# 4.0 Appendices

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# Existing Conditions Report

TOOLE DESIGN

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# MEMORANDUM

November 8, 2021

To: Alex Waltz
Organization: Charles County Government, Department of Planning and Growth Management
From: Stacie Desai; Kathleen Hayes, PLA, LEED AP
Project: Indian Head Rail Trail Extension Feasibility Study

**Re: Existing Conditions Review**

## Purpose and Goal

The purpose of this plan is to determine the feasibility of extending the existing 13-mile Indian Head Rail Trail (IHRT) from its current terminus in White Plains eastward to the northern terminus of the Three Notch Trail in Charlotte Hall.

The goal of the study is to determine a recommended alignment for extension of the IHRT that

- provides an uninterrupted east-west cross-County shared-use trail connection
- maintains a natural and scenic experience akin to the existing IHRT to the greatest extent possible
- is safe, comfortable, and accessible for users of all ages and abilities
- fills the existing gap between two important trails in Southern Maryland—the IHRT and the Three Notch Trail—resulting in a regional trail system that may lead to significant tourism and economic development potential

## Study Area Description and Context

The project study area encompasses approximately 35 square miles in Charles County. It is bounded by Crain Highway/US-301 to the west, Billingsley Road and Leonardtown Road/MD-5 to the north, the border with St. Mary's County to the east, and an irregular border to the south.

### *Municipalities*

The three municipalities in Charles County--Indian Head, La Plata and Port Tobacco—all fall outside of the study area, however they are in close proximity to the potential trail extension and would benefit from access to this regional system. The study area includes all or portions of several unincorporated communities, including White Plains, Saint Charles, Bryantown, and Hughesville. In addition, the Waldorf community is located to the immediate north of the study area along the US-301 corridor.

### *The Existing Trails*

**Indian Head Rail Trail** (IHRT) is the centerpiece of Charles County's trail system. This abandoned U.S. Government Railroad corridor was acquired by Charles County through the Department of the Interior's Federal Lands to Parks Program. Opened in 2009, the 13-mile paved trail from Indian Head to White Plains meanders through an undeveloped portion of the Mattawoman floodplain and along Old Woman's Creek, protecting an important wildlife corridor and offering a wide variety of scenic views.

**Three Notch Trail** is built on a former railroad right-of-way that was active until the early 1960s. The shared-use trail runs approximately 11 miles from Deborah Drive in Charlotte Hall, south to John V. Baggett Park, in Laurel Grove, with future plans to extend the trail further south to Lexington Park.

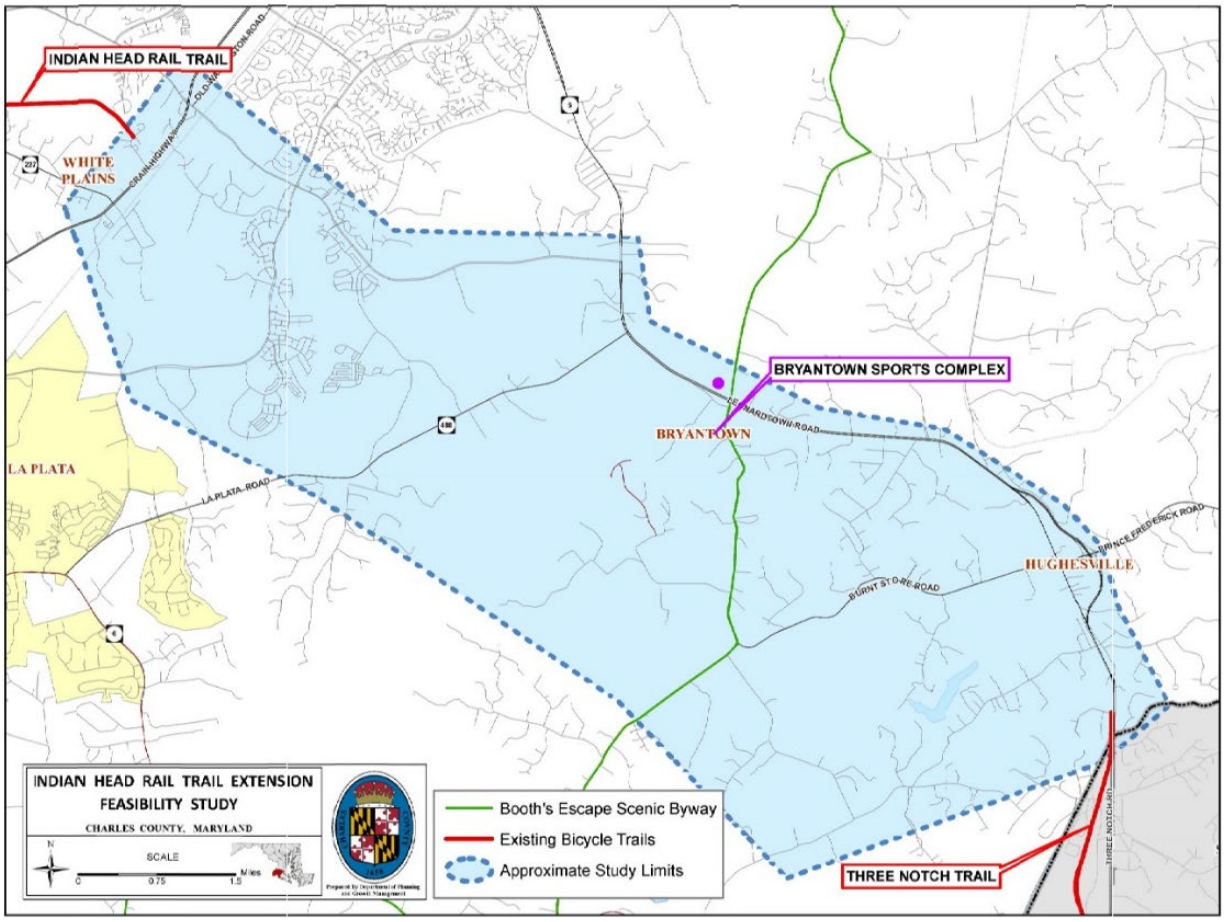



**Figure 1. Indian Head Rail Trail Extension Study Area**

## Relevant Plans and Initiatives

### *Charles County Bicycle and Pedestrian Master Plan (2012)*

This plan establishes a vision for Charles County as "a place where people have the safe and convenient option of walking and bicycling for transportation, recreation, and health…" within a "… seamless, balanced and barrier free network for all." The plan calls for on and off-road recreation trails to showcase the County's natural and cultural resources.

The plan's description of the Indian Head Rail Trail confirms the intention that the trail provide a full east-west connection across the County that, "follows the U.S. Government Railroad from Indian Head to White Plains following Old Woman's Run, connects to White Plains Regional Park, and follows MD 5 to Hughesville. From Hughesville the route heads towards Lexington Park via the Three Notch Trail (the former Southern MD Railroad right-of-way)."

### *Charles County Comprehensive Plan (2016)*

This plan does not update or expand on the recommendations of the 2012 Bicycle and Pedestrian Master Plan. However, it affirms them and incorporates them by reference.

### *Charles County Land Preservation, Parks, and Recreation Plan (2017)*

The extension of the Indian Head Rail Trail being examined in this study will support the goals and recommendations in the Land Preservation, Parks, and Recreation Plan by:

- Contributing to the Plan's goal of building an interconnected system of trails and paths for non-automotive use
- Strengthening the County's eco-tourism and resource-based recreation assets
- Expanding the County's active recreation amenities that provide opportunities for people to engage with the County's natural and cultural resources

### *Urban Land Institute Indian Head Rail Trail Technical Panel Assistance Report (2012)*

This report provides guidance for transforming the Indian Head Rail Trail from a trail that is well used and valued by the local community to a trail popular with a broader network of users from other counties and out-of-state. The report recommends linking the IHRT to existing neighborhoods and trails at the White Plains terminus, as well as making the IHRT part of a larger looped bike network in order to attract bike touring and road cyclists. The report also emphasizes the need to identify a series of metrics to track progress related to trail-related economic development. The report notes that other communities have found that documenting their accomplishments over time by collecting regular data on trails has been invaluable in seeking additional state and federal funding.

### *Connect Waldorf (2018)*

Waldorf is an urbanized community to the immediate north of the study area along the US-301 corridor, making the Connect Waldorf plan relevant to the current project. The Connect Waldorf plan seeks to, "transform the Waldorf Urban Area into a place where walking and bicycling can be considered safe and viable daily activities." The proposed walking and biking networks in the plan extend south along US-301 to Demar Road and the IHRT terminus in White Plains. The alignment alternatives considered in this study have the potential to support these priority projects.

## Physical Inventory and Assessment

The following maps and narrative descriptions evaluate natural and man-made features that may impact the feasibility of a shared-use trail within the study area. Specific locations where the features directly impact specific alignment alternatives will be noted in the future Alignments Alternatives Evaluation to be developed as part of this study.

### *Topography and Environmental Assets*

Charles County is a landscape of rivers, streams, wetlands, and forests that support a wide variety of plant and wildlife communities. The Indian Head Rail Trail Extension study area is located on the upland

plateau of Charles County with steep slopes between level uplands and low stream valleys. Steep slopes near streams are protected through Resource Protection Zone Regulations, and most forms of development are prohibited.

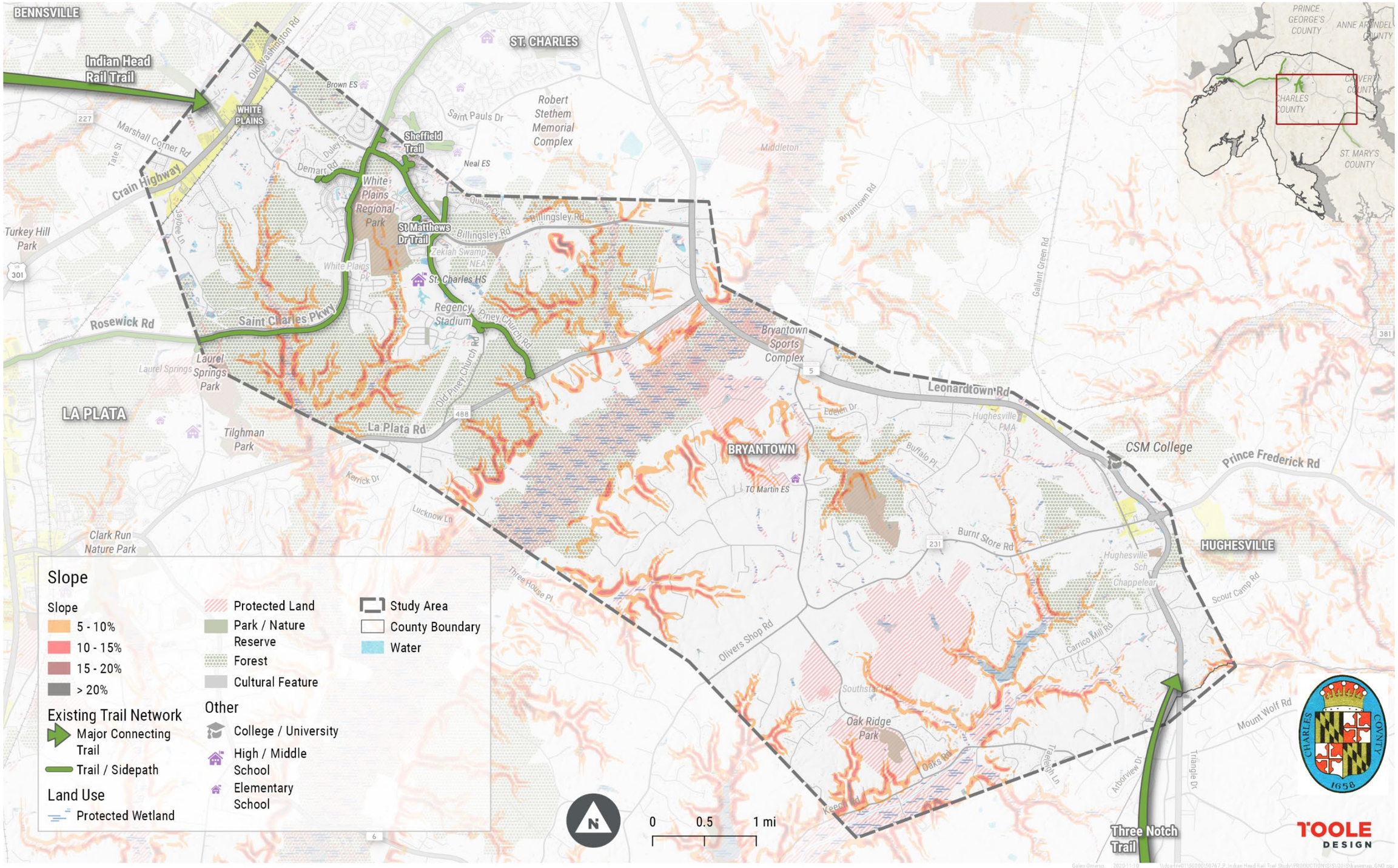
The network of streams and wetlands that traverses the study area is of major importance to the County and Chesapeake Bay ecosystem. Forested buffers around streams maintain stream function and habitat, while floodplains moderate flashy hydrology and store floodwaters. The study area is bisected by the Zekiah Swamp, the largest nontidal wetland in Charles County and a Maryland Wetland of Special State Concern. Wetlands of special concern are noted for rare, threatened, and endangered species, or unique habitat, and require a 100-foot protective buffer.

While the western portion of the study area is urbanized, the bulk of the study area is dominated by natural woodlands and agricultural landscapes, and it features the scenic rural character that Charles County is known for. The County's Rural Legacy Area runs through the center of the study area, following the alignment of the Zekiah Swamp but with a broader cross section. The purpose of Maryland's Rural Legacy Program is to protect Maryland's best remaining large contiguous tracts of rural and natural landscapes.

The topography and environmental assets of the study area are illustrated on the map in Figure 2 on the following page.

# Indian Head Rail Trail Extension Feasibility Study

November 2020



### *Existing Trails, Transportation, and Cultural Assets*

The existing Indian Head Rail Trail, the premier shared-use trail in Charles County, terminates in the western boundary of the study area. Additional trails in the study area include shared-use paths along Saint Charles Parkway, Billingsley Road, and Piney Church Road. As can be seen on the map, the beginnings of a trail network are starting to take shape within the study area. In addition, trails planned as part of Connect Waldorf will include connections within the study area on US-301 at Demarr Road and the existing IHRT terminus.

The existing roadway network offers potential right of way corridors for the IHRT extension, but at the same time presents challenges. There is presently no safe way for pedestrians or bicyclists to cross US-301, as will be required for the IHRT to extend eastward. Maryland Route 5 is the only existing crossing of the Zekiah Swamp within the study area, and the existing bridges have minimal shoulder area. In their current configuration, they are inadequate for bike lanes.

Cultural assets located within the study area include regional and local parks, schools, and sports complexes. Properties within the study area listed on the National Register of Historic Places include The Lindens, a historic Federal-style home, and the Bryantown Historic District. National Register designation is currently pending for the historic warehouse district in Hughesville.

Existing trails, transportation, and cultural assets in the study area are illustrated on the map in Figure 3 on the following page.

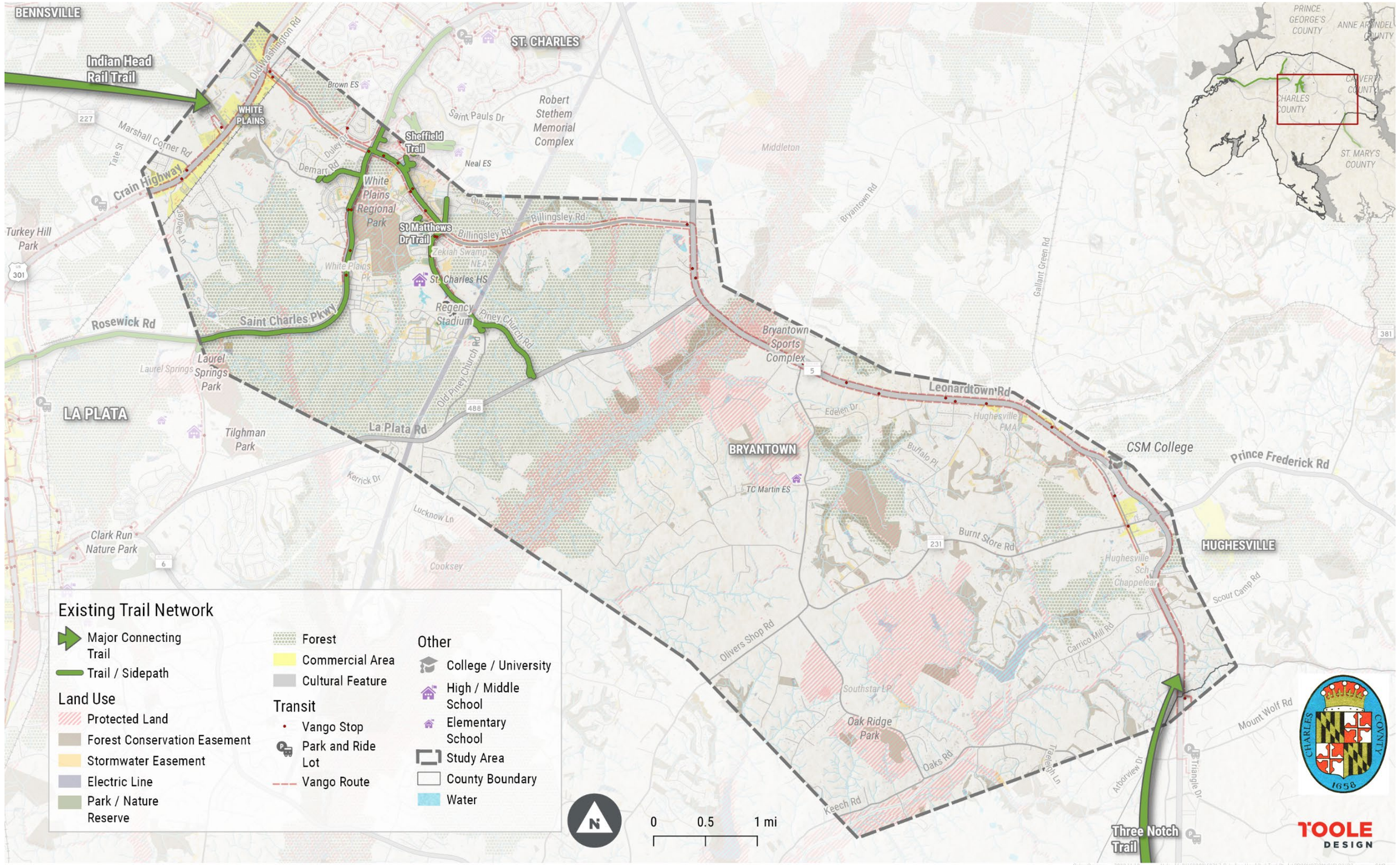



**Figure 3. Existing Conditions—Existing Trails, Transportation, and Cultural Assets**

## Summary of Opportunities and Challenges

*Opportunities*

- The study area topography includes an abundance of level terrain suitable for trail development and providing opportunities for Americans with Disabilities Act (ADA) accessible trail connections.
- The waterways, wetlands, woodlands, and farmland that punctuate the study area offer the potential to create a unique trail experience.
- The natural, cultural, and historic features within the study area may serve as destinations to and/or from trail related improvements and provide multiple opportunities for environmental or historical interpretation.

*Challenges*

- Steep slopes where the level upland connects to stream valleys could pose barriers to trail development and limit options for trail routing to existing rights of way.
- Zekiah Swamp bisects the study area creating a formidable natural barrier to an east-west trail connection.
- Physical barriers created by existing transportation corridors pose challenges to developing a IHRT extension that is safe and comfortable for users of all ages and abilities.
- Existing roadway rights-of-way may offer space for a continuous shared use trail, but the resulting trail may not offer the desired natural character provided by the existing IHRT alignment.

# Appendix B. LTS Analysis

# Appendix B. User Experience/LTS Analysis

**Table 1. Character Matrix for Segments and Adjacent Roadways, Main Connector Route (Alternative A)**

In summary, Main Connector Route (Alternative A), using all roadway rights of way, many of which are busier roadways, may result in a higher stress trail experience, though it would be the most direct and shortest of the of the three alternatives, by as much as five miles.

| SEGMENT | LENGTH (mi) | FACILITY TYPE | ROW/ PAVED WIDTH (ft) | CLASSIFATION & APPROX. ADT * | SPEED LIMIT | |
|---|---|---|---|---|---|---|
| **ALTERNATIVE A/MAIN CONNECTOR ROUTE** | | | | | | |
| **Leonardtown Road,** Three Notch Trailhead to La Plata Road | 6.5 | Sidepath | 150 typ/ 80 | Minor Arterial 31,000-38,000 | 55 mph | 3 |
| **La Plata Road /MD-488** Leonardtown Road to Old Piney Church Road | 1.8 | Sidepath | 80/ 50 | Minor Arterial 6,000 | 50 mph | 3 |
| **Old Piney Church Road,** La Plata to Billingsley Road | 1.91 | Sidepath (existing) | 40 | N/A | N/A | 1 |
| **Billingsley Road,** Old Piney Church Road to St. Charles Parkway | 1.07 | Sidepath (existing) | 150/ 108 | Intermed. Arterial 5,600-12,000 | 45 mph | 2 |
| **St. Charles Parkway,** Billingsley Road to Demarr Road | 0.27 | Sidepath | 175 typ/ 80 | Minor Arterial | 50 mph | 3 |
| **Demarr Road** St Charles Parkway to Crain Hwy/US-301 | 1.53 | Sidepath | 60/ 26 | Major Collector | 30 mph | 3 |
| **Crain Hwy/US-301** Demarr Road to IHRT Trailhead | 0.43 | Sidepath | 175/ 135 | Principal arterial 34,000-55,000 | 55 mph | 3 |
| TOTAL LENGTH | **13.51** | **miles** | Shortest, most direct alternative | | | 18 |

*Average daily traffic

**SOURCES**:
https://www.roads.maryland.gov/Traffic_Volume_Maps/Traffic_Volume_Maps.pdf#page=1&zoom=100

Table 2. Character Matrix for Segments and Adjacent Roadways, Alternative B

| SEGMENT | LENGTH (mi) | FACILITY TYPE | ROW/ PAVED WIDTH (ft) | CLASSIFICATION & APPROX. ADT * | SPEED LIMIT | |
|---|---|---|---|---|---|---|
| **ALTERNATIVE B** | | | | | | |
| **Deborah Drive,** Three Notch to SMECO ROW | 0.58 | Sidepath | 60 / 20-40 | Local | 25 mph | 1 |
| **SMECO Powerline,** Deborah Drive to SMECO Campus & Burnt Store Road | 1.72 | SUP | | N/A | N/A | 1 |
| **Burnt Store Road, MD-231** SMECO Campus to Oliver's Shop Road | 3.4 | Sidepath | 42/ 26 | Major Collector 3,000 | 50 mph | 2 |
| **Oliver's Shop Road,** Burt Store Road to Trotter Road | 2.33 | Sidepath | 40/ 22 | Major Collector | 40 mph | 2 |
| **Trotter Road,** Oliver's Shop Road to Leonardtown Road /Rt 5 | 0.44 | Sidepath | 40/ 22 | Local | 25 mph | 2 |
| **Leonardtown Road /Rt 5,** Trotter Road to LaPlata Road | 0.78 | Sidepath | 120/ 85 | Minor Arterial 31,000-38,000 | 40 mph | 1 |
| **LaPlata Road,** Leonardtown Road to Powerline Corridor | 3.17 | Sidepath | 53-68/ 28-62 | Minor Arterial 5,000 | 50 mph | 1 |
| **Powerline Corridor,** La Plata Road to White Plains Park | 2.68 | SUP | | N/A | N/A | 1 |
| **White Plains Park Road,** Park to St. Charles Parkway | 0.32 | Sidepath | N/A | Local | | 1 |
| **St. Charles Parkway,** White Plains Parkway to Demarr Homestead Road | 0.41 | Sidepath | 175 typ/ 80 | Minor arterial | 50 mph | 3 |
| **Demarr Homestead Road/PL,** St. Charles Parkway to Demarr Road | 1.23 | Sidepath | | Local | | 2 |
| **Demarr Road,** Powerline to Printers Ct | 0.87 | Sidepath | 60/ 26 | Major Collector | 30 mph | 2 |
| **Printers Court,** Demarr Road to Railroad ROW | 0.27 | Sidepath | 60 / 38 | Local | | 1 |
| **Railroad Right of Way** | 0.056 | SUP | | N/A | NA | 1 |
| **US-301 to IHRT** | 0.594 | Sidepath | 175 / 125 | Principal Arterial 34,000-55,000 | 55 mph | 1 |
| TOTAL LENGTH | **18.85** | **miles** | | | | 22 |

In summary, Alternative B, is a mix of shared use path and sidepath, along a mix of roadway types. While Leonardtown Road/MD Route 5 stands out as a busier roadway, many but not all of the sidepath segments are along medium to lower volume and speed roadways.

Table 3. Character Matrix for Segments and Adjacent Roadways, Alternative C

| SEGMENT | LENGTH (mi) | FACILITY TYPE | ROW/ PAVED WIDTH (ft) | CLASSIFICATION & APPROX. ADT * | SPEED LIMIT | |
|---|---|---|---|---|---|---|
| **ALTERNATIVE C** | | | | | | |
| **Deborah Drive,** Three Notch to SMECO Powerline Corridor | 0.58 | Sidepath | 60 / 20-40 | Local | 25 mph | 2 |
| **SMECO Powerline Corridor,** Deborah Drive to SMECO Campus @ Burst Store Road | 1.72 | SUP | | N/A | N/A | 1 |
| **Burnt Store Road, MD 231** SMECO Campus to Oliver's Shop Road | 3.4 | Sidepath | 42/ 26 | Major collector 3,000 | 50 mph | 3 |
| **Oliver's Shop Road,** Burnt Store Road to Trotter Road | 2.33 | Sidepath | 40/ 22 | Major Collector | 40 mph | 3 |
| **Trotter Road,** Oliver's Shop Road to Leonardtown Road/Rt 5 | 0.44 | Sidepath | 40/ 22 | Local | 25 mph | 2 |
| **Leonardtown Road/Rt 5,** Trotter Road to LaPlata Road | 0.78 | Sidepath | 120/ 85 | Minor Arterial 31,000-38,000 | 40 mph | 3 |
| **LaPlata Road/MD-488** Leonardtown Road/Rt 5 to Powerline in LaPlata | 4.55 | Sidepath | 53-68/ 28-62 | Minor Arterial 5,000 | 50 mph | 3 |
| **Powerline in La Plata,** La Plata Road to Laurel Springs Trail | 0.64 | SUP | | N/A | N/A | 1 |
| **Laurel Springs Trail,** Powerline in LaPlata to Radio Station Road/Jaybee Ln | 1.01 | SUP (existing) | | N/A | N/A | 1 |
| **Jaybee Ln,** Radio Station Road/Jaybee Ln | 1.74 | Sidepath | 30/ 16 | Major collector | N/A | 2 |
| **Crain Highway/ US-301,** Jaybee Ln to Willett's Crossing | 0.17 | Sidepath | 175 / 125 | Principal Arterial 34,000-55,000 | 55 mph | 2 |
| **Willett's Crossing/ Marshall Corner Road/MD-227** US-301/Crain Hwy to Padgett Road | 0.56 | Sidepath | 40/ 26 | Major Collector 6,500 | 25 mph (WC) 40 mph (MD 227) | 2 |
| **Padgett Road, Willett's Crossing/ Marshall Corner/MD-227** | 0.99 | Sidepath | 60/ 22 | Local 6,000 | 30 mph | 2 |
| TOTAL LENGTH | **18.91** | **miles** | | | | |

In summary, Alternative C, is a mix of shared use path and sidepath, along a mix of roadway types. While Leonardtown Road/MD Route 5 stands out as a busier roadway, many but not all of the sidepath segments are along medium to lower volume and speed roadways.

# Appendix C. Structural Details

# Appendix C: Structural Details

### *Main Connector Route, Alternatives 1 and 2: Proposed Grade-Separated Bicycle/Pedestrian Crossing of US-301/Crain Highway*

The main span would consist of a prefabricated steel truss spanning approximately 145 feet with a skew of approximately 25 degrees. The clear width inside the superstructure between handrails would be 12 feet, per design standards. The span length assumes there is no proposed widening of US-301 beyond existing buildings. No intermediate pier is proposed to allow for future interior road expansion. Eliminating the center pier reduces cost but that may be offset by the single long span truss. Crash barriers at the piers are proposed to protect the substructure from vehicular impact. The vertical clearance of the bridge over US-301 would be set to meet federal and state codes and regulations.

The elevated pedestrian crossing requires approximately 350-400 feet minimum length approach ramps to meet the required ADA 5% profile grade. The ramp would consist of multiple spans, approximately 50 feet, with 2-steel beam superstructure with concrete decks. Hand railing with minimum height 3’-6” would be required. Due to the numerous buildings in the vicinity of the ramps, a clear substructure using isolated concrete piers is proposed instead of a closed ramp using mechanically stabilized earth (MSE) walls for improved visibility. The west approach ramp alignment would be straight, but the east ramp would require multiple turns due to limited space. The proposed piers would have drilled shaft foundations with above-ground pier columns. The pier caps would be constructed with concrete and sized to support the two steel trusses and beams.

Overhead powerlines in the vicinity of the bridge would need to be moved underground. There may be other underground utilities that may also require relocation and should be addressed in the next level of the project. Construction access to the site is not restricted.

A sketch of the General Plan and Elevation (GPE) and Section is shown in Figure 16.


**Figure 1. Concept Pedestrian Bridge Crossing of US-301**

### *Main Connector Route, Alternatives 1 and 2: Pedestrian Bridge over Zekiah Run on Route 5*

Each alternative proposed a sidepath along the south side of Leonardtown Road/MD Route 5. To cross the Zekiah Swamp Run, a single span 125 feet steel truss bridge is proposed parallel to the existing bridge. The clearance between the existing bridge and proposed bridge is 2 feet. The clear width inside the superstructure between handrails would be 12 feet. The existing guardrails would need to be replaced with concrete barriers to protect pedestrians and drivers. The proposed steel truss bridge would allow for the bottom chord to be located above the existing wingwalls and the waterway would not be impacted. Avoiding disturbance of the waterway would eliminate the need to hydraulic analysis.

Widening of the existing bridge to accommodate the trail would likely be more expensive due to the required demolition of part of the existing deck and wingwalls.

The proposed bridge is supported on three 14-inch diameter concrete drilled shafts with concrete cap located inside the fill behind the existing wingwalls. The approaches to the bridge would require wingwalls due to the existing grading. More detailed investigation would be required to determine the length of wingwall required but it is currently estimated at 30 feet long with an approximate height of 12 feet.

No utilities have been identified in the vicinity of the proposed bridge. Construction access to the site is not restricted.

A sketch of the General Plan and Elevation (GPE) and Section is shown in Figure 17.

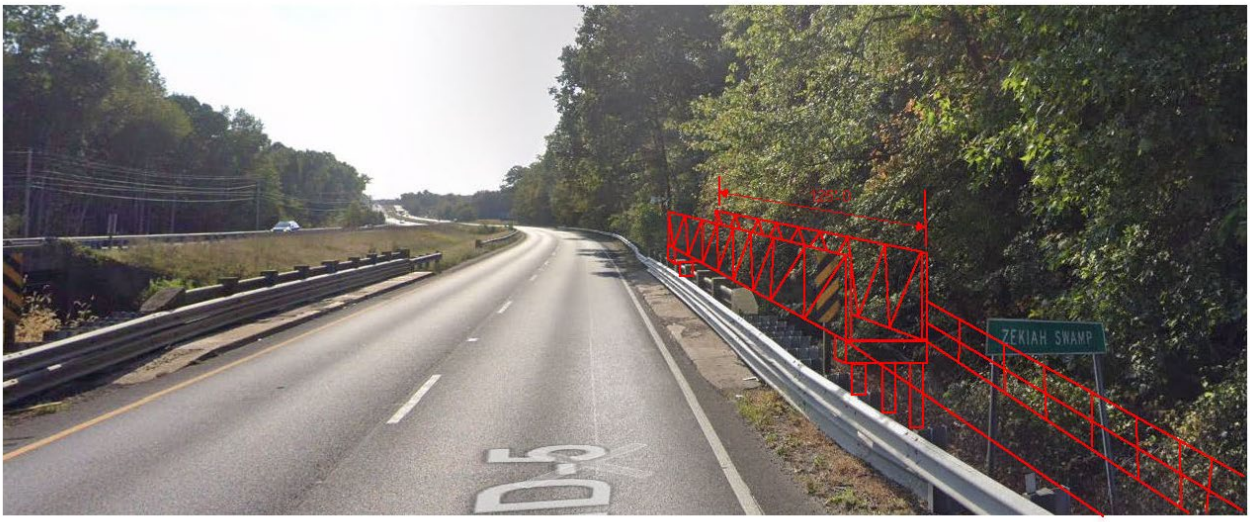



**Figure 2. GPE of the Zekiah Run crossing**

### *Main Connector Route, Alternatives 1 and 2: Pedestrian Bridge over Mill Dam Run on Route 5*

To cross the Mill Dam Run (which runs parallel to the Zekiah Swamp Run), a single span 84 feet steel truss bridge is proposed parallel to the existing bridge. The clearance between the existing bridge and proposed bridge is 2 feet. The clear width inside the superstructure between handrails is would be 12 feet. The existing guardrails would need to be replaced with concrete barriers to protect pedestrians and drivers. The proposed steel truss bridge allows for the bottom chord to be located above the existing wingwalls and the waterway is not impacted. Disturbance of the waterway would require hydraulic analysis.

Widening of the existing bridge to accommodate the trail would likely be more expensive due to the required demolition of part of the existing deck and wingwalls.

The proposed bridge is supported on three 14” diameter concrete drilled shafts with concrete cap located inside the fill behind the existing wingwalls. The approaches to the bridge would require wingwalls due to the existing grading. More detailed investigation would be required to determine the length of wingwall required but it is currently estimated at 30 feet long with an approximate height of 12 feet. No utilities have been identified in the vicinity of the proposed bridge. Construction access to the site is not restricted.

Attached is a sketch of the General Plan and Elevation (GPE) and Section is shown in Figure 18.

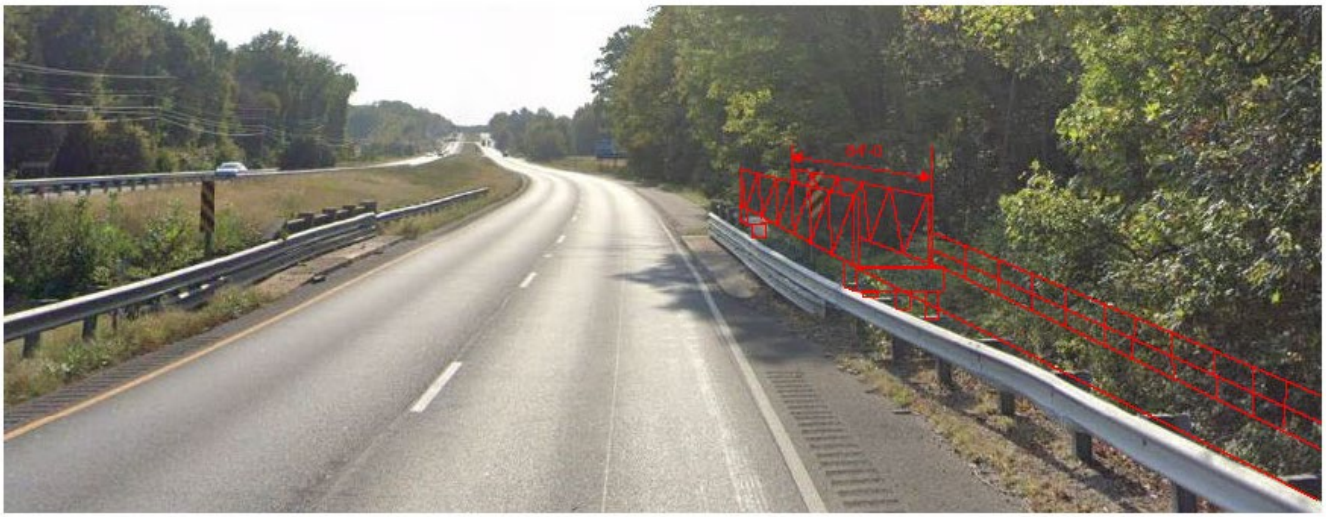


**Figure 3. GPE of the proposed Mill Dam Run crossing.**

# Indian Head Trail
# Prefabricated Steel Truss Pedestrian Bridge Over Route 301

## Bridge Data

**4 in. Concrete Slab over Corrugated S.I.P. Forms**

| | | |
|---|---|---|
| **Bridge Span:** | **145'-0"** | **Truss Span over Route 301** |
| **Bridge Width:** | **12'-0"** | **Clear Rail to Rail** |
| **Ramp Length:** | **700.0** | **ft** |
| **Bridge Deck Area:** | **2030** | **sq. ft.** |

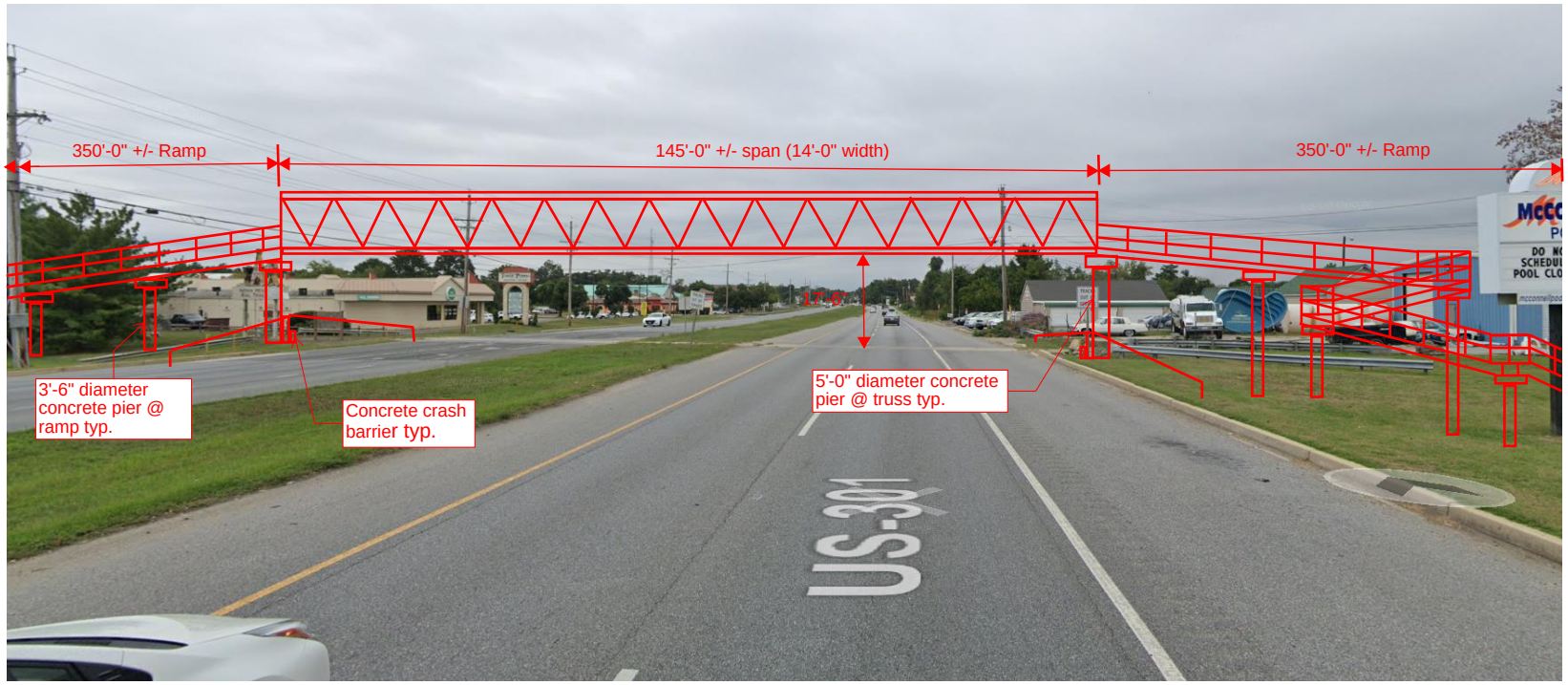
Superstructure Cost Estimate

| Item Description | Total Quantity | Unit | Unit Price | Total Price |
|---|---|---|---|---|
| Mobilization | 1 | LS | $25,000.00 | **$25,000** |
| Crane Rental | 1 | L.S. | $15,000.00 | **$15,000** |
| Deck Concrete - Bridge | 21.5 | C.Y. | $800.00 | **$17,185** |
| Slab Concrete - Ramp | 104 | C.Y. | $800.00 | **$82,963** |
| 145 ft Prefabricated Steel Truss | 2030 | S.F. | $220.00 | **$446,600** |
| 2-W30x108 Structural Steel Beam | 151200 | LBS. | $2.50 | **$378,000** |
| Railing - Ramp | 1,400 | LF | $40.00 | **$56,000** |
| Reinforcing Mesh 6x6 - Deck | 574 | LBS. | $3.00 | **$1,723** |
| Reinforcing Mesh 6x6 - Ramp | 2,780 | LBS. | $3.00 | **$8,340** |
| | | **Total Cost of Superstructure:** | | **$1,030,811** |
| | | **Unit Cost of Superstructure:** | | **$508** **per ft$^2$** |

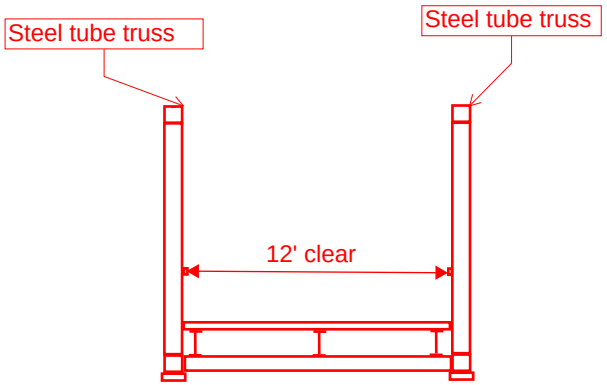
## Substructure Cost Estimate

| Item Description | Total Quantity | Unit | Unit Price | Total Price |
|---|---|---|---|---|
| Pier Cap Concrete | 47 | C.Y. | $800.00 | **$37,748** |
| 5' Concrete Pier Column | 22 | C.Y. | $1,200.00 | **$26,180** |
| 3.5' Concrete Pier Column | 43 | C.Y. | $1,000.00 | **$42,761** |
| 5' Drilled Shaft | 100 | LF | $800.00 | **$80,000** |
| 3.5' Drilled Shaft | 480 | LF | $550.00 | **$264,000** |
| Pier Protection | 28 | C.Y. | $800.00 | **$22,469** |
| Structure Excavation | 30 | C.Y. | $100.00 | **$3,000** |
| Structure Fill | 0 | C.Y. | $150.00 | **$0** |
| M.O.T. | 1 | L.S. | $25,000.00 | **$25,000** |
| Reinforcing Bars Pier | 16,764 | LBS. | $2.00 | **$33,529** |
| | | **Total Cost of Substructure:** | | **$534,687** |
| | | **Unit Cost of Substructure:** | | **$263** **per ft$^2$** |

| | | |
|---|---|---|
| **Bridge Cost (Superstr. + Substr.) :** | | **$1,565,498** |
| **Unit Bridge Cost :** | | **$771.18** per ft$^2$ |
| **Utility Coordination** | **LS** | **$50,000.00** |
| **Survey** | **LS** | **$25,000.00** |
| **Engineering Design** | **LS** | **$350,000.00** |
| **Contingencies (30%) :** | | **$597,149** |
| **Total Bridge Cost :** | | **$2,587,647** |
| **Unit Bridge Cost (w/contingency) :** | | **$1,274.70** per ft$^2$ |
| **Total Cost of Pedestrian Bridge & Boardwalk** | | **$2,587,647** |




Elevation




Section

# Route 301 Pedestrian Bridge Crossing

# Indian Head Trail
# Prefabricated Steel Truss Pedestrian Bridge Over Mill Dam Run

## Bridge Data

**4 in. Concrete Slab over Corrugated S.I.P. Forms**

| | | |
|---|---|---|
| **Bridge Span:** | **84'-0"** | **Truss Span over Mill Dam Run** |
| **Bridge Width:** | **12'-0"** | **Clear Rail to Rail** |
| **Ramp Length:** | **60.0** | **ft** |
| **Bridge Deck Area:** | **1176** | **sq. ft.** |

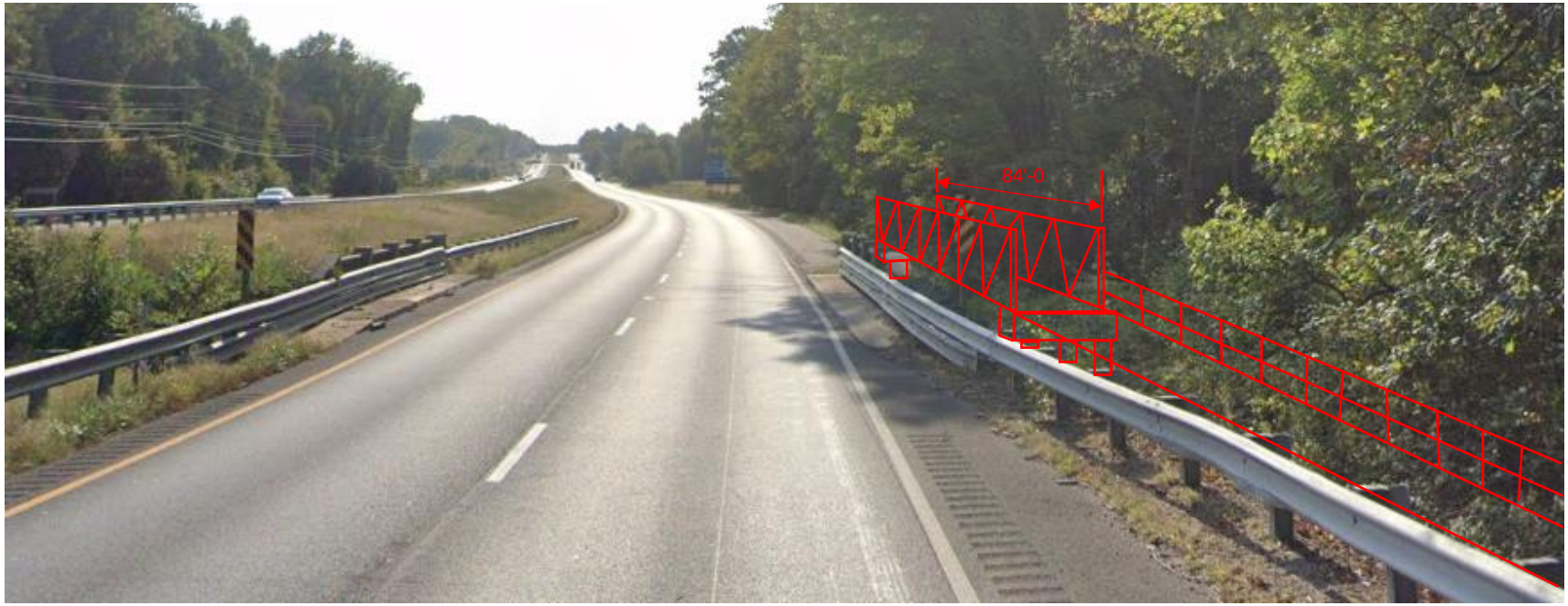
Superstructure Cost Estimate

| Item Description | Total Quantity | Unit | Unit Price | Total Price |
|---|---|---|---|---|
| Mobilization | 1 | LS | $25,000.00 | **$25,000** |
| Crane Rental | 1 | L.S. | $15,000.00 | **$15,000** |
| Deck Concrete - Bridge | 12.4 | C.Y. | $800.00 | **$9,956** |
| Slab Concrete - Ramp | 18 | C.Y. | $800.00 | **$14,222** |
| 84 ft Prefabricated Steel Truss | 1176 | S.F. | $250.00 | **$294,000** |
| Railing - Ramp | 120 | LF | $40.00 | **$4,800** |
| Reinforcing Mesh 6x6 - Deck | 333 | LBS. | $3.00 | **$998** |
| Reinforcing Mesh 6x6 - Ramp | 483 | LBS. | $3.00 | **$1,449** |
| | | **Total Cost of Superstructure:** | | **$365,425** |
| | | **Unit Cost of Superstructure:** | | **$311** per $ft^2$ |

## Substructure Cost Estimate

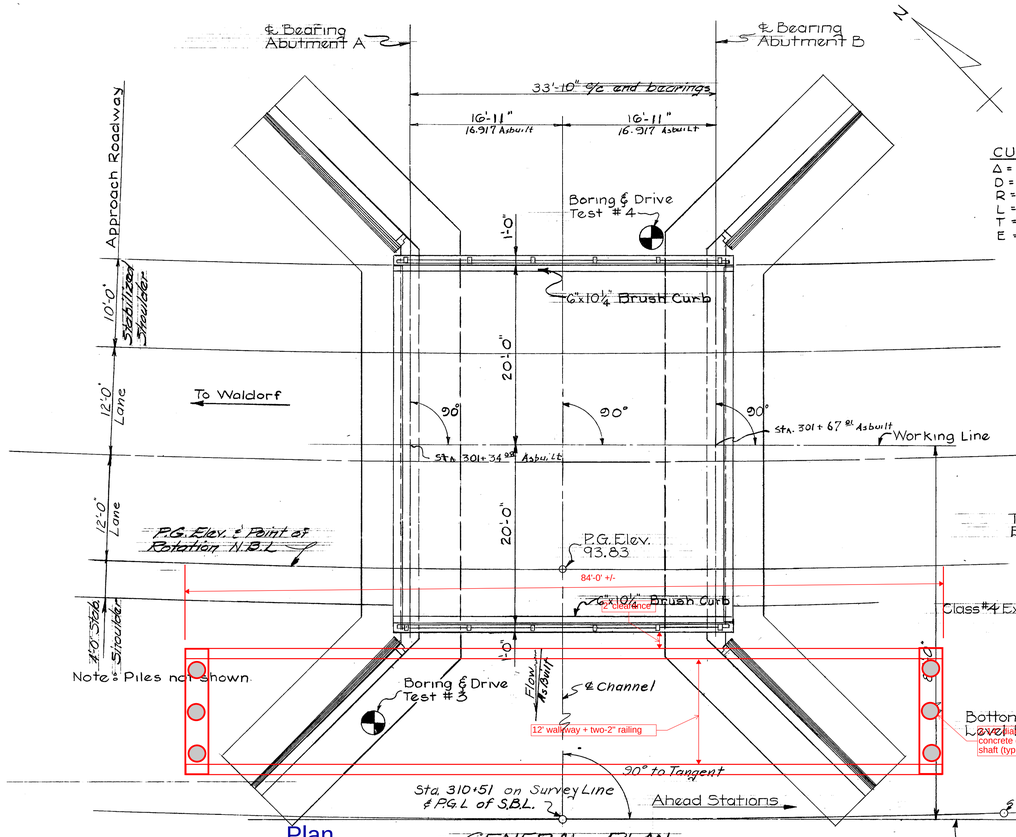
| Item Description | Total Quantity | Unit | Unit Price | Total Price |
|---|---|---|---|---|
| Pier Cap Concrete | 5 | C.Y. | $800.00 | **$3,793** |
| 14" Concrete Pier Column | 4 | C.Y. | $1,200.00 | **$4,276** |
| 14" Drilled Shaft | 540 | LF | $800.00 | **$432,000** |
| 6" Precast Concrete Wall Panel | 14 | C.Y. | $1,000.00 | **$14,000** |
| Structure Excavation | 30 | C.Y. | $100.00 | **$3,000** |
| Structure Fill | 156 | C.Y. | $150.00 | **$23,333** |
| M.O.T. | 1 | L.S. | $20,000.00 | **$20,000** |
| Reinforcing Bars Pier | 1,246 | LBS. | $2.00 | **$2,491** |
| | | **Total Cost of Substructure:** | | **$502,893** |
| | | **Unit Cost of Substructure:** | | **$428** **per ft$^2$** |

| | | |
|---|---|---|
| **Bridge Cost (Superstr. + Substr.) :** | | **$868,318** |
| **Unit Bridge Cost :** | | **$738.37** per ft$^2$ |
| **Utility Coordination** | **LS** | **$10,000.00** |
| **Survey** | **LS** | **$25,000.00** |
| **Engineering Design** | **LS** | **$200,000.00** |
| **Contingencies (30%) :** | | **$330,995** |
| **Total Bridge Cost :** | | **$1,434,313** |
| **Unit Bridge Cost (w/contingency) :** | | **$1,219.65** per ft$^2$ |
| **Total Cost of Pedestrian Bridge & Boardwalk** | | **$1,434,313** |




Mill Dam Run Pedestrian Bridge Crossing

| FED. ROAD DIV. NO. | STATE | FED. AID PROJ. NO. | SHEET NO. | TOTAL SHEETS |
|---|---|---|---|---|
| 2 | MD. | F-321-1(13) | 44 | 52 |

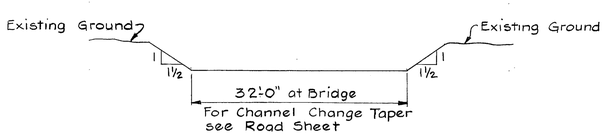



Plan

## GENERAL PLAN

Scale: 1/8"=1'-0"

CURVE DATA
Δ = 12°54'-30"
D = 1°-18'
R = 4407.37'
L = 992.95
T = 498.59
E = 28.11




## TYPICAL STREAM CHANGE SECTION

No Scale

## GENERAL NOTES

**Specifications** : S.R.C Specifications dated January 1962 and Special Provisions for material and construction. A.A.S.H.O Standard Specifications for Highway Bridges dated 1961 for design, including 1961, 1962, 1963, and 1964 interim specifications.

**Loading** : H520-44

**Excavation** : See Special Provisions.

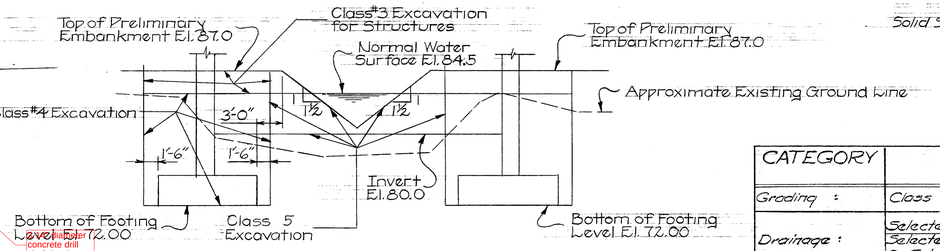
**Concrete** : Class A-1 and Class A Concrete shall have a minimum compressive strength of 3000 p.s.i. at 28 days. See Special Provisions.

**Chamfer** : All exposed corners of concrete to be chamfered with milled chamfer strips. Chamfers to be ¾"x¾" unless otherwise noted.

**Reinforcing Steel** : Reinforcing steel to be intermediate grade. All splices shall be lapped a minimum of 24 bar diameters unless otherwise noted. Minimum cover for any bar shall be 2" unless otherwise noted.

**Structural Steel** : Structural steel shall be A.S.T.M. Designation A-36. See Special Provisions.

**Solid Sodding** : A three foot strip shall be laid adjacent to and in back of all wing walls and down slope to stream invert as directed by the Engineer.

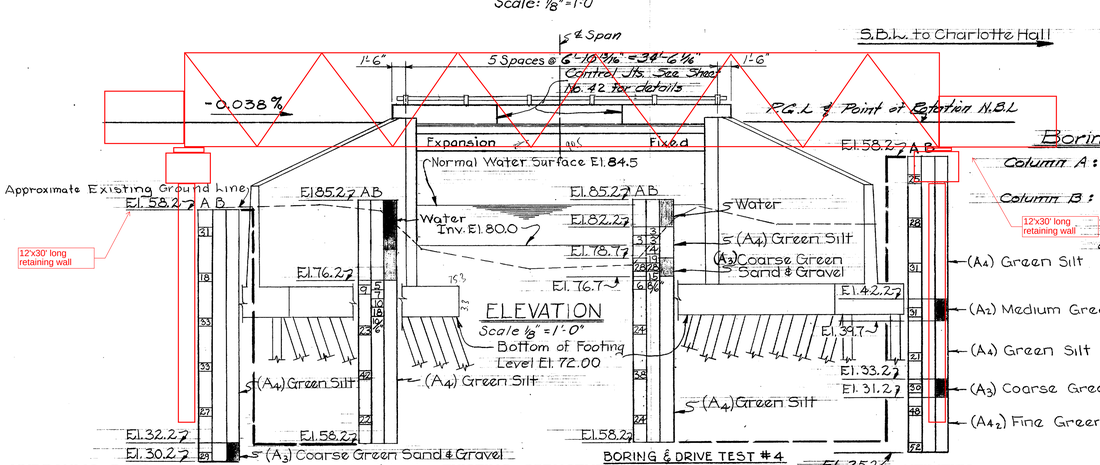



Note: Limits of measurement for payment for Class 5 Excavation longitudinally along stream shall not extend more than 25 feet beyond new bridge wing ends, unless otherwise directed in writing by the Engineer.

## LIMITS FOR MEASUREMENT FOR PAYMENT FOR STRUCTURE AND STREAM CHANGE EXCAVATION

Scale: 1/8"=1'-0"

| CATEGORY | Item | Method of Measurement | Estimated Quantity |
|---|---|---|---|
| Grading : | Class 5 Excavation | C.Y. | 480 |
| Drainage : | Selected Backfill using #6 Aggregate | C.Y. | 40 |
| | Selected Backfill using CR-6 or Type 2 Sub-base | C.Y. | 40 |
| Structures : | Class #3 Excavation for Structures | C.Y. | 240 |
| | Class #4 Excavation | C.Y. | 1170 |
| | 12 In. Diameter Cast In Place Concrete Piles Furnished, Driven, Filled etc. | L.F | 3380 |
| | 12 In. Diameter Cast In Place Conc. Test Pile, Furnished, Driven, Filled, etc. | L.F | 80 |
| | 12 In. Diameter Cast In Place Concrete Pile Splices. | Ea. | 20 |
| | Footing Concrete for Zekiah Swamp Bridge at Sta. 310+ | C.Y. | 246 |
| | Substructure Concrete for Zekiah Swamp Bridge at Sta. 310+ | L.S. | L.S. |
| | Superstructure Concrete for Zekiah Swamp Bridge at Sta. 310+ | L.S. | L.S. |
| | Contingent Concrete for Bridges | C.Y. | 5 |
| | Fabricated Structural Steel for Zekiah Swamp Bridge at Sta. 310+ | L.S. | L.S. |
| | Porous Backfill for Zekiah Swamp Bridge at Sta. 310+ | L.S. | L.S. |
| | Metal Railing One Strand for Zekiah Swamp Bridge at Sta. 310+ | L.S. | L.S. |
| | Bituminous Concrete Spec. B for Bridge Deck | Tons | 16 |
| Landscaping : | Solid Sodding | S.Y. | 60 |



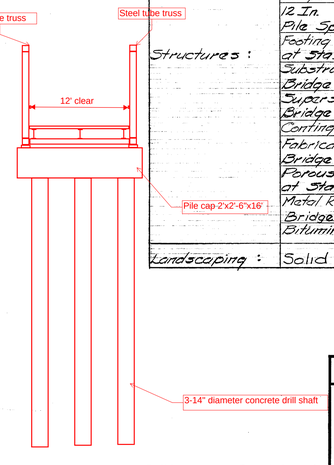

Elevation

## Boring Notes :

Column A : Blows on 2" spoon by 140# weight falling 30".

Column B : Blows on 2½" casing by a 300# weight falling 30".

Blows are per foot unless otherwise indicated. Classification of soil has been made by the driller and has not been checked by a Soils Engineer.




Section

**HYDRAULIC DATA** — BORING & DRIVE TEST # 3

| | | | |
|---|---|---|---|
| DRAINAGE AREA | | = 6.0 SQ. MI. | = 3840 ACRES |
| STORMWATER DISCHARGE | c. f. s. | = | 1300 cfs. |
| TIDAL FLOW | c. f. s. | = | ~ |
| TOTAL MAXIMUM DISCHARGE | c. f. s. | = | 1300 cfs. |
| MAXIMUM FLOW DEPTH AT H.W. | FEET | = | 6.7 |
| OPENING BY | | | 300 sq. ft. |
| OPENING TO H.W. | SQ. FT. | = | 210 |
| VELOCITY AT OUTLET | FT. PER SEC. | = | 5.9 |

**EXISTING STRUCTURE** ~ None

TYPE
WATERWAY
UNDERCLEARANCE
DATE BUILT
OWNERSHIP
DISPOSITION
REMARKS

**UTILITIES** ~ Unknown

STORM SEWERS
SANITARY SEWERS
WATER MAINS
GAS MAINS
ELECTRIC WIRES (OVERHEAD / UNDERGROUND)
OTHER

**TRAFFIC DATA** ~ See Title Sheet

TRAFFIC COUNT = ~ DATE ~
DESIGN SPEED = ~ m. p. h.

**DATUM** ~ See Road Sheet

| REVISIONS |
|---|
| Asbuilts Rev. 4-4-68 |

STATE OF MARYLAND
STATE ROADS COMMISSION
BALTIMORE, MD.

# STEEL BEAM BRIDGE
ON N.B.L. OF MD. ROUTE 5 AT STA. 310+
OVER ZEKIAH SWAMP
## GENERAL PLAN AND ELEVATION

SCALE As Shown DATE Feb., 1966 CONTRACT CH-300-9-541

MADE BY EAE R.G.
TRACED BY
CHECKED BY J.A.L.
APPROVED A. L. Goldsmith 2/1/66.
ASSISTANT CHIEF ENGINEER, DESIGN

APPROVED A. L. Goldsmith 2/1/66.
CHIEF, BUREAU OF BRIDGES

SHEET NO. 44 OF 52

BRIDGE No. 8003

Survey Book No.

File No. Pocket No. 8 Folder No.

INDEXED

PHOENIX #106 TRACING CLOTH 64094

# Indian Head Trail
# Prefabricated Steel Truss Pedestrian Bridge Over Zekiah Swamp Run

## Bridge Data

**4 in. Concrete Slab over Corrugated S.I.P. Forms**

| | | |
|---|---|---|
| **Bridge Span:** | **125'-0"** | **Truss Span over Zekiah Swamp Run** |
| **Bridge Width:** | **12'-0"** | **Clear Rail to Rail** |
| **Ramp Length:** | **60.0** | **ft** |
| **Bridge Deck Area:** | **1750** | **sq. ft.** |

Superstructure Cost Estimate

| Item Description | Total Quantity | Unit | Unit Price | Total Price |
|---|---|---|---|---|
| Mobilization | 1 | LS | $25,000.00 | **$25,000** |
| Crane Rental | 1 | L.S. | $15,000.00 | **$15,000** |
| Deck Concrete - Bridge | 18.5 | C.Y. | $800.00 | **$14,815** |
| Slab Concrete - Ramp | 18 | C.Y. | $800.00 | **$14,222** |
| 125 ft Prefabricated Steel Truss | 1750 | S.F. | $240.00 | **$420,000** |
| Railing - Ramp | 120 | LF | $40.00 | **$4,800** |
| Reinforcing Mesh 6x6 - Deck | 495 | LBS. | $3.00 | **$1,485** |
| Reinforcing Mesh 6x6 - Ramp | 483 | LBS. | $3.00 | **$1,449** |
| | | **Total Cost of Superstructure:** | | **$496,771** |
| | | **Unit Cost of Superstructure:** | | **$284** per $ft^2$ |

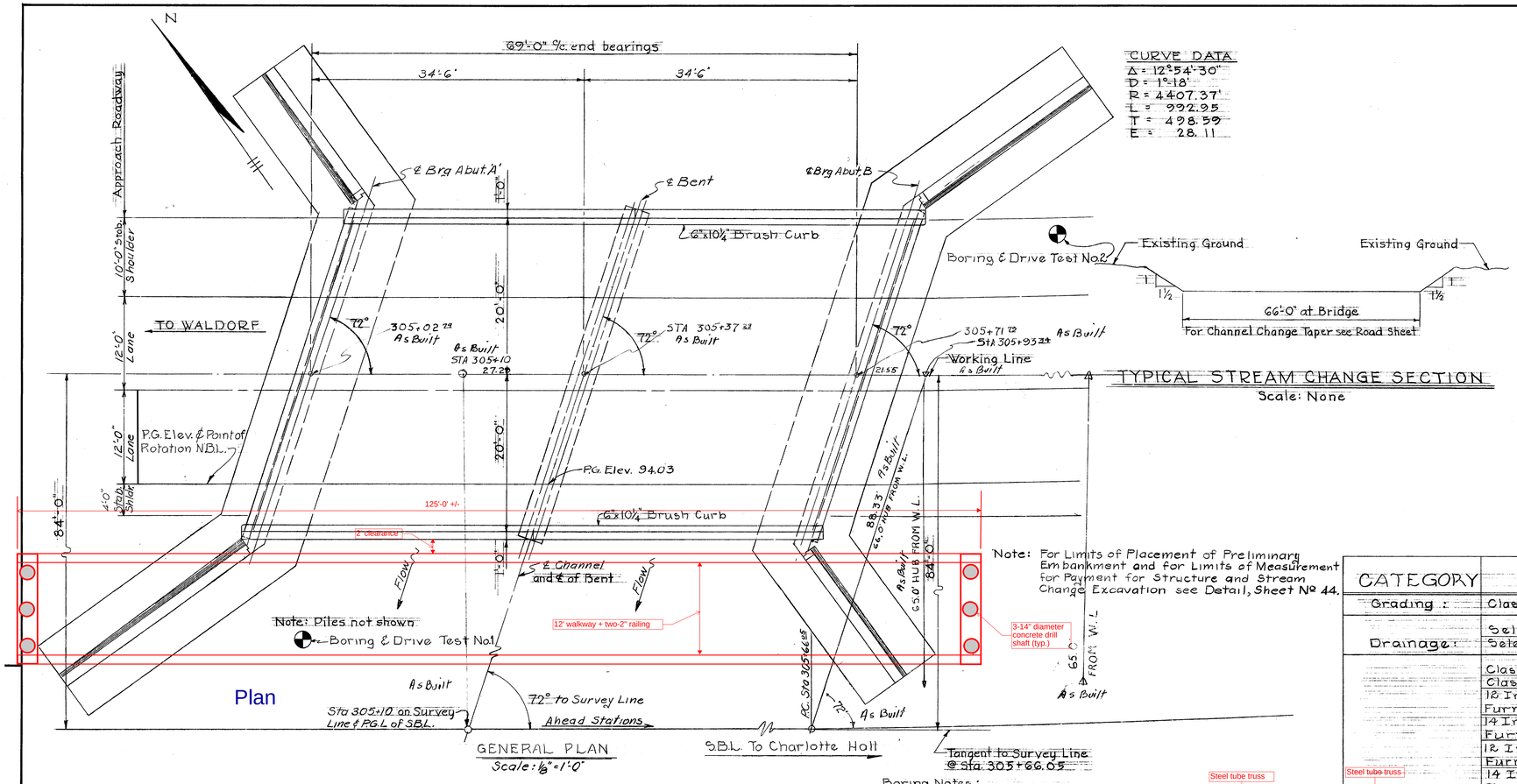
## Substructure Cost Estimate

| Item Description | Total Quantity | Unit | Unit Price | Total Price |
|---|---|---|---|---|
| Pier Cap Concrete | 7 | C.Y. | $800.00 | **$5,689** |
| 14" Concrete Pier Column | 4 | C.Y. | $1,200.00 | **$4,276** |
| 14" Drilled Shaft | 540 | LF | $800.00 | **$432,000** |
| 6" Precast Concrete Wall Panel | 14 | C.Y. | $1,000.00 | **$14,000** |
| Structure Excavation | 30 | C.Y. | $100.00 | **$3,000** |
| Structure Fill | 156 | C.Y. | $150.00 | **$23,333** |
| M.O.T. | 1 | L.S. | $20,000.00 | **$20,000** |
| Reinforcing Bars Pier | 1,601 | LBS. | $2.00 | **$3,202** |
| | | **Total Cost of Substructure:** | | **$505,500** |
| | | **Unit Cost of Substructure:** | | **$289** **per ft$^2$** |

| | | | |
|---|---|---|---|
| **Bridge Cost (Superstr. + Substr.) :** | | **$1,002,271** | |
| **Unit Bridge Cost :** | | **$572.73** | per ft$^2$ |
| **Utility Coordination** | **LS** | **$10,000.00** | |
| **Survey** | **LS** | **$10,000.00** | |
| **Engineering Design** | **LS** | **$250,000.00** | |
| **Contingencies (30%) :** | | **$381,681** | |
| **Total Bridge Cost :** | | **$1,653,952** | |
| **Unit Bridge Cost (w/contingency) :** | | **$945.12** | per ft$^2$ |
| **Total Cost of Pedestrian Bridge & Boardwalk** | | **$1,653,952** | |


Zekiah Run Pedestrian Bridge Crossing

| FED. ROAD DIV. NO. | STATE | FED. AID PROJ. NO. | SHEET NO. | TOTAL SHEETS |
|---|---|---|---|---|
| 2 | MD. | F-021-1(13) | 38 | 52 |




## Plan

GENERAL PLAN
Scale: ⅛"=1'-0"

CURVE DATA
Δ = 12°54'-30"
D = 1°-18'
R = 4407.37'
L = 992.95
T = 498.59
E = 28.11




Boring & Drive Test No.2

TYPICAL STREAM CHANGE SECTION
Scale: None

Note: For Limits of Placement of Preliminary Embankment and for Limits of Measurement for Payment for Structure and Stream Change Excavation see Detail, Sheet No 44.

## GENERAL NOTES

Specifications: S.R.C. Specifications dated January 1962 and Special Provisions for material and construction. A.A.S.H.O. Standard Specifications for Highway Bridges dated 1961 for design, including 1961, 1962 1963, and 1964 Interim Specifications.

Loading: H 520-44

Excavation: See Special Provisions

Concrete: Class A-1 and Class A Concrete shall have a minimum compressive strength of 3000 psi at 28 days. See Special Provisions.

Chamfer: All exposed corners of concrete to be chamfered with milled chamfered strips. Chamfers to be ¾ x ¾ unless otherwise noted.

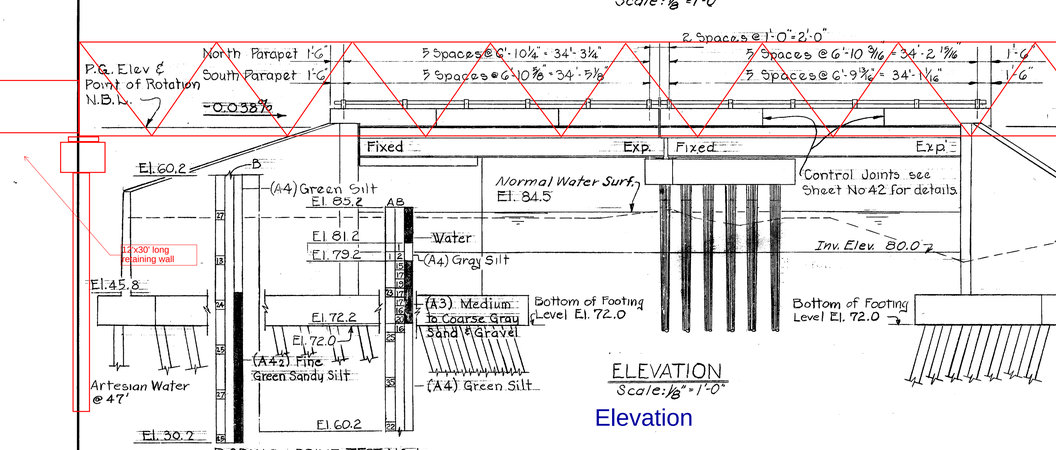
Reinforcing Steel: Reinforcing Steel to be intermediate grade. All splices shall be lapped a minimum of 24 bar diameters unless otherwise noted. Minimum cover for any bar shall be 2" unless otherwise noted.

Structural Steel: Structural Steel shall be A.S.T.M. Designation A-36 See Special Provisions.

Solid Sodding: A three foot strip shall be laid adjacent to and in back of all wingwalls and down slope to stream invert as directed by the Engineer.

| CATEGORY | ITEM | Method of Measurement | Estimated Quantity |
|---|---|---|---|
| Grading: | Class B Excavation | C.Y. | 1,620 |
| Drainage: | Selected Backfill using #6 Aggregate | C.Y. | 40 |
| | Selected Backfill using CR-6 or Type 2 Sub-base | C.Y. | 40 |
| Structures | Class #3 Excavation for Structures | C.Y. | 260 |
| | Class #4 Excavation | C.Y. | 1,260 |
| | 18 In. Diameter Cast In Place Concrete Piles Furnished, Driven, Filled, etc. | L.F. | 3,460 |
| | 14 In. Diameter Cast In Place Concrete Piles Furnished, Driven, Filled, etc. | L.F. | 260 |
| | 18 In. Diameter Cast In Place Conc. Test Pile Furnished, Driven, Filled, etc. | L.F. | 80 |
| | 14 In. Diameter Cast In Place Conc. Test Pile Furnished, Driven, Filled, etc. | L.F. | 50 |
| | 18 In. Diameter Cast In Place Concrete Pile Splices | Ea. | 20 |
| | 14 In. Diameter Cast In Place Concrete Pile Splices | Ea. | 2 |
| | Footing Concrete for Zekiah Swamp Bridge at Sta. 305+ | C.Y. | 261 |
| | Substructure Concrete for Zekiah Swamp Bridge at Sta. 305+ | L.S. | L.S. |
| | Superstructure Concrete for Zekiah Swamp Bridge at Sta. 305+ | L.S. | L.S. |
| | Contingent Concrete for Bridges | C.Y. | 5 |
| | Fabricated Structural Steel for Zekiah Swamp Bridge at Sta. 305+ | L.S. | L.S. |
| | Porous Backfill for Zekiah Swamp Bridge at Sta. 305+ | L.S. | L.S. |
| | Metal Railing One Strand for Zekiah Swamp Bridge at Sta. 305+ | L.S. | L.S. |
| | Bituminous Concrete Spec B for Bridge Deck | Tons | 32 |
| Landscaping | Solid Sodding | S.Y. | 60 |

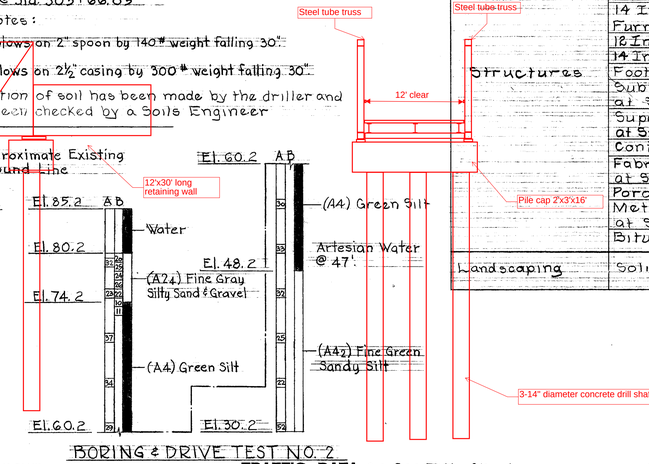
Boring Notes:
Note A: Blows on 2" spoon by 140# weight falling 30".
Note B: Blows on 2½" casing by 300# weight falling 30".
Classification of soil has been made by the driller and has not been checked by a Soils Engineer




ELEVATION
Scale: ⅛" = 1'-0"

BORING & DRIVE TEST NO. 1

Elevation




BORING & DRIVE TEST NO. 2

Section

**HYDRAULIC DATA**

| | | | |
|---|---|---|---|
| DRAINAGE AREA | SQ. MI. = 33.45 | = 21,400 | ACRES |
| STORMWATER DISCHARGE | c. f. s. = | 2,800 | |
| TIDAL FLOW | c. f. s. = | ~ | |
| TOTAL MAXIMUM DISCHARGE | c. f. s. = | 2,800 | |
| MAXIMUM FLOW DEPTH AT H.W. | FEET = | 7.4 | |
| OPENING | | 660 | sq. ft. |
| OPENING TO H.W. | SQ. FT. = | 460 | |
| VELOCITY AT OUTLET | FT. PER SEC. = | 5.9 | |

**EXISTING STRUCTURE** ~ None
TYPE
WATERWAY
UNDERCLEARANCE
DATE BUILT
OWNERSHIP
DISPOSITION
REMARKS

**UTILITIES** ~ Unknown
STORM SEWERS
SANITARY SEWERS
WATER MAINS
GAS MAINS
ELECTRIC WIRES (OVERHEAD / UNDERGROUND)
OTHER

**TRAFFIC DATA** ~ See Title Sheet
TRAFFIC COUNT = ~ DATE ~
DESIGN SPEED = ~ m. p. h.

**DATUM** ~ See Road Sheet

| REVISIONS |
|---|
| As Built Rev. 4-4-68 |

STATE OF MARYLAND
STATE ROADS COMMISSION
BALTIMORE, MD.

# STEEL BEAM BRIDGE
ON N.B.L. OF MD. ROUTE 5 AT STA. 305+
OVER ZEKIAH SWAMP
GENERAL PLAN & ELEVATION

SCALE As Shown DATE Feb., 1966 CONTRACT CH-300-9-541

MADE BY EWE & E.H.W.
TRACED BY
CHECKED BY J.A.L.
APPROVED A. L. Hutchinson 2/1/66 CHIEF, BUREAU OF BRIDGES
APPROVED C. A. Goldsmith 2/1/66 ASSISTANT CHIEF ENGINEER, DESIGN

SHEET NO. 38 OF 52

BRIDGE No. 8002
Survey Book No.
File No. Pocket No. Folder No. 69
INDEXED

# Appendix D. Opinions of Probable Cost

## Indian Head Rail Trail Feasibility Study - Opinion of Probable Cost

**Main Connector Route = 13.1 miles (69,200 LF) sidepath plus 0.4 mi of bridge**

TOOLE DESIGN

11/9/2021

| Work Item | Unit | Quantity | Unit Cost | Total Cost |
|---|---|---|---|---|
| | | | | |
| **Earthwork** | | | | |
| Clearing and Grubbing | LS | 1 | | $0 |
| Excavation | CY | 61,511 | $50 | $3,075,556 |
| Borrow Fill | CY | 6,151 | $50 | $307,556 |
| Topsoil | CY | 2,563 | $30 | $76,889 |
| | | | **Subtotal** | **$3,460,000** |
| **Pavement** | | | | |
| Asphalt Concrete SM-9.5A | TONS | 10,254 | $120 | $1,230,468 |
| Asphalt Base Material SM-12.5 mm | TONS | 20,502 | $120 | $2,460,198 |
| 6" Aggregate | CY | 15,378 | $50 | $768,889 |
| | | | **Subtotal** | **$4,459,556** |
| **Structures - Rte 301 Pedestrian Bridge and Rte 5 Bridges** | | | | |
| Pedestrian bridge over 301 (see Structural Opinion of Cost for breakdown) | EA | 1 | $2,587,647 | $2,587,647 |
| Pedestrian bridge over Mill Dam Run (see Structural Opinion of Cost for breakdown) | EA | 1 | $1,434,313 | $1,434,313 |
| Pedestrian bridge over Zekiah Swamp Run (see Structural Opinion of Cost for breakdown) | EA | 1 | $1,653,952 | $1,653,952 |
| | | | **Subtotal** | **$5,675,912** |
| **Other Items** | | | | |
| Gates | EA | 2 | $13,000 | $26,000 |
| Decorative Signs | EA | 26 | $1,500 | $39,000 |
| Wayfinding Signs | EA | 26 | $200 | $5,200 |
| | | | **Subtotal** | **$70,200** |
| | | | | |
| | | **Subtotal above categories** | | **$13,665,668** |
| **Lump Sum Items** | | | | |
| Landscaping (5%) | LS | 1.00 | $683,283 | $683,283 |
| Drainage and E&S (15%) | LS | 1.00 | $2,049,850 | $2,049,850 |
| Utility Adjustments (5%) | LS | 1.00 | $683,283 | $683,283 |
| | | | **Subtotal** | **$3,416,416** |
| | | | | |
| Mobilization and Startup Costs (5%) | 1 | LS | $683,283 | $683,283 |
| Survey Stakeout (5%) | 1 | LS | $683,283 | $683,283 |
| | | | **Subtotal** | $18,448,650 |
| | | | | |
| | | | 30% Contingency | $5,534,595 |
| | | | **Total Estimated Cost** | **$23,983,300** |

| | | |
|---|---|---|
| Wayside areas | EA | $25,000 |
| Trailhead areas | EA | $25,000 |

Note: This opinion of probable cost is a planning level only.

Unit prices are based on historical bid pricing and the Estimator's Judgment.

Right-of-Way/Easement costs are not anticipated as part of this project and are not included in this estimate.

Opinion of probable cost was developed for the recommendations by identifying pay items and establishing rough quantities by linear feet.

Construction costs will vary based on the ultimate project scope and economic conditions at the time of construction.

## Indian Head Rail Trail Feasibility Study - Opinion of Probable Cost

**Alternative One = 15 miles (79,200 LF) sidepath and trail plus 0.4 mi of bridge**

TOOLE DESIGN

11/9/2021

| Work Item | Unit | Quantity | Unit Cost | Total Cost |
|---|---|---|---|---|
| | | | | |
| **Earthwork** | | | | |
| Clearing and Grubbing | LS | 1 | | $0 |
| Excavation | CY | 70,400 | $50 | $3,520,000 |
| Borrow Fill | CY | 7,040 | $50 | $352,000 |
| Topsoil | CY | 2,933 | $30 | $88,000 |
| | | | **Subtotal** | **$3,960,000** |
| **Pavement** | | | | |
| Asphalt Concrete SM-9.5A | TONS | 11,736 | $120 | $1,408,282 |
| Asphalt Base Material SM-12.5 mm | TONS | 23,464 | $120 | $2,815,718 |
| 6" Aggregate | CY | 17,600 | $50 | $880,000 |
| | | | **Subtotal** | **$5,104,000** |
| **Structures - Rte 301 Pedestrian Bridge and Rte 5 Bridges** | | | | |
| Pedestrian bridge over 301 (see Structural Opinion of Cost for breakdown) | EA | 1 | $2,587,647 | $2,587,647 |
| Pedestrian bridge over Mill Dam Run (see Structural Opinion of Cost for breakdown) | EA | 1 | $1,434,313 | $1,434,313 |
| Pedestrian bridge over Zekiah Swamp Run (see Structural Opinion of Cost for breakdown) | EA | 1 | $1,653,952 | $1,653,952 |
| | | | **Subtotal** | **$5,675,912** |
| **Other Items** | | | | |
| Gates | EA | 2 | $13,000 | $26,000 |
| Decorative Signs | EA | | $1,500 | $0 |
| Wayfinding Signs | EA | 30 | $200 | $6,000 |
| | | | **Subtotal** | **$32,000** |
| | | | | |
| | | **Subtotal above categories** | | **$14,771,912** |
| **Lump Sum Items** | | | | |
| Landscaping (5%) | LS | 1.00 | $738,596 | $738,596 |
| Drainage and E&S (15%) | LS | 1.00 | $2,215,787 | $2,215,787 |
| Utility Adjustments (5%) | LS | 1.00 | $738,596 | $738,596 |
| | | | **Subtotal** | **$3,692,979** |
| | | | | |
| Mobilization and Startup Costs (5%) | 1 | LS | $738,596 | $738,596 |
| Survey Stakeout (5%) | 1 | LS | $738,596 | $738,596 |
| | | | **Subtotal** | $19,942,083 |
| | | | | |
| | | | 30% Contingency | $5,982,625 |
| | | | **Total Estimated Cost** | **$25,924,800** |

| | | |
|---|---|---|
| Wayside areas | EA | $25,000 |
| Trailhead areas | EA | $25,000 |

Note: This opinion of probable cost is a planning level only.

Unit prices are based on historical bid pricing and the Estimator's Judgment.

Right-of-Way/Easement costs are not anticipated as part of this project and are not included in this estimate.

Opinion of probable cost was developed for the recommendations by identifying pay items and establishing rough quantities by linear feet.

Construction costs will vary based on the ultimate project scope and economic conditions at the time of construction.

## Indian Head Rail Trail Feasibility Study - Opinion of Probable Cost

**Alternative Two = 14 miles (73,920 LF) sidepath plus 0.4 mi of bridge**

TOOLE DESIGN

11/9/2021

| Work Item | Unit | Quantity | Unit Cost | Total Cost |
|---|---|---|---|---|
| | | | | |
| **Earthwork** | | | | |
| Clearing and Grubbing | LS | 1 | | $0 |
| Excavation | CY | 65,707 | $50 | $3,285,333 |
| Borrow Fill | CY | 6,571 | $50 | $328,533 |
| Topsoil | CY | 2,738 | $30 | $82,133 |
| | | | **Subtotal** | **$3,696,000** |
| **Pavement** | | | | |
| Asphalt Concrete SM-9.5A | TONS | 10,953 | $120 | $1,314,396 |
| Asphalt Base Material SM-12.5 mm | TONS | 21,900 | $120 | $2,628,004 |
| 6" Aggregate | CY | 16,427 | $50 | $821,333 |
| | | | **Subtotal** | **$4,763,733** |
| **Structures - Rte 301 Pedestrian Bridge and Rte 5 Bridges** | | | | |
| Pedestrian bridge over 301 (see Structural Opinion of Cost for breakdown) | EA | 1 | $2,587,647 | $2,587,647 |
| Pedestrian bridge over Mill Dam Run (see Structural Opinion of Cost for breakdown) | EA | 1 | $1,434,313 | $1,434,313 |
| Pedestrian bridge over Zekiah Swamp Run (see Structural Opinion of Cost for breakdown) | EA | 1 | $1,653,952 | $1,653,952 |
| | | | **Subtotal** | **$5,675,912** |
| **Other Items** | | | | |
| Gates | EA | 2 | $13,000 | $26,000 |
| Decorative Signs | SF | 28 | $1,500 | $42,000 |
| Wayfinding Signs | EA | 28 | $200 | $5,600 |
| | | | **Subtotal** | **$73,600** |
| | | | | |
| | | **Subtotal above categories** | | **$14,209,245** |
| **Lump Sum Items** | | | | |
| Landscaping (5%) | LS | 1.00 | $710,462 | $710,462 |
| Drainage and E&S (15%) | LS | 1.00 | $2,131,387 | $2,131,387 |
| Utility Adjustments (5%) | LS | 1.00 | $710,462 | $710,462 |
| | | | **Subtotal** | **$3,552,311** |
| | | | | |
| Mobilization and Startup Costs (5%) | 1 | LS | $710,462 | $710,462 |
| Survey Stakeout (5%) | 1 | LS | $710,462 | $710,462 |
| | | | **Subtotal** | $19,182,480 |
| | | | | |
| | | | 30% Contingency | $5,754,744 |
| | | | **Total Estimated Cost** | **$24,937,300** |

| | | |
|---|---|---|
| Wayside areas | EA | $25,000 |
| Trailhead areas | EA | $25,000 |

Note: This opinion of probable cost is a planning level only.

Unit prices are based on historical bid pricing and the Estimator's Judgment.

Right-of-Way/Easement costs are not anticipated as part of this project and are not included in this estimate.

Opinion of probable cost was developed for the recommendations by identifying pay items and establishing rough quantities by linear feet.

Construction costs will vary based on the ultimate project scope and economic conditions at the time of construction.

## Indian Head Rail Trail Feasibility Study - Opinion of Probable Cost

**New Route Option = 17.3 miles (91,350 LF) sidepath**

TOOLE DESIGN

11/9/2021

| Work Item | Unit | Quantity | Unit Cost | Total Cost |
|---|---|---|---|---|
| | | | | |
| **Earthwork** | | | | |
| Clearing and Grubbing | LS | 1 | | $0 |
| Excavation | CY | 81,200 | $50 | $4,060,000 |
| Borrow Fill | CY | 8,120 | $50 | $406,000 |
| Topsoil | CY | 3,383 | $30 | $101,500 |
| | | | **Subtotal** | **$4,567,500** |
| **Pavement** | | | | |
| Asphalt Concrete SM-9.5A | TONS | 13,536 | $120 | $1,624,325 |
| Asphalt Base Material SM-12.5 mm | TONS | 27,064 | $120 | $3,247,675 |
| 6" Aggregate | CY | 20,300 | $50 | $1,015,000 |
| | | | **Subtotal** | **$5,887,000** |
| **Structures *** | | | | |
| Pedestrian bridge over 301 (see Structural Opinion of Cost for breakdown) | EA | 1 | $2,587,647 | $2,587,647 |
| Pedestrian bridge over Rogers Mill Branch and Zekiah Swamp Run (approx 200 LF) * | EA | 1 | $3,000,000 | $3,000,000 |
| Pedestrian bridge over Gilbert Swamp Run (approx 75 LF) * | EA | 1 | $1,300,000 | $1,300,000 |
| | | | **Subtotal** | **$6,887,647** |
| **Other Items** | | | | |
| Gates | EA | 2 | $13,000 | $26,000 |
| Decorative Signs | SF | 34 | $1,500 | $51,000 |
| Wayfinding Signs | EA | 34 | $200 | $6,800 |
| | | | **Subtotal** | **$83,800** |
| | | | | |
| | | **Subtotal above categories** | | **$17,425,947** |
| **Lump Sum Items** | | | | |
| Landscaping (5%) | LS | 1.00 | $871,297 | $871,297 |
| Drainage and E&S (15%) | LS | 1.00 | $2,613,892 | $2,613,892 |
| Utility Adjustments (5%) | LS | 1.00 | $871,297 | $871,297 |
| | | | **Subtotal** | **$4,356,486** |
| | | | | |
| Mobilization and Startup Costs (5%) | 1 | LS | $871,297 | $871,297 |
| Survey Stakeout (5%) | 1 | LS | $871,297 | $871,297 |
| | | | **Subtotal** | $23,525,027 |
| | | | | |
| | | | 30% Contingency | $7,057,508 |
| | | | **Total Estimated Cost** | **$30,582,600** |

| | | |
|---|---|---|
| Wayside areas | EA | $25,000 |
| Trailhead areas | EA | $25,000 |

***Future study needs to be done to determine structures/associated costs along Route 6. From desktop review it appears Route 6 crosses Rogers Mill Branch and Zekiah Swamp Run (approx. 200 lf), and Gilbert Swamp Run (approx. 75 lf). Prices estimated based on this square footage from similiar per SF costs for Dadson's structure costs on Route 5**

Note: This opinion of probable cost is a planning level only.

Unit prices are based on historical bid pricing and the Estimator's Judgment.

Right-of-Way/Easement costs are not anticipated as part of this project and are not included in this estimate.

Opinion of probable cost was developed for the recommendations by identifying pay items and establishing rough quantities by linear feet.

Construction costs will vary based on the ultimate project scope and economic conditions at the time of construction.

# Appendix E: Permitting and Regulatory Authorities

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## Permitting and Regulatory Authorities

### Local Permitting Authorities

Charles County permits will likely include:

- Site Plan Review
- Land Disturbance and Development Permits
- Conditional Use Permit
- Nonconforming Use Determination

There may be additional zoning requirements for agricultural conservation zones, designated rural or village areas, and the historic Hughesville Village Core areas.

### State Regulatory Authorities

The MDSHA's Recreational Trails Program Manual provide a wealth of planning, development, and permitting information regarding trail development. Some relevant programs include:

- Maryland Environmental Policy Act
- Chesapeake and Atlantic Coastal Bay Critical Areas Act
- Metropolitan Planning Organization (MPO) Requirements
- Maryland Historical Trust (MHT)
- Maryland Department of Natural Resources (DNR)
- MDSHA – a Memorandum of Understanding must be signed if using MDSHA funding

### Federal Regulatory Authority

At the federal level, relevant environmental protection laws include, but are not limited to:

- National Environmental Policy Act (NEPA)
- Section 106 of the National Historic Preservation Act
- Section 106 Historic Preservation
- Section 404 of the Clean Water Act
- Section 7 of the Endangered Species Act
- Wetland/Waterway/Floodplain/Erosion & Sediment Control Permits

Possible environmental documentation and permits required include, but are not limited to:

- Wetland permit/waiver through the US Army Corp of Engineers (USACE) and Maryland Department of Ecology (MDE), if impacts to wetlands or wetland buffers will occur
- Waterway Construction Permits if the project involves a bridge (hydrology/hydraulic studies and a scour study are required for this) (MDE)
- Coordination with the Federal Emergency Management Agency (FEMA), if the project involves a bridge in a FEMA flood plain
- National Marine Fisheries Service and US Fish and Wildlife Permits
- Section 404 Discharge of Fill Nationwide Permit

Likely environmental documentation and permits required include, but are not limited to:

- Access permit for work within State right-of-way (refer to RTP Manager to provide contact info for MDOT SHA District Regional Engineers)
- Sediment and Erosion Control and Stormwater Management approvals (MDE).
- Floodplain permits (MDE)
- Access permit for work within state right-of-way (MDSHA).