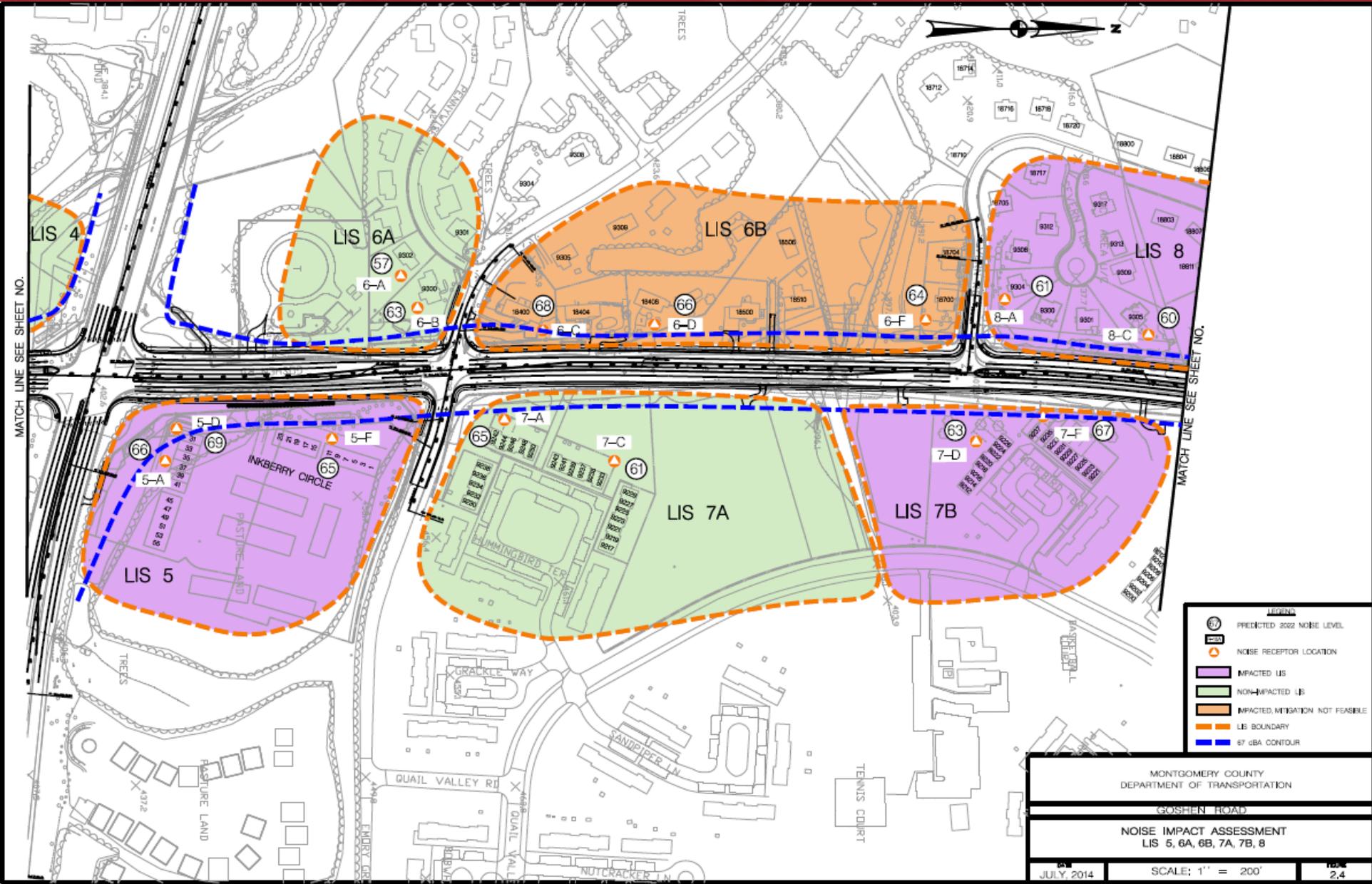
## Reasonableness Criteria

- 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 are impacted or affected by construction and will enjoy a barrier loss of at least 3 dBA).
- \* If homes are built **AFTER** the approved Master Plan for the subject area, the home owner is required to pay 10% of cost of barrier up to the first \$100,000.
- The barrier designs and payment responsibility, if any, are approved by the benefited property owners.

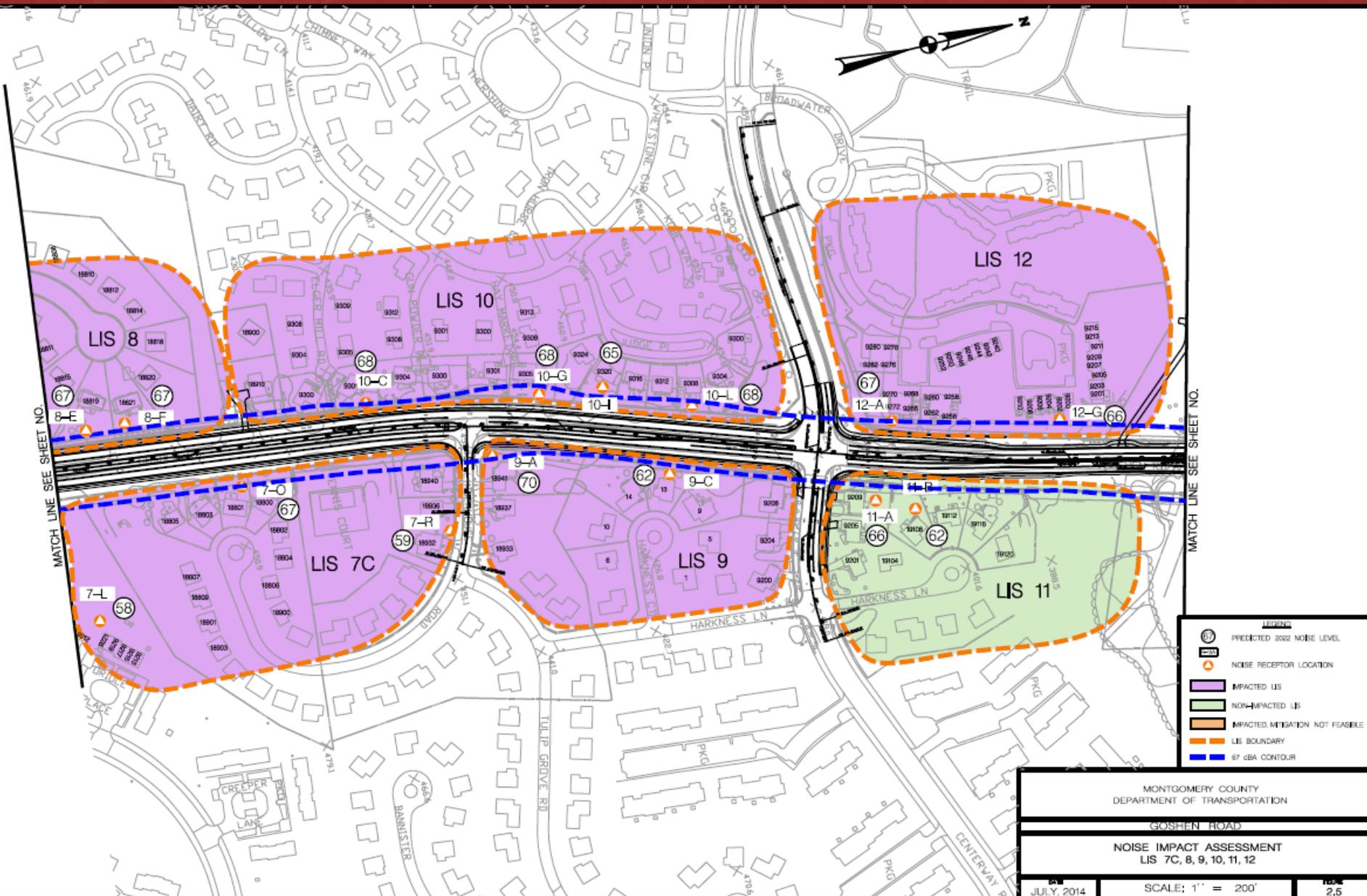
# LIS Map



# LIS Map continued



# LIS Map continued



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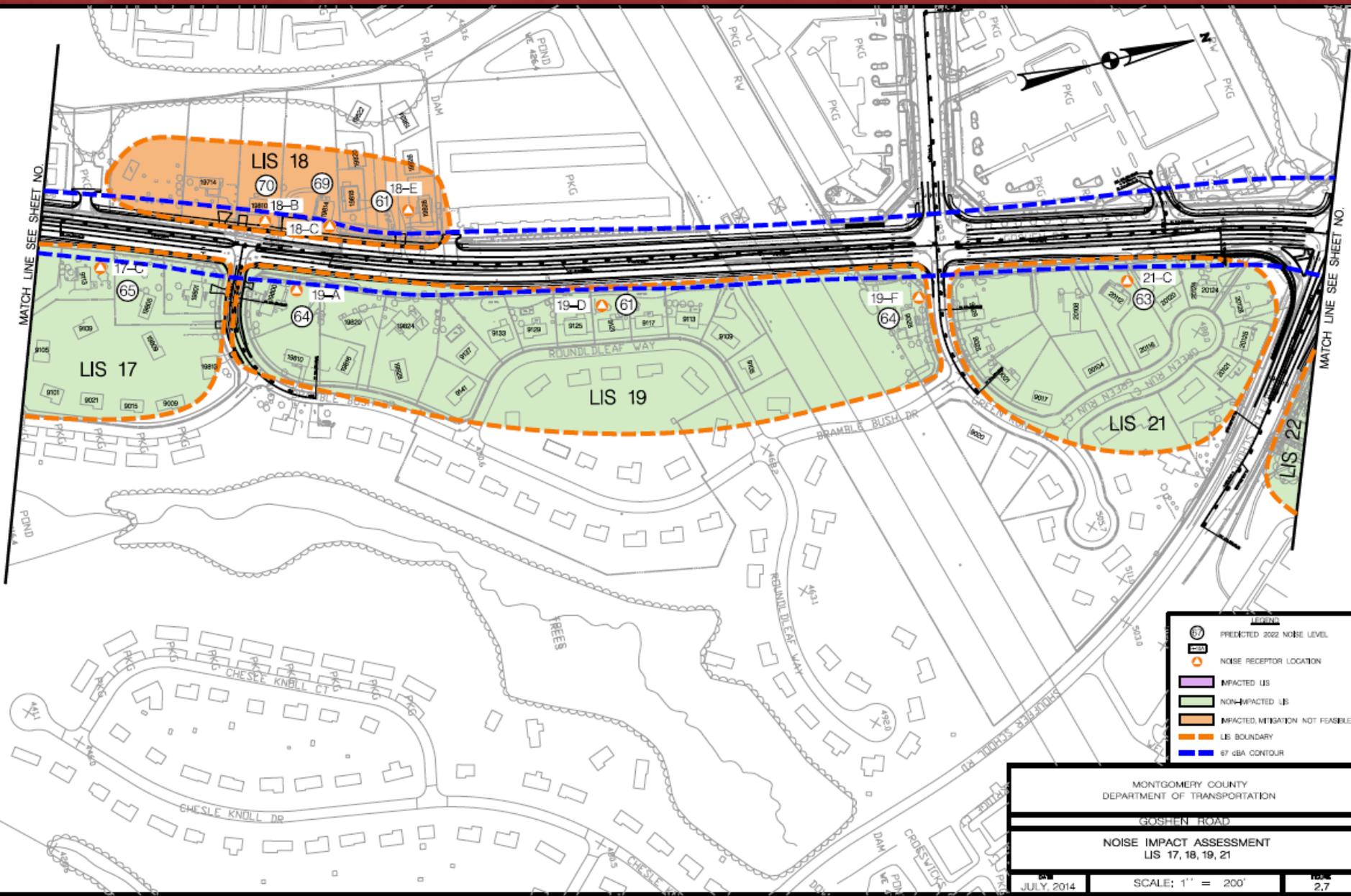
GOSHEN ROAD

NOISE IMPACT ASSESSMENT  
LIS 7C, 8, 9, 10, 11, 12

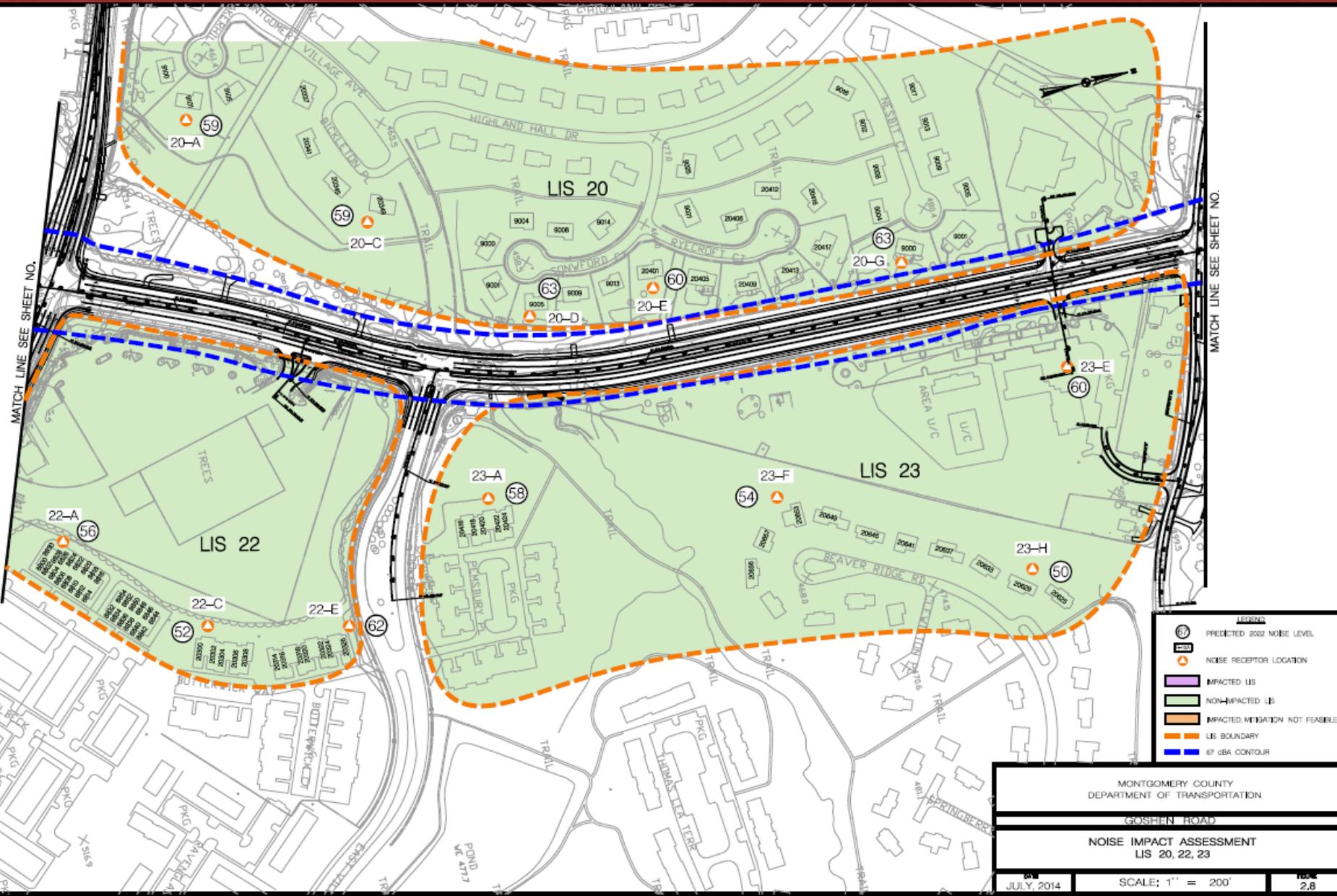
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# LIS Map continued



# LIS Map continued



**LEGEND**

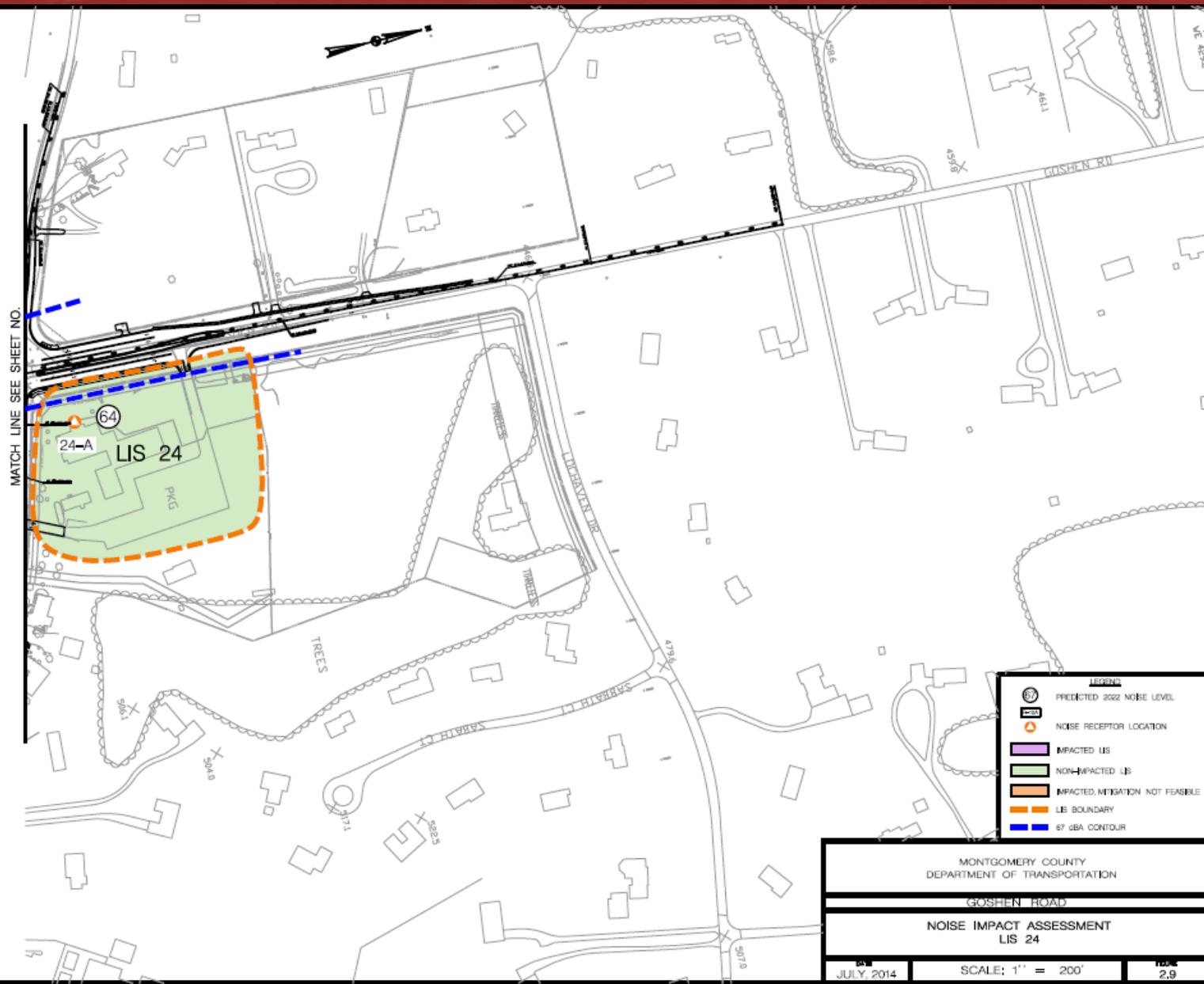
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DEPARTMENT OF TRANSPORTATION

GOSHEN ROAD

NOISE IMPACT ASSESSMENT  
LIS 20, 22, 23

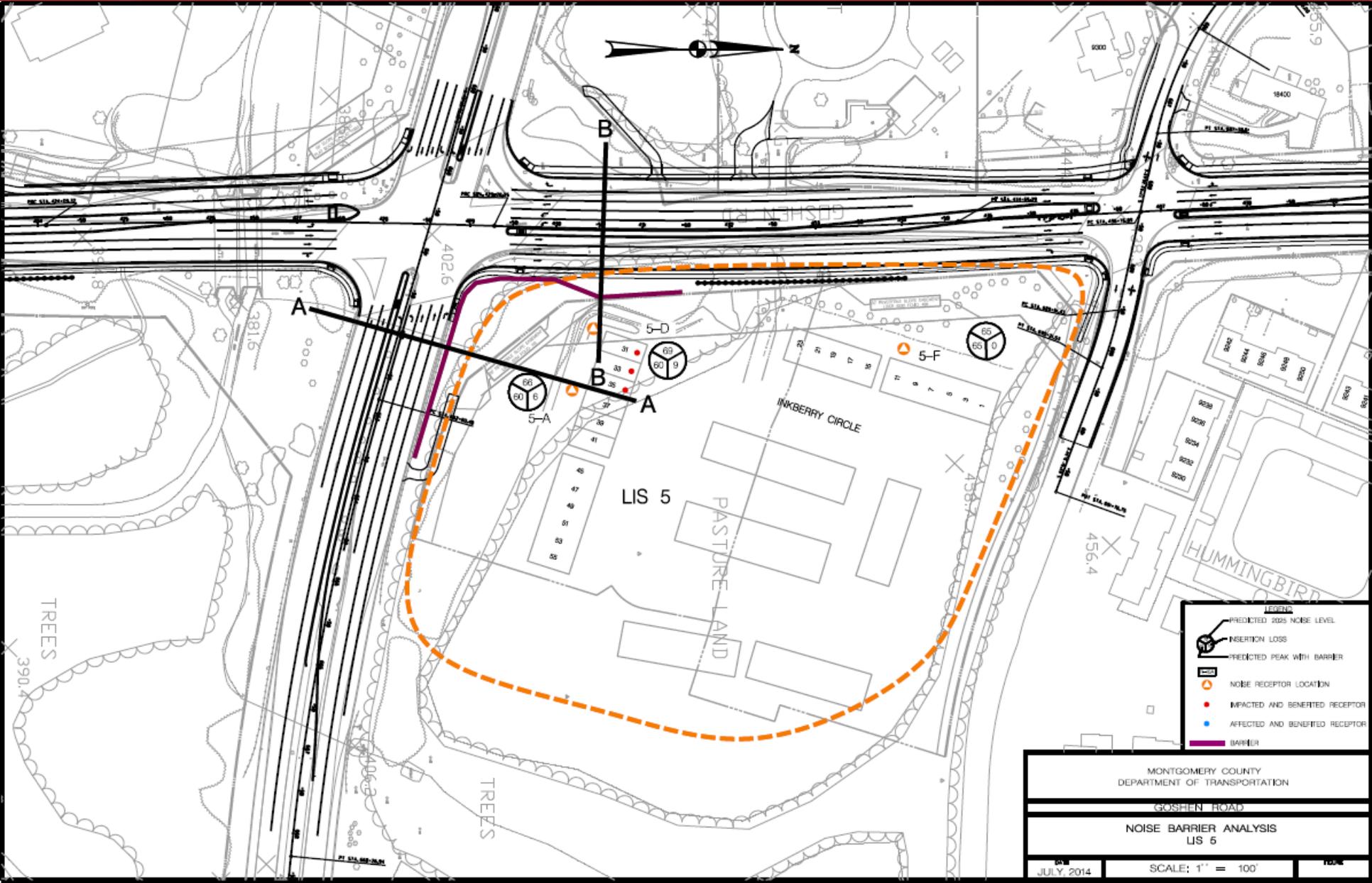
# LIS Map continued



# Summary of Results

- **Only the following LISs meet the criteria for noise mitigation: LIS 5, LIS 7B, LIS 7C, LIS 8, LIS 9, LIS 10, LIS 12, LIS 14 and LIS 15A**

# LIS 5 with proposed barrier



- LEGEND**
- PREDICTED 2025 NOISE LEVEL
  - INSERTION LOSS
  - PREDICTED PEAK WITH BARRIER
  - NOISE RECEPTOR LOCATION
  - IMPACTED AND BENEFITED RECEPTOR
  - AFFECTED AND BENEFITED RECEPTOR
  - BARRIER

MONTGOMERY COUNTY  
DEPARTMENT OF TRANSPORTATION

GOSHEN ROAD

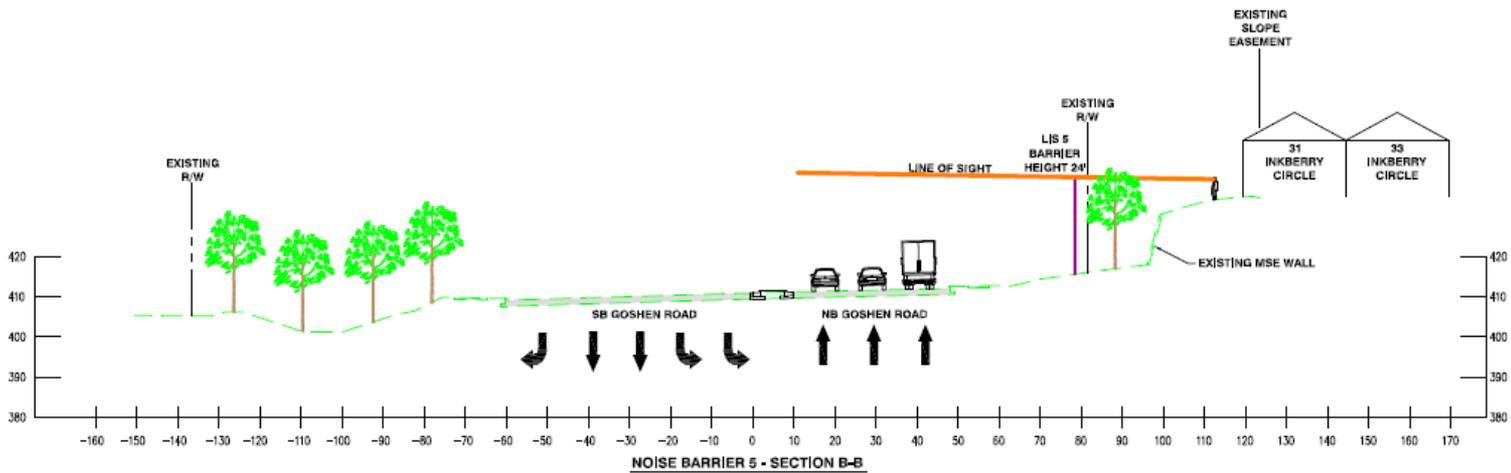
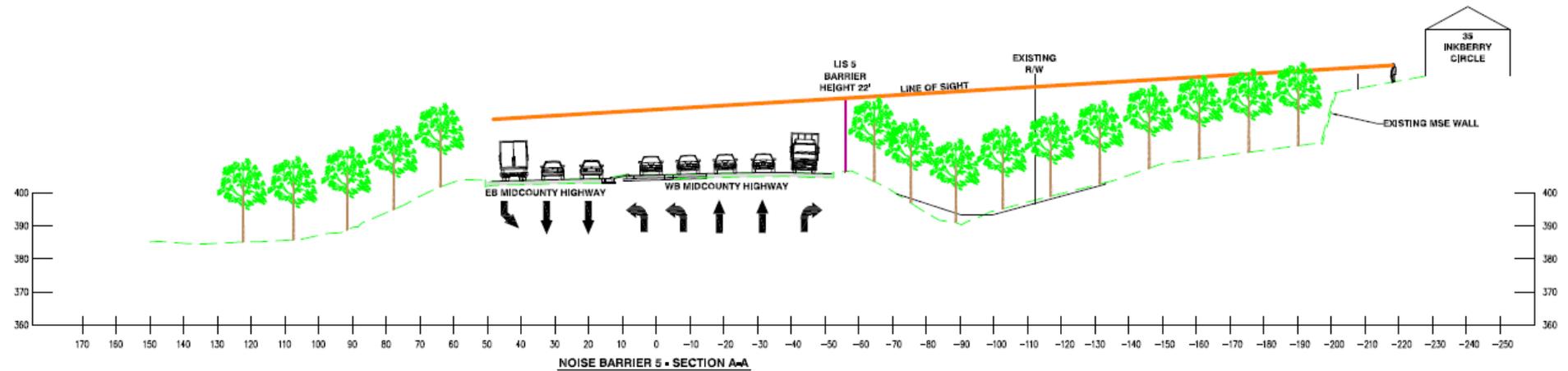
NOISE BARRIER ANALYSIS  
US 5

JULY 2014

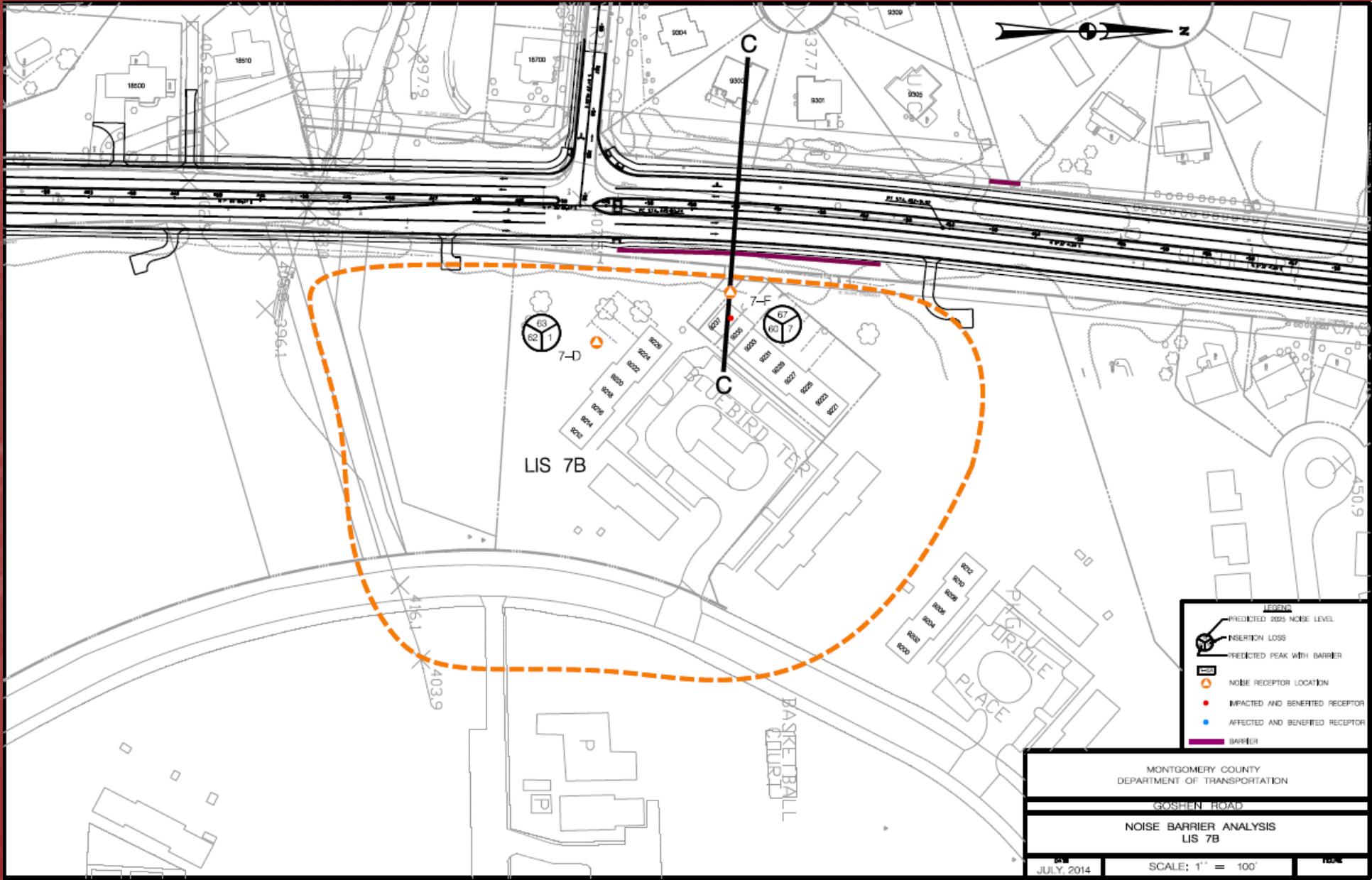
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FOOT

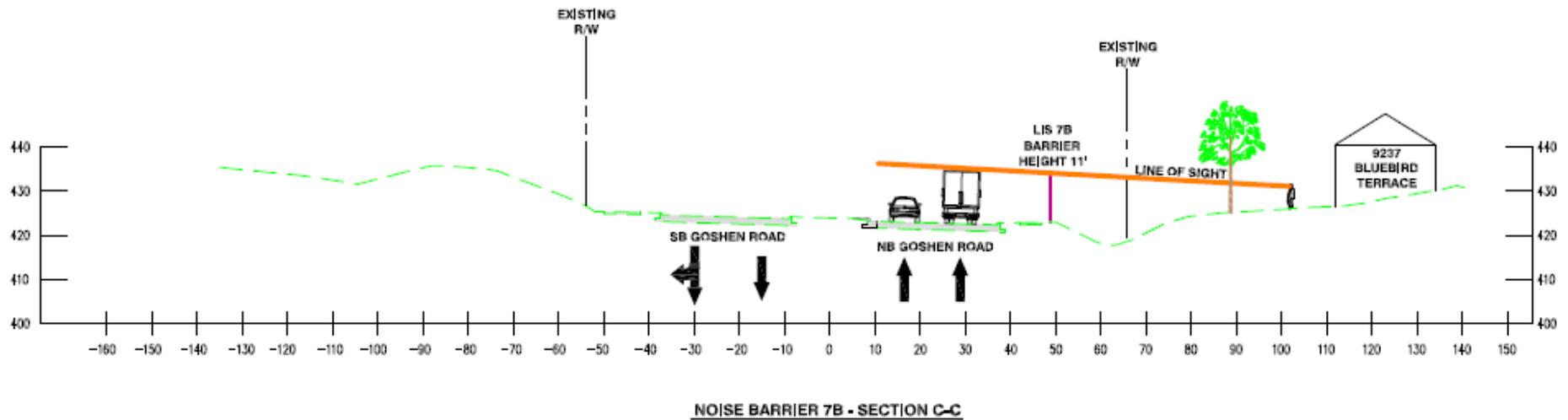
# LIS 5 proposed typical sections



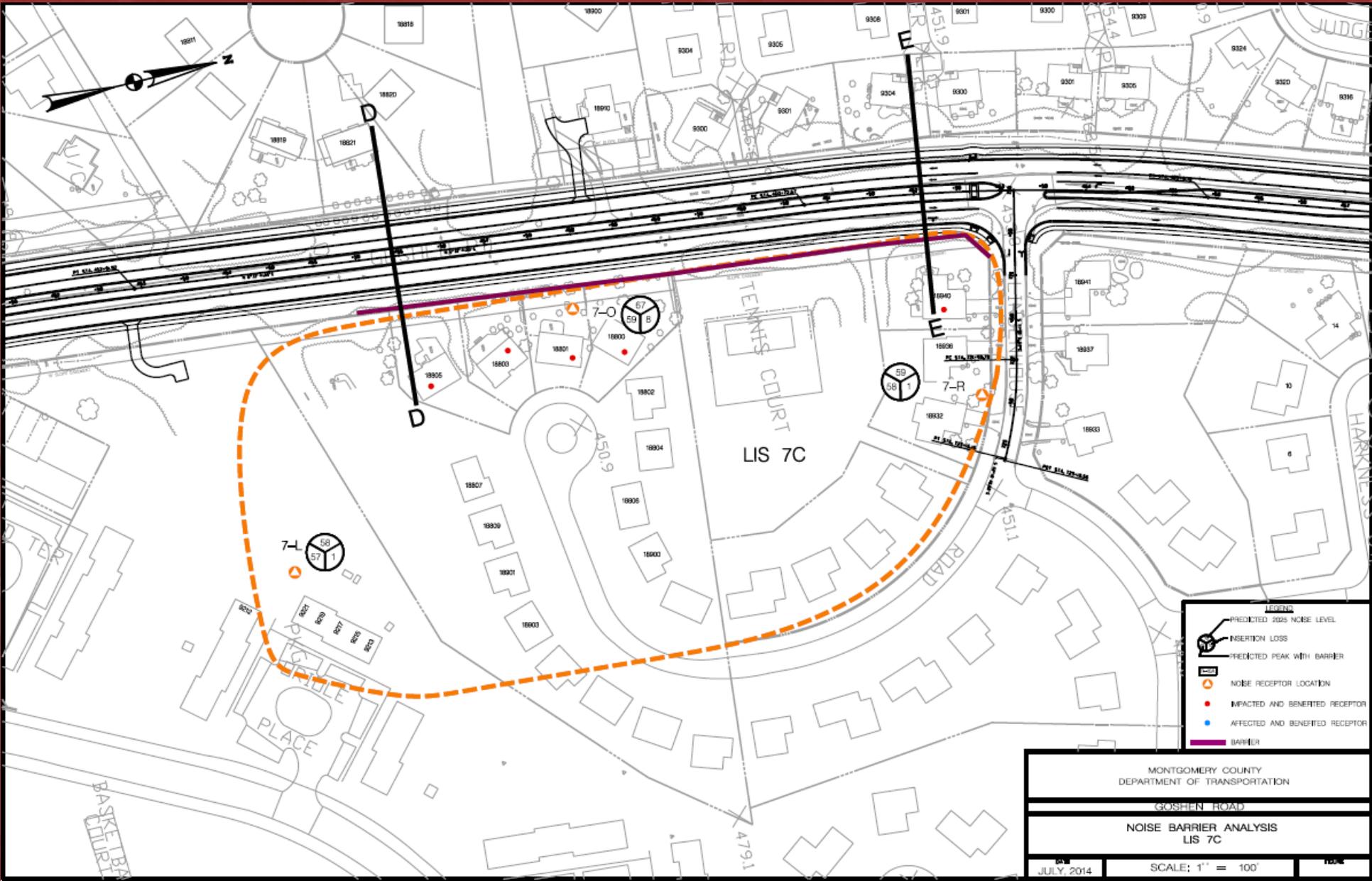
# LIS 7B with proposed barrier



# LIS 7B proposed typical sections



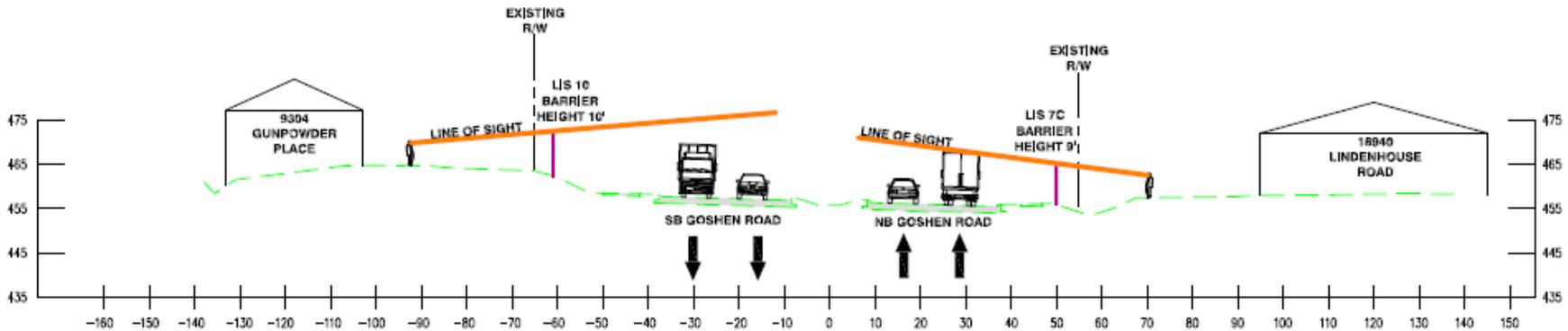
# LIS 7C with proposed barrier



# LIS 7C proposed typical sections

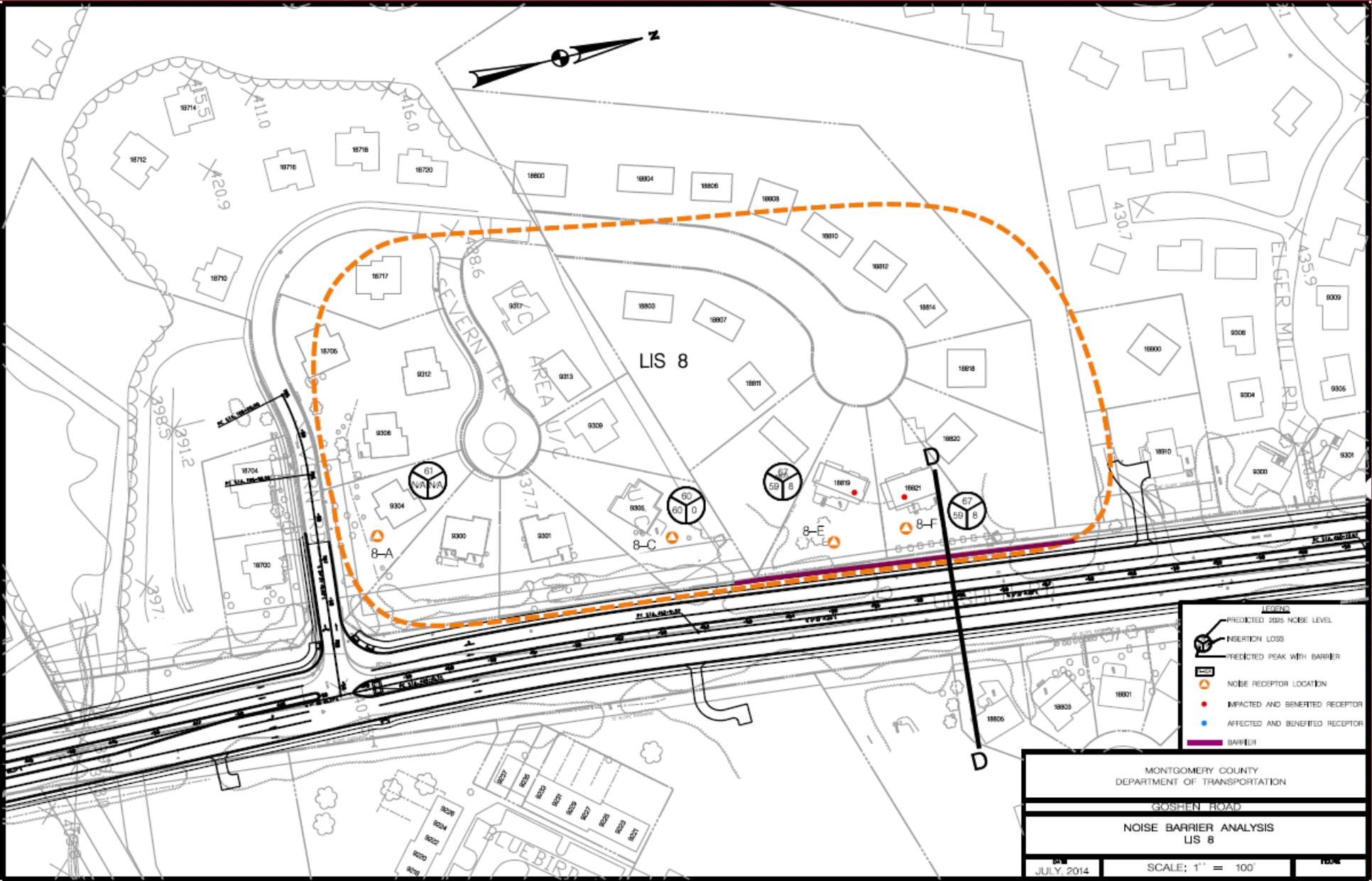


**NOISE BARRIER 7C & 8 - SECTION D-D**



**NOISE BARRIER 7C & 10 - SECTION E-E**

# LIS 8 with proposed barrier



- LEGEND**
- PREDICTED 2025 NOISE LEVEL
  - INSERTION LOSS
  - PREDICTED PEAK WITH BARRIER
  - NOISE RECEPTOR LOCATION
  - IMPACTED AND BENEFITED RECEPTOR
  - AFFECTED AND BENEFITED RECEPTOR
  - BARRIER

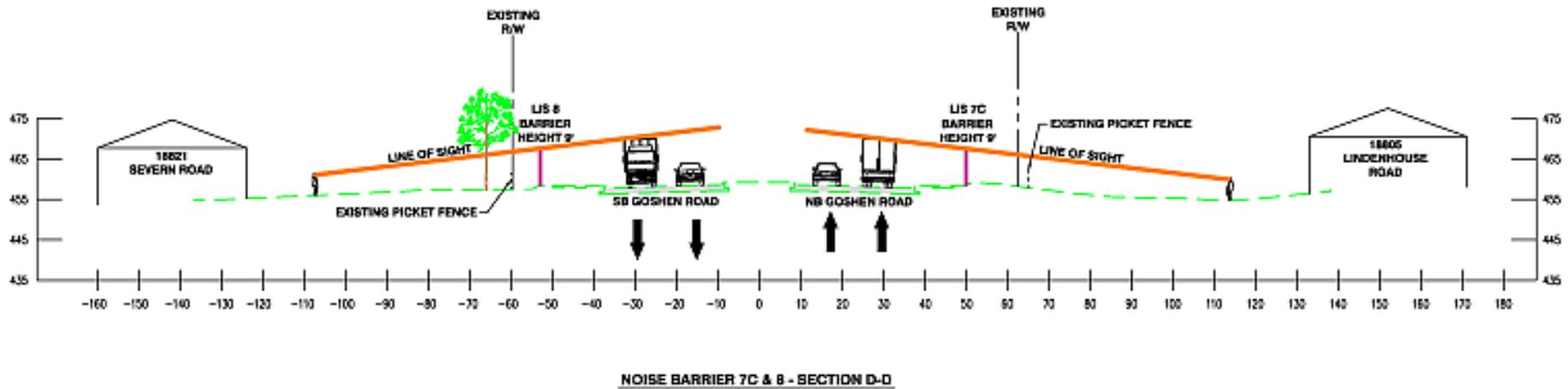
MONTGOMERY COUNTY  
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GOSHEN ROAD

**NOISE BARRIER ANALYSIS  
LIS 8**

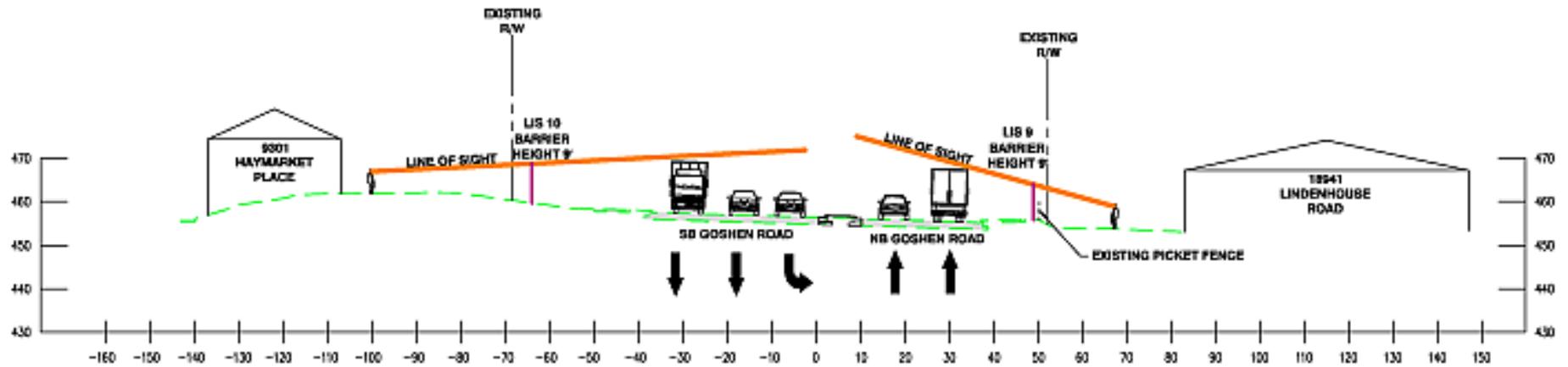
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# LIS 8 proposed typical sections



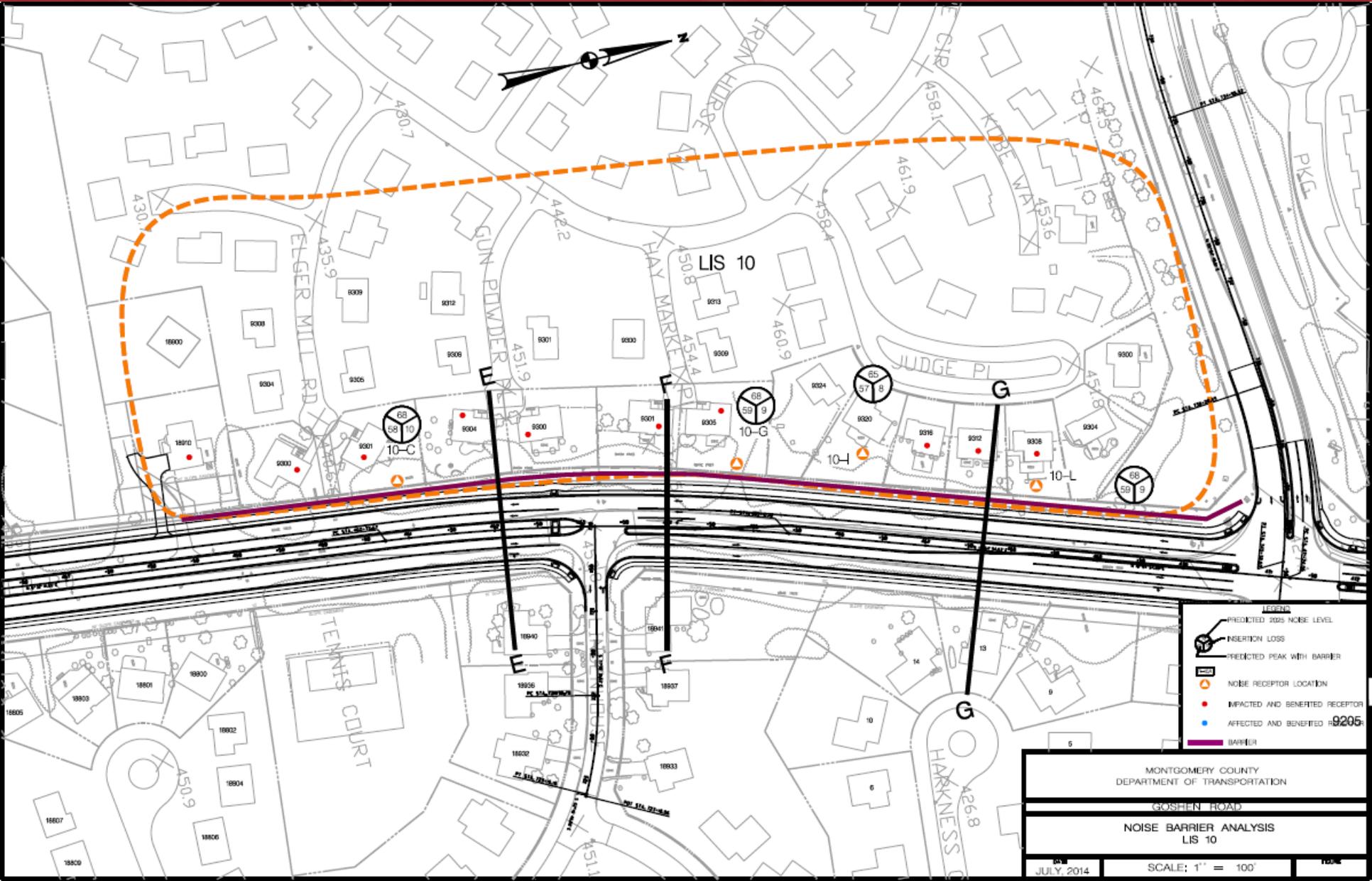


# LIS 9 proposed typical sections

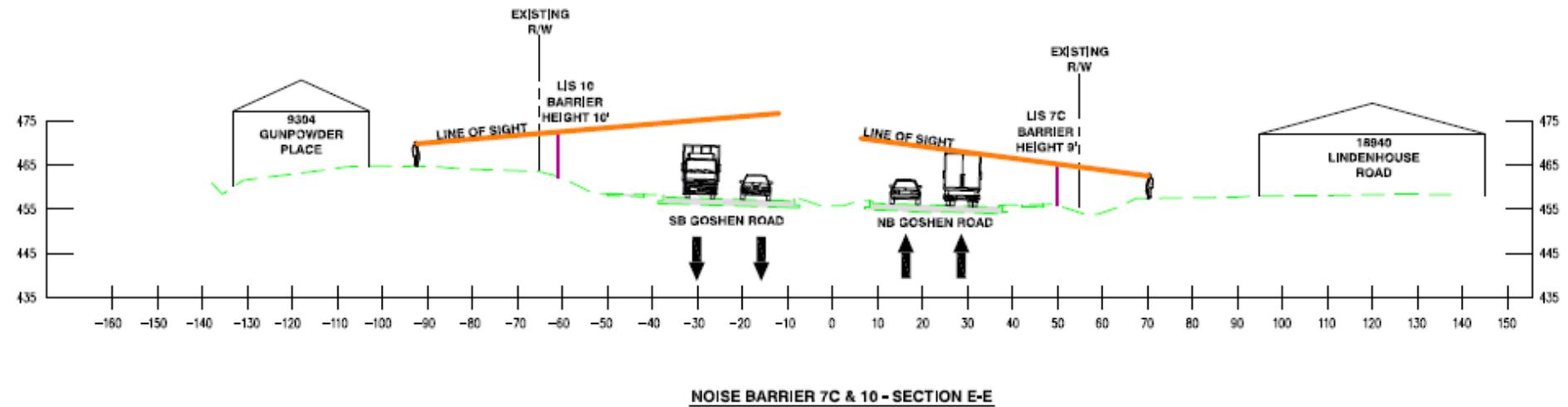


NOISE BARRIER 9 & 10 - SECTION F-F

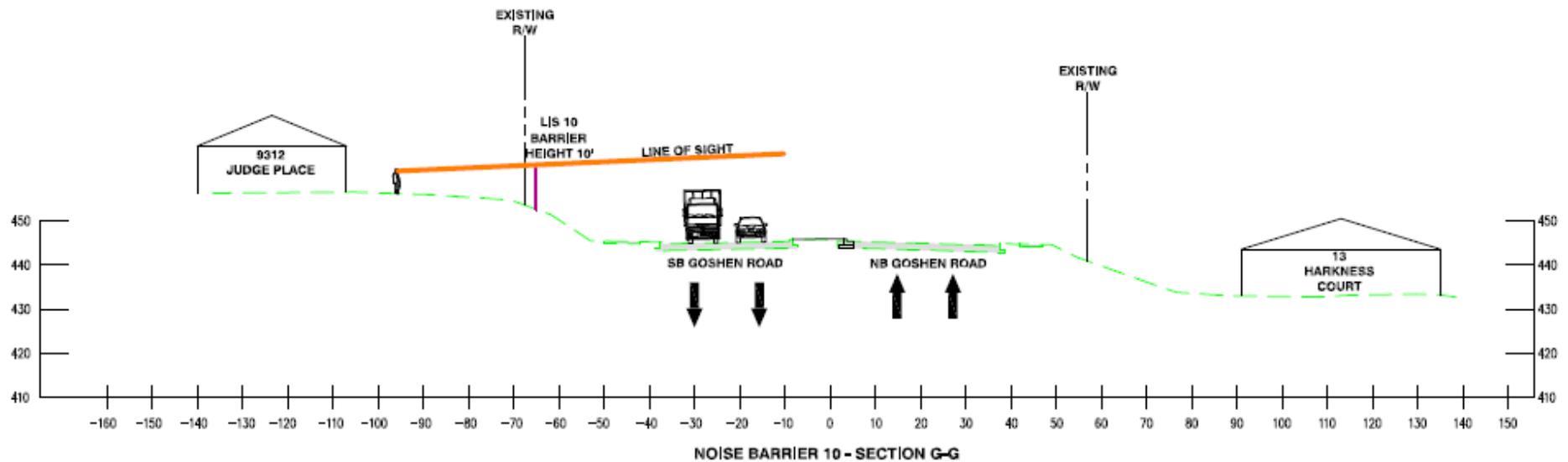
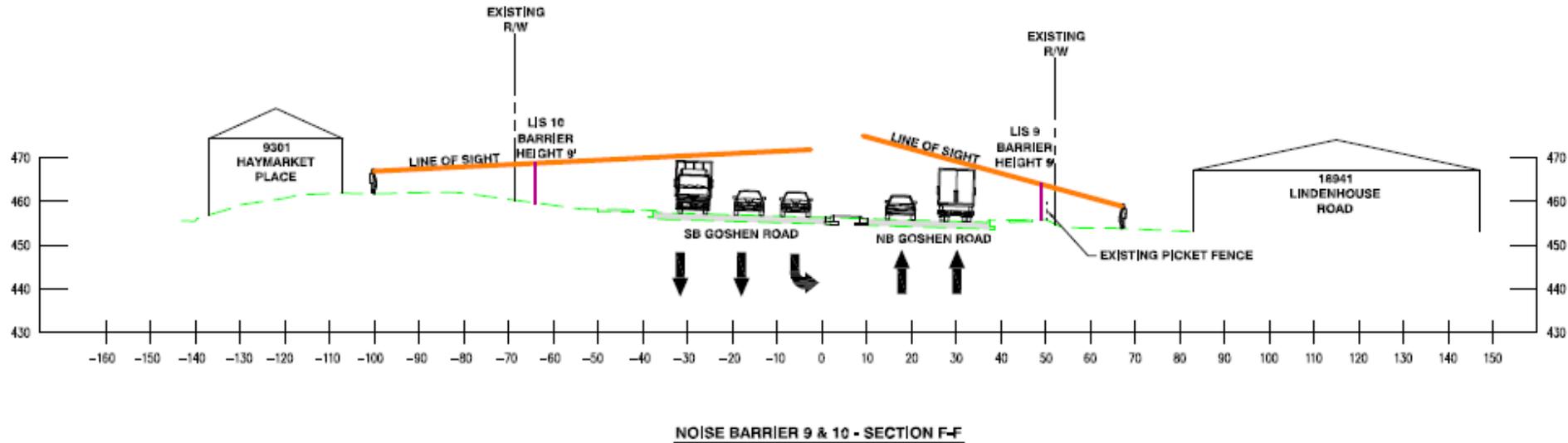
# LIS 10 with proposed barrier



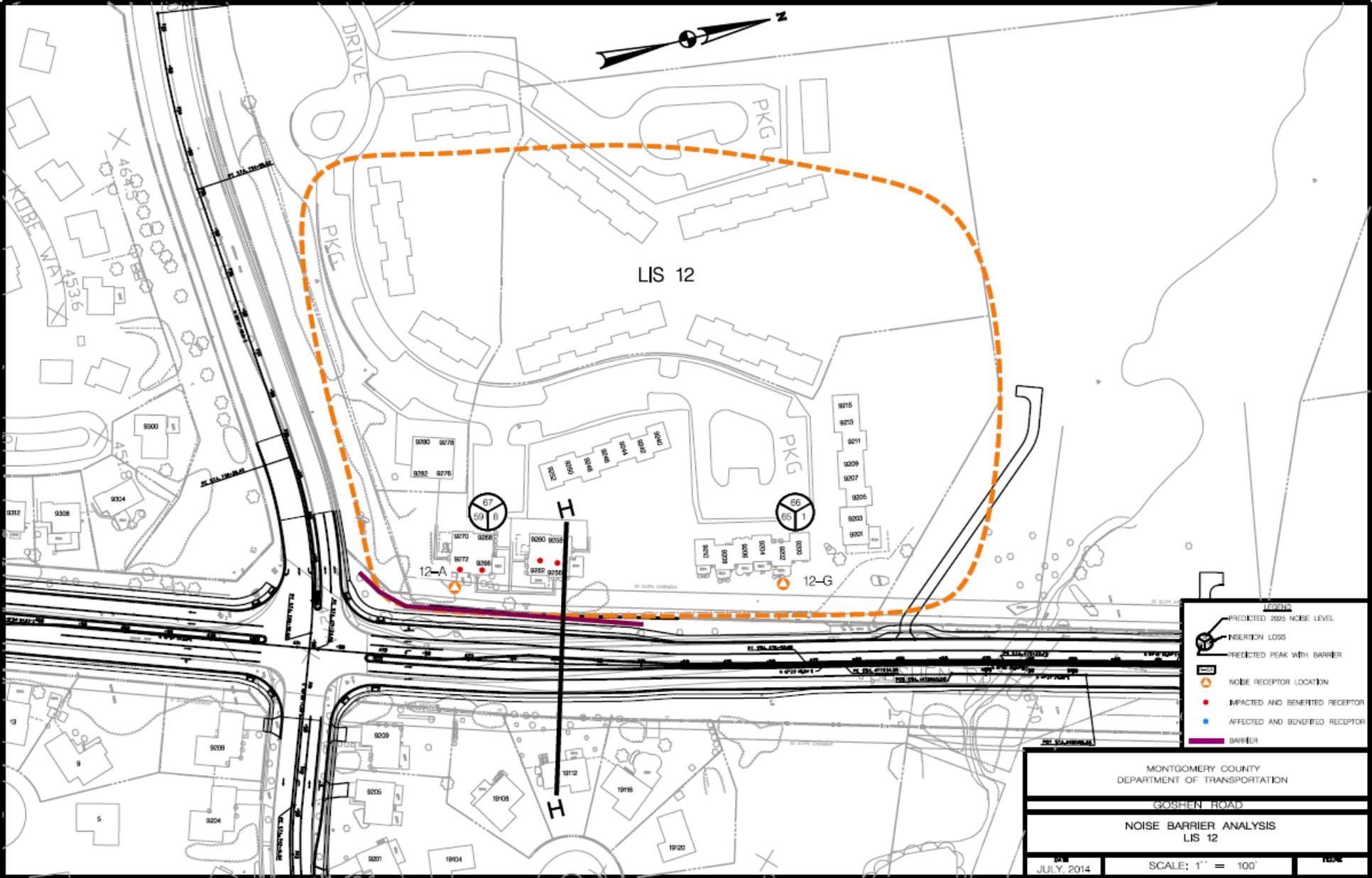
# LIS 10 proposed typical sections



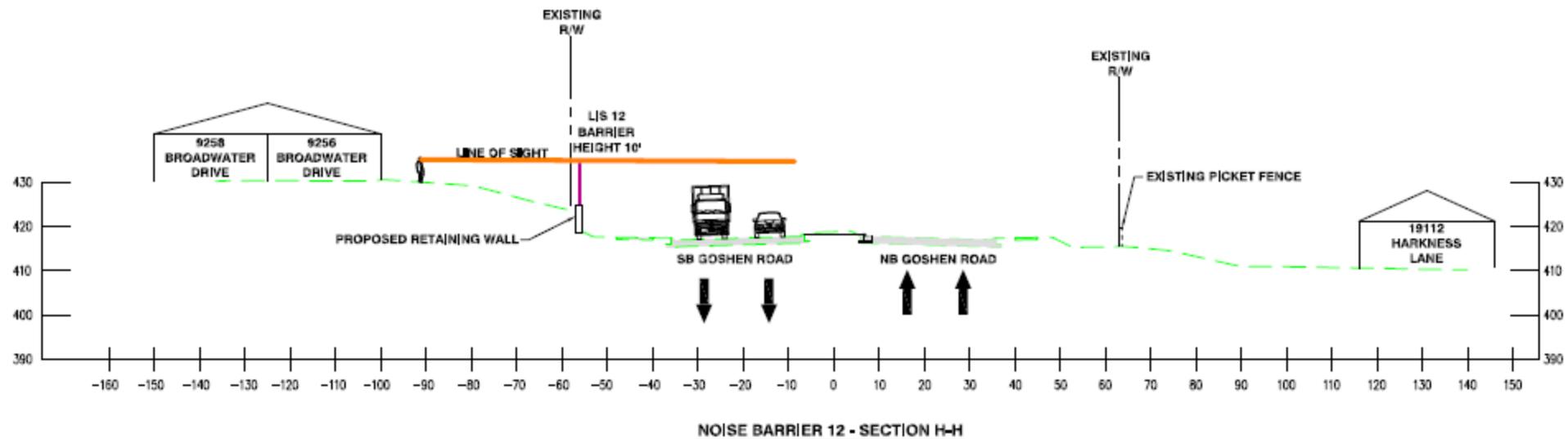
# LIS 10 proposed typical sections continued



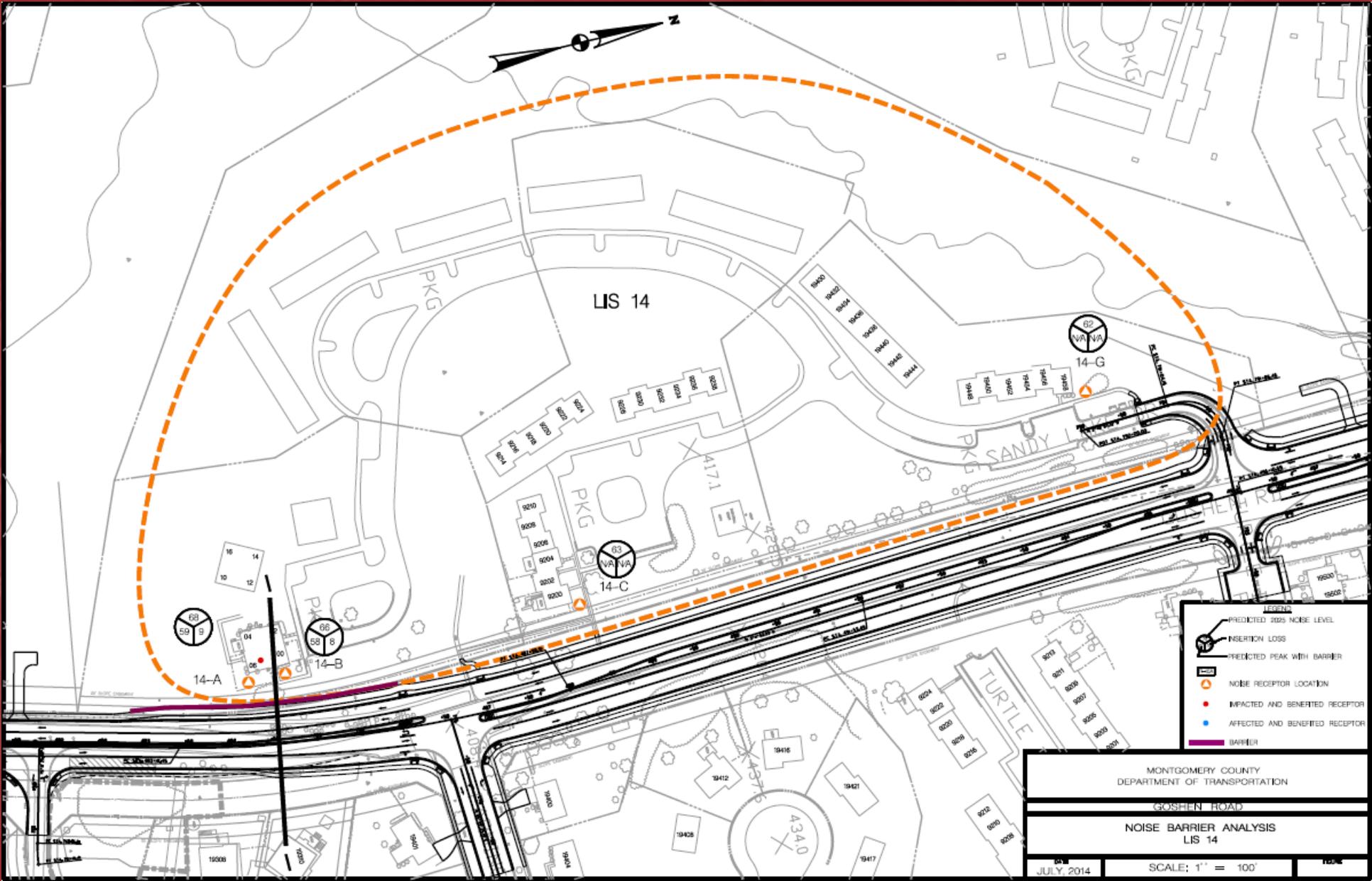
# LIS 12 with proposed barrier



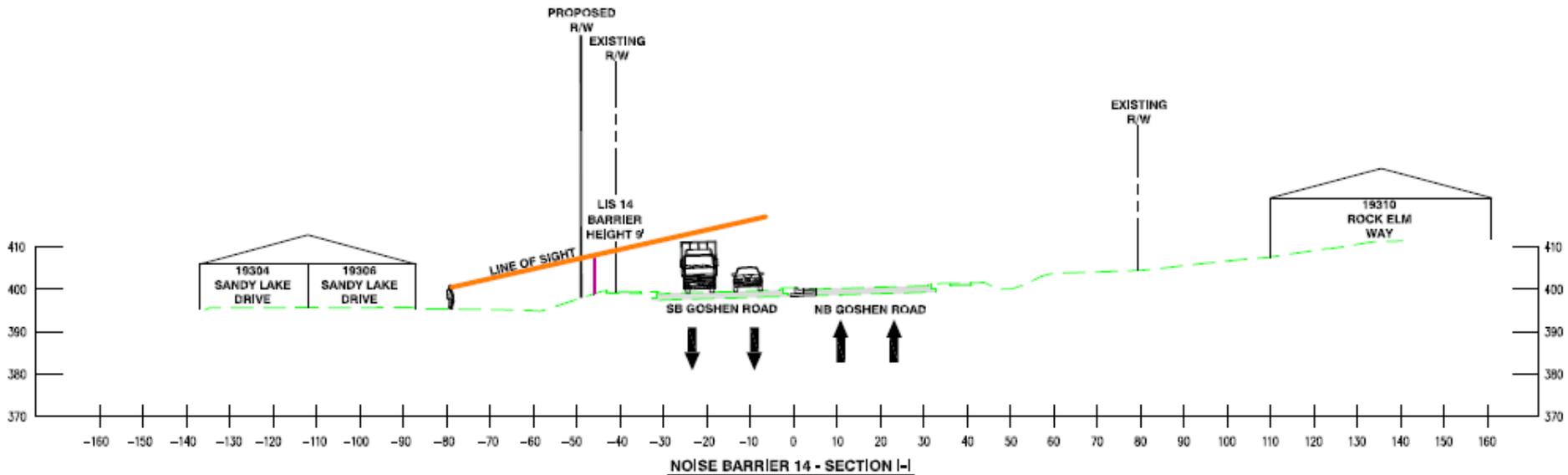
# LIS 12 proposed typical sections



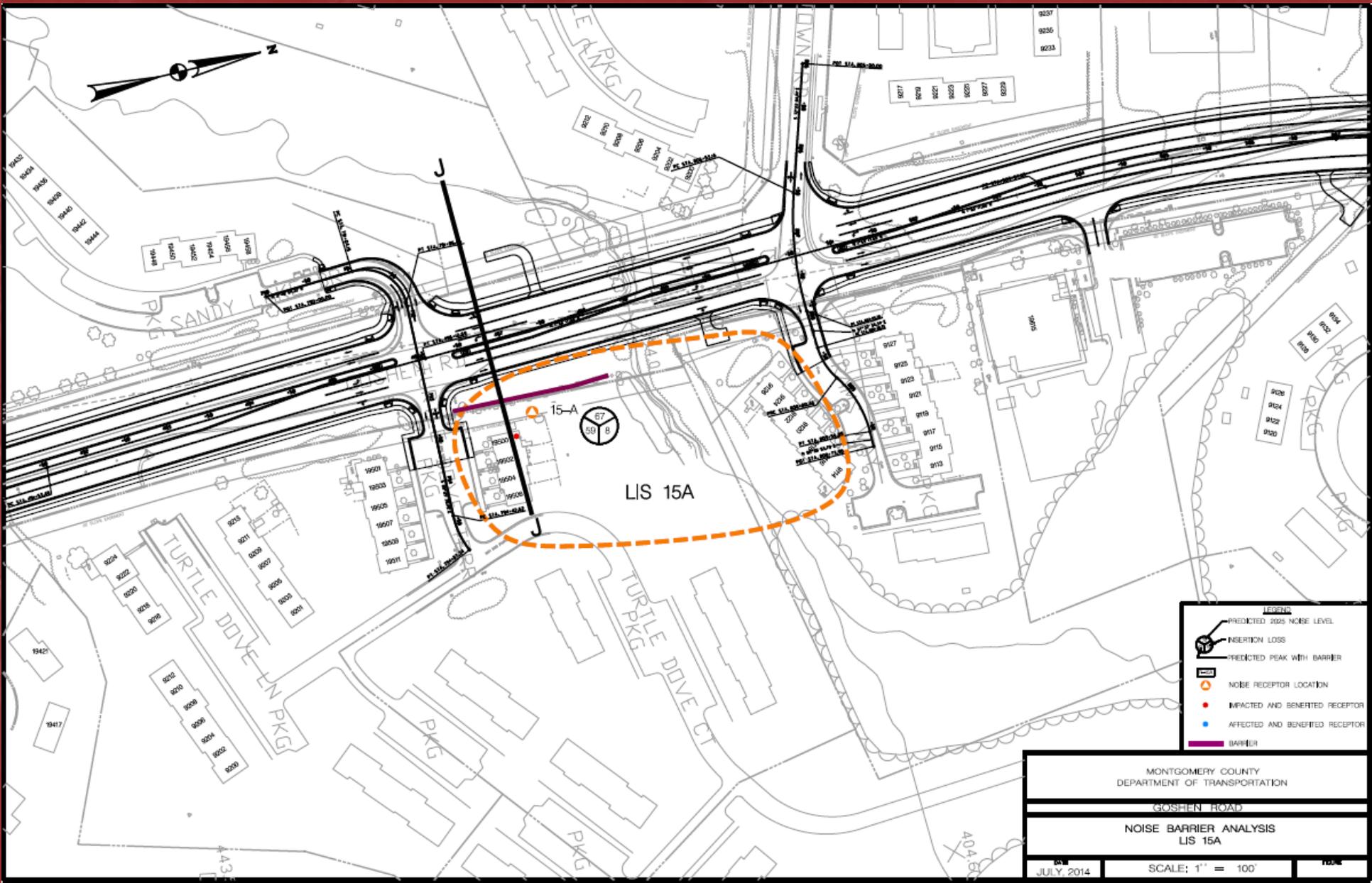
# LIS 14 with proposed barrier



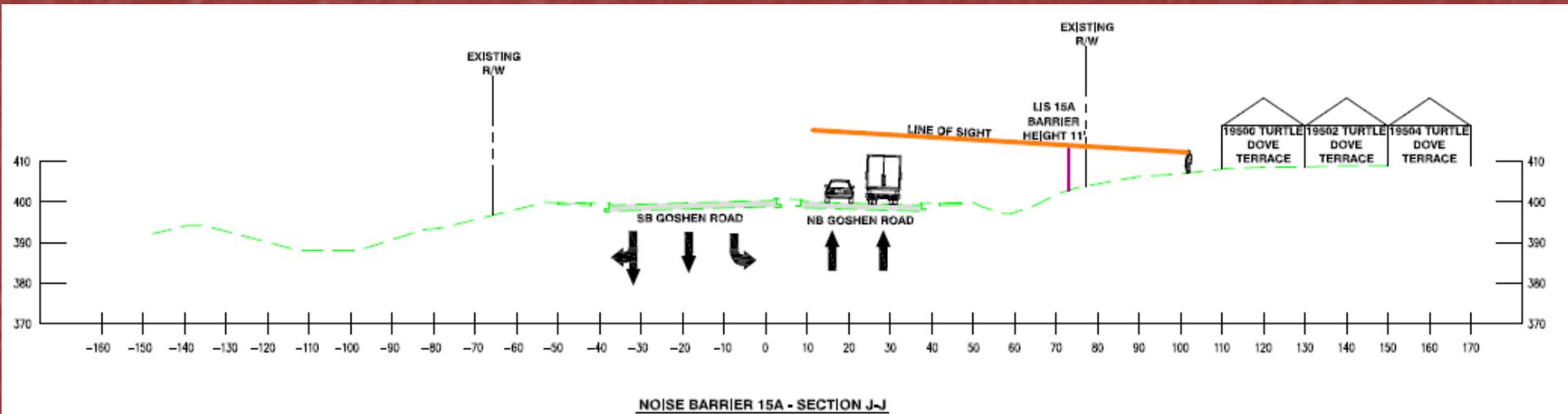
# LIS 14 proposed typical sections



# LIS 15A with proposed barrier



# LIS 15A proposed typical sections



# 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: 1985]	Total Per Resident Co-Pay
5	68	\$987,905	3	\$329,301	2003	\$239,301
7B	67	\$287,760	1	\$285,760	1976	\$185,760
7C	67	\$646,000	5	\$129,200	'74; '90-'91	\$39,200 --
8	67	\$325,185	2	\$162,593	2000	\$72,593
9	70	\$206,720	1	\$206,720	1974	\$106,720
10	69	\$948,480	10	\$94,848	'68-'69; '00	\$0
12	67	\$308,465	4	\$77,116	1984	\$0
14	68	\$240,160	1	\$240,160	1985	\$140,160
15A	67	\$193,135	1	\$193,615	1979	\$93,135

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

# 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 will 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).

# Funding for Noise Barriers

- MC-DOT will request funding for noise barriers along Goshen Road for those LISs where at least 60% of the properties (owners) have voted for the barriers. The funding request will be as part of the Goshen Road project.

# Next Steps:

- ⚙ Get Community Input
- ⚙ Conduct Survey (Voting)
- ⚙ Communicate the results of the survey back to the community.
- ⚙ Request funding for those noise barriers (LISs) where at least 60% of the impacted-benefited property owners vote for the barriers.

QUESTIONS?