

MASTER PLAN BROADNECK PENINSULA TRAIL

Prepared for:

Anne Arundel County, Maryland

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INTRODUCTION

Human & Rohde, Inc. has prepared this Master Plan and report for the development of a multi-use trail to connect the Chesapeake Bay Bridge and Sandy Point State Park with the Baltimore & Annapolis Trail (B&A Trail). The proposed trail would offer a safe travel way for residents of the Broadneck Peninsula and users of the American Discovery Trail, a national trail, providing access to the existing and proposed trail network in Maryland and beyond. As part of this plan, Human & Rohde, Inc. has identified possible alignments for connector trails to other public facilities including schools and parks on the Broadneck Peninsula.

In preparing the Master Plan, Human & Rohde, Inc. explored the entire area to determine the best location for the trail. We investigated existing and proposed land uses, and ownership of land to identify public resources, such as schools and recreation sites, flood plains, and utility corridors.

We gathered right of way information and investigated the traffic volumes on area roadways to determine the feasibility of on-road bike routes as opposed to an off-road trail. We also evaluated road crossings and intersections. We identified topographic features, wetlands, utility easements, and drainage ways.

The alignment suggested here reflects our best effort to provide the residents of the Broadneck Peninsula with a trail system connecting them with Sandy Point State Park / Chesapeake Bay Bridge and the B&A Trail, as well as providing them access to public facilities on the peninsula in an efficient and safe manner.

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SCOPE OF WORK

Anne Arundel County Department of Recreation & Parks has three main goals for the implementation of the Broadneck Peninsula Trail:

1. To provide access for hikers and bikers on the Broadneck Peninsula to the Baltimore & Annapolis Trail and to Sandy Point State Park.
2. To connect neighborhoods on the Broadneck Peninsula with one another and with public facilities via connector trails from the main trail.
3. To provide a link between the Baltimore & Annapolis Trail and the Chesapeake Bay Bridge to Maryland's Eastern Shore for the American Discovery Trail, a national trail extending from Cape Henlopen, Delaware, to Point Reyes, California. The Broadneck Peninsula Trail will also intersect with the Maine and Georgia East Coast Greenway at its western terminus.

The primary trail objectives are:

1. To provide a trail system that minimizes conflicts with other forms of transportation.
2. Maximize use of existing open space and publicly owned lands including linear rights-of-way, such as highway corridors and drainage ways, to minimize conflicts with private land owners.
3. Minimize environmental impacts.
4. Align the trail to take advantage of the natural features of the Broadneck peninsula.

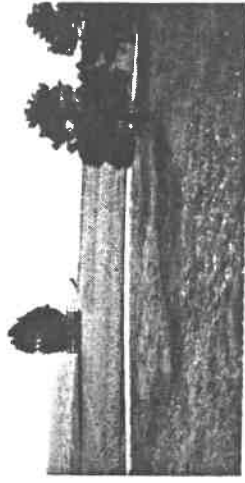
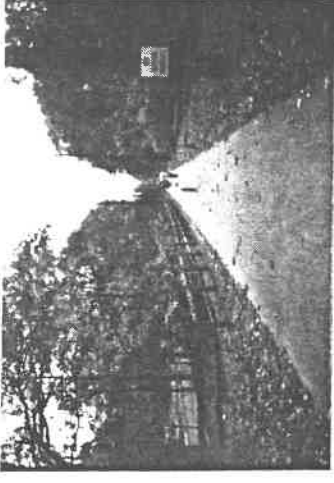
5. Design the trail to accommodate the needs of a broad spectrum of users including walkers, runners, bicyclists, in-line skaters, and (seasonally) cross country skiers.

A major goal of the Broadneck Peninsula Trail is to provide a link for hikers and bikers between the Bay Bridge and the B&A Trail. The B&A Trail runs north and south from Glen Burnie to Jonas Green Park at the Naval Academy Bridge and entrance to Annapolis. Planned future trails from Annapolis, (e.g. South Shore, and WB&A Trails in Anne Arundel and Prince Georges Counties) will link the B&A Trail to existing and future trails in Washington, D.C. and points west and south. The B&A Trail's north terminus links with the Baltimore Washington International (BWI) Trail. The BWI Trail will connect with trail systems heading west following the Patapsco River and north through Baltimore City along the Gwynns Falls Trail and eventually to the North Central Trail into Pennsylvania.

Eventually, the Broadneck Peninsula Trail would be part of an even broader trail system; the American Discovery Trail. The American Discovery Trail (ADT) is envisioned to be the first coast to coast hike/bike trail. It is planned to begin at Cape Henlopen, Delaware and end in Point Reyes, California, traveling over 6,000 miles through several cities such as Washington, D.C., St. Louis, Denver, and San Francisco. It will also travel through 14 national parks and 16 national forests and intersect with north/south trails, such as the Appalachian, Continental Divide, and Pacific Crest Trails, as well as the planned East Coast Greenway. The alignment of the ADT crosses Maryland's Eastern Shore to the Bay Bridge. The proposed Broadneck Peninsula Trail would be the ADT route from the Bay Bridge to the B&A Trail, following the B&A Trail to Annapolis.

The East Coast Greenway (ECG) is another inter-state multi-use trail system that will extend about 2,000 miles from Maine to Florida when complete. The B&A Trail has already been designated as part of the East Coast Greenway.

The Broadneck Peninsula Trail consequently would serve as an important link with the B&A Trail not only for the residents of the Broadneck Peninsula, but also for long distance hikers and bikers traveling across the state and the entire nation.



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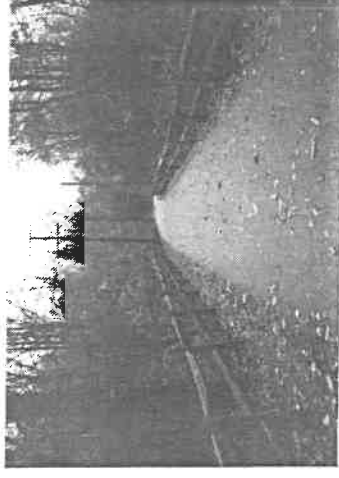
OVERALL SETTING

The Broadneck Peninsula is located in east central Anne Arundel County and is bounded by the Chesapeake Bay on the east, the Severn River on the south, and the Magothy River on the north. The peninsula is approximately 9 miles long and 4.5 miles wide at the broadest point. The land mass can be characterized as a ridge running the length of the peninsula with numerous deep ravines cut by streams and creeks that empty into the Severn and Magothy Rivers. The Broadneck Peninsula is linked with the rest of the County by two major roadways: The Blue Star Memorial Highway / Route 50/301, and Governor Ritchie Highway / Route 2. The Blue Star Memorial Highway is a multi-lane controlled access freeway that runs east and west linking Washington D.C. and Annapolis to the Eastern Shore via the Chesapeake Bay Bridge. Governor Ritchie Highway is an arterial collector road that runs north and south linking the Baltimore region with Annapolis via the U.S. Naval Academy Bridge. College Parkway is the only arterial road that runs the length of the peninsula, loosely following the ridge line. Because of the numerous ravines and streams, pockets of development have occurred on fingers of land between the ravines with the collector streets emptying onto College Parkway.

The Broadneck Peninsula is zoned primarily for single family residential use with a few pockets of multi-family use. There are currently approximately 38,363 residents who are serviced by six elementary schools, two middle schools, and one high school. Anne Arundel County Community College is also located on the peninsula, as is one public library. There are several County parks including Arnold, Broadneck and Cape St. Claire Parks, as well as Sandy Point State Park. The B&A Trail runs through the western end of the peninsula. Several small commercial areas service the needs of the surrounding neighborhoods and communities. The population on the Broadneck Peninsula is projected to increase to 41,874 by the year 2020.

PROPOSED TRAIL ALIGNMENT

As proposed, the Broadneck Peninsula Trail would be approximately 6.6 miles long excluding the connector trails and extension to Sandy Point State Park. The trail would begin at the B&A Trail approximately 600 feet south of mile marker 3, about .6 mile south of the intersection at Jones Station Road and Baltimore & Annapolis Boulevard. The trail would cross B&A Boulevard and extend through a parcel of land owned by Baltimore Gas & Electric Company, to Governor Ritchie Highway (Route 2), and follow Route 2 right-of-way south to the intersection of West Campus Drive. The trail would then cross Route 2 at the existing signal. Once east of Route 2, the trail would be on the campus of Anne Arundel County Community College. It would parallel West Campus Drive and pass behind the Cade Center for Fine Arts and Florestano Allied Health Building, utilizing the existing pedestrian bridge over a small tributary of Dividing Creek. It would then parallel Campus Drive on the west side, avoiding conflicts with campus operations. The trail would remain on the campus along College Parkway to the intersection of Jones Station Road.



At Jones Station Road (west), College Parkway is in a fill situation on the south side. The grade falls off sharply behind the existing guardrail. It may be necessary to construct a retaining wall to provide room for the trail. The proposed trail would cross College Parkway at Jones Station Road. The intersection is currently not signalized; however, there is an existing median in the roadway. The trail from this point to East College Parkway parallels College Parkway along the north side within the existing right-of-way. The right-of-way varies from a minimum of 120 feet to a maximum of 250 feet. College Parkway from Jones Station (east) has two lanes with 8-10 foot shoulders on each side. Long term plans for College Parkway call for four lanes with the expansion occurring on the north side.



Assuming sufficient room for the trail within the right-of-way, the biggest obstacles for trail construction would be the cut and fill slopes adjacent to the roadway. Between Kimwood Road and Bellerive there are five areas where grades along the roadway fall off quickly into ravines. In these areas, it may be necessary to retain a portion of the slope to allow for a 10 foot wide trail. If necessary, a 2 foot wide concrete median could be used to separate the trail from the travel lanes. Where College Parkway is in a cut situation, retaining walls may also be necessary to maintain a 5% or less gradient on the trail or to avoid massive grading destroying the existing vegetation that provides a buffer between the road and the adjoining properties.

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Between Jones Station Road (west) and Cape St. Claire Road, there are several road crossings, some with traffic signals, others with stop signs. There are also a few driveway crossings.

Crossings with Signals

Jones Station Road (east)
Kimwood Road
Shore Acres Road (north)
Bay Dale Drive
Bellerive Road / Pennington Lane
Green Holly Drive
Cape St. Claire Road / St. Margaret's Road

Crossings Without

Terwing Drive
Rosslare Drive
Shore Acres Road (south)
Bellerive Road (west)
Falcon Nest Court
Commander Way

The Site Constraints section of this report will provide additional information regarding road crossings.

At the intersection of College Parkway and Old Cape St. Claire Road / East College Parkway, the trail would cross to the east side of East College Parkway and cross Peregoy Park Place. The trail alignment through this area would be subject to future redevelopment. This area is an old commercial district that serviced the traffic on the Blue Star Highway (Route 301/50). Access to Route 50 has been eliminated causing most of the businesses along East College Parkway to close. Studies are currently underway for the redevelopment of the area. The alignment for the trail should be incorporated into those plans.

Once beyond the commercial district, the trail would parallel East College Parkway along the north side to Bay Head Road crossing Revell Downs Road. This part of the Broadneck Peninsula is very flat, which would make trail construction easy; however, East College Parkway is a State road and right-of-way may be limited. Revell Downs Community open space appears to abut East College Parkway, providing a screen to nearby residences.



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The trail would cross Bay Head Road to the east side and head north paralleling Bay Head Road to the former Nike site which is planned to become an Anne Arundel County Park facility and the trail terminus. The trail would cross in front of two privately owned parcels before reaching the Nike site. Right-of-way along Bay Head Road is 30 feet. Restrooms and trail information would be available at this facility and it would also be the drop off / pick up site for shuttle service for cyclists and pedestrians traveling across the Bay Bridge. Because Sandy Point State Park reaches its user capacity early in the day on busy weekends and holidays, Anne Arundel County was discouraged from using it as the terminus. When capacity is reached, the park is closed and its facilities would not be available to trail users. Signage would be posted at the Nike site informing users of this possibility. A trail extension would link Sandy Point State Park and the proposed park at the former Nike site.



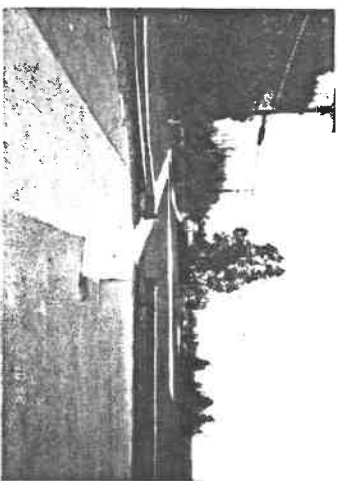
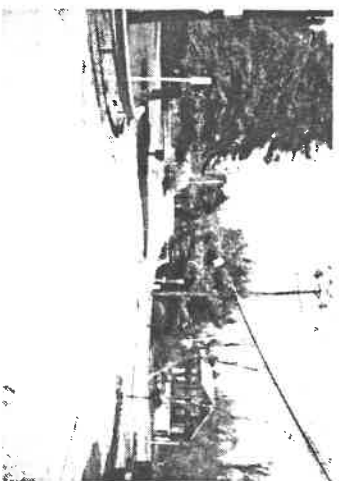
PROPOSED CONNECTOR & ALTERNATIVE TRAILS

The second goal Anne Arundel County hopes to achieve with the implementation of the Broadneck Peninsula Trail is to connect the various neighborhoods on the Broadneck Peninsula with one another and with public facilities. This chapter discusses the “connector trails” that link the main trail with public facilities, i.e., schools, parks, and shopping centers.

It is the desire of Anne Arundel County to provide off-road trails wherever possible. As proposed, the entire length of the main trail form the B&A Trail to the former Nike site on Bay Head Road would be an off-road trail. Some of the connector trails, however, parallel older roads and neighborhoods where the existing right-of-ways are not as wide, making off-road trail construction both difficult and costly. Therefore, some of the proposed connectors are bike lanes or bike routes (see Appendix) with pedestrian traffic utilizing existing walkways.

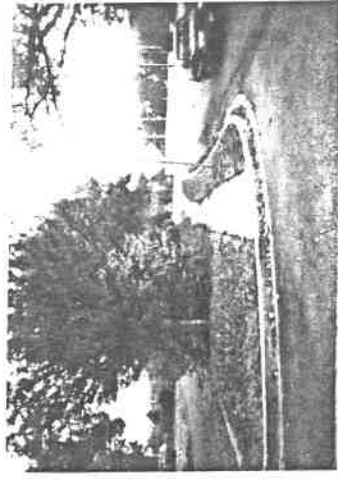
1. Bicycle Route from the B&A Trail to Peninsula Farm Road via Jones Station Road

This connector is an existing designated bike route. A map located on the B&A Trail at the intersection of the trail and Jones Station Road, shows trail users how to reach Anne Arundel Community College via this route. A drinking fountain and a telephone are also available at this location. A Park & Ride is located at the intersection with Governor Ritchie Highway and Jones Station Road. The traffic signal at Ritchie Highway is equipped with a pedestrian sequence and crosswalks, and crosswalks are also provided to Manhattan Beach Road and Jones Station Road. Jones Station Road is a residential road with limited County right-of-way and no sidewalks or curbs. The road ends with a cul de sac, and a paved trail connects the cul de sac to Peninsula Farm Road. Because of the desire to provide an off-road trail for the length of the Broadneck Peninsula Trail, this route was not desirable as the primary alignment. The bike route does, however, provide a short cut for trail users traveling from points north on the B&A Trail to the Broadneck Peninsula Trail and vice versa.



2. Off-Road Trail from College Parkway to Twin Oaks Park, Magothy River Middle School, and Severn River Middle Schools

Twin Oaks Park, an Anne Arundel County facility, Magothy River and Severn River Middle Schools, are located approximately a block north of College Parkway on Peninsula Farm Road. In order to connect these facilities with the trail, it would be necessary to equip the existing traffic signal at the intersection of Peninsula Farm Road and College Parkway with a pedestrian/bike sequence and provide crosswalks. Trail users would cross from the south side of College Parkway to the north and up the east side of Peninsula Farm Road. There are existing free right turn lanes at this intersection which would cause a hazard for trail users. Appropriate signage and crosswalks would help mitigate the situation. The existing sidewalk could be widened to 8 or 10 feet and pedestrian ramps added to accommodate trail users. Once on the school's site there appears to be sufficient area to provide for a trail. Twin Oaks Park is across Peninsula Farm Road from the schools.



3. Bicycle Lane Connector to Belvedere Elementary School and Mago Vista Park

The proposed bike lanes to Belvedere Elementary School would leave the main trail where it crosses from the south side of College Parkway to the north side at Jones Station Road (west). Jones Station Road between Campus Green Drive and College Parkway would need to be improved (i.e., sidewalks constructed and culvert extended); however, beyond Campus Green Drive there appears to be sufficient right-of-way to Mago Vista Road for bike lanes. Pedestrians would use the existing sidewalk on the north side of Jones Station Road. Right-of-way on Mago Vista is more limited. Currently a parking lane exists on the west side of the roadway. In order to provide bike lanes, the road would need to be restriped. Between Hollins Road and Broadwater Road, the County may need to acquire right-of-way. At Broadwater Road the trail would enter onto school property. Pedestrians would use the existing sidewalk on the west side of Mago Vista. Appropriate signage, crosswalk markings, and bike lane striping would be required at all intersections and along the length of the connector.

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4. Off-Road Trail along Shore Acres Road to Broadneck Elementary School

An off-road trail is proposed to link the Broadneck Peninsula Trail with Broadneck Elementary School. There appears to be sufficient County right-of-way along Shore Acres Road to allow for an off-road trail along the west side of Shore Acres to the school. A 2 foot wide concrete median could be used to separate the trail from the roadway. Appropriate signage and/or crosswalks would be required at all intersections and driveway crossings.

5. Bicycle Lanes to Arnold Park

Arnold Park, another Anne Arundel County facility, is south of College Parkway on Broadneck Road directly behind the garden center at the intersection of Shore Acres Road (north). The most efficient, safest route for a connector to the park would cross College Parkway at this signalized intersection and enter the park along the east side of the garden center; however, the property is privately owned, and steeply sloping to the park. Bike lanes could be provided along Shore Acres Road (south) and Jones Station Road to an exiting entrance to the park. There is no traffic signal at College Parkway and Shore Acres Road (south). Appropriate signage and crosswalks would be required.

6. Bicycle Route on Church Road to Arnold Elementary School and the B&A Trail at Arnold Station Shopping Center

The link between the Broadneck Peninsula Trail, Arnold Elementary School, and the B&A Trail at Arnold Station Shopping Center would be appropriate for experienced bike riders only at this point in time. Church Road is curbed, relatively narrow, heavily used, and lacks sufficient right-of-way to provide an off-road trail or bike lanes. Bicyclists would be required to share the travel lanes with vehicles. There are sidewalks for pedestrian traffic on the north side of Church Road and Arnold Road to Governor Ritchie Highway. The intersection of Arnold Road and Ritchie Highway is signalized and equipped with a pedestrian sequence and crosswalk. The B&A Trail can be accessed behind the Arnold Station Shopping Center. An existing





sidewalk links Arnold Elementary School with Church Road. It would be desirable in the future to widen the existing sidewalk to 8 feet to provide an off-road alternative for all users.

7. Off-Road Trail Along Bay Dale Drive

An existing off-road trail follows Bay Dale Drive south from College Parkway to Old Mill Road north of Route 50/301. This trail would provide access for communities south of College Parkway to the main trail. The intersection at Bay Dale and College Parkway is signalized with a pedestrian/bike sequence and crosswalks. An existing sidewalk provides access north to the shopping center. Ideally, the sidewalk should be widened to accommodate users other than pedestrians. However, signal poles and a transformer are obstacles.

In the future the Bay Dale Trail could be continued, providing another “short cut” to Annapolis. The trail could be extended across the bridge over Route 50/301 to Ferguson Road, parallel Ferguson Road to the end, and connect with Baltimore & Annapolis Boulevard. The alignment then would follow Baltimore & Annapolis Boulevard to an appropriate point and out to Route 450 and the B&A Trail. Bicyclists could also use Old Mill Bottom Road south of Route 50/301 to connect St. Margaret’s Road to Ferguson Road and the Bay Dale Trail.

8. Off-Road Trail to Windsor Farm Elementary School and Broadneck Park

Windsor Farm Elementary School on Broadneck Road and Broadneck Park are south of College Parkway. Proposed access to these facilities would be provided from the main trail at the intersection of College Parkway and Green Holly Drive. A pedestrian/bike sequence would need to be added to the existing signal and a crosswalk provided. Once south of College Parkway, the trail would be on Anne Arundel County property, Broadneck Park. A trail would then continue south across park property to Broadneck Road, parallel the road to a point opposite the school, and cross Broadneck Road. Appropriate signage and crosswalks would be required. A trail would also split off of this alignment and connect with the existing loop trail in Broadneck Park.

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9. Off-Road trail to the Broadneck Library and Senior High School

The Broadneck Peninsula Trail would pass along the side of the library and senior high school complex. Access to these facilities would be easy to achieve at the library via a paved connector trail.

10. Access to Cape St. Claire Elementary School, Cape St. Claire Park, and Shopping Center

An off-road trail is proposed along the west side of Cape St. Claire Road to Hill Drive to connect Cape St. Claire Elementary School, Park, and the Cape St. Claire community to the main trail. Cape St. Claire Road has been improved from the intersection at College Parkway to beyond the entrance to the Admirals Walk development. Right-of-way should be sufficient through this section to allow for a trail, although it may be tight where a stormwater management facility abuts the road. North of Admirals Walk development, the road narrows and is unimproved. The properties between Admirals Walk and Hill Drive have subdivision potential and if developed, the trail should be included in the infrastructure improvements. The County owns right-of-way to the school property from Cape St. Claire Road. Access to the school and recreation facilities adjacent to it would be within this right-of-way; however, steep slopes may present a problem.

The master plan also indicates a bike route on old Cape St. Claire Road, providing a short cut between the main trail and Cape St. Claire Road. This section of road ends in a cul de sac, which has minimal traffic; an existing path links the cul de sac to Cape St. Claire Road. This short cut would place the user onto Cape St. Claire Road on the east side, creating a need for a trail on the east side of Cape St. Claire Road to an intersection where trail users could cross the road and connect into the trail on the west side of the road.

11. Bicycle Route to Annapolis via St. Margarets Road and B&A Boulevard

At this time, St. Margarets Road and B&A boulevard to Route 450/ the B&A Trail is the designated bike route of the American Discovery trail (ADT) to Annapolis. St. Margarets Road and B&A boulevard both

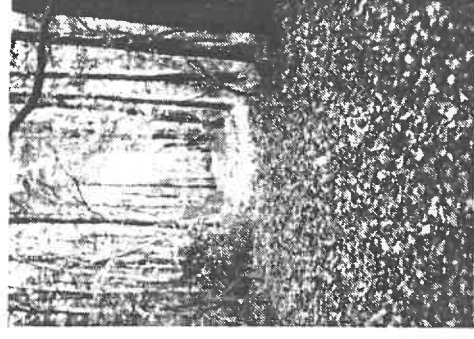


have historical and scenic qualities that make this a desirable bike route, however, improvements need to be made to the roadways to make it safe for bicycles. St. Margarets Road is an old two lane State highway and for most of its length has narrow shoulders and no sidewalks. The minimum right-of-ways on St. Margarets Road are 30 feet between Route 450 and Pleasant Road and 40 feet between Pleasant Road and Route 50/301 interchange. It is also winding with some steep grades. In order to provide a safer bikeway along St. Margarets Road, right-of-way would need to be acquired from adjacent property owners to provide minimum four (4) foot wide shoulders. Because it is a State roadway, the directive to make improvements would come from the State Highway Administration and not Anne Arundel County. B&A Boulevard is also a State road and would need similar treatment. For these reasons, once the Broadneck Peninsula Trail is completed to the B&A Trail, it would become the designated route for the American Discovery Trail to Annapolis. St. Margarets Road would remain a short cut to Annapolis for aggressive bike riders.

12. Trail Extension to Sandy Point State Park

Because of the crowded conditions at Sandy Point State Park on summer weekends and holidays, the Broadneck Peninsula Trail would formally terminate at the former Nike site/proposed park on Bay Head Road. Restroom facilities, parking, and information concerning the Broadneck Peninsula trail and Sandy Point State Park, would be available at this location. Since many trail users would want access into Sandy Point, a loop-trail extension would be provided from the Nike site through the undeveloped portion of the park. The proposed loop trail would head north along the east side of Bay Head Road from the Nike site to Pettebone Drive. In order to provide an off-road trail on Bay Head Road, the County would need to acquire right-of-way to augment the existing thirty foot right-of-way. The trail would stop at Pettebone Drive, where trail users would take Pettebone Drive to access an open space easement that would link into park land. Because the Pettebone subdivision is small and will generate little traffic, trail users could share the roadway safely. Once on park land, the alignment would follow an existing trail to Yorktown Road. This section of park is a nature preserve and would give trail users an opportunity to experience the natural habitat of the Broadneck Peninsula.

The trail would cross Tydings Road and continue east to Log Inn Road through another undeveloped area. Tydings Road and Log Inn Road are both rural with limited traffic; with the appropriate signage and crosswalks, crossing should not be a problem. At Log Inn Road, the proposed trail would connect to an existing trail that would take trail users through the woods to Sandy Point State Park's Visitors Center.



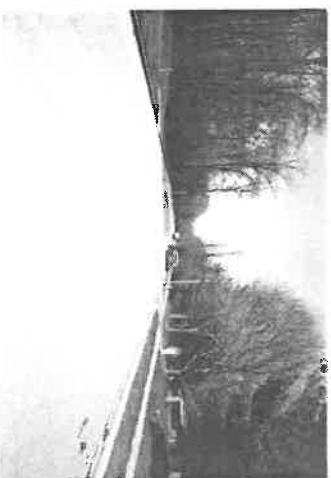
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At the Visitor's Center, trail users could obtain information about the park and its facilities; however public restrooms are not available there. From the Visitors Center, the trail would loop around to East College Parkway and Log Inn Road, where it would parallel East College Parkway west across Yorktown Road and into the eastern edge of the Nike site. The County may need to acquire right-of-way along East College Parkway to provide an off-road trail: a concrete median may be used to separate the roadway from the trail. Because East College Parkway parallels Route 50/301, a highway with heavy volumes of fast moving vehicles, locating the trail on the north side of East College Parkway is advisable. Appropriate signage and crosswalks would be required at all road crossings, as well as signage at all driveway crossings. Some culverts would need to be extended.

13. Alternative Trail Alignment between Bay Head Road and Cape St. Claire Road

In an attempt to let the trail users glimpse a little of the water that surrounds the Broadneck Peninsula on three sides, this alternative alignment is proposed. It would take trail users across the Little Magothy River from Bay Head Road via Woods Landing Drive to Cape St. Claire Road. This alignment would cross Bay Head Road at Woods Landing Drive from the proposed loop trail to Sandy Point. Bike lanes would be sufficient on Woods Landing Drive because of the ample road width and limited residential traffic volume. Pedestrians would use existing walks. At the western end of Woods Landing Drive, a trail would leave the road and follow a utility easement to the river where the alignment would follow the grades to a point opposite County owned property on the western side of the river. The trail would cross the river via a bridge and continue to Cape St. Claire Road to the north of Cape St. Claire Fire Station No. 19. Though this plan has visual appeal, several obstacles may preclude its implementation: acquisition of the needed right-of-way, problems associated with the flood plain / wetland along the Magothy, the steepness of the slopes along the river.

We have attempted to connect many of the public facilities on the Broadneck Peninsula with the Broadneck Peninsula Trail to enable residents the opportunity to travel about on their bikes or by foot. Wherever possible, along the length of the trail, connectors should be provided into the neighborhoods and crosswalks and pedestrian sequences added to existing traffic signals to allow residents along College Parkway access to the trail.

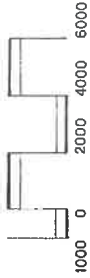


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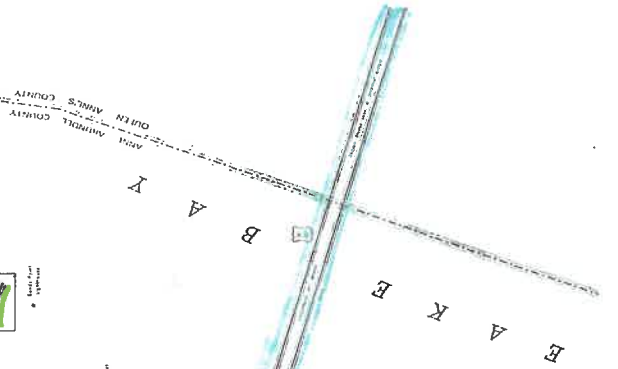
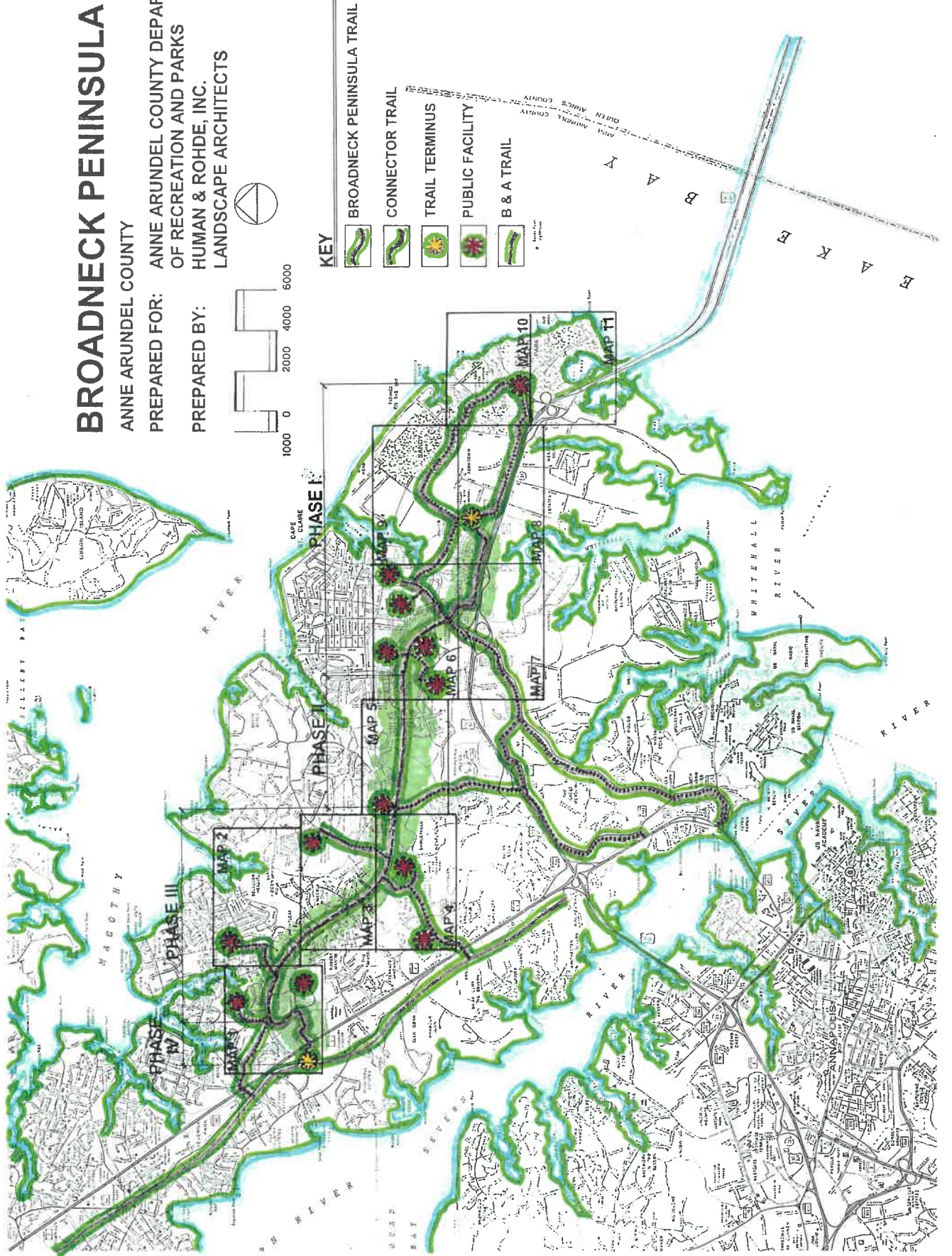
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OF RECREATION AND PARKS

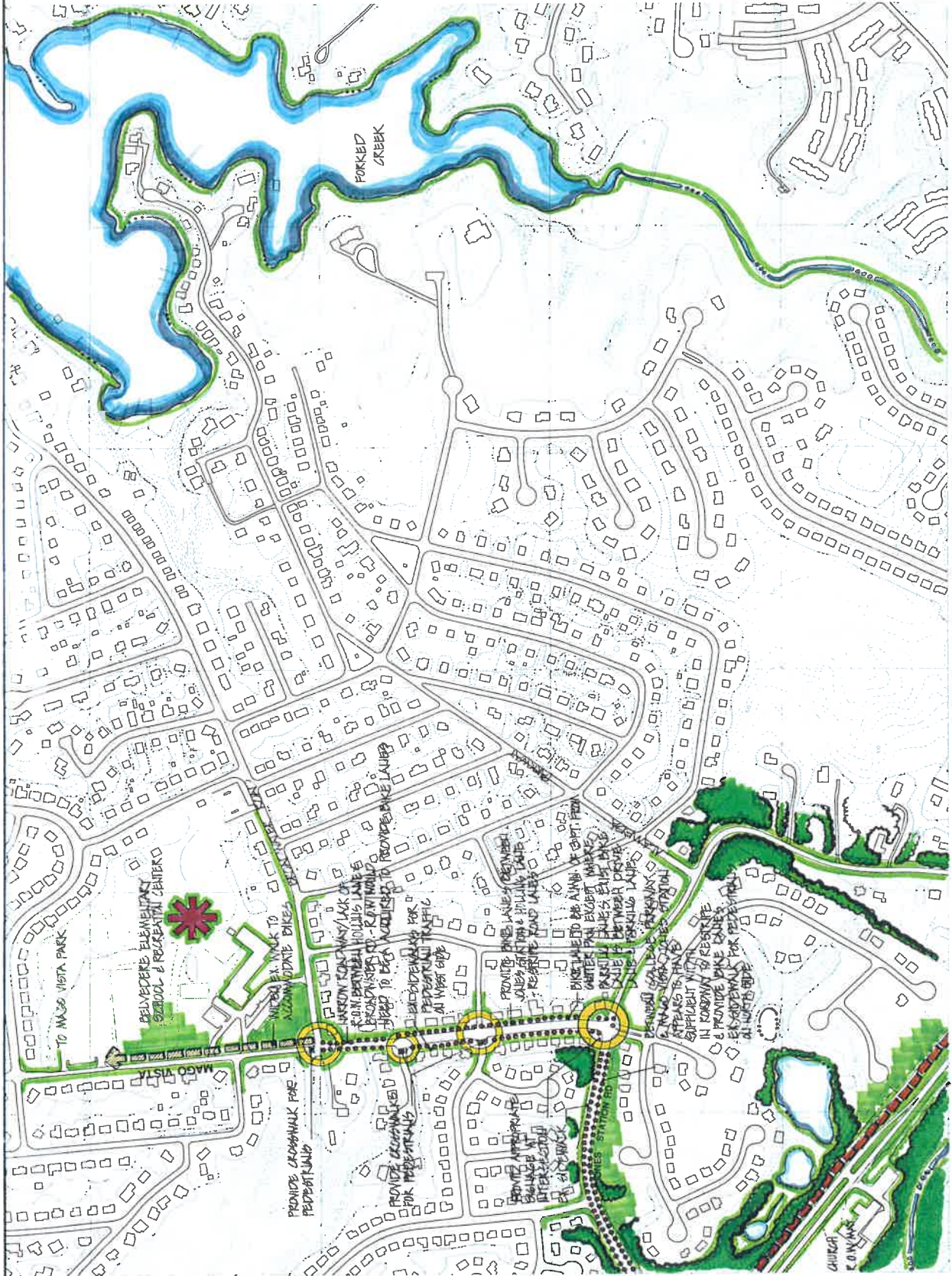
PREPARED BY: HUMAN & ROHDE, INC.
LANDSCAPE ARCHITECTS



KEY

- BROADNECK PENINSULA TRAIL
- CONNECTOR TRAIL
- TRAIL TERMINUS
- PUBLIC FACILITY
- B & A TRAIL



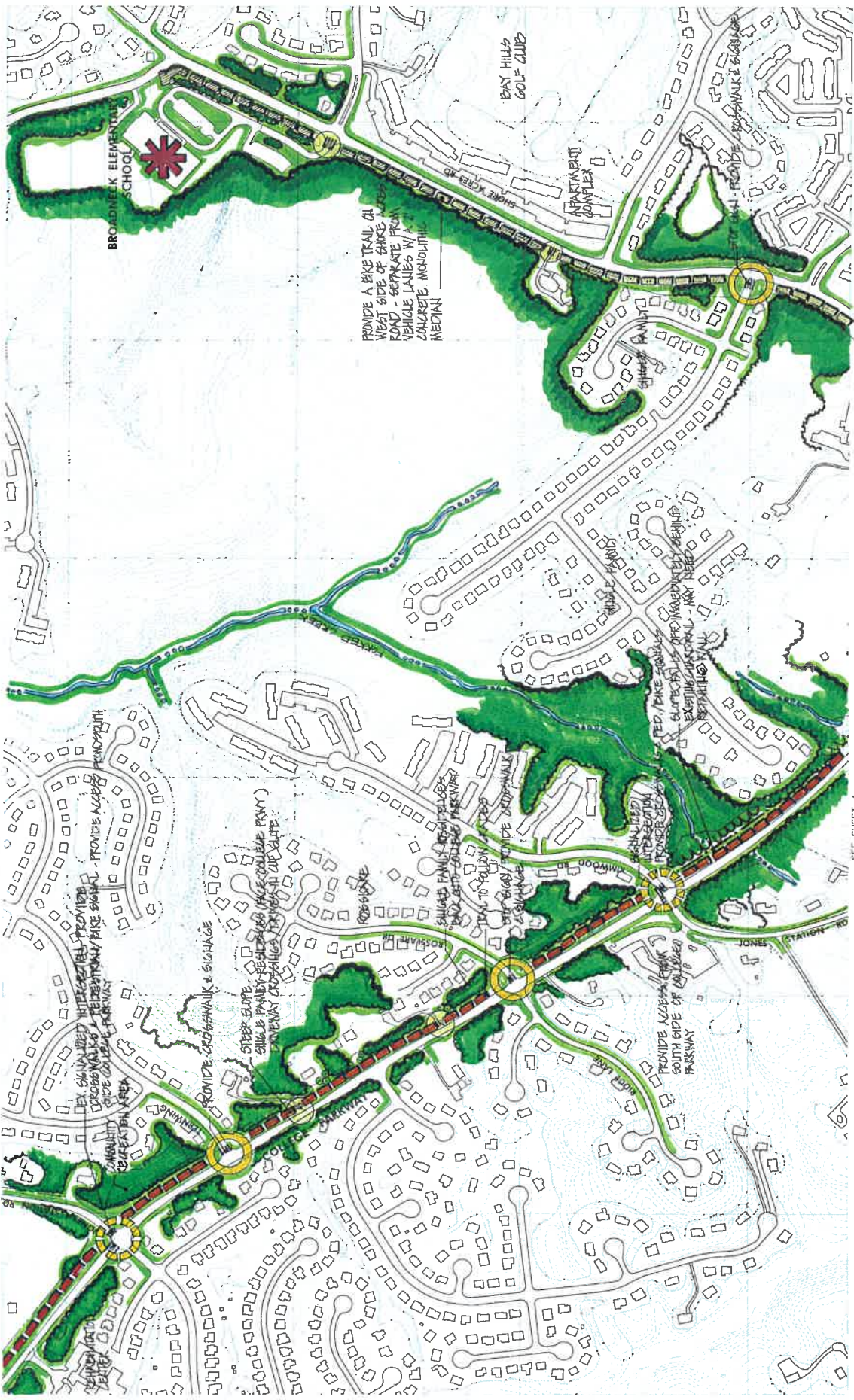


SEE SHEET 1

SEE SHEET 3

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APPROVED	ANNE ARUNDEL COUNTY	
DIRECTOR, RECREATION AND FINES	DEPARTMENT OF PUBLIC WORKS	BUREAU OF ENGINEERING
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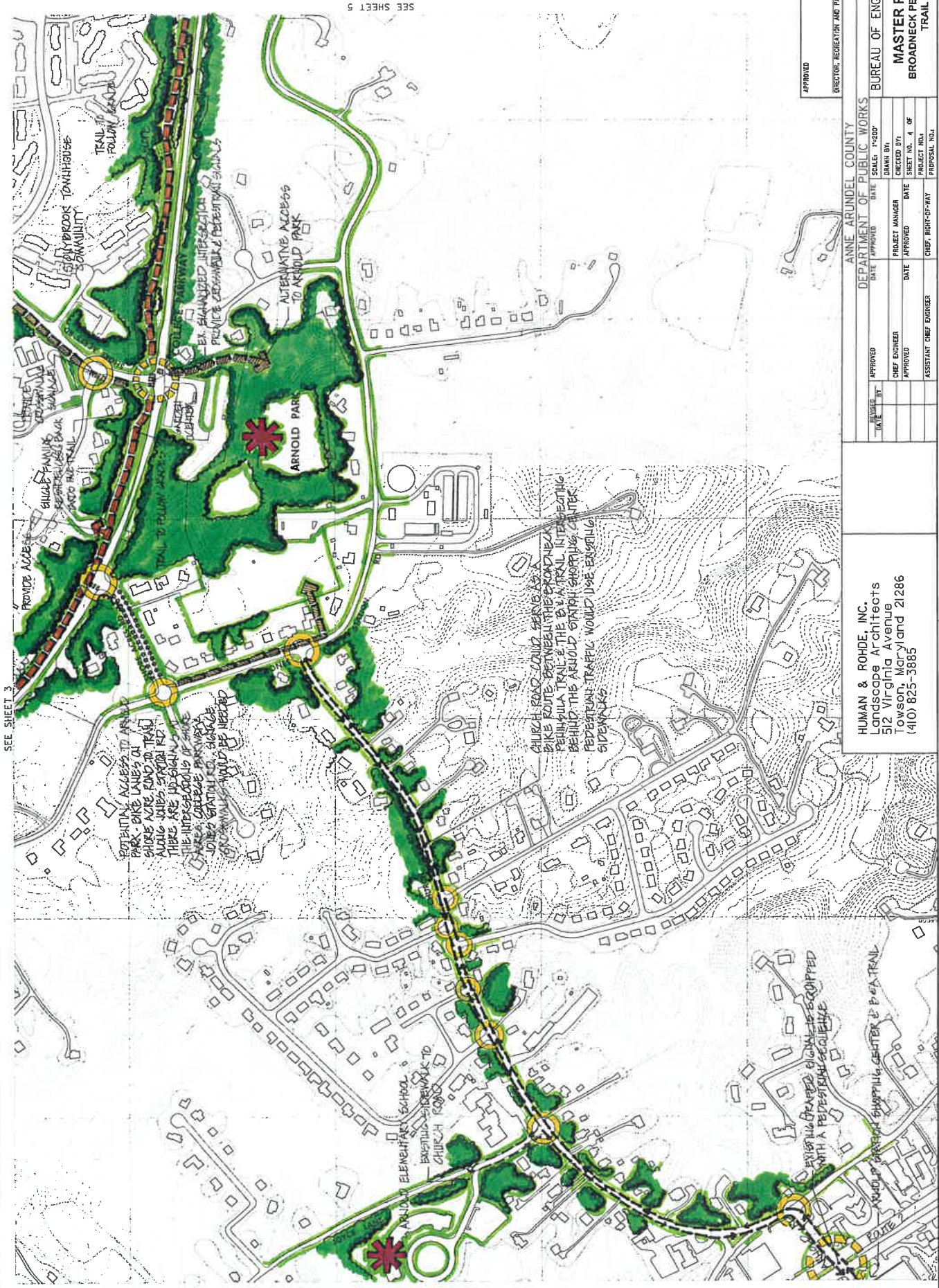
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APPROVED _____ DATE _____
 DIRECTOR, RECREATION AND PARKS

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MASTER PLAN BROADNECK PENINSULA TRAIL		ASSISTANT CHIEF ENGINEER _____	CHIEF, RIGHT-OF-WAY _____	PROPOSAL NO. _____

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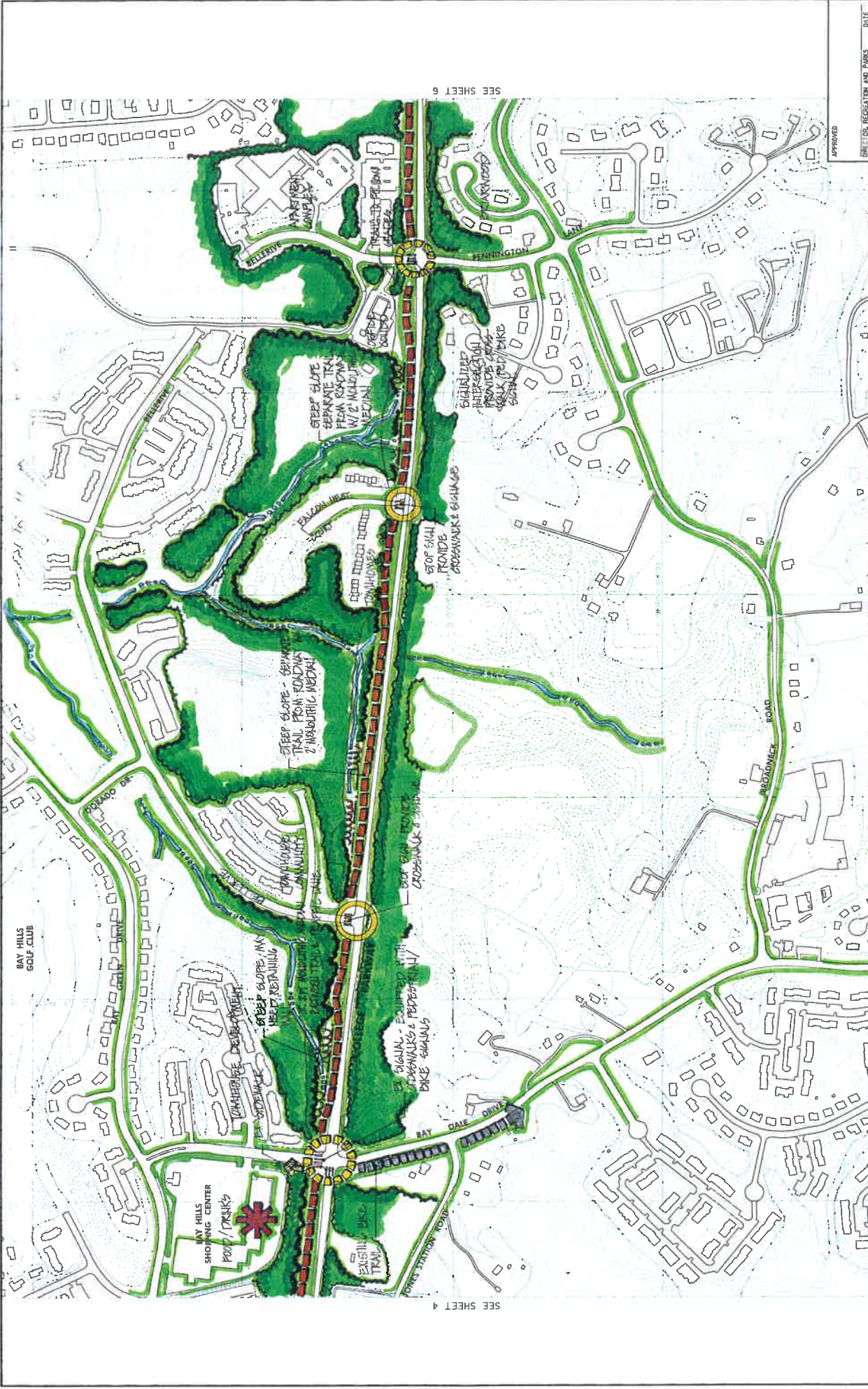
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MASTER PLAN
 BROADNECK PENINSULA
 TRAIL



SEE SHEET 6

SEE SHEET 4

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ENGINEER, RECREATION AND PARKS

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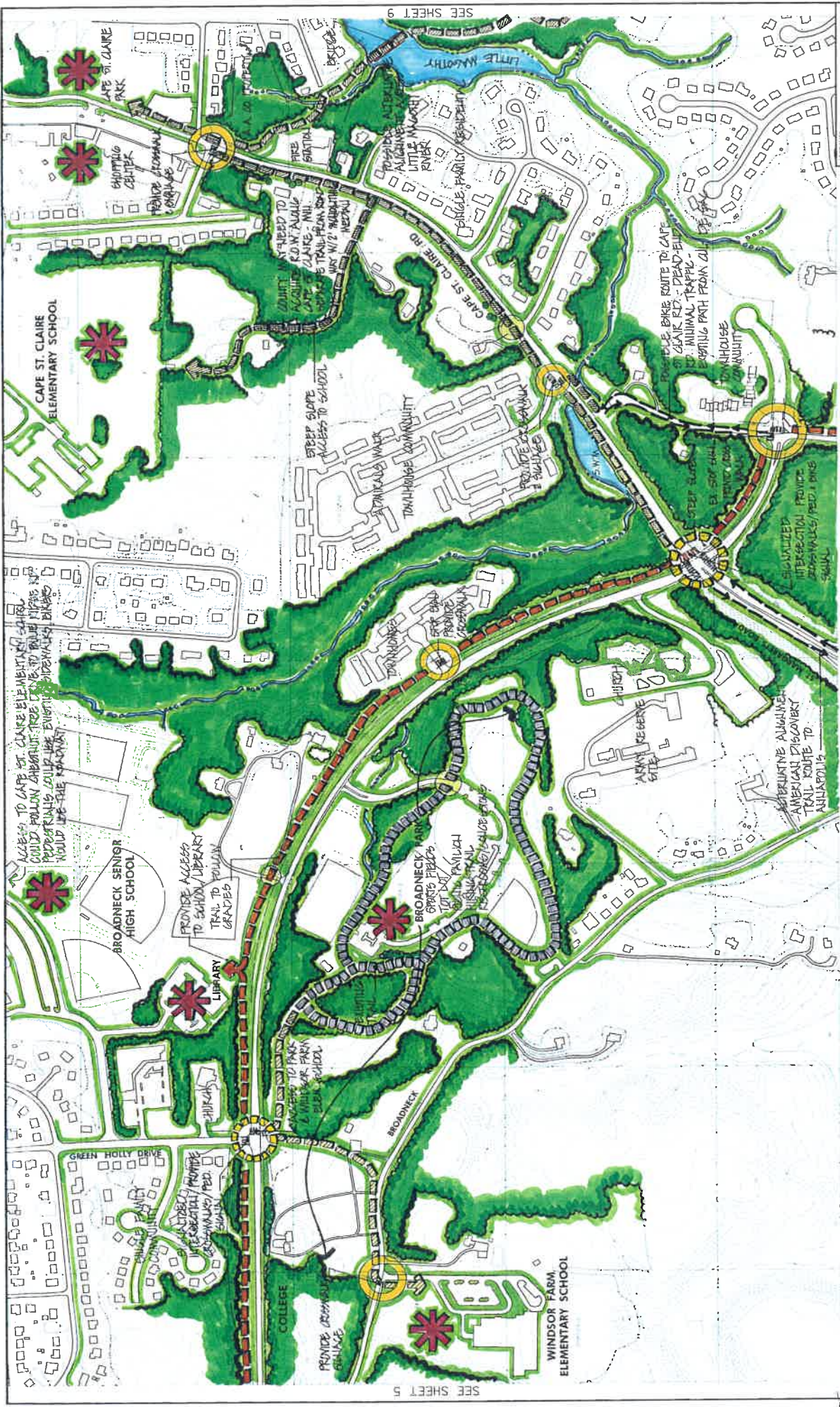
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BROADNECK PENINSULA TRAIL

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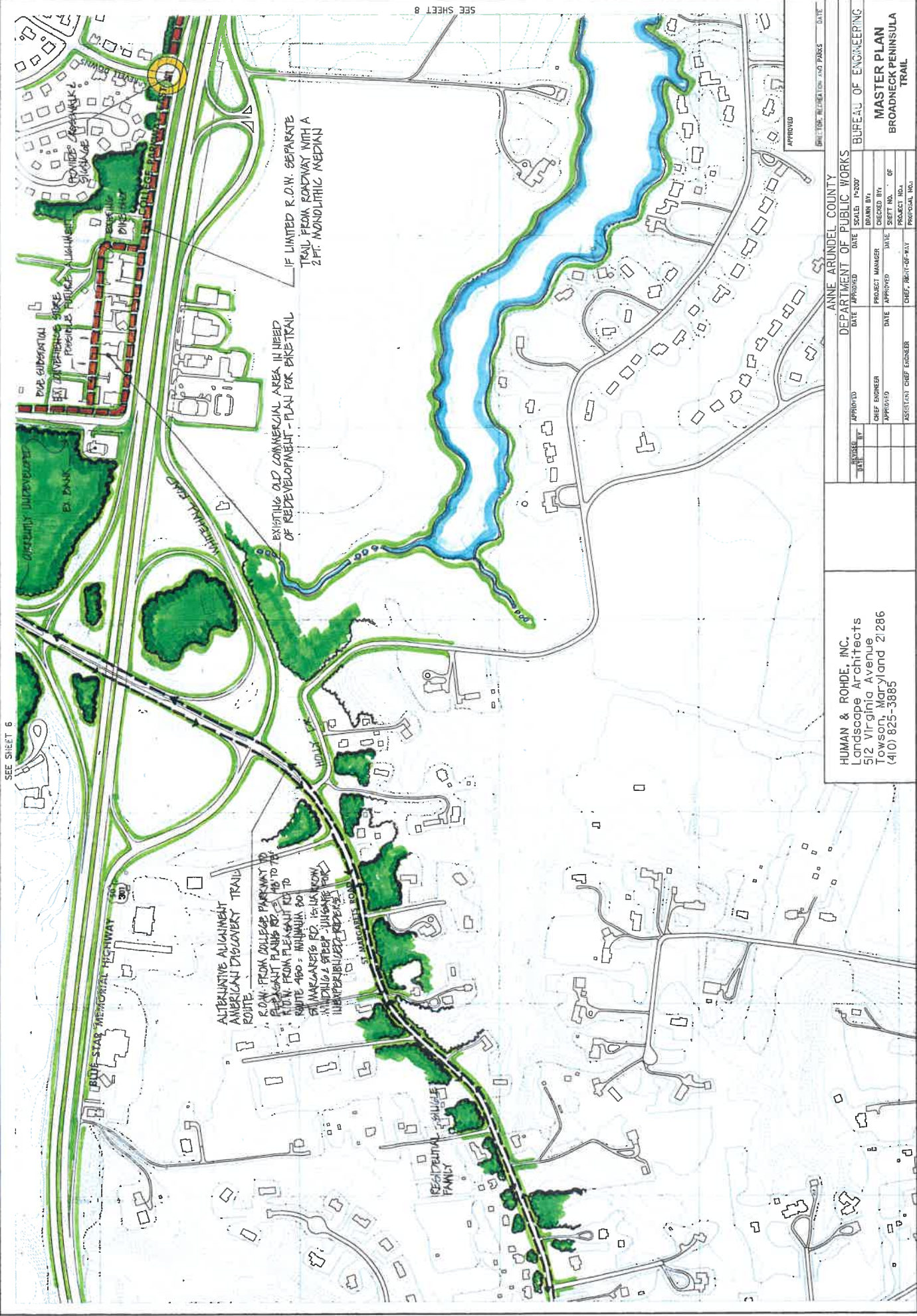
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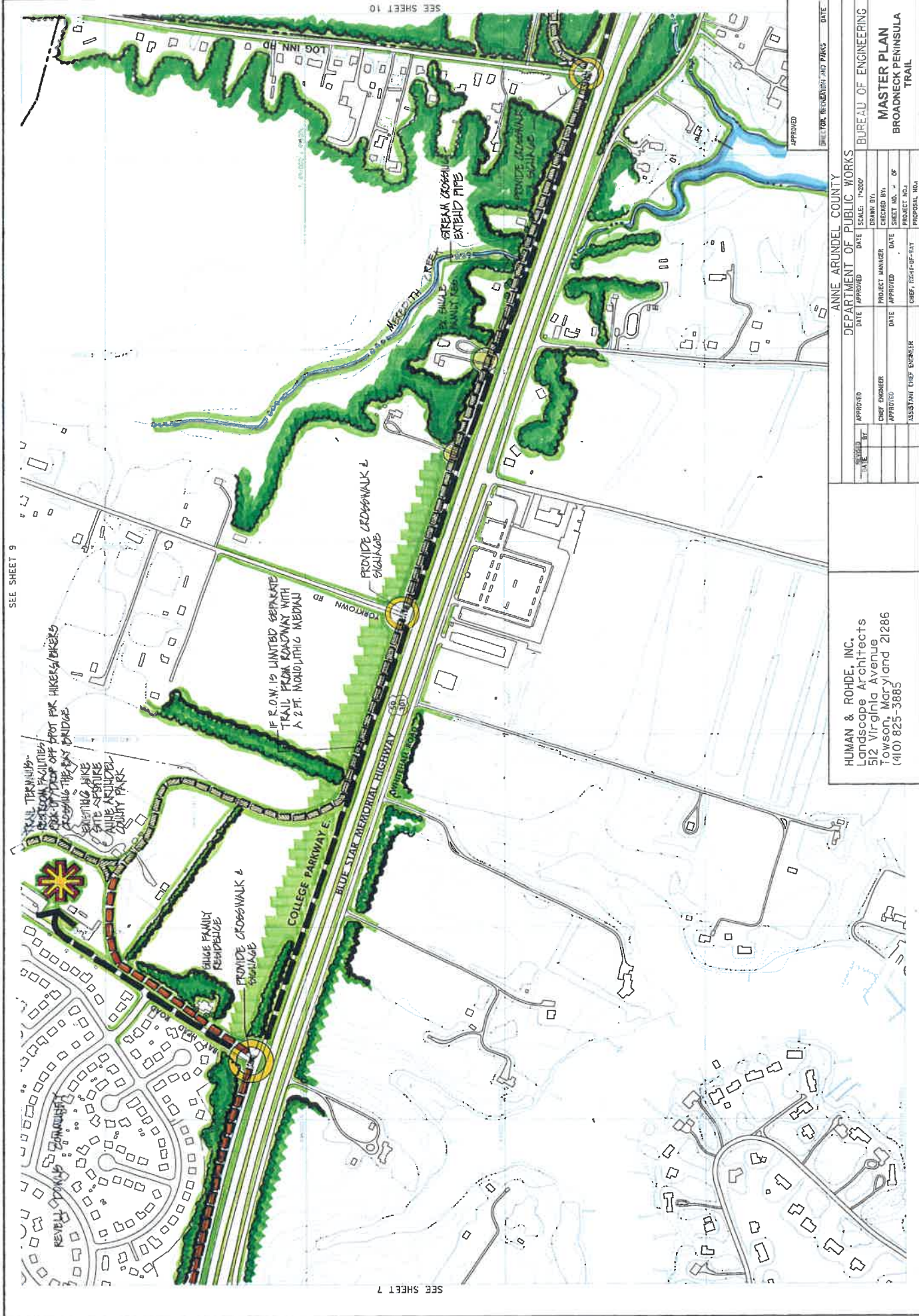
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 BROADNECK PENINSULA
 TRAIL

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DIRECTOR, RECREATION AND PARKS

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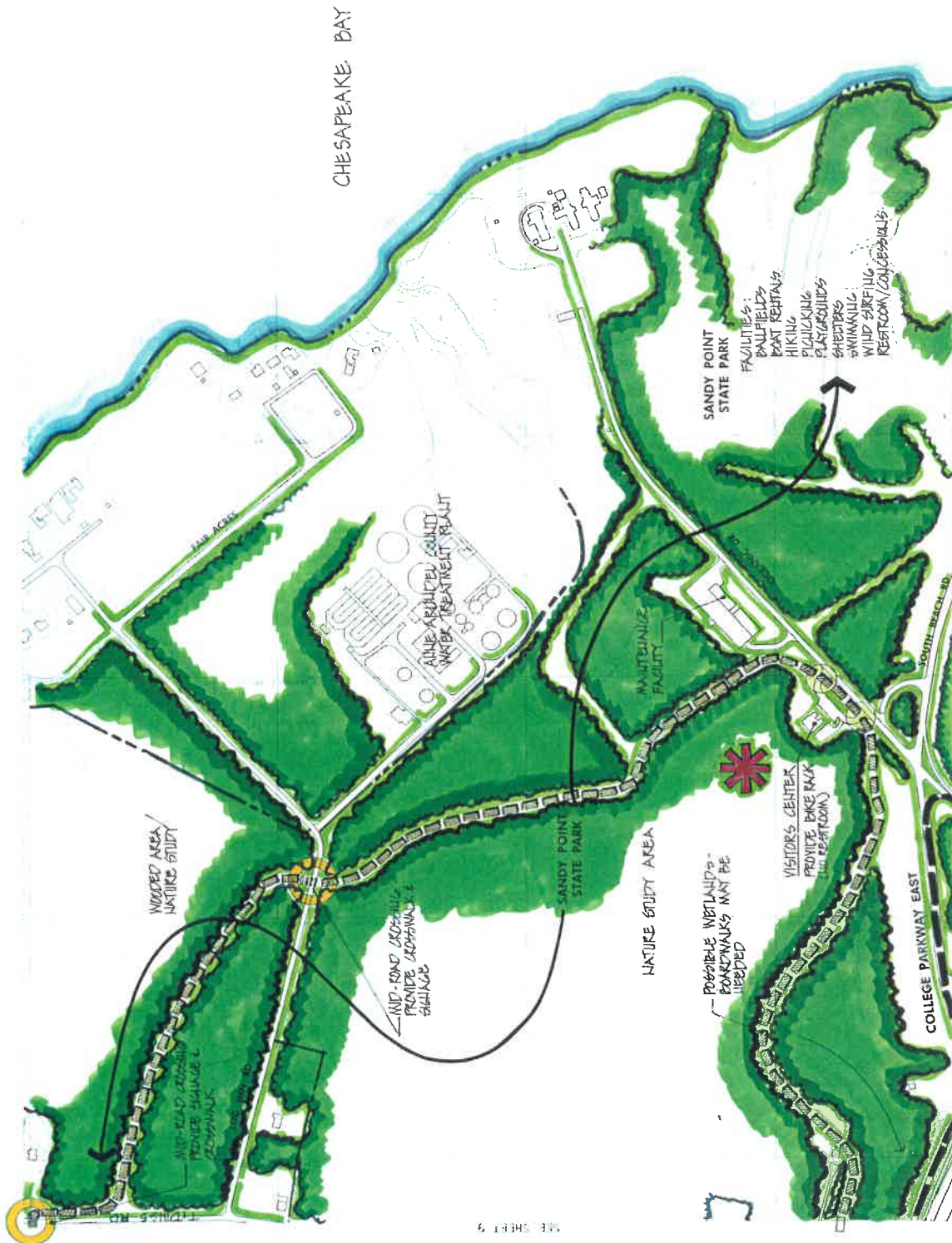
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MASTER PLAN
BROADNECK PENINSULA TRAIL



CHESAPEAKE BAY

APPROVED:

SHEET NO. 11 OF 11
 SHEET TITLE: MASTER PLAN
 PROJECT: BROADNECK PENINSULA TRAIL

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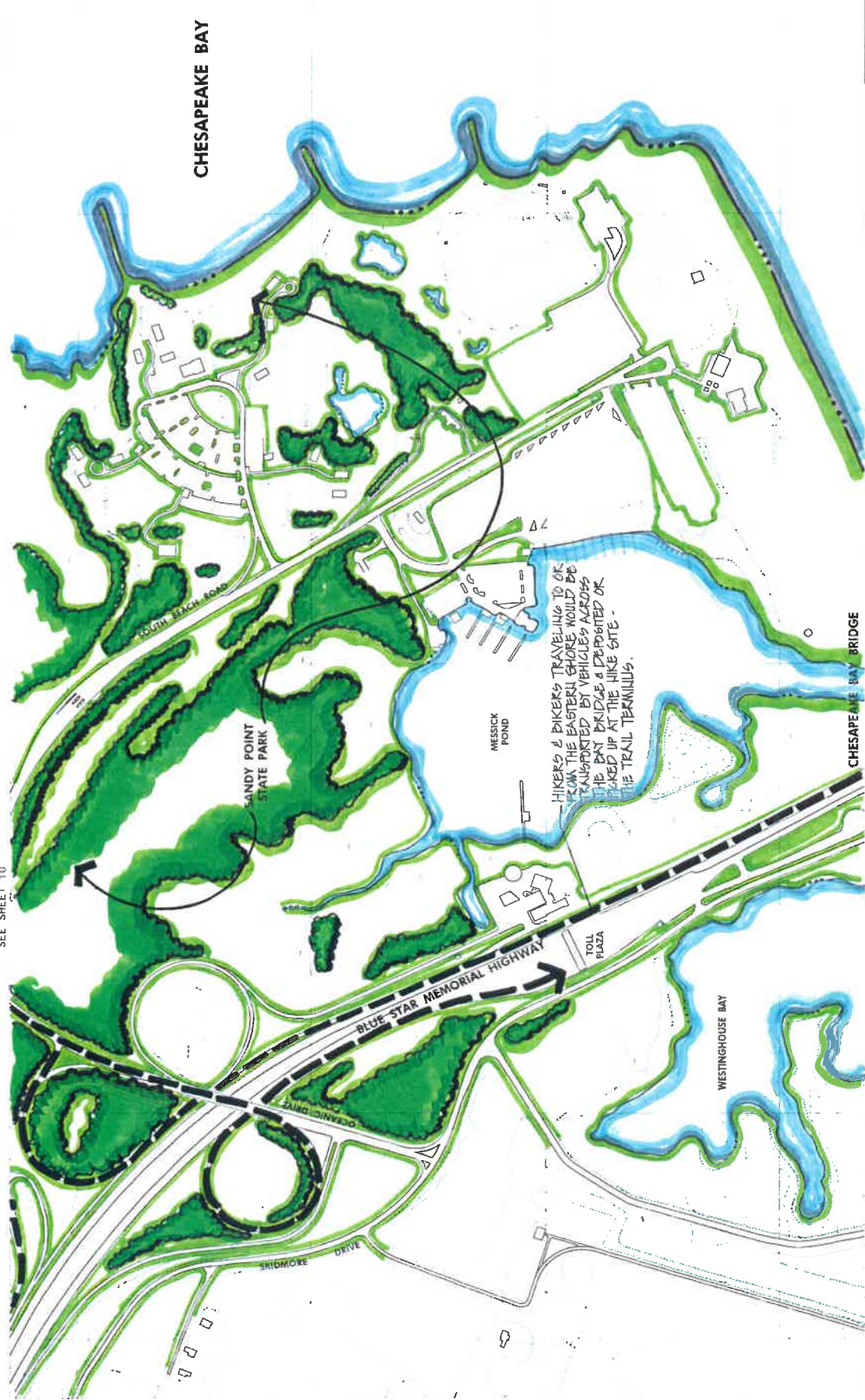
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SEE SHEET 9

SEE SHEET 10



CHESAPEAKE BAY

SANDY POINT STATE PARK

HIKERS & BIKERS TRAVELING TO OR FROM THE EASTERN SHORE WOULD BE TRANSPORTED BY VEHICLES ACROSS THE BAY BRIDGE & DEPOSITED OR PICKED UP AT THE HIKE SITE - THE TRAIL TERMINUS.

MESSICK POND

BLUE STAR MEMORIAL HIGHWAY

TOLL PLAZA

WESTINGHOUSE BAY

CHESAPEAKE BAY BRIDGE

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APPROVED	DATE	BY	APPROVED	DATE	BY
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SITE CONSTRAINTS

Topography / Soils

The topography of the Broadneck Peninsula more or less dictated road alignments and development patterns. The peninsula can be characterized as a series of ridges separated by deep ravines with creeks emptying into the Magothy and Severn Rivers and ultimately into the Chesapeake Bay. As the land form nears the Bay, it flattens out and has very little topographic change. College Parkway loosely follows a ridge line from west to east. Because of the deep ravines and numerous creeks, following the alignment of College Parkway seemed to be the most feasible path for the Broadneck Peninsula Trail. This alignment would allow accessible slopes of 5 percent or less, with a few short sections exceeding 5 percent where College Parkway transitions between cut and fill.

The trail would pass through two soil associations, the Manmouth-Collington Association and the Elkton-Othello-Mattapex Association. For most of the length of the trail, the soils are in the Manmouth-Collington Association which is characterized as having nearly level to moderately steep well drained, sandy and loamy soils. The primary limitation for development is the steep slopes. As the topography flattens out near the Chesapeake Bay, the soils change to the Elkton-Othello-Mattapex Association. This soil association is characterized as having level to sloping poorly drained to moderately drained loamy soils. The Othello and Elkton soils are both hydric, which means they are "saturated, flooded or ponded long enough during the growing season to develop anaerobic vegetation" (U.S. Dept. of Agricultural Soil Conservation Service, 1985). Hydric soils are an indicator of wetland conditions and potentially could hinder or stop trail construction. These soil conditions are present in the wooded areas of Sandy Point State Park.

The native tree species in the upland areas of the Manmouth-Collington Association would include mixed hardwoods, primarily oaks and some stands of Virginia pine. The native species found in the Elkton-Othello-Mattapex Association are mixed wetland hardwoods, such as oaks, gums, red maples, and holly.

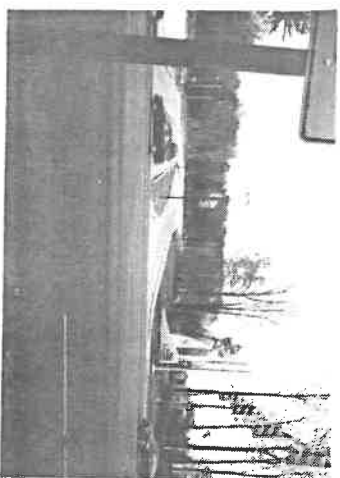
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Road Crossings

Trail users' safety is of primary concern when selecting an alignment. We have tried to minimize conflicts with other modes of transportation by proposing an off-road trail for the entire length of the main trail and wherever possible the connector trails. However, it will be necessary for trail users to interface with motorized traffic at road crossings. It would be necessary to adequately sign and mark the crossings for both trail users and motorists. Existing traffic signals would need to be equipped with pedestrian signals and pushbuttons, as well as the signs and road markings. Intersections with stop signs only would need appropriate signage and crosswalks. All signage and markings would conform to the Manual on Uniform Traffic Control Devices (MUTCD) and the American Association of State Highway and Transportation Officials (AASHTO) Guide to the Development of Bicycle Facilities.

Following is a list of the road crossings along the trail.

<u>Crossing</u>	<u>Road Type</u>	<u>Comments</u>
Baltimore & Annapolis Blvd.	arterial-collector	<ul style="list-style-type: none">• State Highway road• Crossing does not occur at an intersection• Limited sight distances both directions• Narrow roadway
Governor Ritchie Highway	principal arterial	<ul style="list-style-type: none">• State Highway road• Major intersection



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<u>Crossing</u>	<u>Road Type</u>	<u>Comments</u>
(MD Rt. 2) @ W. Campus Drive		<ul style="list-style-type: none"> Existing traffic signal Needs pedestrian signal/pushbuttons, and crosswalks
Anne Arundel Community College Drives	campus drive	<ul style="list-style-type: none"> Campus traffic Free right turns Need crosswalks and signage
College Parkway @ Jones Station Road (west)	collector	<ul style="list-style-type: none"> No signal Existing median provides haven between east- and westbound lanes Need signage, crosswalks, and perhaps a pedestrian signal
Jones Station Road (east)	collector	<ul style="list-style-type: none"> Existing traffic signal Provide pedestrian signal/pushbutton, and crosswalk
Ternwing Drive	collector	<ul style="list-style-type: none"> Existing stop sign Residential / limited traffic volume Provide signage and crosswalk
Rosslare Drive	collector	<ul style="list-style-type: none"> Existing stop sign Residential / limited traffic volume Provide signage and crosswalk



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<u>Crossing</u>	<u>Road Type</u>	<u>Comments</u>
Kimwood Road	collector	<ul style="list-style-type: none"> • Existing traffic signal • Residential traffic • Provide pedestrian signal/pushbutton and crosswalk
Shore Acres Road	collector	<ul style="list-style-type: none"> • Existing traffic signal • Moderate traffic volume • Provide pedestrian signal/pushbutton and crosswalk
Bay Dale Drive	arterial-collector	<ul style="list-style-type: none"> • Existing traffic signal equipped with pedestrian signal and crosswalks • Moderate traffic volume
Bellerive Road	collector	<ul style="list-style-type: none"> • Existing stop sign • Residential traffic • Provide signage and crosswalk
Falcon Nest Court	local	<ul style="list-style-type: none"> • Residential traffic • Existing stop sign • Provide signage and crosswalk
Bellerive Drive	collector	<ul style="list-style-type: none"> • Existing traffic signal • Provide pedestrian signal/pushbutton and crosswalks

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<u>Crossing</u>	<u>Road Type</u>	<u>Comments</u>
Green Holly Drive	collector	<ul style="list-style-type: none"> • Existing traffic signal • Moderate traffic volume • School/residential traffic • Provide pedestrian signal/pushbutton and crosswalks
Cape St. Claire Road	collector	<ul style="list-style-type: none"> • Existing signal • Moderate residential / commercial traffic • Provide pedestrian signal/ pushbutton and crosswalk
Old Cape St. Claire Road	local	<ul style="list-style-type: none"> • Dead-end residential • Existing stop sign • Provide signage and crosswalk
Peregoy Park Place	local	<ul style="list-style-type: none"> • Existing stop sign • Limited residential • Provide signage and crosswalk
Revell Downs Drive	collector	<ul style="list-style-type: none"> • Existing stop sign • Residential • Provide signage and crosswalk
Bay Head Road	collector	<ul style="list-style-type: none"> • Existing stop sign • Low volume residential • Provide signage and crosswalk

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The problem crossings as of this writing would be B&A Boulevard, Ritchie Highway, and College Parkway at Jones Station Road. The proposed alignment crossing B&A Boulevard does not occur at an intersection and sight distance is limited. The crossing of Governor Ritchie Highway causes the most concern because of the heavy volume of traffic, speed of the motorists, and turning motions. The highway may be easiest crossed south of the intersection to facilitate traffic flow. The other crossing of concern is College Parkway at Jones Station Road. At this time the intersection is not signalized; however, there is a large median between the eastbound and westbound lanes that would provide a safe mid-road stopping point.

Utilities

The final location of the Broadneck Peninsula Trail will depend on any future decision as to whether to widen College Parkway to four lanes, which may limit the right-of-way available to accommodate the trail and utilities. Generally, the major obstacles for trail construction paralleling an existing roadway include overhead utility poles, fire hydrants, light poles, traffic signal poles, and culverts. Underground utilities, if not in the roadway, are generally buried deep enough that they don't pose a problem for trail construction. Along the proposed alignment for the main and connector trails, it may be necessary to lengthen some existing culverts or bridge drainage ways to avoid wetland impacts. Also, at some of the subdivision entrances (i.e. Ternwing Drive), cable boxes, transformers, and community identification signs appear to be within the road right-of-way. It will be necessary at the construction document phase to locate all existing utilities and obstacles above and below ground and to minimize conflicts to keep the cost of the trail construction down.



DESIGN CONSIDERATIONS

Trail Design

As proposed, the Broadneck Peninsula Trail would be a multi-use facility separate from the roadway. The width of the trail would be 10 feet; however, where right-of-way is limited or environmental conditions prohibit, the trail could be reduced to a minimum of 8 feet. Eight feet is the minimum width for a multi-use facility that meets AASHTO Standards. Where space is limited, a 2 foot wide raised concrete median may be used to separate the trail from the roadway.

Bituminous concrete with a subbase of crushed stone is the preferred trail surface treatment because it provides a smooth riding surface for users, requires minimal maintenance, and has a relatively long life. Where the trail would cross drainways, it would be appropriate to lengthen the existing culverts or if necessary to provide bridges.

The grades on the Broadneck Peninsula Trail should be kept to a minimum, preferably between one to three percent. Grades in excess of 5 percent are undesirable because they do meet ADA accessibility standards. Steeper inclines, if required, should be limited to 500 foot segments and the trail widened in these areas. An adequate cross slope should be provided to prevent water ponding on the trail.

In general, the design for this facility should be in accordance with the standards and guidelines set forth in the latest edition of Guide for the Development of Bicycle Facilities published by the American Association of State Highway and Transportation Officials (AASHTO).

MASTER PLAN

Connector Trail Designs

Three types of bicycle facilities would be utilized for the proposed connector trails.

1. Off-Road Trails

The same design standards used for the Broadneck Peninsula Trail, an off-road facility, would apply for the following connector trails:

1. College Parkway to Twin Oaks Park, Magothy River / Severn River Middle Schools
2. Shore Acres Road to Broadneck Elementary School
3. Access to Windsor Farm Elementary School and Broadneck Park
4. Access to Broadneck High School and Library
5. Access to Cape St. Claire Elementary School and Park
6. Trail Extension to Sandy Point State Park

2. Bicycle Lanes

A bike lane is a portion of a roadway that has been designated by striping, signing, and pavement markings, for the preferential use of bicyclists. Bike lanes are one way facilities that carry traffic the same direction as the adjacent motor vehicles. Bike lanes are normally 5 feet wide from the face of curb or guardrail; the minimum width is 3 feet from the gutter pan. Where curb and gutters / guardrails do not exist, the minimum width is 4 feet. All drainage grates in the roadway should be bike safe. Along streets with existing parking lanes, bike lanes are located between the travel lane and parking area. Bike lanes are delineated from the

motor vehicle lanes with solid white lines and standard pavement symbols. Bike lane road markings change at intersections; the type of treatment depends on the configuration of the intersection. As mentioned previously, for all types of hike/bike trails AASHTO standards are to be followed. The following connectors are proposed as bike lanes:

1. Access to Belvedere Elementary School
2. Access to Arnold Park
3. A segment of the alternative alignment between Bay Head Road and Cape St. Claire Road.

3. **Bicycle Routes / Shared Roadways**

A bike route is simply a shared roadway that has been designated by signing as a preferred route for bicycle use. One connector is an existing bike route:

1. Bike route from the B&A Trail to Peninsula Farm Road via Jones Station Road.

Bike lanes and bike routes are designations for bicycles only. Between College Parkway and Belvedere Elementary School, pedestrians would use the existing sidewalks. As of this writing, there are no sidewalks for pedestrians along Jones Station Road between Peninsula Farm Road and Governor Ritchie Highway. The appropriate signage as per MUTCD and AASHTO would be required.

Signage

Signage along the proposed Broadneck Peninsula Trail should be uniform and consistent with the design character of that developed for the B&A Trail. The traffic signs should follow the standards specified in the Manual on Uniform Traffic Control Devices published by the U.S. Department of Transportation Federal Highway Administration. Following is a list of the six types of signs that would be required:

1. Staging Area Sign(s) are located at both ends of the trail. The name of the trail, location map, destination, distances and trail rules should be included.

MASTER PLAN

2. Directional Signs should be used where paths can be confused, i.e., road intersections. Directional signs may also show destinations adjacent to the trail. Distances may also be given in miles and kilometers on directional signs.
3. Warning Signs must be placed on the trail to indicate hazardous conditions, such as a road intersection. Warning signs should be placed approximately 100-120 feet in front of any hazard.
4. Regulatory Signs are STOP or YIELD signs. The State standards for colors should be followed. These signs should be smaller than roadway signs. Regulatory signs, i.e., No Dogs and No Motorized Vehicles, may need to be installed at trail entrances.
5. Information Signs should be used to indicate mileage markers, emergency services, rest areas, food stops, etc.
6. Night Visibility Signs, reflecting strips and reflective paint on bollards, gates and other hazards, should be part of the trail.

The following aesthetic characteristics should be considered:

1. Sign Material, whether metal or wood, should be standard throughout the trail.
2. Sign Sizes should be standardized.
3. Sign Colors should be designed for the entire trail.

4. Sign Letter Style should be consistent throughout the trail. If wood is used, letters can be sandblasted or routed and then painted. The same type of letters should be used on all trail signs.
5. Sign Location should take into account the existing vegetation and grades. Safe sight distances should always be maintained. Height of a sign is generally 40 inches from grade to the bottom of a sign. For safety, the sign should be located so the sign face is 2 feet from the edge of the trail.
6. Sign Consolidation is recommended whenever possible. Signs should be used sparingly. However, warning and regulatory signs should not be mixed with any other type of sign.
7. Pavement Signs should be considered. STOP signs, as well as directional and informational signs, can be painted on the pavement.

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SUPPORT FACILITIES

Trail support facilities include parking, restrooms, drinking fountains, site furnishings, and, to some extent, landscaping. The extent and type of support facilities depends on the anticipated user groups and the intensity of use of the trail. As previously stated, the Broadneck Peninsula Trail is proposed to link the Bay Bridge and the B&A Trail for the residents of the Broadneck Peninsula and for hikers and bikers traveling between central Maryland and the Eastern Shore. The trail, along with the proposed connector trails, also serves as a link between neighborhoods and public facilities on the peninsula. Because of the location of the trail paralleling the roadway and its function as a facilitator rather than a recreational destination in itself, it is anticipated some of these support facilities can be provided at existing public facilities. Parking for trail users would be accommodated at the Park & Ride at Jones Station Road and Governor Ritchie Highway, Twin Oaks Park, Arnold Park, Broadneck Park, and the Nike site. At non-peak hours, school parking lots could also be available. Restroom facilities and drinking fountains would be available at the public library, Broadneck Park, and the Nike site, and possibly at the Community College. A phone booth and drinking fountain are also available on the B&A Trail at the intersection of Jones Station Road..

The typical site furnishings along the proposed trail would include bollards, guardrails, fencing, bike racks, trash receptacles, and benches. A consistent theme for all the site amenities should be carried out along the trail.

1. Bollards. It is generally necessary to provide bollards along a trail to prevent unauthorized vehicles from entering. The bollards centered on a trail should be removable with a locking system to allow access for maintenance and service vehicles.
2. Site furnishings should be placed a minimum of three feet away from the edge of the trail to insure user safety. Benches should be located approximately a half mile apart along the length of the trail and sited to take advantage of views, sunlight or shade.

Site furnishings would be selected for their durability and ease of maintenance.

3. Guardrails and Fences may be necessary along sections of the trail and should be constructed of wood. Guardrails along multi-use trails should be designed for the safety of a cyclist. Fences should be 42 inches high.
4. Bike Racks should be located at all possible destination points, (i.e., schools, parks, shopping centers) where visual supervision, lighting and shelter are provided.

Landscaping

Landscaping along the proposed trail would enhance the recreational and aesthetic experience for trail users, as well as screen adjacent properties and provide shade. It would be desirable to protect and maintain existing vegetation along the trail. Clearing should occur only on the trail alignment within the recommended clearance along the trail edge. The variety of plant material used should provide interest throughout the year without compromising trail users' safety.

MASTER PLAN

OPERATION & MAINTENANCE OF THE TRAIL

The Broadneck Peninsula Trail would be maintained and operated by Anne Arundel County. As a linear park, it would require all the normal maintenance and supervision of any other park facility. A park superintendent would be responsible for the daily maintenance and security of the trail facility with help from a maintenance crew, park ranger(s), and possibly local volunteer groups, such as hiking clubs, scout troops, or community organizations, as well as trail volunteers trained by the Park staff.

Typical maintenance of the trail would include grass cutting, trash collection, tree and shrub pruning, repairing damaged paving, replacing stolen or damaged signs and structures, repairing gates, fences or bridges, removing fallen trees, and correcting erosion and drainage problems. Additionally, regular safety inspections and the maintenance of trail signs and site furnishings would be required.

The trail would need regular supervision to prevent unauthorized vehicles from using it, to insure the safety of the trail users, and to prevent trail users from trespassing on and perhaps vandalizing adjacent properties. Several studies have been conducted to determine the effect of trails on public safety. It has been shown that hiker/biker facilities have not increased the crime rate in adjacent neighborhoods nor have they increased the incidence of trespassing on properties along the trails. Park rangers are trained to handle security problems; however, they are not law enforcement officers. The rangers are equipped to call Anne Arundel County Police for assistance, if necessary.

As a public facility, the Broadneck Peninsula Trail would need to provide guidelines and regulations for users. The trail's rules and regulations, including park hours (e.g. sunrise to sunset), would need to be clearly posted at all access points.

PHASING AND COST

The Broadneck Peninsula Trail could be implemented in four phases as funding becomes available. The phases are arranged in the order that appears to provide the most immediate benefit to the residents of the peninsula. Because of the existing bike route between the B&A Trail and Anne Arundel Community College, and the ample shoulders on College Parkway, the link between Broadneck Park, the Nike site, and Sandy Point State Park should be provided first. An extension of the trail into Sandy Point Park and the connector trails to Broadneck Park and Windsor Farm School are included in this phasing plan.

<u>PHASE</u>	<u>LOCATION</u>	<u>LENGTH</u> <u>(App. Mileage)</u>	<u>COST ESTIMATE</u>
I	Green Holly Drive to the Nike site with an extension to Sandy Point State Park and the connector trails to Broadneck Park and Windsor Farm Elementary School	3.65 miles	\$1.5 million
II	Bay Dale Drive to Green Holly Drive	1.35 miles	\$0.9 million
III	Peninsula Farm Road to Bay Dale Drive	2.4 miles	\$1.0 million
IV	B&A Trail to Peninsula Farm Road	1.0 mile	\$0.3 million
		8.4 miles	\$3.7 million

See **Appendix B** for further breakdown of estimated costs for Phases I through IV and estimates for the connector trails.

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APPENDIX A

Definitions from AASHTO Guide for the Development of Bicycle Facilities

AMERICAN ASSOCIATION OF STATE HIGHWAY & TRANSPORTATION OFFICIALS (AASHTO) -

The group that has defined the principles and criteria for the design of urban and rural highways in the United States. Because trails are a transportation corridor, AASHTO guidelines prevail and are considered to be the standard for bikeway design.

BICYCLE - Every vehicle-propelled solely by human power upon which any person may ride, having two tandem wheels except scooters and similar devices. The term "bicycle" also includes three and four wheeled human powered vehicles, but not infant type tricycles.

BICYCLE FACILITIES - A general term denoting improvements and provisions made by public agencies to accommodate or encourage bicycling, including parking facilities, mapping all bikeways, and shared roadways not specifically designated for bicycle use.

BICYCLE ROUTE or BIKE ROUTE - A system of bikeways designated by the jurisdiction having authority with appropriate directional and informational route markers, with or without specific bicycle route numbers. Bike routes establish a continuous routing, but may be a combination of any and all Classes of bikeway.

BIKEWAY - Any road, street, path, or way which in some manner is specifically designated as being open to bicycle travel, regardless of whether such facilities are designated for the exclusive use of bicycles or are to be shared with other transportation modes.

CLASS I BIKEWAY (BICYCLE PATH or BIKE PATH) - A bikeway physically separated from motorized vehicular traffic by an open space or barrier and either within the highway right of way or within an independent right of way.

CLASS 2 BIKEWAY (BICYCLE LANE or BIKE LANE) - A portion of a roadway which has been designated by striping, signing and pavement markings for the preferential use of bicyclists.

CLASS 3 BIKEWAY (DESIGNATED SHARED ROADWAY) - A shared roadway which has been designated by signing as a preferred route for bicycle use.

NON-DESIGNATED SHARED ROADWAY - A roadway which is not officially designated and marked as a bicycle route, but which is open to both bicycle and motor vehicle travel and upon which no bicycle lane is designated.

HIGHWAY - A general term denoting a public way for purposes of vehicular travel, including the entire area within the right of way

MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD) - A manual published by AASHTO defining uniform standards for traffic control devices. "Traffic control devices are all signs, signals, markings, and devices placed on, over, or adjacent to a street or highway by authority of a public body or official having jurisdiction to regulate, warn, or guide traffic."

RIGHT-OF-WAY - Land owned by a municipality for the purpose of containing transportation and utility corridors.

ROADWAY - The portion of the highway, including shoulders, for vehicle use.

SHOULDER - The portion of the roadway contiguous with the traveled way for accommodation of stopped vehicles, for emergency use and for lateral support of subbase, base and surface courses. (In some cases, the shoulder can be made usable for bicyclists.)

SIDEWALK - The portion of a highway designed for preferential or exclusive use by pedestrians.

MASTER PLAN

APPENDIX B

**COST ESTIMATE
BROADNECK PENINSULA TRAIL
PHASE I**

Green Holly Drive to the Nike Site
Including an Extension to Sandy Point State Park
and Windsor Farm Elementary School
February 1999

CONSTRUCTION OFFICE: Lump Sum \$ 12,000

MOBILIZATION: Lump Sum \$ 15,000

CLEAR & GRUB: Lump Sum \$ 30,000

COSNTRUCTION STAKEOUT: Lump Sum \$ 20,000

MAINTENANCE AND PROTECTION OF TRAFFIC: Lump Sum \$ 10,000

SEDIMENT CONTROL:

Stabilized Construction Entrance:
5 @ \$1,200/each = \$ 6,000
Silt Fence: 19,400 lf @ \$2.50/lf = \$48,500
\$ 54,500

MASTER PLAN

HIKER/BIKER TRAIL:

Excavation & Grading Trail: 5,862 cy @ \$20/cy	=	\$117,240
Graded Aggregate (6" Base): 25,900 sy @ \$6.50/sy	=	\$168,350
2" Bituminous Trail 10' Wide 1,150 cy = 2,300 ton @ \$45.00/ton	=	\$103,500
Culverts 16 @ \$4,000/each	=	\$ 64,000
Fencing 500 lf @ \$5.00/lf	=	\$ 2,500
Wood Bridges - @ \$10,000/each	=	\$ -
Boardwalk over Wetlands 300 lf @ \$200.00/lf	=	\$ 60,000
End Wall 4 @ \$600/each	=	\$ 2,400
		\$517,990

SIGNAGE AND MARKINGS:

Lump Sum \$ 15,000

SITE FURNISHINGS

Removable Bollard 11 @ \$325/each	=	\$ 3,575
Bollard 22 @ \$240/each	=	\$ 5,280
Bench 6 @ \$770/each	=	\$ 4,620
Bike Rack 4 @ \$700/each	=	\$ 2,800
		\$ 16,275

MASTER PLAN

REFORESTATION

SEEDING & SOD:

Seeding: 388,000 sf @ \$0.06/sf = \$ 23,280
Sod: _____ sy @ \$3.00/sy = \$ 23,280

LANDSCAPING:

Lump Sum

\$ 35,000

Total
Design Cost (10%) \$ 749,045
Construction Mgt (5%) \$ 75,000
\$ 37,500

Total Construction Cost \$ 861,545
Contingencies (25%) \$ 215,386

TOTAL \$ 1,076,931

LAND ACQUISITION FOR ROW:

5 acres @ \$75,000/acre \$ 375,000

GRAND TOTAL (Say) \$ 1,450,000

**COST ESTIMATE
BROADNECK PENINSULA TRAIL
PHASE II**
Bay Dale Drive to Green Holly Drive
February 1999

<u>CONSTRUCTION OFFICE:</u>	Lump Sum	\$ 12,000
<u>MOBILIZATION:</u>	Lump Sum	\$ 15,000
<u>CLEAR & GRUB:</u>	Lump Sum	\$ 16,000
<u>COSNTRUCTION STAKEOUT:</u>	Lump Sum	\$ 10,000
<u>MAINTENANCE AND PROTECTION OF TRAFFIC:</u>	Lump Sum	\$ 10,000

SEDIMENT CONTROL:

Stabilized Construction Entrance:	=	\$ 4,800
4 @ \$1,200/each	=	\$ 4,800
Silt Fence:	7,100 lf @ \$2.50/lf	\$ 17,750
		\$ 22,550

MASTER PLAN

HIKER/BIKER TRAIL:

Excavation & Grading Trail:		
2,400 cy @ \$20/cy	=	\$ 48,000
Graded Aggregate (6" Base):		
9,500 sy @ \$6.50/sy	=	\$61,750
2" Bituminous Trail 10' Wide		
422 cy = 844 ton @ \$45.00/ton		\$37,980
Culverts		
8 @ \$4,000/each	=	\$ 32,000
Fencing		
2,600 lf @ \$5.00/lf	=	\$ 13,000
Extend Existing Culverts & Endwalls		
5 @ \$7,200/each	=	\$ 36,000
Concrete Retaining Walls (8' ht x 1' thick)		
2,000 lf = 889 cy @ \$300/cy	=	\$266,666
		\$495,396

SIGNAGE AND MARKINGS:

Lump Sum

\$ 20,000

SITE FURNISHINGS

Removable Bollard		
5 @ \$325/each	=	\$ 1,625
Bollard		
10 @ \$240/each	=	\$ 2,400
Bench		
2 @ \$770/each	=	\$ 1,540

MASTER PLAN

REFORESTATION:

SEEDING & SOD:

Seeding: 142,000 sf @ \$0.06/sf = \$ 8,520
Sod: _____ sy @ \$3.00/sy = \$ 8,520

LANDSCAPING: Lump Sum

Total \$635,031
Design Cost (10%) \$ 63,503
Construction Mgt (5%) \$ 31,752

Total Construction Cost \$730,286
Contingencies (25%) \$182,571

TOTAL \$912,857

LAND ACQUISITION FOR ROW:

- acres @ \$75,000/acre

GRAND TOTAL (Say) \$913,000

MASTER PLAN

**COST ESTIMATE
BROADNECK PENINSULA TRAIL
PHASE III
Peninsula Farm Road to Bay Dale Drive
February 1999**

<u>CONSTRUCTION OFFICE:</u>	Lump Sum	\$ 12,000
<u>MOBILIZATION:</u>	Lump Sum	\$ 15,000
<u>CLEAR & GRUB:</u>	Lump Sum	\$ 40,000
<u>COSNTRUCTION STAKEOUT:</u>	Lump Sum	\$ 15,000
<u>MAINTENANCE AND PROTECTION OF TRAFFIC:</u>	Lump Sum	\$ 15,000
<u>SEDIMENT CONTROL:</u>		
Stabilized Construction Entrance:		
16 @ \$1,200/each	=	\$19,200
Silt Fence:	12,675 lf @ \$2.50/lf	= \$31,700
		\$ 50,900

HIKER/BIKER TRAIL:

Excavation & Grading Trail:	=	\$ 84,500
4,225cy @ \$20/cy		
Graded Aggregate (6" Base):	=	\$109,850
16,900 sy @ \$6.50/sy		
2" Bituminous Trail 10' Wide		
750 cy = 1,500 ton @ \$45.00/.ton		\$ 67,500
Extend Culverts & Endwalls		
5 @ 7,200/each	=	\$ 36,000
Fencing		
2,350 lf @ \$5.00/lf	=	\$ 11,750
Wood Bridges		
- @ \$10,000/each	=	\$
Boardwalk over Wetlands		
- lf @ \$200.00/lf	=	\$
End Wall		
- @ \$600/each	=	\$
Fencing - Chain Link 6' high		
900 lf @ \$16/lf	=	\$ 14,400
Concrete Retaining Wall 8' high, 1' thick		
1000 lf = 445 cy @ \$300/cy =		\$133,500

SIGNAGE AND MARKINGS: Lump Sum \$ 30,000

SITE FURNISHINGS

Removable Bollard	=	\$ 3,250
10 @ \$325/each		
Bollard		
20 @ \$240/each	=	\$ 4,800

MASTER PLAN

Bench
4 @ \$770/each = \$ 3,080

REFORESTATION:

SEEDING & SOD:

Seeding: 253,500 sf @ \$0.06/sf = \$ 15,210
Sod: _____ sy @ \$3.00/sy = \$ 15,210

LANDSCAPING: Lump Sum \$ 25,000

Total
Design Cost (10%) \$ 68,675
Construction Mgt (5%) \$ 38,000

Total Construction Cost \$ 793,185
Contingencies (25%) \$ 198,300

TOTAL \$ 991,485

LAND ACQUISITION FOR ROW:
- acres @ \$75,000/acre

GRAND TOTAL (Say) \$ 1,000,000

**COST ESTIMATE
BROADNECK PENINSULA TRAIL
PHASE IV
B&A Trail to Peninsula Farm Rod
February 1999**

<u>CONSTRUCTION OFFICE:</u>	Lump Sum	\$ 12,000
<u>MOBILIZATION:</u>	Lump Sum	\$ 15,000
<u>CLEAR & GRUB:</u>	Lump Sum	\$ 7,500
<u>CONSTRUCTION STAKEOUT:</u>	Lump Sum	\$ 10,000
<u>MAINTENANCE AND PROTECTION OF TRAFFIC:</u>	Lump Sum	\$ 10,000

SEDIMENT CONTROL:

Stabilized Construction Entrance:	=	\$ 4,800
4 @ \$1,200/each	=	\$11,000
Silt Fence:	4,400 lf @ \$2.50/lf	\$ 15,800

MASTER PLAN

HIKER/BIKER TRAIL:

Excavation & Grading Trail:	=	\$ 29,300
1,465 cy @ \$20/cy		
Graded Aggregate (6" Base):	=	\$ 38,150
5,866 sy @ \$6.50/sy		
2" Bituminous Trail 10' Wide		
260 cy = 520 ton @ \$45.00/ton		\$ 23,400
Culverts		
3 @ \$4,000/each	=	\$ 12,000
Fencing		
1,400 lf @ \$5.00/lf	=	\$ 7,000
Wood Bridges		
- @ \$10,000/each	=	\$
Boardwalk over Wetlands		
- lf @ \$200.00/lf	=	\$
End Wall		
4 @ \$600/each	=	\$ 2,400

SIGNAGE AND MARKINGS:

Lump Sum

\$ 10,000

SITE FURNISHINGS

Removable Bollard		
4 @ \$325/each	=	\$ 1,300
Bollard		
8 @ \$240/each	=	\$ 1,920
Bench		
2 @ \$770/each	=	\$ 1,540

MASTER PLAN

REFORESTATION:

SEEDING & SOD:

Seeding: 88,000 sf @ \$0.06/sf = \$ 5,300
Sod: _____ sy @ \$3.00/sy = \$ 5,300

LANDSCAPING: Lump Sum

Total \$210,210
Design Cost (10%) \$ 21,021
Construction Mgt (5%) \$ 10,510

Total Construction Cost \$241,741
Contingencies (25%) \$ 60,435

TOTAL \$302,176

LAND ACQUISITION FOR ROW:

- acres @ \$75,000/acre

GRAND TOTAL (Say) \$300,000

MASTER PLAN

COST ESTIMATE CONNECTOR TRAILS February 1999

<u>Location</u>	<u>Length</u> (approx. mileage)	<u>Cost Estimate</u>
• Off-road trail from College Parkway to Twin Oaks Park, Magothy River/Severn River Middle Schools	0.2 miles	\$60,000.00
• Bicycle lanes to Belvedere Elementary School	0.6 miles	\$40,000.00 (includes land acquisition)
• Off-road trail from College Parkway to Broadneck Elementary School	0.75 miles	\$180,000.00
• Bicycle lanes to Arnold Park	0.4 miles	\$30,000.00
• Off-road trail to Broadneck Library and Broadneck Senior High School	0.4 miles	\$120,000.00
• Off-road trail to Cape St. Claire Park & Elementary School	0.75 miles	\$400,000.00 (includes land acquisition)
• The remainder of the "loop" trail to Sandy Point State Park (assumes a gravel trail in Sandy Point)	1.9 miles	\$260,000.00 (includes land acquisition)
• Bicycle lanes on St. Margaret's Road & B&A Boulevard to Route 450	3.0 miles	\$1.5 million (includes land acquisition)

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