

MEMORANDUM

TO: Mr. Jason Ridgway, Director
Office of Highway Development

Mr. Cedric Ward, Director
Office of Traffic & Safety

THROUGH: Tim Smith
District Engineer, District 5

FROM: Debra Russell
ADE – Project Development

BY: Chau Chiem
Project Engineer

Subject: FMIS AA195A21 / SHA Contract No. BCS 2011-02N
Project: MD 170 (Telegraph Road) at MD 174 (Reece Road) Concept Study

RE: Concept Development Study

Date: June 30, 2016

Purpose and Need

The purpose of this Concept Development Study is to evaluate highway capacity improvements along MD 170 (Telegraph Road) at the MD 174 (Reece Road) intersection in Anne Arundel County. As part of a traffic study performed for MD 170 at MD 174 in 2014, field observations showed lengthy queues of northbound through traffic in the morning peak period (LOS D), and lengthy queues of southbound through traffic in the PM peak period (LOS E). In addition, thirteen (13) rear end accidents, six (6) angle crashes, and three (3) left turn accidents were observed at the intersection of MD 174 and MD 170 in 2012.

In order to address these capacity and safety-related issues at this location, District 5 Engineering Systems has requested two roadway improvement options be considered in order to identify concept-level impacts and costs. A CSIP review for 2012 crash data indicated that the nine (9) angle and left-turn crashes at the intersection could be mitigated by improvements similar to those proposed under these options.

Option 1: Develop a geometric layout to include:

- An additional southbound through lane along MD 170 through the intersection of MD 174.
- A raised median along MD 170 on approaches in order to prevent left turns.

Option 2: Develop a geometric layout to include:

- All of the features in Option 1.
- An extension of the northbound dual through lanes along MD 170 to meet the existing two northbound lanes at Crestwood Mobile Homes.
- Bicycle and pedestrian facilities (assumes a closed section).

As part of this study, these improvements are presented as concept plans and are contained in Appendix A and explained below.

Existing Site Conditions

The posted speed limit along MD 170, within the study limits, is 50 MPH. This roadway is classified as an Urban Other Principal Arterial and is on the National Highway System (NHS). MD 174 is classified as an Urban Minor Arterial, has a posted speed limit of 45 MPH, and is not on the NHS. MD 170 also intersects Minnetonka Road, a local county road, about 1,500 feet north of the MD 174 intersection. Old Donaldson Avenue is a County-owned road that intersects MD 170 approximately 600 feet south of MD 174.

MD 170 includes a traffic signal at the MD 174 intersection and a signal at the Anne Arundel County 4 Fire Station that is only activated when fire personnel need to quickly access the roadway. The existing typical section along MD 170 is comprised of two through lanes in the northbound direction, one through lane in the southbound direction, and auxiliary turn lanes at the MD 174 intersection. The second northbound through lane exists from Old Donaldson Avenue and terminates approximately 400 feet north of the MD 174 intersection at the northern Royal Farms (gas station) entrance. The travel lanes measure primarily 11 feet in width along MD 170 and right and left shoulder widths vary between 0 and 12 feet throughout the project limits. Right turn lanes exist in both northbound and southbound directions at Minnetonka Road and in the northbound direction at Old Donaldson Avenue. A southbound left turn lane exists at Old Donaldson Avenue. The turn lane widths measure primarily 11 feet to 12 feet; however, the northbound right turn lane onto MD 174 measures 16 feet.

MD 174 is comprised of two through lanes in both the eastbound and westbound direction, divided by a 4-foot wide concrete median. The two westbound through lanes merge to one lane approximately 350 feet west of the intersection of MD 170. There are auxiliary turn lanes in both the eastbound and westbound directions along MD 174. At the intersection, the southbound right turn lane to MD 174 and eastbound right turn lane to MD 170 are channelized. Curb and gutter exists at the intersection and along driveways near the intersection. Sidewalk exists in front of Royal Farms, CVS, and also at the Anne Arundel County 4 Fire Station. According to the *2013 Anne Arundel County Pedestrian and Bicycle Master Plan*, there are no planned sidewalk or bicycle improvement projects in the area.

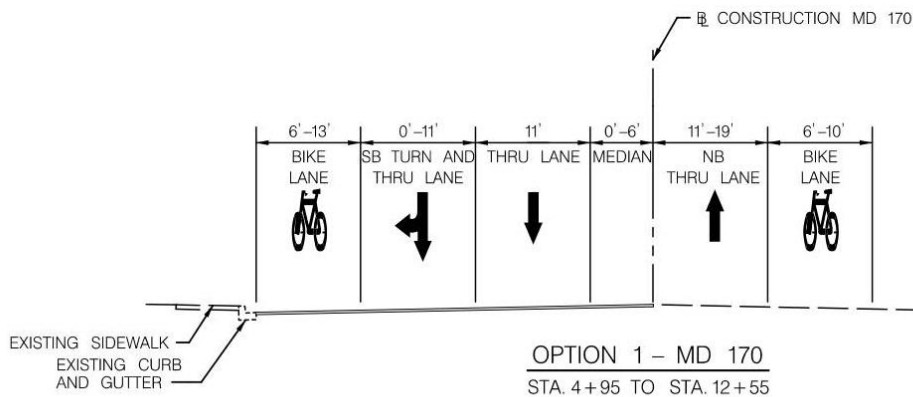
Proposed Improvements

The proposed improvements along MD 170 consist of widening the roadway to provide additional capacity. Both options include adding a raised median along MD 170 between Old Donaldson Avenue and the northern Royal Farms entrance. Option 2 extends the northern limits of the project and adds sidewalks, bike compatible shoulders, and modifies the segment to closed section. A traffic study prepared by Sabra, Wang & Associates in March 2014 and the *2011 AASHTO Green Book* were used to determine the proposed turn lane lengths and taper rates. Additionally, *AASHTO* specifies proposed sidewalk as 4 feet to 8 feet wide in order to be compliant. Thus, proposed sidewalk for Option 2 was

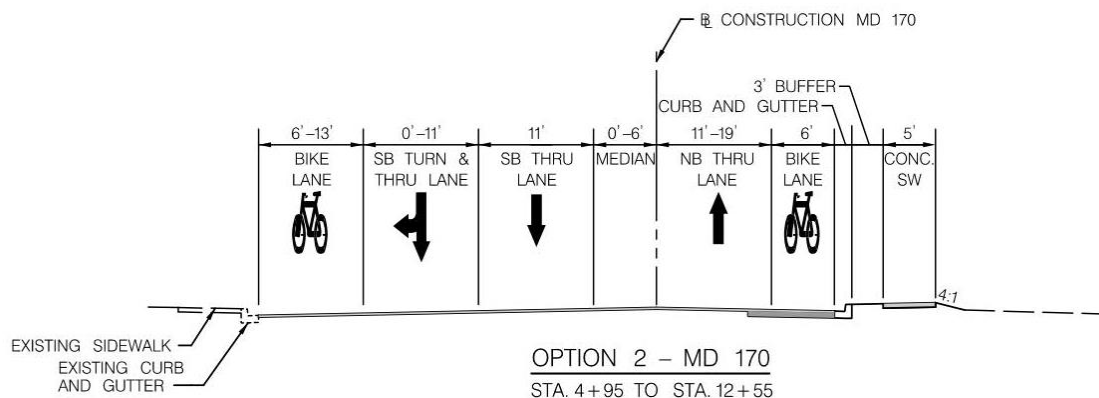
proposed as 5 feet to 6 feet wide to match the existing conditions. There are no proposed changes to vertical grades, superelevation, or cross slopes. The length of work along MD 170 for Option 1 is 0.71 miles and for Option 2 is 0.82 miles.

MD 170, South of Fire Station Entrance

The proposed typical section along MD 170 for Option 1 south of the existing fire station includes one through lane in both the northbound and southbound directions, a right turn lane for southbound vehicles, a varying-width bike lane on both sides, and a painted median that varies from 0 feet to 6 feet. No modifications are proposed in the northbound direction. The existing curb and gutter and sidewalk in front of the fire station will remain as is.

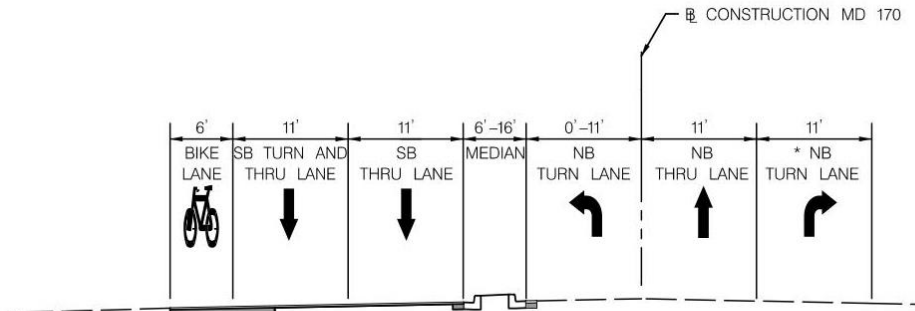


The typical section for Option 2 has through lanes, median, and a right turn lane, proposed similar to Option 1. The existing sidewalk and curb and gutter will remain along the frontage of the fire station. On the northbound side, a 605-foot lane shift is proposed to widen the road and provide an additional through lane. A bike lane, curb and gutter, and 5-foot sidewalk with a 3-foot grass buffer is also proposed in the northbound direction. According to the *2015 Maryland State Highway Administration Bicycle Policy & Design Guidelines*, bike lanes for roads with posted speeds greater than 45mph must have a width of 6 feet. Thus, for all proposed marked bike lanes the width shall be 6 feet throughout the project.



MD 170, North of Fire Station Intersection

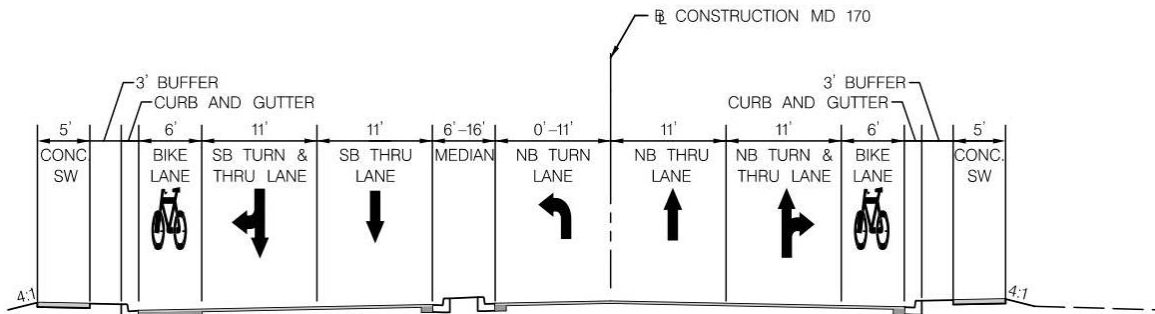
The proposed typical section just north of the fire station has one full and one transitioning southbound through lane, a 6-foot bike lane southbound, and a varying width landscaped median. No work is proposed in the northbound direction; therefore, the existing section will remain. Widening southbound will be required for the added through and right turn lane and the bike lane.



OPTION 1 – MD 170

STA. 13+63 TO STA. 19+20
* NB TURN LANE BECOMES A THRU LANE AFTER OLD DONALDSON AVENUE INTERSECTION AT STA. 15+80

The typical section for Option 2 proposed one full and one transitioning southbound through lane, a varying width landscaped median, a transitioning northbound left turn lane, a northbound through lane and a shared northbound through and right turn lane. A 6-foot bike lane on both sides of the road is also provided with a 5-foot concrete sidewalk and a 3-foot grass buffer.

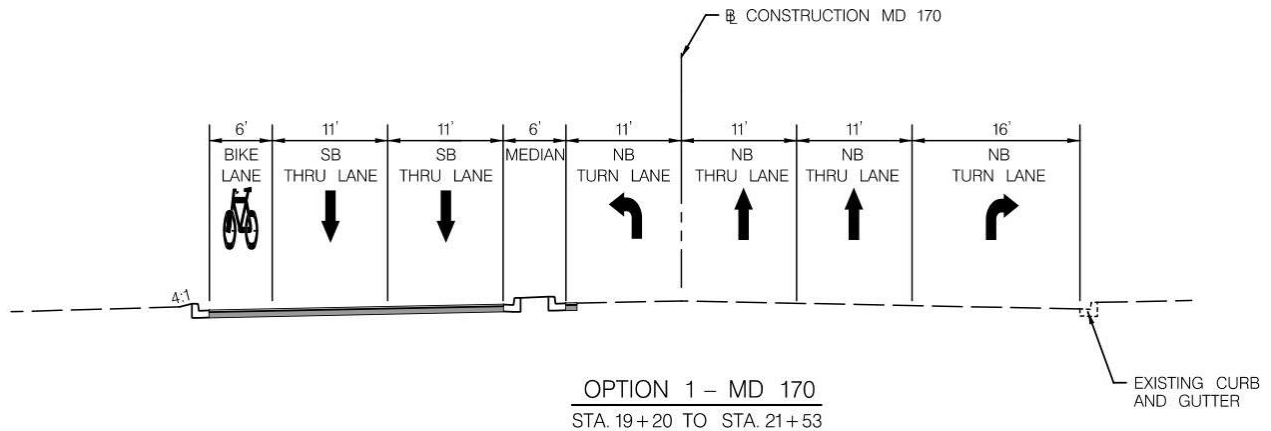


OPTION 2 – MD 170

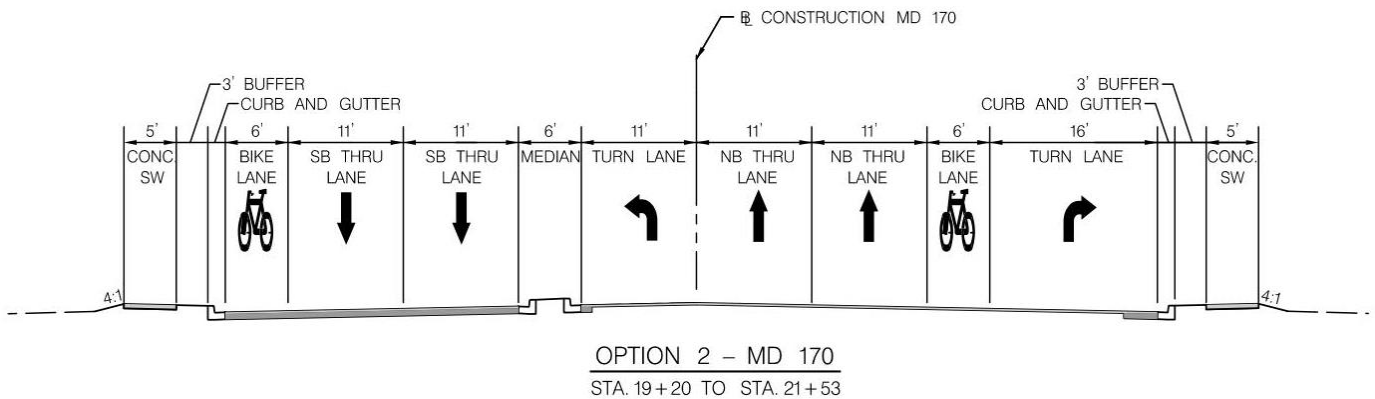
STA. 13+63 TO STA. 19+20

MD 170, South of MD 174

The proposed typical section for Option 1 just south of the MD 174 intersection includes two southbound through lanes, a 6-foot bike lane, and a raised median. No work is proposed in the northbound direction; therefore, the existing section will remain.

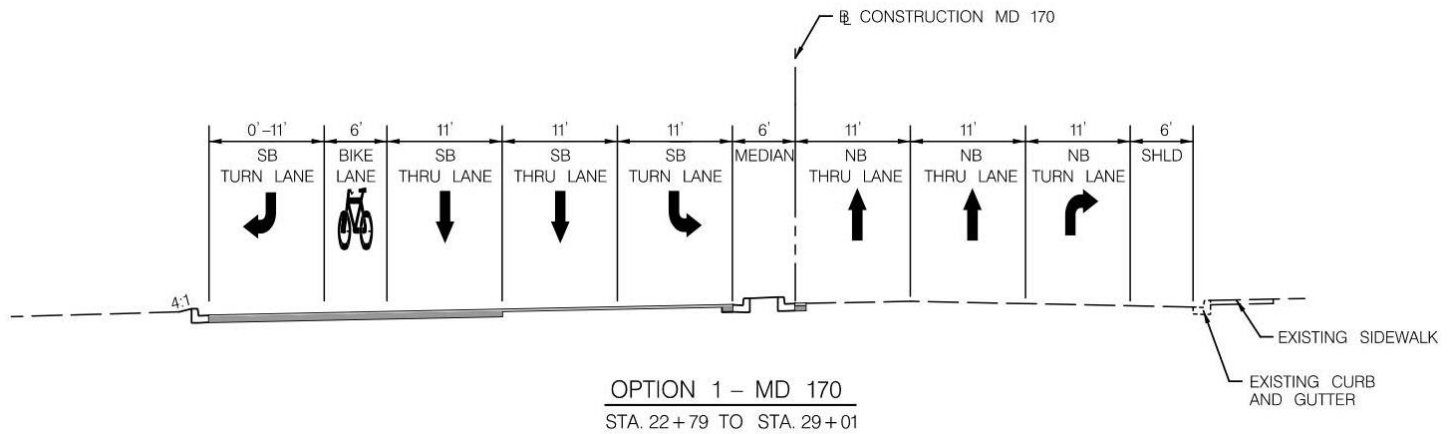


The typical section for Option 2 includes two through lanes in each direction, a raised median and northbound left and right turn lanes. A 6-foot bike lane on both sides of the road is also provided with a 5-foot concrete sidewalk and a 3-foot grass buffer.

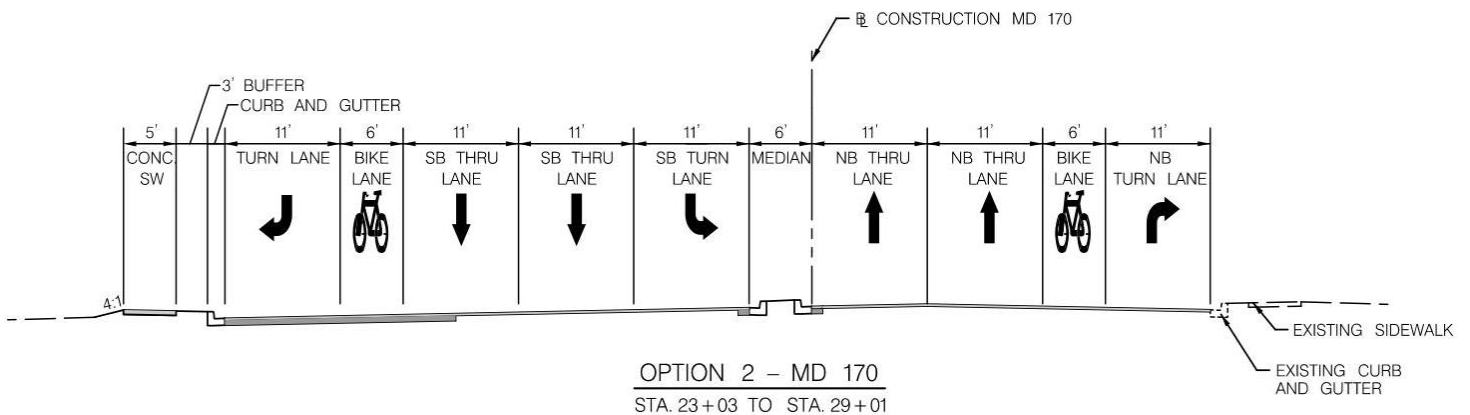


MD 170, North of MD 174

The proposed typical section for Option 1 along MD 170, north of MD 174, includes two through lanes and southbound left and right turn lanes, a bike lane, and a raised median. The two existing northbound through lanes and right turn lane to Royal Farms will remain unchanged.

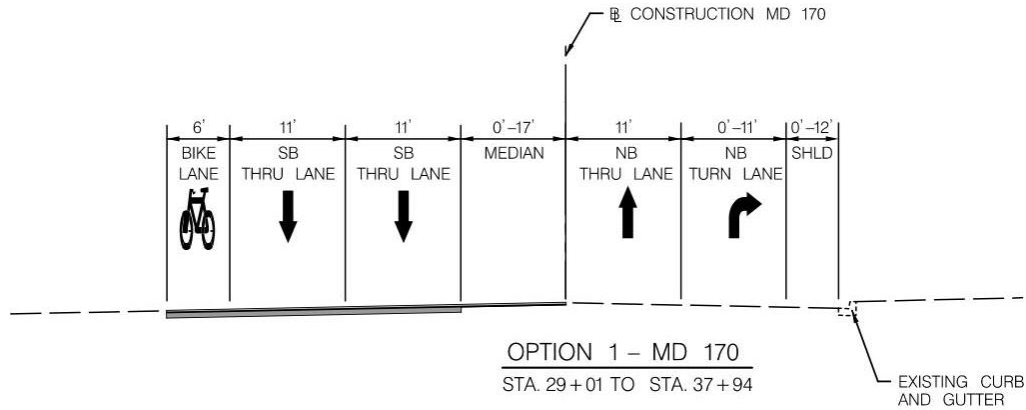


The typical section for Option 2 includes a similar lane configuration as Option 1, but has added 5-foot sidewalk with a 3-foot grass buffer in the southbound direction. The northbound lanes include two through lanes and an 11-foot right turn lane, which is utilized for vehicles accessing the Royal Farms store. The existing curb and gutter and sidewalk in the northbound direction will remain for most of this segment.

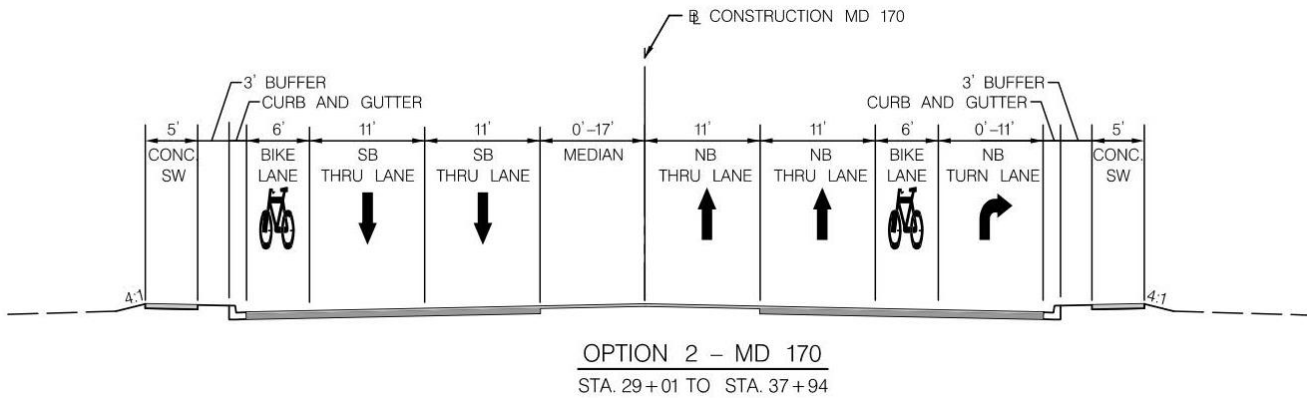


MD 170, South of Minnetonka Road

The proposed typical section along MD 170, south of Minnetonka Road, for Option 1 includes two southbound through lanes, a 6-foot bike lane, and varying width striped median. The northbound through and right turn lanes and varying width shoulder will remain unchanged.

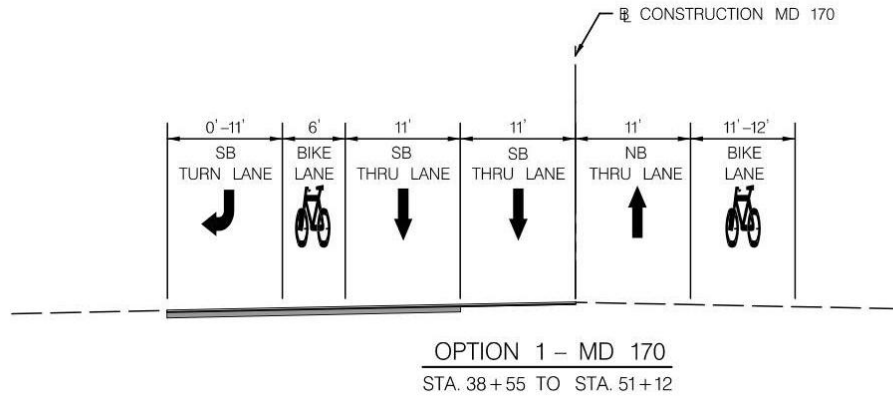


The typical section for Option 2 includes two southbound through lanes, a varying width painted median, two northbound through lanes, a northbound right turn lane, 6-foot bike lanes on both sides of the roadway, and 5-foot sidewalk with 3-foot grass buffers on both sides of the roadway.

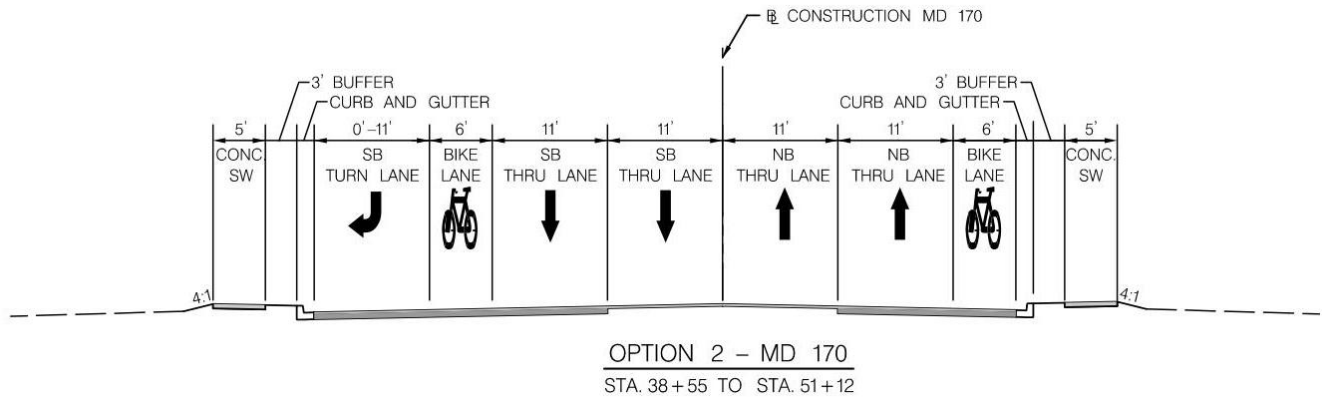


MD 170, North of Minnetonka Road

The proposed typical section along MD 170 north of Minnetonka Road includes two southbound through lanes, a right turn lane at Minnetonka Road, and a 6-foot bike lane. The northbound through lane and wide shoulder will remain unchanged.

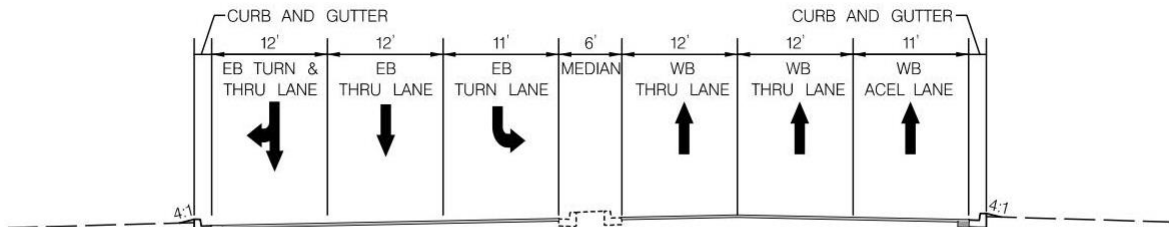


The typical section for Option 2 includes the same lane configuration in the southbound direction and also has an additional northbound through lane. There are proposed 6-foot bike lanes on both sides of the roadway and a 5-foot sidewalk with 3-foot grass buffers.



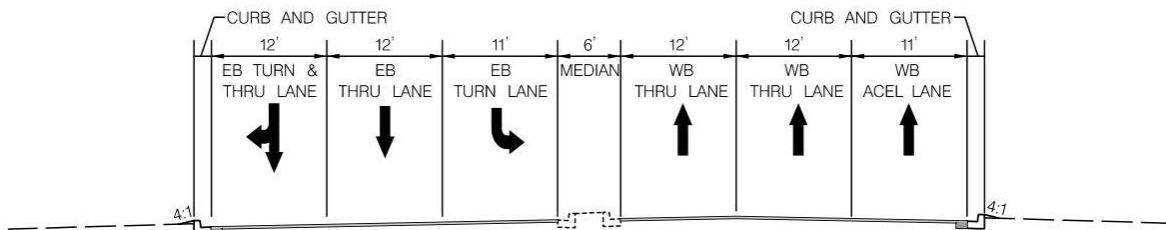
MD 174, West of MD 170

The proposed typical section for MD 174, west of MD 170, matches the existing typical section. There are two westbound through lanes, a westbound acceleration lane, an eastbound left turn lane, and two eastbound through lanes with a channelized right turn lane. There is a raised median that divides traffic. Proposed curb is required due to modifying the channelized right turns.



OPTION 1 – MD 174
WEST OF MD 170

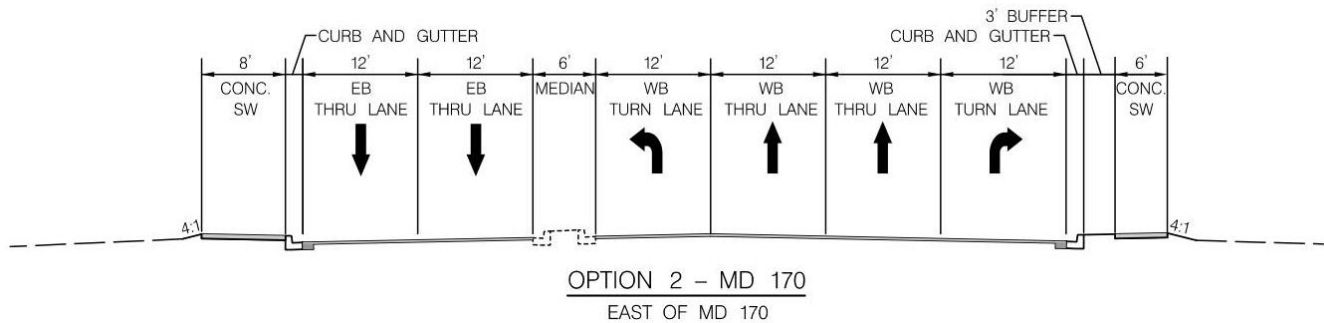
The typical section for Option 2 is the same as Option 1.



OPTION 2 – MD 174
WEST OF MD 170

MD 174, East of MD 170

There is no typical section for MD 174, east of MD 170, for Option 1 since there are no proposed improvements along that side. The typical section for Option 2 includes two eastbound through lanes, a raised median, two westbound through lanes, and left and right turn lanes. There is 8-foot sidewalk with no buffer on the south side and a 6-foot sidewalk with 3-foot grass buffers on the north side.



Impacts of Proposed Improvements

Property Impacts – Option 1 does not require any right-of-way acquisitions. Option 2 requires 710 square feet of right-of-way acquisition along the CVS parcel in the southeast quadrant of the MD 174 intersection and 200 square feet from the Royal Farms parcel in the northeast quadrant due to the addition of the sidewalk at the intersection.

Utility Impacts – Several utility boxes and utility poles along the length of MD 170 will be impacted by the widening. These impacts are even more prevalent with Option 2 due to the proposed improvements on the northbound side. Figure 1 shows a typical utility box that will need to be relocated due to widening.



Figure 1 - Utility Impact

Several utility poles will also need to be relocated. Six utility poles in Option 1 and seven utility poles in Option 2 will likely need to be adjusted due to the widening. Figure 2 shows a light pole at Minnetonka Road that will need to be relocated in Option 2.



Figure 2 - Utility Pole Impact

Figure 3 shows one of the two traffic signal poles at the MD 174 intersection that will need to be relocated due to the road widening in both options. Two additional signals will need to be modified at the fire station intersection in Option 2.



Figure 3 - Signal Impact

Grading / Excavation – Widening the southbound section along MD 170 north of the MD 174 intersection will require substantial grading and excavation due to the elevation difference between the road and the

proposed tie-in locations. This would primarily be a fill condition. The image below displays the side slope and existing elevation difference along the west side of MD 170 near the MD 174 intersection. Figure 4 also shows a utility handbox and multiple light poles that will need to be relocated during construction.



Figure 4 – Existing Side Slope

Stormwater Management – Additional impervious surface will require stormwater quality and quantity control, which is anticipated to be provided for both options through implementation of Environmental Site Design (ESD) facilities located between the roadway and right-of-way line along the west side of MD 170. Minimal right-of-way acquisition is expected to accommodate stormwater management.

Operational Benefits

Option 1 increases traffic capacity with an additional southbound through lane. This extra lane will provide relief for the lengthy southbound queuing lengths observed in the 2014 traffic study, mentioned previously. Additionally, the raised median will prevent left turn movements into entrances; which will promote uninterrupted traffic flow, and potentially reduce the number of accidents. Bike lanes and shoulders that are a minimum of 6 feet wide are applied southbound as well, increasing the safety for bicyclists along this stretch of roadway. The geometric layout for Option 2 southbound has the same layout as Option 1; so all of the benefits gained for the southbound lanes under Option 1 will convey to Option 2.

Option 1 leaves the northbound roadway unchanged for the length of the project. However, Option 2 provides a continuous 6-foot bike lane along MD 170 northbound; as well as 5-foot continuous sidewalk along both sides of the roadway, with a 3-foot buffer to accommodate pedestrians. The additional northbound through lane, north of the MD 174 intersection, will remedy traffic congestion here.

Constructability and Operational Issues

Option 1 requires roadway widening to the west. There are no expected right-of-way impacts; however, substantial fill will need to be placed in some areas, as mentioned above. Therefore, grading will impact some trees, unless the fill is retained.

Option 2 requires widening in both directions, as well as the addition of sidewalk along both sides of the roadway. Again, fill and grading impacts are expected, as in Option 1. However, minimal grading will be needed on the northbound side, as the side slopes are not as steep. There will be a need for right-of-way acquisition from two parcels at the MD 174 intersection.

Complications with drainage design are not expected, as the existing roadway section is primarily open. In both of the proposed options, proposed culverts at driveways and regrading of ditches will be necessary in areas where widening occurs. Proposed pipe and inlet relocation will be needed at the MD 174 intersection.

Recommendation

Although more costly of the two options, Option 2 successfully improves capacity through the entire intersection and improves safety by adding amenities for pedestrians and cyclists. Option 1 would only improve the southbound direction of MD 170 and the need to upgrade the northbound side would likely arise in the future. In this regard, construction costs could be saved on mobilization by improving the roadway, entirely. Therefore, Option 2 is recommended for construction.

Permitting Required

Due to the proposed improvements, the following permits may be required:

- *NEPA (National Environmental Protection Act)* – If this project includes federal funding, it will require an assessment of the project's impacts on the environment documented by the NEPA process. If this project only uses state funding, impacts will need to be assessed using the Maryland Environmental Policy Act (MEPA) standards.
- *SWM/ESC Control Permit* – The project will disturb more than 5,000 square feet; therefore, a Stormwater Management and Erosion and Sediment Control permit is needed from SHA PRD.
- *NPDES General Permit for Construction Activity* – The project will require construction activity of more than one acre; therefore application and coverage under a National Pollutant Discharge Elimination System (NPDES) general permit is required.
- *Joint Permit Application (JPA)* – A JPA from the Army Corps of Engineers may be needed after field investigations are performed to determine if there are water or wetland impacts within the project limits.
- *Roadside Tree Permit* – The project may impact trees which will require a Roadside Tree Permit from Department of Natural Resources (DNR).

Schedule

After receiving full funding for the project, it is assumed the project would be completed in 6 years as outlined below.

Task	Duration	Year 1				Year 2				Year 3				Year 4				Year 5				Year 6			
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Receive Full Funding	Begins on Day 1	■																							
Survey	3 months		■																						
Design	1.5 years		■	■	■	■	■	■	■	■	■	■	■												
Permitting	2 years					■	■	■	■	■	■	■	■												
Utility Relocation	2 years					■	■	■	■	■	■	■	■												
Property Acquisition	3 years					■	■	■	■	■	■	■	■	■	■	■	■								
Construction	2 years													■	■	■	■	■	■	■	■	■	■	■	■

Concept Cost Estimate

Neat Construction concept-level costs are estimated to be approximately \$5,475,000 for Option 1 and \$10,400,000 for Option 2. Detailed breakdowns can be found in Appendix B. Items from Categories 2, 5, 6, and 8 have been estimated including earthwork, test pit excavation, full depth pavement, milling and overlay, curb and gutter, sidewalk, pavement removal, pavement markings, and signal improvements. Categories 1, 3, and 7 have been estimated using the *SHA Cost Estimating Manual, 2012*. There are no Category 4 items. Utility and right-of-way costs have been estimated utilizing information known at this time. Right-of-way costs have been estimated using a fee simple unit cost of \$15 per square foot. In accordance with SHA Cost Estimating Manual, a 40% contingency, and 14.4% administrative costs have been applied to this estimate for concept-level. A 15% design fee has also been added to the cost estimates in Appendix B.

APPROVAL

We are hereby requesting your approval of the proposed geometric improvements as described in this Design Approval Memorandum. Upon your approval, project design activities will begin.

If you have any questions or comments, or corrections or additions to this report, please do not hesitate to contact Ms. Chau Chiem, Project Engineer, at (410) 841-1071 or via email at cchiem@sha.state.md.us.

cc: Ms. Kim Tran
Mr. Dennis German
Mr. Steve Rochon
Mr. Bill Stroud

Approved

Approved

Jason Ridgway Date
Director, Office of Highway Development

Cedric Ward Date
Director, Office of Traffic & Safety

Appendix A

Concept Plans



MATCH LINE STA. 15+00 - SEE DRAWING PS-02

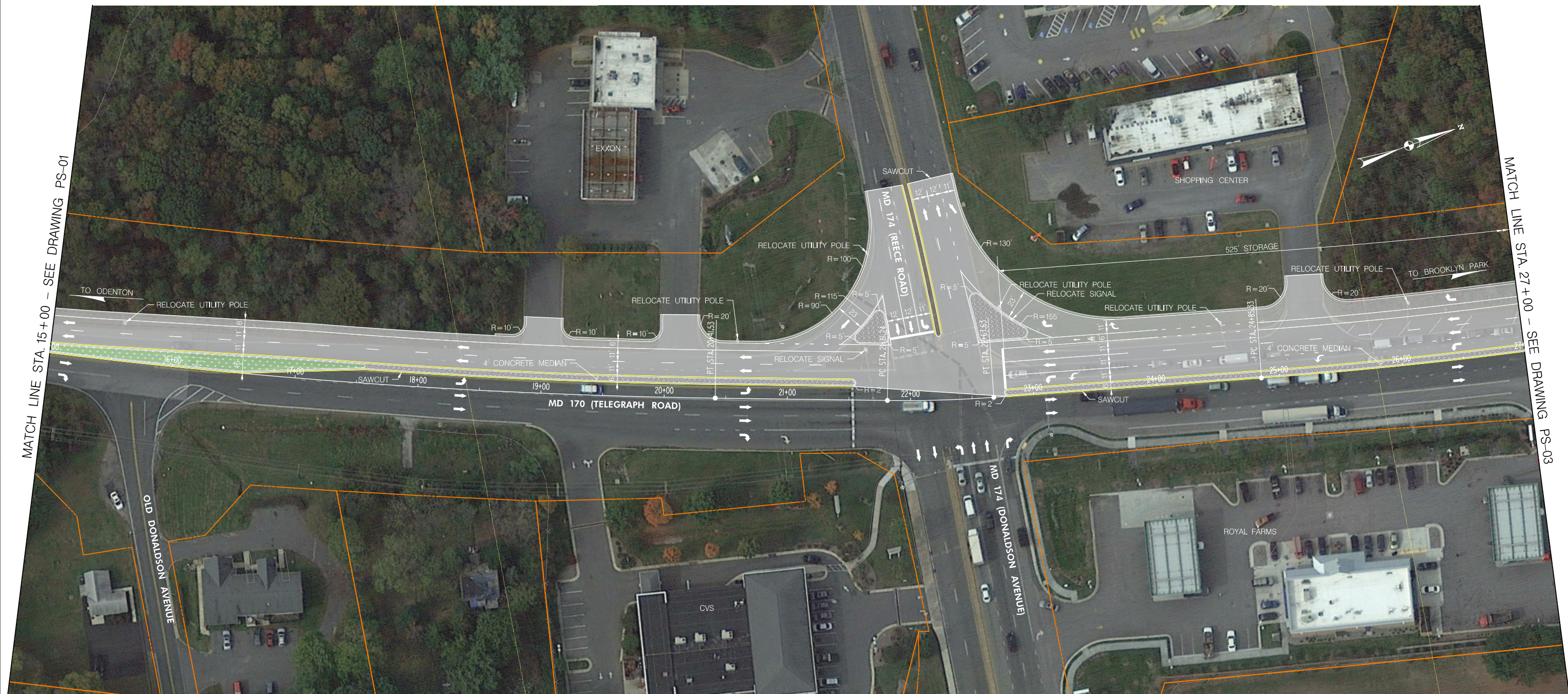
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	PROPOSED RIGHT-OF-WAY
	PROPOSED WIDENING AND RESURFACING
	PROPOSED CONCRETE PAVEMENT
	PROPOSED LANDSCAPING
	TRAFFIC FLOW ARROWS
	PAVEMENT MARKING ARROWS

BY: jgipe

DATUM: NAD 8391 Horizontal
NAVD 88 Vertical

SHA	STATE OF MARYLAND DEPARTMENT OF TRANSPORTATION STATE HIGHWAY ADMINISTRATION HIGHWAY DESIGN DIVISION	
	MD 170 (TELEGRAPH ROAD) AT MD 174 (REECE ROAD) CONCEPT DESIGN - STUDY OPTION 1	
ROADWAY PLAN		
SCALE 1" = 40'	DATE JUNE 2015	CONTRACT NO. N/A
DESIGNED BY JDG	COUNTY ANNE ARUNDEL	
DRAWN BY JDG		
CHECKED BY BJR		
F.A.P. NO. N/A		
DRAWING NO. PS-01	OF 04	SHEET NO. 1 OF 4

PLOTTED: June 26, 2015
FILE: N:\3199-001\CADD\PHD-0001_MD170.dgn



MATCH LINE STA. 15+00 - SEE DRAWING PS-01

MATCH LINE STA. 27+00 - SEE DRAWING PS-03

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	PROPOSED RIGHT-OF-WAY
	PROPOSED WIDENING AND RESURFACING
	PROPOSED CONCRETE PAVEMENT
	PROPOSED LANDSCAPING
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	PAVEMENT MARKING ARROWS

Whitman, Requardt & Associates, LLP
801 South Caroline Street, Baltimore, Maryland 21231

BY: jgipe

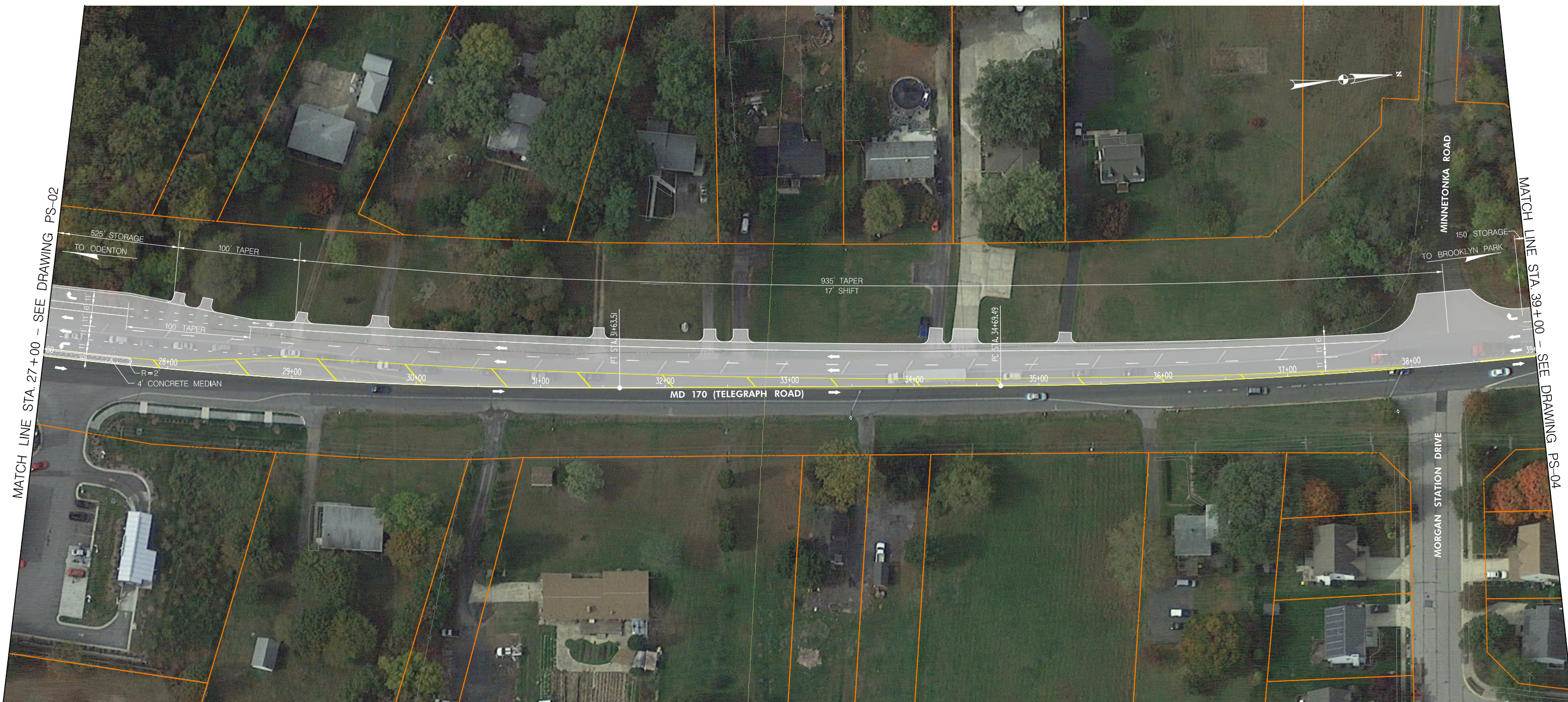
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DEPARTMENT OF TRANSPORTATION
STATE HIGHWAY ADMINISTRATION
HIGHWAY DESIGN DIVISION

MD 170 (TELEGRAPH ROAD) AT MD 174 (REECE ROAD)
CONCEPT DESIGN - STUDY OPTION 1

ROADWAY PLAN					
SCALE	1" = 40'	DATE	JUNE 2015	CONTRACT NO.	N/A
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DRAWN BY	JDG				
CHECKED BY	BJR				
F.A.P. NO.	N/A				
DRAWING NO.	PS-02	OF	04	SHEET NO.	2 OF 4

PLOTTED: June 26, 2015
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MATCH LINE STA. 39+00 - SEE DRAWING PS-04

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	PROPOSED RIGHT-OF-WAY
	PROPOSED WIDENING AND RESURFACING
	PROPOSED CONCRETE PAVEMENT
	PROPOSED LANDSCAPING
	TRAFFIC FLOW ARROWS
	PAVEMENT MARKING ARROWS

DATUM: NAD 8391 Horizontal
NAVD 88 Vertical

SHA STATE OF MARYLAND
DEPARTMENT OF TRANSPORTATION
STATE HIGHWAY ADMINISTRATION
HIGHWAY DESIGN DIVISION

MD 170 (TELEGRAPH ROAD) AT MD 174 (REECE ROAD)
CONCEPT DESIGN STUDY OPTION 1

ROADWAY PLAN		
SCALE 1"=40'	DATE JUNE 2015	CONTRACT NO. N/A
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F.A.P. NO. N/A		
DRAWING NO. PS-03	OF 04	SHEET NO. 3 OF 4

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MATCH LINE STA. 39+00 - SEE DRAWING PS-03

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	PROPOSED WIDENING AND RESURFACING
	PROPOSED CONCRETE PAVEMENT
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DATUM: NAD 8391 Horizontal
NAVD 88 Vertical

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HIGHWAY DESIGN DIVISION

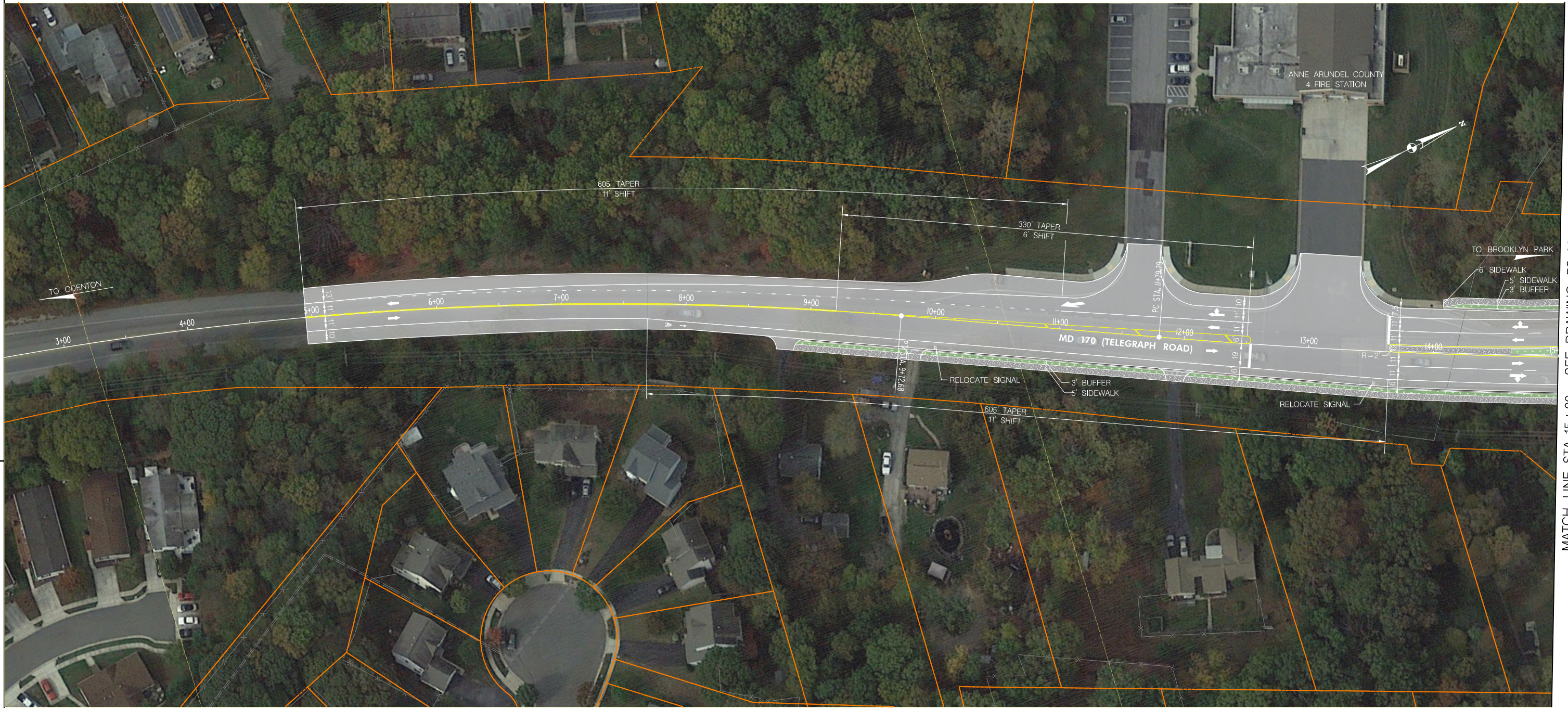
MD 170 (TELEGRAPH ROAD) AT MD 174 (REECE ROAD)
CONCEPT DESIGN STUDY OPTION 1

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		JUNE 2015
DESIGNED BY	JDG	COUNTY
		ANNE ARUNDEL
DRAWN BY	JDG	
CHECKED BY	BJR	
F.A.P. NO.	N/A	
DRAWING NO.	PS-04 OF 04	SHEET NO.
		4 OF 4

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PLOTTED: June 09, 2015
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MATCH LINE STA. 15+00 - SEE DRAWING PS-02

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	PROPOSED WIDENING AND RESURFACING
	PROPOSED CONCRETE PAVEMENT
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 STATE HIGHWAY ADMINISTRATION
 HIGHWAY DESIGN DIVISION

MD 170 (TELEGRAPH ROAD) AT MD 174 (REECE ROAD)
 CONCEPT DESIGN - STUDY OPTION 2

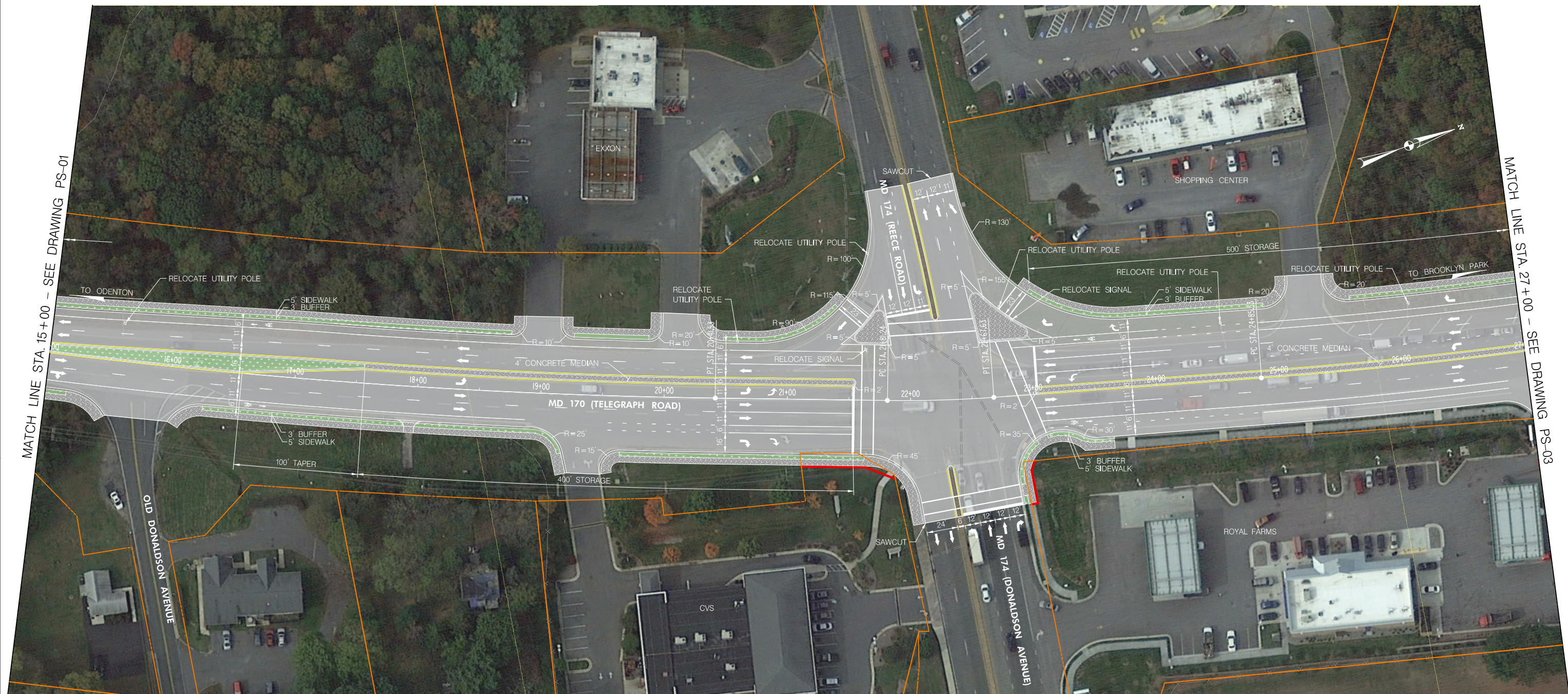
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SCALE 1" = 40' DATE JUNE 2015 CONTRACT NO. N/A

DESIGNED BY JDG COUNTY ANNE ARUNDEL
 DRAWN BY JDG
 CHECKED BY BJR
 F.A.P. NO. N/A

DRAWING NO. **PS-01** OF **04** SHEET NO. 1 OF 4

PLOTTED: June 26, 2015
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MATCH LINE STA. 15+00 - SEE DRAWING PS-01

MATCH LINE STA. 27+00 - SEE DRAWING PS-03

LEGEND	
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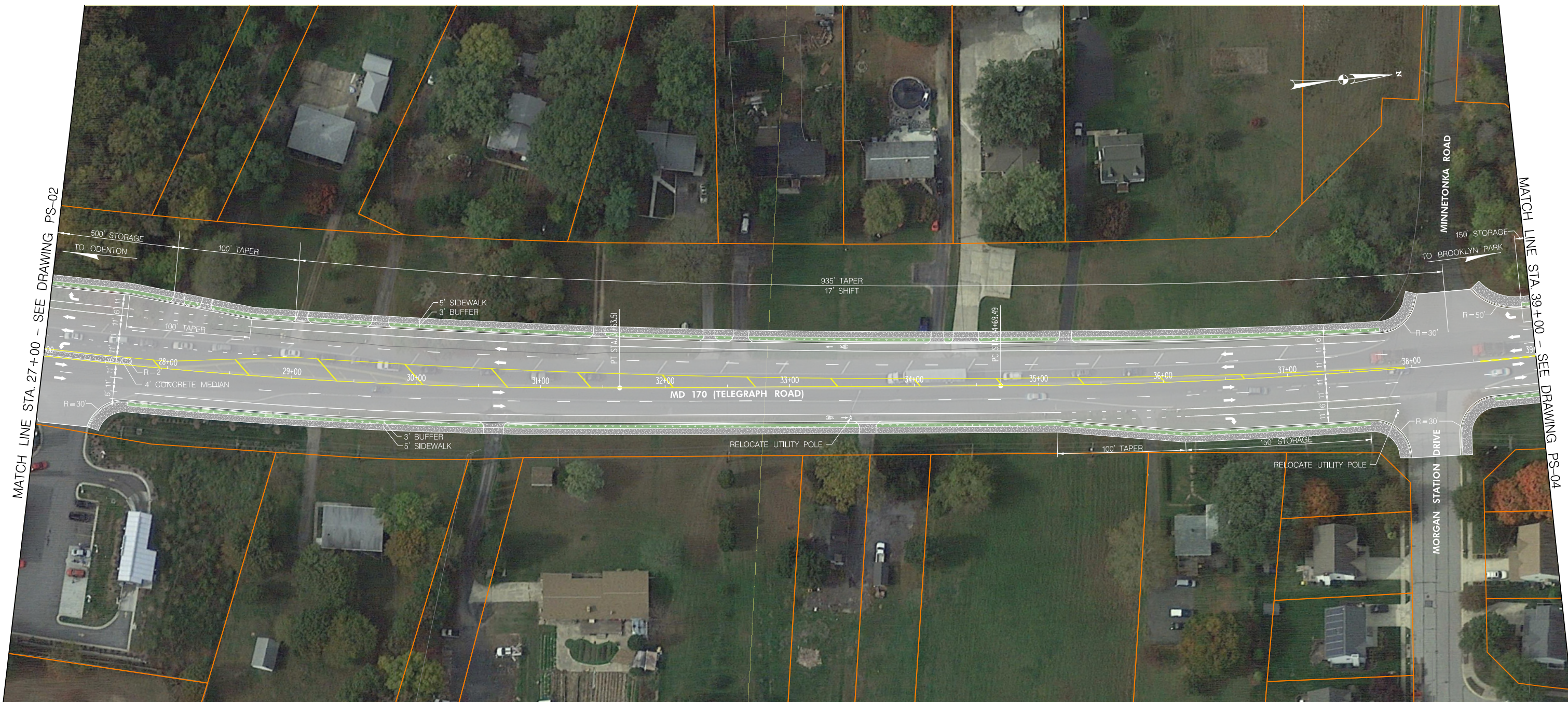
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DATUM: NAD 8391 Horizontal
NAVD 88 Vertical

SHA STATE OF MARYLAND
DEPARTMENT OF TRANSPORTATION
STATE HIGHWAY ADMINISTRATION
HIGHWAY DESIGN DIVISION

MD 170 (TELEGRAPH ROAD) AT MD 174 (REECE ROAD)
CONCEPT DESIGN - STUDY OPTION 2

ROADWAY PLAN		
SCALE	1" = 40'	DATE
		JUNE 2015
DESIGNED BY	JDG	COUNTY
DRAWN BY	JDG	ANNE ARUNDEL
CHECKED BY	BJR	
F.A.P. NO.	N/A	
DRAWING NO.	PS-02	OF 04
SHEET NO.	2	OF 4



MATCH LINE STA. 27+00 - SEE DRAWING PS-02

MATCH LINE STA. 39+00 - SEE DRAWING PS-04

LEGEND	
	EXISTING RIGHT-OF-WAY / PARCEL BOUNDARY
	PROPOSED RIGHT-OF-WAY
	PROPOSED WIDENING AND RESURFACING
	PROPOSED CONCRETE PAVEMENT
	PROPOSED LANDSCAPING
	TRAFFIC FLOW ARROWS
	PAVEMENT MARKING ARROWS



BY: jgipe

DATUM: NAD 8391 Horizontal
NAVD 88 Vertical

SHA STATE OF MARYLAND
DEPARTMENT OF TRANSPORTATION
STATE HIGHWAY ADMINISTRATION
HIGHWAY DESIGN DIVISION








MD 170 (TELEGRAPH ROAD) AT MD 174 (REECE ROAD)
CONCEPT DESIGN STUDY OPTION 2

ROADWAY PLAN					
SCALE	1" = 40'	DATE	JUNE 2015	CONTRACT NO.	N/A
DESIGNED BY	JDG	COUNTY	ANNE ARUNDEL		
DRAWN BY	JDG				
CHECKED BY	BJR				
F.A.P. NO.	N/A				
DRAWING NO.	PS-03	OF	04	SHEET NO.	3 OF 4

PLOTTED: June 01, 2015
FILE: N:\3199-001\CADD\PHD-0003_MD170.dgn



MATCH LINE STA. 39+00 - SEE DRAWING PS-03

LEGEND	
	EXISTING RIGHT-OF-WAY / PARCEL BOUNDARY
	PROPOSED RIGHT-OF-WAY
	PROPOSED WIDENING AND RESURFACING
	PROPOSED CONCRETE PAVEMENT
	PROPOSED LANDSCAPING
	TRAFFIC FLOW ARROWS
	PAVEMENT MARKING ARROWS



Whitman, Requardt & Associates, LLP
801 South Caroline Street, Baltimore, Maryland 21231

BY: jgipe

DATUM: NAD 8391 Horizontal
NAVD 88 Vertical

SHA	STATE OF MARYLAND DEPARTMENT OF TRANSPORTATION STATE HIGHWAY ADMINISTRATION HIGHWAY DESIGN DIVISION
	MD 170 (TELEGRAPH ROAD) AT MD 174 (REECE ROAD) CONCEPT DESIGN STUDY OPTION 2
ROADWAY PLAN	
SCALE 1" = 40'	DATE JUNE 2015 CONTRACT NO. N/A
DESIGNED BY JDG	COUNTY ANNE ARUNDEL
DRAWN BY JDG	
CHECKED BY BJR	
F.A.P. NO. N/A	
DRAWING NO. PS-04 OF 04	SHEET NO. 4 OF 4

PLOTTED: June 01, 2015
FILE: N:\3199-001\CADD\PHD-0004_MD170.dgn

Appendix B

Cost Estimate

CONCEPTUAL CONSTRUCTION COST SUMMARY

DATE: 6/30/2016
ROUTE: MD 170 At MD 174
JOB DESCRP: Concept Development Study
 Option 1
IMPROV TYPE: Intersection Improvements
TYPICAL SEC: Varies
PREPARED BY: WRA

PROJECT #: AA195A21
FEDERAL #: TBD
PDMS: TBD
COUNTY: Anne Arundel
PRJ LENGTH: 0.71 miles
DIVISION: District 5

1	HIGHWAY DESIGN		\$4,413,696.70
	CATEGORY 1 - PRELIMINARY	\$1,192,891.00	
	CATEGORY 2 - GRADING	\$730,380.00	
	CATEGORY 3 - DRAINAGE	\$715,734.60	
	CATEGORY 5 - PAVING	\$1,362,662.00	
	CATEGORY 6 - SHOULDERS	\$292,740.00	
	CATEGORY 7 - LANDSCAPING	\$119,289.10	
2	BRIDGE DESIGN		\$0.00
	BRIDGES	\$0.00	
	REMOVAL	\$0.00	
	BOX CULVERT	\$0.00	
	RETAINING WALLS	\$0.00	
	OTHER	\$0.00	
	ITEMIZED - CATEGORY 4	\$0.00	
3	TRAFFIC ENGINEERING		\$758,100.00
	OVERHEAD SIGN BRIDGES	\$0.00	
	CANTILIVER SIGNING	\$0.00	
	GROUND MOUNTED SIGNING	\$0.00	
	ROADWAY LIGHTING	\$0.00	
	PAVEMENT MARKINGS	\$0.00	
	SIGNALS	\$0.00	
	OTHER	\$0.00	
	COST PER MILE	\$0.00	
	ITEMIZED - CATEGORY 8	\$758,100.00	
4	UTILITIES		\$300,000.00
	WATER	\$0.00	
	SEWER	\$0.00	
	GAS	\$0.00	
	ELECTRIC	\$300,000.00	
	TELEPHONE	\$0.00	
	CABLE TELEVISION	\$0.00	
	OTHER	\$0.00	
5	LANDSCAPE ARCHITECTURE		\$0.00
	PLANTINGS & BEAUTIFICATION	\$0.00	
	WETLANDS	\$0.00	
	NOISE WALLS	\$0.00	
	URBAN DESIGN	\$0.00	
	REFORESTATION	\$0.00	
	OTHER	\$0.00	
	NEAT CONSTRUCTION COST [Includes 40% Contingency]		\$5,471,796.70
	R/W IMPACT COSTS		\$0.00
	OVERHEAD (14.4%)		\$787,938.72
	DESIGN (15%)		\$820,769.51
	TOTAL		\$7,090,000.00

Category 1 - Preliminary Items

DATE: 6/30/2016
ROUTE: MD 170 At MD 174
JOB DESCRP: Concept Development Study
Option 1
IMPROV TYPE: Intersection Improvements
TYPICAL SEC: 3-11' Lanes, 5' Bike Lanes
ALTERNATE:
PREPARED BY: WRA

PROJECT #: AA195A21
FEDERAL #: TBD
PDMS: TBD
COUNTY: Anne Arundel

PRJ LENGTH: 0.71 miles
DIVISION: District 4

Category Code	Item Description	Unit	Quantity	Unit Cost	Total Cost
100000	50% OF CATEGORY 2, 4, 5, 6	LS	1	\$852,065.00	\$852,065.00
SUBTOTAL					\$852,065.00
CONTINGENCY			40.00%		\$340,826.00
SUBTOTAL CATEGORY 1 COST					\$1,192,891.00

Category 2 - Grading Items

DATE: 6/30/2016
ROUTE: MD 170 At MD 174
JOB DESCRP: Concept Development Study
Option 1
IMPROV TYPE: Intersection Improvements
TYPICAL SEC: 3-11' Lanes, 5' Bike Lanes
ALTERNATE:
PREPARED BY: WRA

PROJECT #: AA195A21
FEDERAL #: TBD
PDMS: TBD
COUNTY: Anne Arundel

PRJ LENGTH: 0.71 miles
DIVISION: District 5

Category Code	Item Description	Unit	Quantity	Unit Cost	Total Cost
201030	CLASS 1 EXCAV	CY	6100	\$32.00	\$195,200.00
201031	CLASS 1-A EXCAV	CY	500	\$25.00	\$12,500.00
201040	GEOSYN STAB SUB GR AGGR BASE	CY	500	\$50.00	\$25,000.00
202065	COMMON BORROW	CY	6100	\$40.00	\$244,000.00
203030	TEST PIT EXCAVATION	CY	300	\$150.00	\$45,000.00
SUBTOTAL					\$521,700.00
CONTINGENCY			40.00%		\$208,680.00
SUBTOTAL CATEGORY 2 COST					\$730,380.00

Category 3 - Drainage Items

DATE: 6/30/2016
ROUTE: MD 170 At MD 174
JOB DESCRP: Concept Development Study
 Option 1
IMPROV TYPE: Intersection Improvements
TYPICAL SEC: 3-11' Lanes, 5' Bike Lanes
ALTERNATE:
PREPARED BY: WRA

PROJECT #: AA195A21
FEDERAL #: TBD
PDMS: TBD
COUNTY: Anne Arundel
PRJ LENGTH: 0.71 miles
DIVISION: District 5

Category Code	Item Description	Unit	Quantity	Unit Cost	Total Cost
300000	30% OF CATEGORY 2, 4, 5, & 6	LS	1	\$511,239.00	\$511,239.00
SUBTOTAL					\$511,239.00
CONTINGENCY			40.00%		\$204,495.60
SUBTOTAL CATEGORY 3 COST					\$715,734.60

Category 4 - Structure Items

DATE: 6/30/2016
ROUTE: MD 170 At MD 174
JOB DESCRP: Concept Development Study
 Option 1
IMPROV TYPE: Intersection Improvements
TYPICAL SEC: 3-11' Lanes, 5' Bike Lanes
ALTERNATE:
PREPARED BY: WRA

PROJECT #: AA195A21
FEDERAL #: TBD
PDMS: TBD
COUNTY: Anne Arundel

PRJ LENGTH: 0.71 miles
DIVISION: District 5

Category Code	Item Description	Unit	Quantity	Unit Cost	Total Cost
	NO ITEMS IN CATEGORY				
SUBTOTAL					\$0.00
CONTINGENCY			40.00%		\$0.00
SUBTOTAL CATEGORY 4 COST					\$0.00

Category 5 - Paving Items

DATE: 6/30/2016
 ROUTE: MD 170 At MD 174
 JOB DESCRP: Concept Development Study
 Option 1
 IMPROV TYPE: Intersection Improvements
 TYPICAL SEC: 3-11' Lanes, 5' Bike Lanes
 ALTERNATE:
 PREPARED BY: WRA

PROJECT #: AA195A21
 FEDERAL #: TBD
 PDMS: TBD
 COUNTY: Anne Arundel
 PRJ LENGTH: 0.71 miles
 DIVISION: District 5

Category Code	Item Description	Unit	Quantity	Unit Cost	Total Cost
504500	SUPERPAVE ASPHALT MIX 9.5MM FOR SURFACE, PG 64S-22, LEVEL 2	TON	2600	\$100.00	\$260,000.00
504560	SUPERPAVE ASPHALT MIX 19.0MM FOR BASE, PG 64S-22, LEVEL 2	TON	4100	\$90.00	\$369,000.00
520113	6 INCH GRADED AGGREGATE BASE COURSE	SY	18200	\$15.00	\$273,000.00
530100	GRINDING HOT MIX ASPHALT PAVEMENT 0 INCH TO 2 INCH	SY	13700	\$3.00	\$41,100.00
585340	SNOWFLOWABLE RAISED PAVEMENT MARKERS	EA	20	\$100.00	\$2,000.00
585405	5 INCH WHITE LEAD FREE REFLECTIVE THERMOPLASTIC PAVEMENT MARKINGS	LF	7100	\$1.50	\$10,650.00
585407	5 INCH YELLOW LEAD FREE REFLECTIVE THERMOPLASTIC PAVEMENT MARKINGS	LF	8000	\$1.50	\$12,000.00
585414	12 INCH YELLOW LEAD FREE REFLECTIVE THERMOPLASTIC PAVEMENT MARKING	LF	240	\$7.00	\$1,680.00
585625	24 INCH WHITE PREFORMED THERMOPLASTIC PAVEMENT MARKING LINES	LF	110	\$10.00	\$1,100.00
585627	WHITE PREFORMED THERMOPLASTIC PAVEMENT MARKINGS LEG & SYMB	SF	140	\$20.00	\$2,800.00
SUBTOTAL					\$973,330.00
CONTINGENCY			40.00%		\$389,332.00
SUBTOTAL CATEGORY 5 COST					\$1,362,662.00

Category 6 - Shoulder Items

DATE: 6/30/2016
ROUTE: MD 170 At MD 174
JOB DESCRP: Concept Development Study
 Option 1
IMPROV TYPE: Intersection Improvements
TYPICAL SEC: 3-11' Lanes, 5' Bike Lanes
ALTERNATE:
PREPARED BY: WRA

PROJECT #: AA195A21
FEDERAL #: TBD
PDMS: TBD
COUNTY: Anne Arundel

PRJ LENGTH: 0.71 miles
DIVISION: District 5

Category Code	Item Description	Unit	Quantity	Unit Cost	Total Cost
634100	STD TYPE A CURB	LF	250	\$30.00	\$7,500.00
634300	STD TYPE A COMBINATION CURB & GUTTER 12"X8"	LF	1600	\$50.00	\$80,000.00
648140	MONOLITHIC CONCRETE MEDIAN 4 FEET WIDE TYPE A-1	LF	1090	\$100.00	\$109,000.00
655105	5 INCH CONCRETE SIDEWALK	SF	1400	\$9.00	\$12,600.00
SUBTOTAL					\$209,100.00
CONTINGENCY			40.00%		\$83,640.00
SUBTOTAL CATEGORY 6 COST					\$292,740.00

Category 7 - Landscaping Items

DATE: 6/30/2016
ROUTE: MD 170 At MD 174
JOB DESCRP: Concept Development Study
 Option 1
IMPROV TYPE: Intersection Improvements
TYPICAL SEC: 3-11' Lanes, 5' Bike Lanes
ALTERNATE:
PREPARED BY: WRA

PROJECT #: AA195A21
FEDERAL #: TBD
PDMS: TBD
COUNTY: Anne Arundel

PRJ LENGTH: 0.71 miles
DIVISION: District 5

Category Code	Item Description	Unit	Quantity	Unit Cost	Total Cost
700000	5% OF CATEGORY 2, 4, 5, and 6	LS	1	\$85,206.50	\$85,206.50
SUBTOTAL					\$85,206.50
CONTINGENCY			40.00%		\$34,082.60
SUBTOTAL CATEGORY 7 COST					\$119,289.10

Category 8 - Traffic Items

DATE: 6/30/2016
ROUTE: MD 170 At MD 174
JOB DESCRP: Concept Development Study
 Option 1
IMPROV TYPE: Intersection Improvements
TYPICAL SEC: 3-11' Lanes, 5' Bike Lanes
ALTERNATE:
PREPARED BY: WRA

PROJECT #: AA195A21
FEDERAL #: TBD
PDMS: TBD
COUNTY: Anne Arundel

PRJ LENGTH: 0.71 miles
DIVISION: District 5

Category Code	Item Description	Unit	Quantity	Unit Cost	Total Cost
80000	SIGNAL MODIFICATIONS	LS	1	\$440,000.00	\$440,000.00
80000	REGULATORY SIGNS	EA	30	\$50.00	\$1,500.00
80000	LIGHTING	LS	1	\$100,000.00	\$100,000.00
SUBTOTAL					\$541,500.00
CONTINGENCY			40.00%		\$216,600.00
SUBTOTAL CATEGORY 8 COST					\$758,100.00

Category 9 - State Supplied Items

DATE: 6/30/2016
ROUTE: MD 170 At MD 174
JOB DESCRP: Concept Development Study
 Option 1
IMPROV TYPE: Intersection Improvements
TYPICAL SEC: 3-11' Lanes, 5' Bike Lanes
ALTERNATE:
PREPARED BY: WRA

PROJECT #: AA195A21
FEDERAL #: TBD
PDMS: TBD
COUNTY: Anne Arundel

PRJ LENGTH: 0.71 miles
DIVISION: District 5

Category Code	Item Description	Unit	Quantity	Unit Cost	Total Cost
NO ITEMS IN CATEGORY					
SUBTOTAL					\$0.00
CONTINGENCY			40.00%		\$0.00
SUBTOTAL CATEGORY 9 COST					\$0.00

CONCEPTUAL CONSTRUCTION COST SUMMARY

DATE: 6/30/2016
ROUTE: MD 170 at MD 174
JOB DESCRP: Concept Development Study
 Option 2
IMPROV TYPE: Intersection Improvements
TYPICAL SEC: Varies
PREPARED BY: WRA

PROJECT #: AA195A21
FEDERAL #: TBD
PDMS: TBD
COUNTY: Anne Arundel
PRJ LENGTH: 0.82 miles
DIVISION: District 5

1	HIGHWAY DESIGN		\$9,032,314.20
	CATEGORY 1 - PRELIMINARY	\$2,315,978.00	
	CATEGORY 2 - GRADING	\$1,049,580.00	
	CATEGORY 3 - DRAINAGE	\$1,852,782.40	
	CATEGORY 5 - PAVING	\$2,461,956.00	
	CATEGORY 6 - SHOULDERS	\$1,120,420.00	
	CATEGORY 7 - LANDSCAPING	\$231,597.80	
2	BRIDGE DESIGN		\$0.00
	BRIDGES	\$0.00	
	REMOVAL	\$0.00	
	BOX CULVERT	\$0.00	
	RETAINING WALLS	\$0.00	
	OTHER	\$0.00	
	ITEMIZED - CATEGORY 4	\$0.00	
3	TRAFFIC ENGINEERING		\$935,200.00
	OVERHEAD SIGN BRIDGES	\$0.00	
	CANTILIVER SIGNING	\$0.00	
	GROUND MOUNTED SIGNING	\$0.00	
	ROADWAY LIGHTING	\$0.00	
	PAVEMENT MARKINGS	\$0.00	
	SIGNALS	\$0.00	
	OTHER	\$0.00	
	COST PER MILE	\$0.00	
	ITEMIZED - CATEGORY 8	\$935,200.00	
4	UTILITIES		\$425,000.00
	WATER	\$50,000.00	
	SEWER	\$0.00	
	GAS	\$0.00	
	ELECTRIC	\$350,000.00	
	TELEPHONE	\$25,000.00	
	CABLE TELEVISION	\$0.00	
	OTHER	\$0.00	
5	LANDSCAPE ARCHITECTURE		\$0.00
	PLANTINGS & BEAUTIFICATION	\$0.00	
	WETLANDS	\$0.00	
	NOISE WALLS	\$0.00	
	URBAN DESIGN	\$0.00	
	REFORESTATION	\$0.00	
	OTHER	\$0.00	
	NEAT CONSTRUCTION COST [Includes 40% Contingency]		\$10,392,514.20
	R/W IMPACT COSTS		\$15,000.00
	OVERHEAD (14.4%)		\$1,496,522.04
	DESIGN (15%)		\$1,558,877.13
	TOTAL		\$13,470,000.00

Category 1 - Preliminary Items

DATE: 6/30/2016
 ROUTE: MD 170 at MD 174
 JOB DESCRP: Concept Development Study
 Option 2
 IMPROV TYPE: Intersection Improvements
 TYPICAL SEC: 3-11' Lanes, 5' Bike Lanes
 ALTERNATE:
 PREPARED BY: WRA

PROJECT #: AA195A21
 FEDERAL #: TBD
 PDMS: TBD
 COUNTY: Anne Arundel
 PRJ LENGTH: 0.82 miles
 DIVISION: District 4

Category Code	Item Description	Unit	Quantity	Unit Cost	Total Cost
100000	50% OF CATEGORY 2, 4, 5, 6	LS	1	\$1,654,270.00	\$1,654,270.00
SUBTOTAL					\$1,654,270.00
CONTINGENCY			40.00%		\$661,708.00
SUBTOTAL CATEGORY 1 COST					\$2,315,978.00

Category 2 - Grading Items

DATE: 6/30/2016
ROUTE: MD 170 at MD 174
JOB DESCRP: Concept Development Study
Option 2
IMPROV TYPE: Intersection Improvements
TYPICAL SEC: 3-11' Lanes, 5' Bike Lanes
ALTERNATE:
PREPARED BY: WRA

PROJECT #: AA195A21
FEDERAL #: TBD
PDMS: TBD
COUNTY: Anne Arundel

PRJ LENGTH: 0.82 miles
DIVISION: District 5

Category Code	Item Description	Unit	Quantity	Unit Cost	Total Cost
201030	CLASS 1 EXCAV	CY	10100	\$32.00	\$323,200.00
201031	CLASS 1-A EXCAV	CY	500	\$25.00	\$12,500.00
201040	GEOSYN STAB SUB GR AGGR BASE	CY	500	\$50.00	\$25,000.00
202065	COMMON BORROW	CY	8600	\$40.00	\$344,000.00
203030	TEST PIT EXCAVATION	CY	300	\$150.00	\$45,000.00
SUBTOTAL					\$749,700.00
CONTINGENCY			40.00%		\$299,880.00
SUBTOTAL CATEGORY 2 COST					\$1,049,580.00

Category 3 - Drainage Items

DATE: 6/30/2016
ROUTE: MD 170 at MD 174
JOB DESCRP: Concept Development Study
 Option 2
IMPROV TYPE: Intersection Improvements
TYPICAL SEC: 3-11' Lanes, 5' Bike Lanes
ALTERNATE:
PREPARED BY: WRA

PROJECT #: AA195A21
FEDERAL #: TBD
PDMS: TBD
COUNTY: Anne Arundel

PRJ LENGTH: 0.82 miles
DIVISION: District 5

Category Code	Item Description	Unit	Quantity	Unit Cost	Total Cost
300000	40% OF CATEGORY 2, 4, 5, & 6	LS	1	\$1,323,416.00	\$1,323,416.00
SUBTOTAL					\$1,323,416.00
CONTINGENCY			40.00%		\$529,366.40
SUBTOTAL CATEGORY 3 COST					\$1,852,782.40

Category 4 - Structure Items

DATE: 6/30/2016
ROUTE: MD 170 at MD 174
JOB DESCRP: Concept Development Study
 Option 2
IMPROV TYPE: Intersection Improvements
TYPICAL SEC: 3-11' Lanes, 5' Bike Lanes
ALTERNATE:
PREPARED BY: WRA

PROJECT #: AA195A21
FEDERAL #: TBD
PDMS: TBD
COUNTY: Anne Arundel

PRJ LENGTH: 0.82 miles
DIVISION: District 5

Category Code	Item Description	Unit	Quantity	Unit Cost	Total Cost
	NO ITEMS IN CATEGORY				
SUBTOTAL					\$0.00
CONTINGENCY			40.00%		\$0.00
SUBTOTAL CATEGORY 4 COST					\$0.00

Category 5 - Paving Items

DATE: 6/30/2016
 ROUTE: MD 170 at MD 174
 JOB DESCRP: Concept Development Study
 Option 2
 IMPROV TYPE: Intersection Improvements
 TYPICAL SEC: 3-11' Lanes, 5' Bike Lanes
 ALTERNATE:
 PREPARED BY: WRA

PROJECT #: AA195A21
 FEDERAL #: TBD
 PDMS: TBD
 COUNTY: Anne Arundel
 PRJ LENGTH: 0.82 miles
 DIVISION: District 5

Category Code	Item Description	Unit	Quantity	Unit Cost	Total Cost
504500	SUPERPAVE ASPHALT MIX 9.5MM FOR SURFACE, PG 64S-22, LEVEL 2	TON	5000	\$100.00	\$500,000.00
504560	SUPERPAVE ASPHALT MIX 19.0MM FOR BASE, PG 64S-22, LEVEL 2	TON	6900	\$90.00	\$621,000.00
520113	6 INCH GRADED AGGREGATE BASE COURSE	SY	30400	\$15.00	\$456,000.00
530100	GRINDING HOT MIX ASPHALT PAVEMENT 0 INCH TO 2 INCH	SY	29100	\$3.00	\$87,300.00
561114	6 INCH PORTLAND CEMENT CONCRETE PAVEMENT FOR DRIVEWAY MIX 6	SY	430	\$100.00	\$43,000.00
585340	SNOWPLOWABLE RAISED PAVEMENT MARKERS	EA	25	\$100.00	\$2,500.00
585405	5 INCH WHITE LEAD FREE REFLECTIVE THERMOPLASTIC PAVEMENT MARKINGS	LF	14000	\$1.50	\$21,000.00
585407	5 INCH YELLOW LEAD FREE REFLECTIVE THERMOPLASTIC PAVEMENT MARKINGS	LF	8700	\$1.50	\$13,050.00
585414	12 INCH YELLOW LEAD FREE REFLECTIVE THERMOPLASTIC PAVEMENT MARKING	LF	250	\$7.00	\$1,750.00
585621	12 INCH WHITE LEAD FREE REFLECTIVE THERMOPLASTIC PAVEMENT MARKINGS	LF	820	\$7.00	\$5,740.00
585625	24 INCH WHITE PREFORMED THERMOPLASTIC PAVEMENT MARKING LINES	LF	240	\$10.00	\$2,400.00
585627	WHITE PREFORMED THERMOPLASTIC PAVEMENT MARKINGS LEG & SYMB	SF	240	\$20.00	\$4,800.00
SUBTOTAL					\$1,758,540.00
CONTINGENCY			40.00%		\$703,416.00
SUBTOTAL CATEGORY 5 COST					\$2,461,956.00

Category 6 - Shoulder Items

DATE: 6/30/2016
 ROUTE: MD 170 at MD 174
 JOB DESCRP: Concept Development Study
 Option 2
 IMPROV TYPE: Intersection Improvements
 TYPICAL SEC: 3-11' Lanes, 5' Bike Lanes
 ALTERNATE:
 PREPARED BY: WRA

PROJECT #: AA195A21
 FEDERAL #: TBD
 PDMS: TBD
 COUNTY: Anne Arundel
 PRJ LENGTH: 0.82 miles
 DIVISION: District 5

Category Code	Item Description	Unit	Quantity	Unit Cost	Total Cost
634100	STD TYPE A CURB	LF	250	\$30.00	\$7,500.00
634300	STD TYPE A COMBINATION CURB & GUTTER 12"X8"	LF	7400	\$50.00	\$370,000.00
648140	MONOLITHIC CONCRETE MEDIAN 4 FEET WIDE TYPE A-1	LF	1060	\$100.00	\$106,000.00
655105	5 INCH CONCRETE SIDEWALK	SF	34000	\$9.00	\$306,000.00
655120	DETECTABLE WARNING SURFACES CLAY BRICK PAVERS	SF	180	\$60.00	\$10,800.00
SUBTOTAL					\$800,300.00
CONTINGENCY			40.00%		\$320,120.00
SUBTOTAL CATEGORY 6 COST					\$1,120,420.00

Category 7 - Landscaping Items

DATE: 6/30/2016
ROUTE: MD 170 at MD 174
JOB DESCRP: Concept Development Study
 Option 2
IMPROV TYPE: Intersection Improvements
TYPICAL SEC: 3-11' Lanes, 5' Bike Lanes
ALTERNATE:
PREPARED BY: WRA

PROJECT #: AA195A21
FEDERAL #: TBD
PDMS: TBD
COUNTY: Anne Arundel

PRJ LENGTH: 0.82 miles
DIVISION: District 5

Category Code	Item Description	Unit	Quantity	Unit Cost	Total Cost
700000	5% OF CATEGORY 2, 4, 5, and 6	LS	1	\$165,427.00	\$165,427.00
SUBTOTAL					\$165,427.00
CONTINGENCY			40.00%		\$66,170.80
SUBTOTAL CATEGORY 7 COST					\$231,597.80

Category 8 - Traffic Items

DATE: 6/30/2016
ROUTE: MD 170 at MD 174
JOB DESCRP: Concept Development Study
 Option 2
IMPROV TYPE: Intersection Improvements
TYPICAL SEC: 3-11' Lanes, 5' Bike Lanes
ALTERNATE:
PREPARED BY: WRA

PROJECT #: AA195A21
FEDERAL #: TBD
PDMS: TBD
COUNTY: Anne Arundel

PRJ LENGTH: 0.82 miles
DIVISION: District 5

Category Code	Item Description	Unit	Quantity	Unit Cost	Total Cost
80000	SIGNAL MODIFICATIONS	LS	1	\$565,000.00	\$565,000.00
80000	REGULATORY SIGNS	EA	60	\$50.00	\$3,000.00
80000	LIGHTING	LS	1	\$100,000.00	\$100,000.00
SUBTOTAL					\$668,000.00
CONTINGENCY			40.00%		\$267,200.00
SUBTOTAL CATEGORY 8 COST					\$935,200.00

Category 9 - State Supplied Items

DATE: 6/30/2016
ROUTE: MD 170 at MD 174
JOB DESCRP: Concept Development Study
 Option 2
IMPROV TYPE: Intersection Improvements
TYPICAL SEC: 3-11' Lanes, 5' Bike Lanes
ALTERNATE:
PREPARED BY: WRA

PROJECT #: AA195A21
FEDERAL #: TBD
PDMS: TBD
COUNTY: Anne Arundel

PRJ LENGTH: 0.82 miles
DIVISION: District 5

Category Code	Item Description	Unit	Quantity	Unit Cost	Total Cost
	NO ITEMS IN CATEGORY				
SUBTOTAL					\$0.00
CONTINGENCY			40.00%		\$0.00
SUBTOTAL CATEGORY 9 COST					\$0.00