Governor Stone Parkway Shared Use Path Planning Study

Concept Design Alternatives Report

Anne Arundel County, Maryland
Project No. H545906

Prepared for:
Anne Arundel County
Department of Public Works
Bureau of Engineering

KCI Technologies, Inc.
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KCI Project No. 17110671.49

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1.0 INTRODUCTION

The Anne Arundel County Department of Public Works (DPW) is proposing a new shared use path along Governor Stone Parkway between East West Boulevard and Benfield Boulevard. The project intent is to develop a concept study that compares benefits, costs, and impacts of up to three alternatives. Concepts were developed utilizing existing County mapping and right-of-way information. The conceptual design was evaluated for the feasibility of adding a shared use path on one or both sides of Governor Stone Parkway including the analysis of upgrading the existing trail to the east of East West Boulevard intersection to a standard 10-foot wide trail for a length of 500 feet. The implementation of Environmental Site Design (ESD) to the Maximum Extent Possible (MEP) in accordance with the Maryland SWM Act of 2007, COMAR, section 26.17.02 is utilized for all three alternatives:

Alternative 1 – Shared Use Path along Southbound Governor Stone Parkway: Construct a proposed 10-foot wide sidewalk and 4-foot buffer on the southbound side; design and construct enclosed storm drain system on the southbound side, along with micro-bioretention facilities where applicable to demonstrate Environmental Site Design implementation to the maximum extent practical (ESD to the MEP); reconfigure roadway to include two 11-foot travel lanes and two 4-foot bike compatible shoulders; pavement grinding and overlay is proposed for the entire roadway, along with complete pavement restriping.

Alternative 2 – Shared Use Path along Northbound Governor Stone Parkway: Construct a proposed 10-foot wide sidewalk and 4-foot buffer on the northbound side; design and construct enclosed storm drain system on the southbound side, along with micro-bioretention facilities where applicable to satisfy ESD to the MEP; reconfigure roadway to include two 11-foot travel lanes and two 4-foot bike compatible shoulders; pavement grinding and overlay is proposed for the entire roadway, along with complete pavement restriping.

Alternative 3 – Shared Use Path along Northbound Governor Stone Parkway: Construct a proposed 10-foot wide sidewalk with variable buffer on the northbound side; design and construct linear ESD facilities between the roadway and proposed shared use path where applicable to satisfy ESD to the MEP; reconfigure roadway to include two 11-foot travel lanes and two 8-foot bike compatible shoulders; pavement grinding and overlay is proposed for the entire roadway, along with complete pavement restriping.

A cost estimate is also provided for Alternative 3A. Alternative 3A is similar to Alternative 3 in that is provides a 10-foot wide sidewalk, but this option does not include the roadway improvements. Reconfiguration of the roadway to provide two 8-foot bike compatible shoulders, pavement grinding with overlay, and pavement restriping are not provided for Alternative 3A.

2.0 EXISTING CONDITIONS

Governor Stone Parkway is classified as a collector with the posted speed of 35 mph. From the northern terminus of the roadway at East West Boulevard to southern terminus at Benfield Boulevard, the roadway features a through lane in each direction with left turning lanes at the termini intersections. There is a full width shoulder along the southbound lane on the western side and a median shoulder along the northbound lane on the eastern side. The roadway is approximately 1.08 miles long.

Governor Stone Parkway was originally constructed as a half-section roadway of two lanes with the intention of a future full section to make the roadway four lanes. The western side of the roadway was constructed while the eastern side was never constructed. There is more right of way available to the eastern side.

There are very few existing pedestrian facilities along Governor Stone Parkway. An existing sidewalk, approximately 850 feet in length, parallels the roadway north of Rustling Oaks Drive to the east. A 115 foot long sidewalk extends along the roadway to the west side between Rustling Oaks Drive (north) and the entrance to Shipley's Choice Elementary School. Signalized intersections with cross walks are located at the intersections with East West Boulevard and at Benfield Boulevard. There are no additional traffic signals on Governor Stone Parkway.

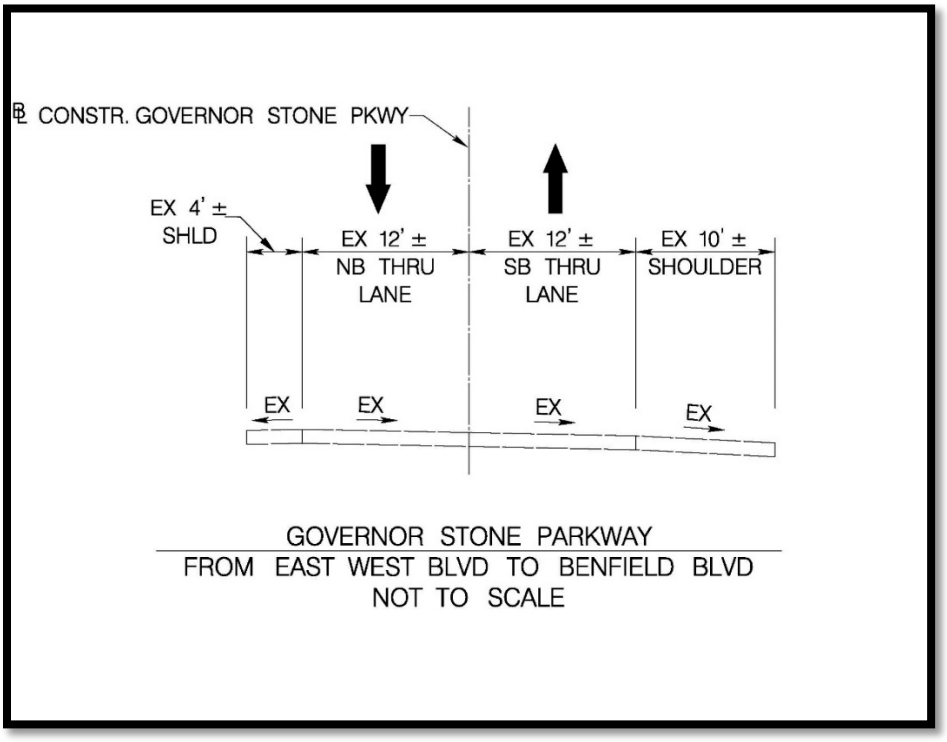
FIGURE 1 - Vicinity Map

All of the areas immediately surrounding the project are zoned Residential R2 [1]. Shipley's Choice Elementary School, Shipley's Choice Swim and Tennis Club, and Shipley's Choice Park are all located to the west of the Governor Stone Parkway. All homes located adjacent to the roadway are part of the Shipley's Choice subdivision. The Shipley's Choice Community Association represents the homes along the southeast portion of Governor Stone Parkway [2]. All other homes are represented by the Shipley's Choice Homeowners Association [3].

A. Typical Section

Governor Stone Parkway within the study limit is mainly a two lane roadway with an additional left turning lane at the intersections with East West Boulevard and Benfield Boulevard. Except for some curb returns at intersections, the roadway is open section. There is a single 12 foot lane for each direction, a 10 foot shoulder to the west, and a 4 foot shoulder to the east. As mentioned in existing conditions, Governor Stone Parkway was originally intended to be constructed as a 4-lane roadway with only 2 lanes to the west being constructed. Both of the constructed lanes drain towards the 10 foot shoulder on the west side of the roadway. The baseline for this study is based off the original baseline for construction and runs from north to south.

FIGURE 2 – Existing Typical Section



B. Horizontal and Vertical Alignments

The existing horizontal alignment of Governor Stone Parkway features one horizontal curve with a radius of 2,865 feet. This meets Anne Arundel County's Design Manual for radius (603' minimum) for a collector roadway in rural zoning [4]. Superelevation is not provided on the roadway. As mentioned previously, both lanes slope to the west which is also the inside of the lone horizontal curve.

The existing vertical alignment has a maximum grade of 3% which meets Anne Arundel County's Design Manual for maximum allowable grade (10% maximum) for a collector roadway in an area zoned R-2[4].

C. Watershed Information

The site is located in Severna Park in Anne Arundel County, Maryland. Runoff from the project area contributes to two watersheds. The northern section of Governor Stone Parkway drains to the Magothy River watershed (Sub-Basin 02-13-10-01). Stormwater is conveyed through closed storm drain systems to an existing wet pond in the Shipley's Choice residential neighborhood which ultimately outfalls to the Magothy River. The closed storm drain structures and pipes are stable and in good condition. The southern side of the project drains to the Severn River watershed (Sub-Basin 02-13-10-02). The south side of Governor Stone Parkway is primarily open section. Runoff exits the roadway via sheet flow that eventually is conveyed to the Severn River. The roadway embankments are stable with no signs of erosion. Runoff from Benfield Boulevard and Scarlett Oak Drive is collected via closed storm drain systems and conveyed to Cool Spring Branch and Bear Branch tributaries, ultimately converging with the Severn River. All of the receiving tributaries and rivers are designated "Use 1", pursuant to which they are protected for 'Water Contact Recreation, and Protection of Non-tidal Warmwater Aquatic Life" by the Maryland Surface Water Use Designation (COMAR 26.08.02.08).

D. Utilities

Utilities were inventoried based on available GIS data, record plans provided by utility owners, field visits and data found through Miss Utility. The following utility owners were identified within the limits of this study:

- Anne Arundel County Water & Sewer
- Broadstripe Broadband
- BG&E Gas & Electric
- Comcast
- Verizon

An existing 8 inch sanitary sewer line runs along the outside edge of the western shoulder of Governor Stone Parkway from East West Highway to approximately 200 feet north of Mathemai Way. An existing 8 inch water line runs along the outside edge of the eastern shoulder of Governor Stone Parkway from Red Birch Road to approximately 275 feet south of the entrance to Shipley's Choice Elementary School. Another existing 8 inch water line runs along the outside edge of the eastern shoulder of Governor Stone Parkway from Rustling Oaks Drive (south) to beyond the southern limits of the study.

Street lighting is provided for the length of the roadway along the outside of the western shoulder. There are no overhead utility lines along Governor Stone Parkway. There are numerous underground communication lines running within the roadway corridor.

Numerous attempts were made to acquire as-built plans from BG&E. At this time, the only plans obtained from BG&E are for a small portion of the project in the vicinity of the Governor Stone Parkway intersection with Rustling Oaks Drive (south). These plans indicated that a segment of a gas line is located along the outside edge of the eastern shoulder while another segment of an electric line is located along the outside edge of the western shoulder.

E. Natural Resources

A desktop survey, using geospatial data, was completed in order to identify the approximate limits of wetlands, waters of the U.S., and forest stands within the project area.

The desktop survey did not identify any wetlands within the project area; however, the headwaters of Cold Spring Branch appear to originate at the SE quadrant of the intersection of Governor Stone Parkway and Rustling Oaks Drive. Additionally, a Sensitive Species Project Review area was identified at the intersection of Governor Stone Parkway and Benfield Boulevard. The FEMA 100-year floodplain is not present within the project area. The presence or absence of wetlands or WUS should be verified through a field walk at a later design stage to determine whether a Joint Federal/State Application for the Alteration of any Floodplain, Waterway, Tidal, or Nontidal Wetland in Maryland is required. These features will be taken into consideration during the final design process, and alternative designs including boardwalks can be utilized to avoid these systems.

Four soils were identified within the project area including Evesboro-Galestown Urban land complex (EuD, EuE), Patapsco-Evesboro-Fort Mott complex (PeB), and Patapsco-Fort Mott-Urban land complex (PgB). None of these soils are classified as hydric.

3.0 PROPOSED SHARED USE PATH

The purpose of this study is to provide a 10 foot wide, paved asphalt shared use path for the entire length of Governor Stone Parkway. The shared use path will improve bicycle and pedestrian connectivity for all neighborhoods within the Shipley's Choice subdivision, Shipley's Choice Elementary School, and Shipley's Choice Park while linking with all of the existing bicycle and pedestrian facilities at cross streets that intersect the roadway. For this study, three alternatives were considered. They are the following:

- Alternative 1 – Provide a single 11 foot wide travel lane, a single 4 foot wide bike lane, and curb and gutter for both northbound and southbound directions of Governor Stone Parkway. Provide a 10 foot wide shared use path on the west side of the roadway, with a 4 foot grass buffer from the back of the curb and gutter.

- Alternative 2 – Provide a single 11 foot wide travel lane, a single 4 foot wide bike lane, and curb and gutter for both northbound and southbound directions of Governor Stone Parkway. Provide a 10 foot wide shared use path on the east side of the roadway, with a 4 foot grass buffer from the back of the curb and gutter.

- Alternative 3 – Provide a single 11 foot wide travel lane and a single 8 foot wide shoulder/bike lane for both northbound and southbound on Governor Stone Parkway while leaving the roadway as an open section. Provide a 10 foot wide meandering shared use path on the west side of the roadway at a variable distance from the edge of shoulder. A cost estimate is also provided for Alternative 3A. Alternative 3A is similar to Alternative 3 but without the roadway improvements.

A. Alternative 1

i) Roadway

The roadway will be a completely closed, two lane section with a third left turn lane at the intersections with East West Boulevard and Benfield Boulevard. The 10 foot wide asphalt shared use path will be placed along the west side of the roadway adjacent to the southbound lane, behind the 4 foot grass buffer from the back of the curb and gutter. The Bicycle accommodations will be provided on the roadway with a 4 foot wide bike lane. See Appendix A for proposed typical section.

ii) Drainage

The proposed curb and gutter along all of southbound Governor Stone Parkway requires the addition of closed storm drain systems to collect runoff from the roadway and shared use path. The proposed storm drain system consists of curb inlets along the west side of the roadway connecting to a trunk line that ties into existing stormdrains wherever feasible. Inlet spacing was evaluated based on spread conditions in the roadway and containment of the two year storm peak discharges within

the proposed six-foot roadway shoulder. The longitudinal slope of Governor Stone Parkway varies and inlets are spaced accordingly, ranging from 75 feet to 110 feet apart. Several existing inlets will be removed and/or relocated to accommodate for the proposed roadway and sidewalk improvements. The trunk line in Alternative 1 is located underneath the shared use path on the west side of the project to minimize right-of-way needs and impacts to existing resources. Right-of-way acquisition on the west side of the project alignment will be required to provide adequate space for proposed conveyance ditches adjacent to the path. Further analysis of existing stormdrain systems will be necessary to determine feasibility to tie-in and capacity to convey the increased discharge volumes. There is one location at an existing low point along on Governor Stone Parkway that will require trenching across the roadway to install a new pipe and stormdrain outfall.

iii) Stormwater Management

The proposed path will result in increased imperviousness throughout the project corridor, therefore implementation of Environmental Site Design (ESD) to the maximum extent practicable (MEP) will be required. SWM requirements have been developed based on the Maryland Stormwater Design Manual, Volumes I & II (Effective October 2000, Revised May 2009). The project site is separated into Points of Interest (POIs) and/or Lines of Interest (LOIs), which are shown on the Concept Plans.

ESD to the MEP is demonstrated by incorporating ten (10) micro-bioretention facilities along the west side of Governor Stone Parkway. Conveyance ditches are proposed to bypass offsite drainage around the project and stormwater management facilities. Included in Alternative 1 are three (3) quantity management facilities to satisfy Anne Arundel County requirement to mitigate/maintain 10-year peak discharges from the site.

B. Alternative 2

i) Roadway

The roadway will be a completely closed, two lane section with the a third left turn lane at the intersections with East West Boulevard and Benfield Boulevard. The 10 foot wide asphalt shared use path will be placed along the east side of the roadway adjacent to the northbound lane, behind the 4 foot grass buffer from the back of the curb and gutter. The Bicycle accommodations will be provided on the roadway with a 4 foot wide bike lane. See Appendix A for proposed typical section.

ii) Drainage

The proposed drainage design for Alternative 2 is very similar to that of Alternative 1 with two exceptions. The stormdrain trunk line in Alternative 2 remains in the same location as in Alternative 1, however, the surface cover over the trunkline is open space rather than the line being positioned under the shared use path. The second difference is that Alternative 2 requires less right-of-way acquisition on the west side of the project than Alternative 1 because the proposed path location on the east allows more space available within the existing right-of-way to incorporate the required drainage ditches. Trenching across the roadway to install a new pipe and stormdrain outfall at an existing low point along on Governor Stone Parkway will be required for both Alternative 1 and Alternative 2. Refer to Alternative 1 Drainage (Section 2.1.2) for further explanation of the drainage design.

iii) Stormwater Management

Stormwater management requirements and proposed solution are similar to Alternative 1. The layout of the ESD facilities and bypass ditches differs slightly from Alternative 1 due to the alignment of the shared use path being on the east side in Alternative 2 rather than on the west side. However, the roadway drainage remains super-elevated to the west side so the stormdrain system layout in Alternative 2 resembles that of Alternative 1. Stormwater management requirements are satisfied using eleven (11) micro-bioretention facilities along the west side of Governor Stone Parkway. Conveyance ditches are proposed to bypass offsite drainage in order to achieve the highest effective impervious area treatment within the facilities. Three (3) quantity management facilities are also included in Alternative 2 to manage the 10-year peak discharges as required by Anne Arundel County. Refer to Appendix C for more detailed stormwater management analysis.

C. Alternative 3

i) Roadway

The roadway will be an open, two lane section with the a third left turn lane at the intersections with East West Boulevard and Benfield Boulevard. The 10 foot wide asphalt shared use path will be placed along the east side of the roadway adjacent to the northbound lane. The shared use path will meander along the roadway and will be placed at a variable distance. Bicycle accommodations will be provided on the roadway with an 8 foot wide shoulder / bike lane. To accommodate the 8 foot wide shoulder / bike lane on each side, the road will shift slightly to the west with a portion of the proposed southbound travel lane using the existing shoulder. This will require placement of 4 foot wide, full depth asphalt to replace the

existing non-full depth pavement on the existing shoulder. See Appendix A for proposed typical section.

ii) Drainage

The roadway is to remain open section in Alternative 3, maintaining sheet flow conditions and eliminating closed stormdrain system requirements under proposed conditions. Conveyance ditches are incorporated to bypass offsite runoff from the proposed stormwater management facilities.

iii) Stormwater Management

The proposed work in Alternative 3 results in the highest increase in impervious area when compared to Alternatives 1 and 2. This is due to the meandering alignment/length of the shared use path versus a linear path alignment as shown in Alternatives 1 and 2. Sheet flow drainage conditions are favorable to implement linear / non-structural ESD facilities to the MEP with minor adjustments to existing flow patterns. A total of eighteen (18) grass swales are proposed within the project limits to satisfy stormwater management requirements. Conveyance ditches are included to bypass offsite drainage in order to achieve the highest effective impervious area treatment within each grass swale. Three (3) quantity management facilities will manage the 10-year peak discharges. Refer to Appendix C for more detailed stormwater management analysis.

iv) Alternative 3A

Alternative 3A is similar to Alternative 3 and requires all the same design aspects minus the roadway improvements, . See Figure 2 for the existing typical section.

D. East West Boulevard Improvements

All alternatives will include improvements to East West Boulevard to provide a 10 foot wide asphalt shared use path along the eastbound lane. For the first 500 feet heading east from Governor Stone Parkway, there is an existing 5 foot wide sidewalk with a retaining wall on the back side that transitions into a 10 foot wide asphalt shared use path. The existing single eastbound lane will be shifted and realigned. An 18 foot eastbound lane and a 10 foot wide asphalt shared use path will be provided without impacting the existing retaining wall.

E. Proposed Pavement Section

The following pavement sections were used to in calculating the cost estimates:

- Pavement Grinding and Overlay – 1.5” Grinding, 1.5” asphalt
- Full Depth Asphalt – 5” asphalt, 6” graded aggregate base
- Shared Use Path – 1.5” asphalt, 4” graded aggregate base

4.0 IMPACTS ASSESSMENT

A. Right of Way Impacts

As mentioned in the existing conditions, Governor Stone Parkway was originally intended to be a four-lane section with two additional lanes planned for construction on the east side of the roadway. There is substantially more right of way available on the eastern side of the roadway that was to accommodate the widened roadway while available right of way on the western side is much more limited. Alternative 1 will cause greater impacts to existing property owners when compared to Alternative 2 and Alternative 3. Alternative 1 will require approximately 31,600 SF (0.73 acres) of impacts.

Opposite of Alternative 1, Alternative 2 will be mainly constructed on the east side of the roadway where the extra right of way is available. However, some right of way will be required but the amount is much less than Alternative 1. Alternative 2 will require approximately 7,300 SF (0.17 acres) of impacts.

Similar to Alternative 2, Alternative 3 will be mainly constructed on the east side of the roadway. Alternative 3 will require no additional right of way.

B. Natural Resources Impacts

Forest stands are present along both sides of the roadway. A Maryland Department of Natural Resources (MDNR) Roadside Tree Permit will be required for the removal or trimming of any trees within the existing public road right of way.

C. Utilities

Impacts to the existing street lighting and the existing underground utilities were estimated utilizing a percentage of the major items per Maryland Department of Transportation State Highway Administration's (MDOT SHA) Cost Estimating Manual to account for relocations and adjustments. This includes any potential impacts to sanitary sewer, storm drains, water, fire hydrants, telecommunications, gas, electric, lighting, and any service connections to adjacent properties. Utility designation and location will need to be completed to further evaluate any impacts in the final design phase.

5.0 COST ESTIMATE

A major quantities estimate was completed for each alternative using MDOT SHA's Cost Estimating Manual for project planning. Preliminary cross sections were developed using available GIS mapping to determine limits of construction and earthwork quantities. Other quantities were calculated by using the concept plans. The estimate includes right of way needed, engineering costs, and a 35% contingency factor. The cost for each

alternative is summarized below in Table 1. See Appendix B for further detailed cost estimates.

TABLE 1 – COST COMPARISON

ALTERNATIVE	CONSTRUCTION	UTILITY RELOCATON	RIGHT OF WAY ACQUISTION	ENGINEERING	TOTAL
1	$8,460,000	$640,000	$730,000	$850,000	$11,260,000
2	$8,270,000	$610,000	$170,000	$830,000	$10,470,000
3	$5,090,000	$430,000	$0	$510,000	$6,340,000
3A	$3,810,000	$310,000	$0	$390,000	$4,750,000

6.0 REFERENCES

[1] Zoning Viewer [Internet]. Anne Arundel County [cited 2018 Jan 08]. Available from: http://gis-world2.aacounty.org/HTML5Viewer/Index.html?configBase=http://gis-world2.aacounty.org/Geocortex/Essentials/REST/sites/ZoningMap/viewers/ZoningMapH5/virtualdirectory/Resources/Config/Default

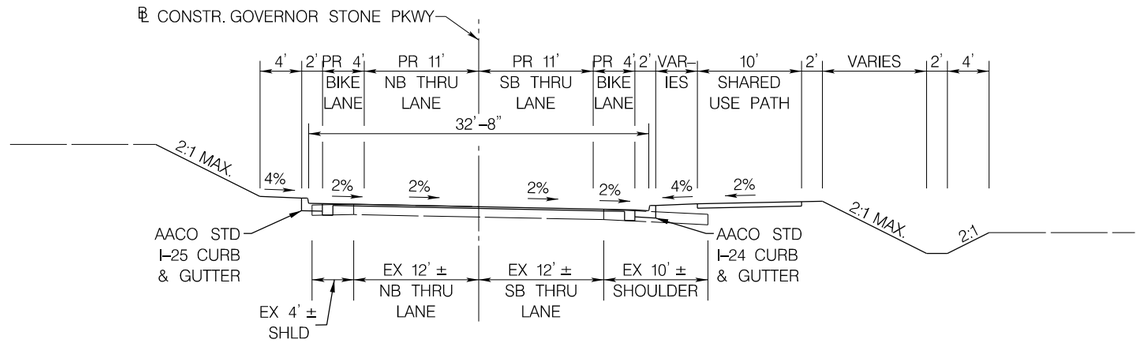
[2] Shipley's Choice Community Association Information [Internet]. Shipley's Choice Community Association [cited 2018 Jan 08]. Available from: http://www.shipleyschoice.org/information.html

[3] Shipley's Choice Homeowners Association Home [Internet]. Shipley's Choice Homeowners Association [cited 2018 Jan 08]. Available from: http://www.shipleyschoice.com/index.html

[4] Chapter III Road and Streets [Internet]. Anne Arundel County DPW Design Manual [cited 2018 Jan 08]. Available from: http://www.aacounty.org/departments/public-works/engineering/design-manual/DMChapter03.pdf

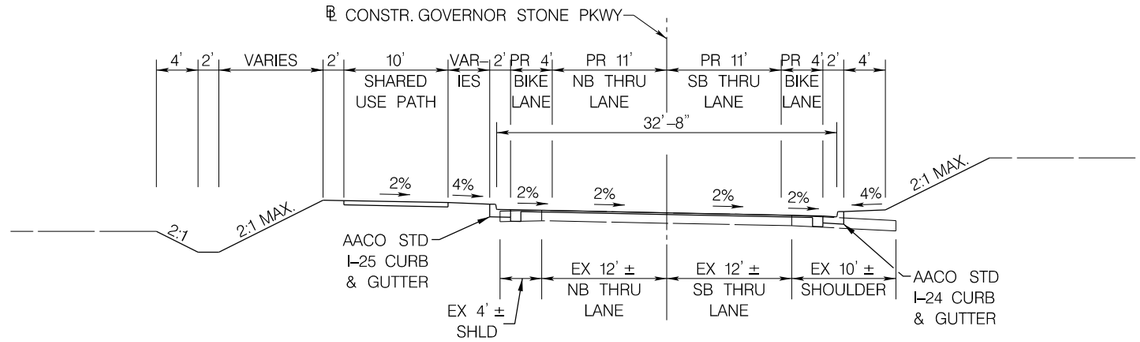
Appendix A: Proposed Typical Sections

ALTERNATIVE 1



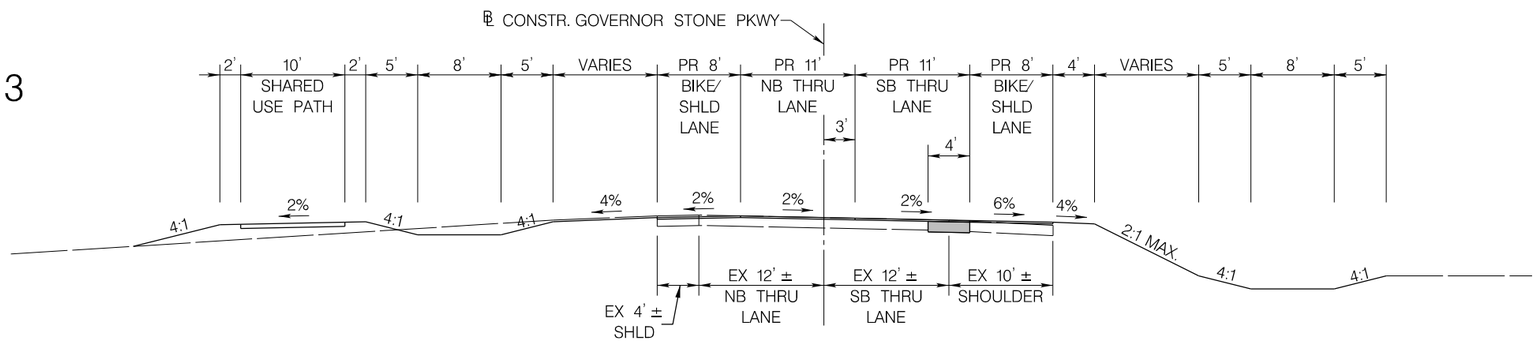
GOVERNOR STONE PARKWAY
FROM EAST WEST BLVD TO BENFIELD BLVD
NOT TO SCALE

ALTERNATIVE 2



GOVERNOR STONE PARKWAY
FROM EAST WEST BLVD TO BENFIELD BLVD
NOT TO SCALE

ALTERNATIVE 3



GOVERNOR STONE PARKWAY
FROM EAST WEST BLVD TO BENFIELD BLVD
NOT TO SCALE

KCI ENGINEERS PLANNERS SCIENTISTS CONSTRUCTION MANAGERS
936 Ridgebrook Road • Sparks, MD 21152
410-316-7800 • www.kci.com

PROFESSIONAL CERTIFICATION. I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NO. 20607, EXPIRATION DATE OCTOBER 14, 2018.

SIGNATURE DATE

STATE OF MARYLAND · KENNETH THOMAS REED · NO. 20607 · PROFESSIONAL ENGINEER

ANNE ARUNDEL COUNTY
DEPARTMENT OF PUBLIC WORKS

REVISIONS NO.	DATE	BY
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APPROVED DATE CHIEF ENGINEER	APPROVED DATE PROJECT MANAGER	SCALE: AS NOTED DRAWN BY: BBB CHECKED BY: JER
APPROVED DATE WPRP ADMINISTRATOR	APPROVED DATE CHIEF RIGHT-OF-WAY	SHEET NO.: OF PROJECT NO.: H545906 CONTRACT NO.: TBD

TYPICAL SECTIONS

GOVERNOR STONE PARKWAY
SHARED USE PATH PLANNING STUDY
JANUARY 2018
4TH ELECTION DISTRICT, TAX MAP 0023, PARCELS TBD
GRID 0008, ZONING TBD, ZIP CODE 21108

PLOTTED: Monday, January 08, 2018 AT 01:40 PM
BY: jeremy.beltz –
FILE: M:\2011\17110671.49\Drawings\pHT-X001_GovStone.dgn

Appendix B: Cost Estimates

GOVERNOR STONE PARKWAY - ALTERNATIVE 1

COST ESTIMATE				
ITEM	*UNIT*	*QUANTITY*	*UNIT PRICE*	***AMOUNT***
CATEGORY 1 - GENERAL				
General (25% Categories 2,4,5 & 6)	LS	1	$800,000.00	**$ 800,000**
SUBTOTAL GENERAL				***$ 800,000***
CATEGORY 2 - EARTHWORK				
Removal of Existing Pavement	CY	900	$35.00	**$ 31,500**
Excavation	CY	12,000	$80.00	**$ 960,000**
Common Borrow	CY	11,000	$80.00	**$ 880,000**
SUBTOTAL EARTHWORK				***$ 1,871,500***
CATEGORY 3 - DRAINAGE				
18" R.C.C.P	LF	4,190	$43.00	**$ 180,170**
Type A-1 Manhole	EA	38	$1,800.00	**$ 68,400**
COG or COS - 5	EA	60	$2,640.00	**$ 158,400**
Standard WR Inlet	EA	18	$2,336.00	**$ 42,048**
18" Concrete End Section	EA	16	$384.00	**$ 6,144**
Type A Headwall	EA	2	$800.00	**$ 1,600**
Type C Endwall	EA	1	$800.00	**$ 800**
Quantity Management Facility	EA	3	$15,000.00	**$ 45,000**
Mulch	CY	1,030	$33.00	**$ 33,990**
Soil Stabilization Matting	CY	5,707	$12.00	**$ 68,484**
Bio-Retention SWM Filter Complete and Installed	CY	10,307	$54.00	**$ 556,578**
Geotextile	CY	2,580	$4.00	**$ 10,320**
6" Perforated P.V.C. Pipe	LF	28	$15.00	**$ 413**
Erosion & Sediment Control (5% Categories 2,4,5 & 6)	LS	1	$160,000.00	**$ 160,000**
SUBTOTAL DRAINAGE				***$ 1,332,347***
CATEGORY 4 - STRUCTURES				
SUBTOTAL STRUCTURES				***$ -***
CATEGORY 5 - PAVEMENT				
Surface HMA	Ton	1,500	$150.00	**$ 225,000**
Base Course HMA	Ton	1,100	$150.00	**$ 165,000**
Pavement Grinding	SY	16,500	$2.00	**$ 33,000**
GAB (4" lifts)	SY	6,350	$20.00	**$ 127,000**
GAB (6" lifts)	SY	1,850	$20.00	**$ 37,000**
SUBTOTAL PAVEMENT				***$ 587,000***
CATEGORY 6 - SHOULDERS				
Curb	LF	350	$35.00	**$ 12,250**
Curb & Gutter	LF	13,800	$35.00	**$ 483,000**
Wooden Fencing	LF	900	$20.00	**$ 18,000**
W-Beam Guardrail	LF	2,000	$25.00	**$ 50,000**
End Treatments	EA	9	$2,500.00	**$ 22,500**
5" Concrete Sidewalk	SF	9,500	$10.00	**$ 95,000**
Detectable Warning Surfaces	SF	650	$40.00	**$ 26,000**
SUBTOTAL SHOULDERS				***$ 706,750***
CATEGORY 7 - LANDSCAPING				
Landscaping (5% Categories 2,4,5 &6)	LS	1	$160,000.00	**$ 160,000**
SUBTOTAL LANDSCAPING				***$ 160,000***
CATEGORY 8 - TRAFFIC				
Marking	LF	25,000	$0.85	**$ 21,250**
Signing	LS	1	$5,000.00	**$ 5,000**
Signal Modification	LS	2	$65,000.00	**$ 130,000**
SUBTOTAL TRAFFIC				***$ 156,250***
CATEGORY 9 - UTILITIES				
Utilities (20% Categories 2,4,5 &6)	LS	1	$640,000.00	**$ 640,000**
SUBTOTAL UTILITIES				***$ 640,000***
RIGHT-OF-WAY *				
Right of Way	SF	31,600	$23.00	**$ 726,800**
SUBTOTAL RIGHT OF WAY				***$ 726,800***

Subtotal = Categories 1-9, does not include ROW

SUBTOTAL (CATEGORIES 1-9)	$	6,260,000
35% CONTINGENCY	$	2,200,000
NEAT CONSTRUCTION COST	***$***	***8,460,000***

RIGHT-OF-WAY	$	730,000
10% ENGINEERING	$	850,000
14.4% CONSTRUCTION OVER	$	1,220,000

TOTAL CONSTRUCTIOI	***$***	***9,680,000***
TOTAL	***$***	***11,260,000***

GOVERNOR STONE PARKWAY - ALTERNATIVE 2

COST ESTIMATE				
ITEM	*UNIT*	*QUANTITY*	*UNIT PRICE*	***AMOUNT***
CATEGORY 1 - GENERAL				
General (25% Categories 2,4,5 & 6)	LS	1	$760,000.00	**$ 760,000**
SUBTOTAL GENERAL				***$ 760,000***
CATEGORY 2 - EARTHWORK				
Removal of Existing Pavement	CY	910	$35.00	**$ 31,850**
Excavation	CY	11,000	$80.00	**$ 880,000**
Common Borrow	CY	10,500	$80.00	**$ 840,000**
SUBTOTAL EARTHWORK				***$ 1,751,850***
CATEGORY 3 - DRAINAGE				
18" R.C.C.P	LF	4,110	$43.00	**$ 176,730**
Type A-1 Manhole	EA	36	$1,800.00	**$ 64,800**
COG or COS - 5	EA	60	$2,640.00	**$ 158,400**
Standard WR Inlet	EA	17	$2,336.00	**$ 39,712**
18" Concrete End Section	EA	20	$384.00	**$ 7,680**
Type A Headwall	EA	2	$800.00	**$ 1,600**
Type C Endwall	EA	1	$800.00	**$ 800**
Quantity Management Facility	EA	3	$15,000.00	**$ 45,000**
Mulch	CY	1,134	$33.00	**$ 37,422**
Soil Stabilization Matting	CY	7,008	$12.00	**$ 84,096**
Bio-Retention SWM Filter Complete and Installed	CY	11,338	$54.00	**$ 612,252**
Geotextile	CY	2,838	$4.00	**$ 11,352**
6" Perforated P.V.C. Pipe	LF	30	$15.00	**$ 454**
Erosion & Sediment Control (5% Categories 2,4,5 & 6)	LS	1	$160,000.00	**$ 160,000**
SUBTOTAL DRAINAGE				***$ 1,400,298***
CATEGORY 4 - STRUCTURES				
SUBTOTAL STRUCTURES				***$ -***
CATEGORY 5 - PAVEMENT				
Surface HMA	Ton	1,500	$150.00	**$ 225,000**
Base Course HMA	Ton	1,125	$150.00	**$ 168,750**
Pavement Grinding	SY	16,250	$2.00	**$ 32,500**
GAB (4" lifts)	SY	6,500	$20.00	**$ 130,000**
GAB (6" lifts)	SY	1,850	$20.00	**$ 37,000**
SUBTOTAL PAVEMENT				***$ 593,250***
CATEGORY 6 - SHOULDERS				
Curb	LF	350	$35.00	**$ 12,250**
Curb & Gutter	LF	13,800	$35.00	**$ 483,000**
Wooden Fencing	LF	0	$20.00	**$ -**
W-Beam Guardrail	LF	2,000	$25.00	**$ 50,000**
End Treatments	EA	9	$2,500.00	**$ 22,500**
5" Concrete Sidewalk	SF	9,250	$10.00	**$ 92,500**
Detectable Warning Surfaces	SF	700	$40.00	**$ 28,000**
SUBTOTAL SHOULDERS				***$ 688,250***
CATEGORY 7 - LANDSCAPING				
Landscaping (5% Categories 2,4,5 &6)	LS	1	$160,000.00	**$ 160,000**
SUBTOTAL LANDSCAPING				***$ 160,000***
CATEGORY 8 - TRAFFIC				
Marking	LF	25,000	$0.85	**$ 21,250**
Signing	LS	1	$5,000.00	**$ 5,000**
Signal Modification	LS	2	$65,000.00	**$ 130,000**
SUBTOTAL TRAFFIC				***$ 156,250***
CATEGORY 9 - UTILITIES				
Utilities (20% Categories 2,4,5 &6)	LS	1	$610,000.00	**$ 610,000**
SUBTOTAL UTILITIES				***$ 610,000***
RIGHT-OF-WAY *				
Right of Way	SF	7,300	$23.00	**$ 167,900**
SUBTOTAL RIGHT OF WAY				***$ 167,900***

Subtotal = Categories 1-9, does not include ROW

SUBTOTAL (CATEGORIES 1-9)	$	6,120,000
35% CONTINGENCY	$	2,150,000
NEAT CONSTRUCTION COST	***$***	***8,270,000***

RIGHT-OF-WAY	$	170,000
10% ENGINEERING	$	830,000
14.4% CONSTRUCTION OVER	$	1,200,000

TOTAL CONSTRUCTIOI	***$***	***9,470,000***
TOTAL	***$***	***10,470,000***

GOVERNOR STONE PARKWAY - ALTERNATIVE 3

COST ESTIMATE				
ITEM	*UNIT*	*QUANTITY*	*UNIT PRICE*	***AMOUNT***
CATEGORY 1 - GENERAL				
General (25% Categories 2,4,5 & 6)	LS	1	$530,000.00	**$ 530,000**
SUBTOTAL GENERAL				***$ 530,000***
CATEGORY 2 - EARTHWORK				
Removal of Existing Pavement	CY	160	$35.00	**$ 5,600**
Excavation	CY	10,000	$80.00	**$ 800,000**
Common Borrow	CY	4,000	$80.00	**$ 320,000**
SUBTOTAL EARTHWORK				***$ 1,125,600***
CATEGORY 3 - DRAINAGE				
18" R.C.C.P	LF	177	$43.00	**$ 7,611**
Type A-1 Manhole	EA	2	$1,800.00	**$ 3,600**
COG or COS - 5	EA	0	$2,640.00	**$ -**
Standard WR Inlet	EA	5	$2,336.00	**$ 11,680**
18" Concrete End Section	EA	14	$384.00	**$ 5,376**
Type A Headwall	EA	1	$800.00	**$ 800**
Type C Endwall	EA	0	$800.00	**$ -**
Quantity Management Facility	EA	3	$15,000.00	**$ 45,000**
Mulch	CY	103	$33.00	**$ 3,399**
Soil Stabilization Matting	CY	15,781	$12.00	**$ 189,372**
Bio-Retention SWM Filter Complete and Installed	CY	1,030	$54.00	**$ 55,620**
Geotextile	CY	258	$4.00	**$ 1,032**
6" Perforated P.V.C. Pipe	LF	3	$15.00	**$ 41**
Erosion & Sediment Control (5% Categories 2,4,5 & 6)	LS	1	$110,000.00	**$ 110,000**
SUBTOTAL DRAINAGE				***$ 433,531***
CATEGORY 4 - STRUCTURES				
SUBTOTAL STRUCTURES				***$ -***
CATEGORY 5 - PAVEMENT				
Surface HMA	Ton	1,500	$150.00	**$ 225,000**
Base Course HMA	Ton	1,380	$150.00	**$ 207,000**
Pavement Grinding	SY	16,350	$2.00	**$ 32,700**
GAB (4" lifts)	SY	6,650	$20.00	**$ 133,000**
GAB (6" lifts)	SY	2,710	$20.00	**$ 54,200**
SUBTOTAL PAVEMENT				***$ 651,900***
CATEGORY 6 - SHOULDERS				
Curb	LF	3,700	$35.00	**$ 129,500**
Curb & Gutter	LF	220	$35.00	**$ 7,700**
Wooden Fencing	LF	165	$20.00	**$ 3,300**
W-Beam Guardrail	LF	2,000	$25.00	**$ 50,000**
End Treatments	EA	9	$2,500.00	**$ 22,500**
5" Concrete Sidewalk	SF	8,565	$10.00	**$ 85,650**
Detectable Warning Surfaces	SF	660	$40.00	**$ 26,400**
SUBTOTAL SHOULDERS				***$ 325,050***
CATEGORY 7 - LANDSCAPING				
Landscaping (5% Categories 2,4,5 &6)	LS	1	$110,000.00	**$ 110,000**
SUBTOTAL LANDSCAPING				***$ 110,000***
CATEGORY 8 - TRAFFIC				
Marking	LF	25,000	$0.85	**$ 21,250**
Signing	LS	1	$5,000.00	**$ 5,000**
Signal Modification	LS	2	$65,000.00	**$ 130,000**
SUBTOTAL TRAFFIC				***$ 156,250***
CATEGORY 9 - UTILITIES				
Utilities (20% Categories 2,4,5 &6)	LS	1	$430,000.00	**$ 430,000**
SUBTOTAL UTILITIES				***$ 430,000***
RIGHT-OF-WAY *				
Right of Way	SF	0	$23.00	**$ -**
SUBTOTAL RIGHT OF WAY				***$ -***

Subtotal = Categories 1-9, does not include ROW

SUBTOTAL (CATEGORIES 1-9)	**$**	**3,770,000**
35% CONTINGENCY	**$**	**1,320,000**
NEAT CONSTRUCTION COST	***$***	***5,090,000***

RIGHT-OF-WAY *	**$**	**-**
10% ENGINEERING	**$**	**510,000**
14.4% CONSTRUCTION OVER	**$**	**740,000**

TOTAL CONSTRUCTIOI	***$***	***5,830,000***
TOTAL	***$***	***6,340,000***

GOVERNOR STONE PARKWAY - ALTERNATIVE 3A

COST ESTIMATE				
ITEM	*UNIT*	*QUANTITY*	*UNIT PRICE*	***AMOUNT***
CATEGORY 1 - GENERAL				
General (25% Categories 2,4,5 & 6)	LS	1	$390,000.00	**$ 390,000**
SUBTOTAL GENERAL				***$ 390,000***
CATEGORY 2 - EARTHWORK				
Removal of Existing Pavement	CY	160	$35.00	**$ 5,600**
Excavation	CY	9,000	$80.00	**$ 720,000**
Common Borrow	CY	4,000	$80.00	**$ 320,000**
SUBTOTAL EARTHWORK				***$ 1,045,600***
CATEGORY 3 - DRAINAGE				
18" R.C.C.P	LF	177	$43.00	**$ 7,611**
Type A-1 Manhole	EA	2	$1,800.00	**$ 3,600**
COG or COS - 5	EA	0	$2,640.00	**$ -**
Standard WR Inlet	EA	5	$2,336.00	**$ 11,680**
18" Concrete End Section	EA	14	$384.00	**$ 5,376**
Type A Headwall	EA	1	$800.00	**$ 800**
Type C Endwall	EA	0	$800.00	**$ -**
Quantity Management Facility	EA	3	$15,000.00	**$ 45,000**
Mulch	CY	103	$33.00	**$ 3,399**
Soil Stabilization Matting	CY	12,525	$12.00	**$ 150,300**
Bio-Retention SWM Filter Complete and Installed	CY	1,030	$54.00	**$ 55,620**
Geotextile	CY	258	$4.00	**$ 1,032**
6" Perforated P.V.C. Pipe	LF	3	$15.00	**$ 41**
Erosion & Sediment Control (5% Categories 2,4,5 & 6)	LS	1	$80,000.00	**$ 80,000**
SUBTOTAL DRAINAGE				***$ 364,459***
CATEGORY 4 - STRUCTURES				
SUBTOTAL STRUCTURES				***$ -***
CATEGORY 5 - PAVEMENT				
Surface HMA	Ton	5	$150.00	**$ 750**
Base Course HMA	Ton	600	$150.00	**$ 90,000**
Pavement Grinding	SY	0	$2.00	**$ -**
GAB (4" lifts)	SY	6,650	$20.00	**$ 133,000**
GAB (6" lifts)	SY	50	$20.00	**$ 1,000**
SUBTOTAL PAVEMENT				***$ 224,750***
CATEGORY 6 - SHOULDERS				
Curb	LF	3,700	$35.00	**$ 129,500**
Curb & Gutter	LF	220	$35.00	**$ 7,700**
Wooden Fencing	LF	165	$20.00	**$ 3,300**
W-Beam Guardrail	LF	300	$25.00	**$ 7,500**
End Treatments	EA	1	$2,500.00	**$ 2,500**
5" Concrete Sidewalk	SF	8,565	$10.00	**$ 85,650**
Detectable Warning Surfaces	SF	660	$40.00	**$ 26,400**
SUBTOTAL SHOULDERS				***$ 262,550***
CATEGORY 7 - LANDSCAPING				
Landscaping (5% Categories 2,4,5 &6)	LS	1	$80,000.00	**$ 80,000**
SUBTOTAL LANDSCAPING				***$ 80,000***
CATEGORY 8 - TRAFFIC				
Marking	LF	0	$0.85	**$ -**
Signing	LS	1	$5,000.00	**$ 5,000**
Signal Modification	LS	2	$65,000.00	**$ 130,000**
SUBTOTAL TRAFFIC				***$ 135,000***
CATEGORY 9 - UTILITIES				
Utilities (20% Categories 2,4,5 &6)	LS	1	$310,000.00	**$ 310,000**
SUBTOTAL UTILITIES				***$ 310,000***
RIGHT-OF-WAY *				
Right of Way	SF	0	$23.00	**$ -**
SUBTOTAL RIGHT OF WAY				***$ -***

Subtotal = Categories 1-9, does not include ROW

SUBTOTAL (CATEGORIES 1-9)	**$**	**2,820,000**
35% CONTINGENCY	**$**	**990,000**
NEAT CONSTRUCTION COST	***$***	***3,810,000***

RIGHT-OF-WAY *	**$**	**-**
10% ENGINEERING	**$**	**390,000**
14.4% CONSTRUCTION OVER	**$**	**550,000**

TOTAL CONSTRUCTIOI	***$***	***4,360,000***
TOTAL	***$***	***4,750,000***

Appendix C: Stormwater Management

Stormwater Management Narrative

The stormwater management design for this project will be designed in accordance with Anne Arundel County Stormwater Management Practices and Procedures Manual (11/22/2010, updated 02/01/12) and the MDE 2000 Maryland Stormwater Design Manual, Volumes I & II (October, 2000, Revised May 2009). Stormwater design elements are required to demonstrate implementation of Environmental Site Design (ESD) to the Maximum Extent Practicable (MEP).

This study includes three (3) proposed pedestrian path and corresponding stormwater management alternatives. Alternative 1 converts the exiting open section roadway into a closed section roadway with curb and gutter, and adds a 10 foot shared use path along the west side of the road. Alternative 2 also converts the exiting open section roadway into a closed section roadway with curb and gutter, but includes the 10 foot shared use path along the east side of the road. Alternative 3 does not change the drainage conditions on the roadway as it remains open section, but shifts the travel lanes to include two 8-foot shoulders to allow for a wider bike lane and shoulder on both sides. This alternative includes a meandering alignment of the 10 foot shared use path along the east side of the road.

Due to the conversion of sheet flow to concentrated flow for Alternatives 1 and 2, several (10 – 11) microbioretention practices are utilized to demonstrate ESD to the MEP. Alternative 3 remains an open section road allowing for the utilization of 21 (twenty one) grass swales and one (1) microbiretention practice to satisfy stormwater requirements.

Microbioretention practices capture and treat runoff from impervious areas via filtration through a bed mixture of sand, soil, and organic matter. Filtered stormwater is either returned to the conveyance system through and underdrain or infiltrated into the native soil. This practice is versatile and suitable to receive concentrated flow from closed stormdrain outfalls. See photo (right) for an example of constructed micro-bioretention practice.

Grass swales are channels that provide conveyance, water quality treatment, and flow attenuation of stormwater runoff. Swales provide pollutant removal through vegetative filtering, sedimentation, biological uptake, and infiltration into the underlying soil media. See photo (right) for an example of a constructed grass swale.

Stormwater runoff from the project area contributes to two watersheds. POI 1 drains to the Magothy River watershed (02-13-10-01 as defined by C.O.M.A.R.) and POI 5, POI 6, LOI 2 and LOI 3 drain to the Severn River (02-13-10-02 as defined by C.O.M.A.R.). POI 1 enters a closed storm drain system that drains to an existing stormwater management pond which eventually outfalls directly into the Magothy River. Runoff from POI 5 drains into an existing wet pond via one of two closed storm drain systems which flow into the Chartwell Branch, a tributary to the Severn River. Runoff from POI 6 and LOI 2 drain into Cool Spring Branch, a tributary of the Severn River. Runoff from LOI 3 enters a closed storm drain system that outfalls directly into Bear Branch, a tributary of the Severn River.

Within each POI drainage boundary, SWM Site Areas (SSA) are defined using the right of way (ROW) within the existing drainage area to each POI, respectively. According to Chapter 5 of the 2000 Maryland Stormwater Design Manual, any existing SSA less than 40% impervious is classified as "New Development" requiring that one hundred percent of all post development impervious area within the project LOD be treated for SWM. Any existing SSA area where existing site imperviousness exceeds 40% is classified and "Redevelopment" requiring that water quality treatment be provided for at least 50% of the existing impervious area within the limit of disturbance (LOD). Tables 1, 2 and 3 below summarizes the imperviousness, site classification and ESD volume required for each alternative.

Table 1 – Alternative 1 POI Classification and ESD Requirements Summary

Alternative 1	Existing Impervious	SWM Site Area Classification	Target ESDv (cf)
POI 1	41 %	Redevelopment	2,082
POI 5	32 %	New Development	8,758
POI 6	29 %	New Development	8,875
LOI 2	49 %	Redevelopment	0
LOI 3	76 %	Redevelopment	51

Table 2 – Alternative 2 POI Classification and ESD Requirements Summary

Alternative 2	Existing Impervious	SWM Site Area Classification	Target ESDv (cf)
POI 1	41 %	Redevelopment	2161
POI 5	32 %	New Development	11,907
POI 6	29 %	New Development	9,325
LOI 2	49 %	Redevelopment	11
LOI 3	76 %	Redevelopment	57

Table 3 – Alternative 3 POI Classification and ESD Requirements Summary

Alternative 2	Existing Impervious	SWM Site Area Classification	Target ESDv (cf)
POI 1	41 %	Redevelopment	2,380
POI 5	32 %	New Development	11,335
POI 6	29 %	New Development	7,774
LOI 2	49 %	Redevelopment	17
LOI 3	76 %	Redevelopment	44

Stormwater Management Provided

Alternative 1

The SWM requirements for each POI are satisfied through the use of microbioretentions along the west side of Governor Stone Parkway. A total of ten (10) microbioretentions are proposed in addition to three (3) quantity management facilities to manage the 10-year peak discharges, as required by Anne Arundel County. POI 1 has one (1) proposed microbioretention and one (1) quantity management facility. POI 5 has five (5) microbioretentions and one (1) quantity management facility. POI 6 has four (4) microbioretentions and one (1) quantity management facility. LOI 2 and LOI 3 have no proposed facilities and SWM requirements within these study areas are satisfied utilizing the overall surplus of ESDv provided elsewhere within sections of the project contributing to the Severn River Watershed. There are two existing grass swales that qualify for grass channel credit within the project limits. There are no impacts to these existing facilities resulting in a loss of water quality in Alternative 1.

Alternative 1	ESDv Provided (cf)	ESDv Required (cf)	TOTAL (cf)
POI 1	2,822	2,082	740
Magothy River Total	**2,822**	**2,082**	**740**

Alternative 1	ESDv Provided (cf)	ESDv Required (cf)	TOTAL (cf)
POI 5	11,293	8,758	2,535
POI 6	8,927	8,875	52
LOI 2	0	0	0
LOI 3	0	51	-51
Severn River Total	**20,220**	**17,684**	**2,536**

Alternative 2

The SWM approach for each POI in Alternative 2 demonstrate implementation of ESD to the maximum extent practical by utilizing microbioretentions along the west side of Governor Stone Parkway. The SWM requirements for POI 1 and POI 6 can be met through the use of microbioretentions along the west side of Governor Stone Parkway. A total of ten (10) microbioretentions are proposed in addition to three (3) quantity management facilities to manage the 10-year peak discharges, as required by Anne Arundel County. POI 1 has one (1) proposed microbioretention and one (1) quantity management facility. POI 5 has five (5) microbioretention practices and one (1) quantity management facility. POI 6 has five (5) microbioretentions and one (1) quantity management facility. LOI 2 and LOI 3 have no proposed facilities due to their small size and limited space available to provide surface stormwater management. There are two existing grass swales that qualify for 2,905 cubic feet of grass channel credit within the project limits that are impacted by Alternative 2. The loss of water quality from impacting these existing swales is offset by an additional microbioretention added to POI 6.

Alternative 2	ESDv Provided (cf)	ESDv Required (cf)	TOTAL (cf)
POI 1	2,779	2,161	618
Magothy River Total	**2,779**	**2,161**	**618**

Alternative 2	ESDv Provided (cf)	ESDv Required (cf)	TOTAL (cf)
POI 5	11,090	11,907	-817
POI 6	11,365	9,325	2,040
LOI 2	0	11	-11
LOI 3	0	57	-57
Severn River Total	**22,455**	**21,300**	**1,155**

Alternative 3

The SWM requirements for each POI in Alternative 3 are satisfied through the use of linear grass swale ESD practices. ESD requirements for POI 5 and POI 6 are satisfied through the use of grass swales on both sides of the road, is all locations where the right-of-way and topography will allow. One (1) microbioretention along the west side of Governor Stone Parkway in also included in POI 6. A total of twenty one (21) grass swales and one (1) microbioretention are recommended to satisfy ESDv requirements and demonstrate ESD to the MEP. In addition, three (3) quantity management facilities are proposed to manage the 10-year peak discharges. POI 1 has two (2) proposed grass swales and one (1) quantity management facility. POI 5 has fourteen (14) proposed grass swales and one (1) quantity management facility. POI 6 has five (5) proposed grass swales, one (1) microbioretention practice, and one (1) quantity management facility. LOI

2 and LOI 3 have no proposed facilities due to their small size and limited space available to provide surface stormwater management. Loss of water quality resulting from disturbing two (2) existing grass swales totals 2,905 cubic feet and is accounted for in the ESDv calculations.

Alternative 3	ESDv Provided (cf)	ESDv Required (cf)	TOTAL (cf)
POI 1	3,431	3,967	-535
Magothy River Total	**3,431**	**3,967**	**-535**

Alternative 3	ESDv Provided (cf)	ESDv Required (cf)	TOTAL (cf)
POI 5	14,636	11,335	3301
POI 6	7,824	7,774	50
LOI 2	0	17	-17
LOI 3	0	44	-44
Severn River Total	**22,460**	**19,170**	**3,290**

Alternative 3A

The SWM requirements for each POI in Alternative 3A are satisfied through the use of linear grass swale ESD practices. ESD requirements for POI 5 and POI 6 are satisfied through the use of grass swales on both sides of the road, is all locations where the right-of-way and topography will allow. One (1) microbioretention along the west side of Governor Stone Parkway in also included in POI 6. A total of ten (10) grass swales and one (1) microbioretention are recommended to satisfy ESDv requirements and demonstrate ESD to the MEP. In addition, three (3) quantity management facilities are proposed to manage the 10-year peak discharges. POI 1 has one (1) proposed grass swales and one (1) quantity management facility. POI 5 has seven (7) proposed grass swales and one (1) quantity management facility. POI 6 has three (3) proposed grass swales, one (1) microbioretention practice, and one (1) quantity management facility. LOI 2 and LOI 3 have no proposed facilities due to their small size and limited space available to provide surface stormwater management. Loss of water quality resulting from disturbing two (2) existing grass swales totals 2,905 cubic feet and is accounted for in the ESDv calculations.

Alternative 3A	ESDv Provided (cf)	ESDv Required (cf)	TOTAL (cf)
POI 1	3,113	2,316	797
Magothy River Total	**3,113**	**2,316**	**797**

Alternative 3A	ESDv Provided (cf)	ESDv Required (cf)	TOTAL (cf)
POI 5	9,448	9,414	34
POI 6	6,110	5,903	207
LOI 2	0	17	-17
LOI 3	0	44	-44
Severn River Total	**15,558**	**15,378**	**180**

Appendix D: Preliminary Submittal Comments with Responses

Preliminary Submittal Comments with Responses

Daniel Anderson:

Page 1:

1. Governor Stone Parkway is more northbound / southbound rather than westbound / eastbound roadway.
   Response: The report will be revised to refer to the roadway as northbound and southbound.

2. What is Infrastructure Management Division's (IMD) Road Rating for the pavement condition of Governor Stone Parkway?
   Response: In an email from Blake Lightcap, IMD Pavement Management Program Manager, to DPW Project Manager Sarah Gentner on December 5, 2017, Mr Lightcap stated the following: *"Governor Stone Parkway rates a 67. However, due to the amount of crack seal, it will have to be milled and resurfaced".*

3. Are any horizontal and / or vertical adjustments being made to the road portion of Governor Stone Parkway other than mill and overlay?
   Response: There are no horizontal or vertical adjustments to the roadway.

4. Alternatives 1 & 2 - The County's standard detail for an Urban Collector (P/4) is a 36' width from face of curb to face of curb; provide measurements to the face of curb; be consistent on terminology, ie, shared used path and sidewalk.
   Response: The design team is aware of discrepancies between the standard typical section P/4 for an Urban Collector compared to our proposed typical sections for Alternatives 1 and 2. We were instructed by DPW to proceed with the typical sections provided via email on 6/20/17. KCI will add a dimension labeling the distance from curb to curb. The typical sections for Alternatives 1 and 2 are currently labeled properly for a shared use path and not a concrete sidewalk.

5. Alternative 1 - There is approximately 65 feet of right of way width available along the east side of Governor Stone Parkway. Is a closed storm drain (SD) system needed? Could an open section along the east side be considered to reduce cost (SD and curb) and use sheet flow?
   Response: Governor Stone Parkway is superelevated to the west, therefore runoff will not sheet flow to the east. Ditches on the east side are to intercept and convey offsite runoff only. An open section roadway along the east side of Governor Stone Parkway would, reduce the cost of curb but would not improve drainage. In addition, as mentioned in the response to *Page 1* - comment #4, KCI was directed by DPW to provide the typical section with curb and gutter.

6. Similar to comment 5 above, what is driving the need for curb along the side of Governor Stone Parkway without the trail?
   Response: As mentioned in the response to *Page 1* - comment #4, KCI was directed by DPW to provide the typical section with curb and gutter.

7. Alternative 3 - Why is mill and resurfacing of Governor Stove Parkway required when the trail is well off of the road? What is the 4 foot wide shaded section on the typical?
   Response: The existing roadway features a 10 foot wide shoulder along the SB lane and a 4 foot wide shoulder along the NB lane. KCI was directed by DPW to center the roadway within the existing footprint by providing an 8 foot wide bike/shoulder lane and an 11 foot wide travel lane for both NB and SB. Shifting the roadway placed a portion of the SB travel lane on existing, non-full depth pavement. The 4 foot wide shaded section depicts the region where the pavement will be upgraded to full depth. The complete grinding and overlay of the roadway for this alternative is being provided due to the complete restriping of the roadway that will be required with the shift.

Page 3:

1. Are all students in Shipley's Choice Community Association (SCCA) and Shipley's Choice Homeowners Association (SCHOA) designated walkers to Shipley's Choice Elementary School (SCES)? It is suggested to obtain information from Anne Arundel County Public Schools (AACPS) Transportation to determine designated walkers to assist in determining a preferred alternative.
   Response: In an email from Sharon Whitcher, Administrative Assistant with Anne Arundel County Public Schools, to DPW Project Manager Sarah Gentner on December 12, 2017, Ms. Whitcher stated the following: "*Everyone walks to Shipley's except Kindergarten students (residing over a half mile) and students residing on the following streets: Boxelder, Live Oak, Oak Stump, Scarlet Oak, Gambel Oak, and Broadleaf*".

2. County GIS is showing a Maryland Department of Natural Resources (DNR) Sensitive Species Project Review Area at the intersection of Governor Stone Parkway and Benfield Boulevard, and the headwaters of Cool Spring Branch appears to start at the SE quadrant of the intersection of Governor Stone Parkway and Rustling Oaks Drive (that may be impacted by the trail in Alternative 3).
   Response: Comment noted. Feature studies will verify any wetland or waterway boundaries. These resources will be considered during final design. Alternative designs such as boardwalks could be utilized to avoid these features.

Page 6:

1. Alternative 3 - Just discuss the path as if this alternative were selected and no road work would be performed.
   Response: A cost estimate has been provided for Alternative 3A. This alternative is identical to Alternative 3 for the path location. However, all roadway improvements have been removed.

Page 8:

1. Alternative 2 Drainage - How does this side drain now? Earlier discussion on page 4 indicates it is in good condition?
   Response: Existing stormdrain structures will be impacted to a varying degree based on the design alternative, regardless of existing condition. Converting the open section roadway to closed section concentrates flow along the proposed curbline that would otherwise sheet flow off the roadway, and would therefore require significant closed stormdrain improvements in order to comply with Chapter V of the Anne Arundel County Design Manual.

2. What would be the issue of decreasing the width of the existing 10' shoulder to say 8' or 5' and utilizing the existing SD system?
   Response: Converting the open section roadway to closed section concentrates flow along the proposed curbline that would otherwise sheet flow off the roadway and would therefore require significant closed stormdrain improvements in order to comply with Chapter V of the Anne Arundel County Design Manual. However, reducing the shoulder width may reduce the need to replace/relocate some of the existing yard inlets that are impacted by the proposed path.

3. Alternative 3 - The 4' wide full depth section, is it paved but failing now?
   Response: Please see the response to *page 1* - comment 7 above.

4. We don't necessarily need an 8' wide bike shoulder.
   Response: Comment noted.

Appendix A:

1. Alternatives 1 and 2 - The 2:1 maximum slopes differ along the right and left sides of the typical sections, is this how the existing conditions are?
   Response: The cut/fill varies by location throughout the roadway corridor. The cut section is shown on the left in Alternative 1 and on the right for Alternative 2 to show where the proposed drainage ditches are located.

2. Alternative 3 - What is the approximate length of the 4' widening?
   Response: There is no widening for this alternative. As mentioned in the response to *Page 1* – comment 7, a 4 foot wide full depth pavement section is being provided for the length of the roadway.

Appendix B:

1. Alternative 3 - What is the $85K for sidewalk?
   Response: All of the alternatives require a similar amount of concrete sidewalk. Concrete sidewalk is being used for all sidewalk and trail ramps at intersections. Also, concrete sidewalk is being used to tie into existing pedestrian facilities at several intersections within the project.

Other:

1. I don't see any discussion about the connection to the existing trail at the intersection of Governor Stone Parkway and East West Boulvard.
   Response: This connection is mentioned in Section 1.0 Introduction. Further discussion has been added to Section 3.0 Proposed Shared Use Path.

2. I would like to see a revised cost estimate for a preferred alternative based on the above.
   Response: Please see the response to page 6 - comment 1 above.

Tanya Asman:

1. Transportation prefers Alternate 3. It meets our needs and is the least expensive.
   Response: Comment noted.

2. Just to be certain, the improvements on East West Boulevard are to replace the sidewalk with the 10 foot shared use path, correct? If not, we'd request that it did.
   Response: The improvements on East West Boulevard include updgrading the existing sidewalk to a 10 foot wide shared use path.

Nestor Flores:

1. The report needs to be consistent with the description used for how Governor Stone Parkway is oriented. Different sections of the report infer that the road is oriented north/south, while other sections the description infers the road travels east/west. First section in Page 1 infers east west travel, while bottom of page 1 refers to northern and southern terminus. Similar page 9 there is inference to north/south.
   Response: Page 1 has been revised to state either northbound or southbound.

2. We are working with communities in the area and we recently received a request to evaluate the opportunity to provide a left turn lane into SCES. The concern is due to the queuing taking place, vehicles are using the shoulder to bypass the queue. Recent changes in the vehicle law allows vehicles to use the shoulder to pass a left turning vehicle, however, it is not clear if the law allows passing of multiple vehicles. I believe that the Alternative 3 cross-section would allow for a left turn lane and still keep the 4 foot shoulder. Can we ask the consultant to confirm my observation?
   Response: The current roadway width at this location is approximately 38 feet wide (4' sb shoulder, 12' sb lane, 12' nb lane, and 10' nb shoulder). Providing three, 11 feet wide lanes at this location would only leave 5 feet to be distributed to both shoulders. If a left turn is desired at this location, we feel that it would be best added during the final design of the project and not during the concept stage. The storage length of the turning lane would also need to be determined.

Claudia O'Keeffe:

1. The Watershed Protection and Restoration Program (WPRP) recently completed a restoration/pond retrofit project downstream of (part of) this site. "Shipley's Choice Pond Retrofit" The project included "Retrofit dry pond as a seepage wetland system and upgrade Shipley's Choice stormwater drainage system." Is there spare capacity in the upgraded stormwater system to accommodate some of the additional impervious from this project?
   Response: The above-mentioned wetland system and wet detention pond to the east of Springbloom Drive were noted during our investigation as an opportunity to provide water quality treatment. However, at planning level it is not conservative to make an assumption that may under-represent the project impacts, right-of-way needs, and cost. The stormwater layout for each alternative does not reflect potential water quality treatment by these facilities. It is recommended that this investigation for impervious area water quality credit in existing stormwater BMPs be included in subsequent phases of the design.

2. Highways prefers Alternative 3. Alternative 3 requires no right of way acquisition and is significantly lower in cost than the other two options. Alternative 3 also may result in a lower than estimated utilities costs as the meandering path will be able to avoid some utilities conflicts.
   Response: Comment noted.


KCI