Mix-Use Path Evaluation

Seabrook Island Road

March 2021

Prepared for:
Town of Seabrook Island

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1 Introduction

The Town of Seabrook Island is responsible for the management and maintenance of storm drainage facilities located within the public right-of-way (ROW) from the traffic circle at Seabrook Island Road and Betsy Kerrison Parkway to the guard house located on Seabrook Island Road, prior to entering the portion of Seabrook Island that is owned by the Seabrook Island Homeowners Association. This portion of Seabrook Island Road is the only public road the provides ingress and egress onto Seabrook Island. The ROW contains a mix-use path which parallels the road on either side (in-bound and out-bound). The Town has experienced flooding and ponding along portions of the mix-use path, especially during larger storm events.

In an effort to proactively identify and address existing and potential issues, the Town is undertaking an initiative to evaluate possible issues with the mix-use path on each side of Seabrook Island Road. This evaluation will be used to plan and budget the implementation of drainage improvements.

2 Preliminary Assessment

A preliminary assessment included data collection and cursory evaluations to characterize stormwater conditions and identify areas of concern/interest surrounding the mix-use path. Specific elements of the preliminary assessment are described in the subsections below.

2.1 Data Collection

Data and information from a variety of sources were used in performing the preliminary analysis. The table below summarizes key data compiled and processed for the evaluation.

Table 1. Summary of Data/Information Sources

Item	Source(s)	Description / Use
General Base Data / Mapping	Charleston County, ESRI Web services	Includes GIS layers of political boundaries, street centerlines, streams, aerial imagery, and similar. Used for general reference
Topographic / Elevation Data	Charleston County, Survey provided by G. Robert George and Associates, Survey provided by ESP Associates.	2019 Charleston County Topo and related bi-products (e.g. contours, DEMS, etc.). Topographic data was used to in assessment of elevations, slopes, drainage flow paths, and drainage basin delineations. Survey data was used for refined pavement elevations, swale locations, and drainage structures.
Closed Drainage System	Plans by G. Robert George and Associates.	Surveyed and Designed Inventory of closed system structures and pipes. Used in drainage system characterization/evaluation and assessment of AOIs.
Tax Parcel Information	Charleston County	GIS tax parcels used for development of existing land use and assessment of property ownership.
Tidal Information	National Oceanic and Atmospheric Administration (NOAA)	Tidal information tracked over a two-week time period. The highest tide was duplicated for a 5-day period to simulate high tides. Used as boundary conditions along the marsh.
Impervious Surface Data	Survey provided by G. Robert George and Associates, ESRI Web services.	Impervious surface layer developed from combining the survey and aerial photos. Used in land use assessments and hydrologic analysis.
Soils Data	NRCS	GIS soils layer with associated property information. Used in physical landform characterizations and hydrologic analysis.

2.2 Evaluation

Using the data and information compiled above, an evaluation was performed to support the preliminary assessments. The first objective of the evaluation was to model the existing conditions to replicate existing conditions seen in the field with specific attention given to areas identified by Town of Seabrook Island. An assessment of these areas provided insight for characterizing stormwater conditions and identify potential flooding issues surrounding the out-bound mix-use path along Seabrook Island Road. The second objective of this evaluation was to provide quantified conditions of code compliance of the in-bound mix-use path along Seabrook Island Road.

3 Potential Improvement Areas

There are three areas of interest associated with this evaluation along the in-bound and out-bound mix-use paths. Area 1 is identified as the area between the wood bridges on the out-bound lane across from Andell Bluff Blvd. This area can be identified between station 25+50 and 33+50 on the survey provided by G. Robert George and Associates. The area of focus was identified near the south west wood bridge, approximately located at station 26+00. This area is heavily influenced by high tides and offsite drainage. The existing path elevations in this area range between 6.31 and 5.77. Possible improvements are listed in Section 4.

Area 2 is identified as the area located along the out-bound path between stations 10+00 and 12+00 on the survey provided by G. Robert George and Associates. There appears to be flooding during higher storms due to limited options for the runoff to outfall. Based on the modeling, most of the ponding is located between the mix-use path and road. However, for higher storm events staging can overtop the path. Existing path elevations in this area vary from 7.15 to 6.25.

Area 3 is identified along the entire length of the in-bound path. The 5-foot path is located from station 0+00 to station 30+50 (Andell Bluff Blvd) and does not extend to the traffic circle like the out-bound path. The in-bound path is showing significant wear throughout the majority of the length and potential flooding issues. The mix-use path was evaluated for ADA compliance and portions exceed cross slopes of 1:48 (2.08%) with some areas were in the range of 10%.

There may be other considerations that are not captured in the protocol; thus, the Town may choose to adjust the final project as desired.

4 Recommendations and Conclusions

This report summarizes a study which evaluates potential improvement projects for the mix-use path along Seabrook Island Road within the Town of Seabrook Island, SC. Potential improvement options for the areas listed in Section 3 are found in this section.

Area 1 has two options that might provide relief. The first option is to raise the sidewalk to bring the surface of the mix-use path to an elevation above where the water stages during larger storms, and provide underdrains to allow runoff to traverse underneath so the path does not cause other inadvertent drainage issues. Since the offsite area was modeled using assumptions outlined in Section 2.1, it is difficult to identify a specific elevation that will prevent future flooding without collecting survey grade field data for the area contributing runoff to the area. Since that information is not available, it is recommended to

raise the mix-use path for the entire section to the minimum elevation at the lower wood bridge, elevation 7.40. This elevation is an assumption and therefore cannot be guaranteed to prevent future drainage issues.

The second option for Area 1 is to improve the drainage swales around the mix-use path to provide the runoff with an option to get away from the path. This option would provide a minimum 2' swale with 3:1 side slope in the area of the ponding to outfall to the ditch under the south west bridge. This option would require coordination with the adjacent property owner. These improvements would not be located within the mix-use path easement, but this appears to be a more cost-effective solution. Please note this recommendation is based on the information available and further design would be required to identify other concerns or conflicts.

For Area 2, the recommendation is to raise the mix-use path to bring it out of the area of flooding. This area has experienced similar challenges to Area 1, a large portion of the contributing runoff is from outside of the surveyed data. Raising the mix-use path approximately 6 inches with underdrains will raise the path above the road in this area and the underdrains would allow for the runoff to pass underneath the path instead of over topping or staging onto the road. This recommendation is based on assumptions that cannot be verified and therefore cannot be guaranteed to prevent future drainage issues.

For Area 3, there are two possible recommendations. The first recommendation is to remove and replace the path from 0+00 to 33+50. As part of the replacement, raising the path to mitigate flooding would be recommended. As part of the replacement, the path should be graded to meet ADA guidelines to bring it back into compliance. Further design would be required to establish grading and drainage as well evaluate or additional conflicts.

For Area 3, option two would be to remove the in-bound mix-use path from station 0+00 to station 33+50 without replacing it. Since there is a mix-use path to facility two-way traffic on the opposite side of Seabrook Island Road, the 5' in-bound mix-use path is not required for in-bound pedestrian access and this path is not required for ADA compliance. As part of this option, additional improvements can be made to the out-bound mix-use path which could include illuminated push-button crosswalk signs (solar powered), solar powered light at both crosswalk locations, and concrete pads with benches and trash cans.

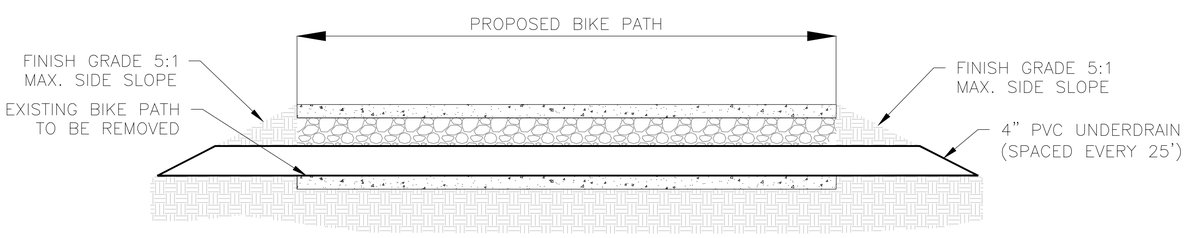
An estimate of the probable cost for each of these options are provided in Section 5. These recommendations are based on the information available at the time of the recommendations. Additional information would be required to evaluate other possible alternatives or to provide more detailed recommendations.

5 Estimate of Probable Cost

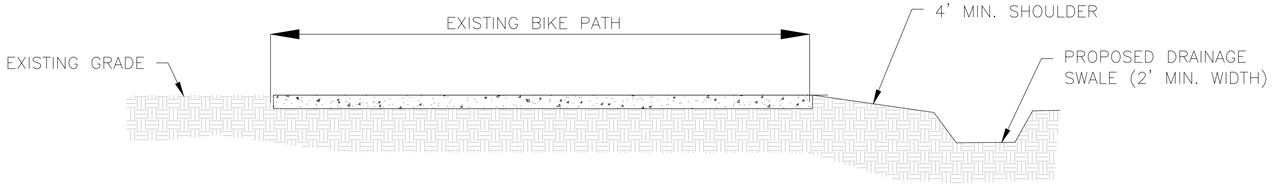
List of Recommended Improvement Projects

Project Area	Location	Category	Description	Opinion of Probable Cost
Area 1 Out-Bound Mix-Use Path (Option 1)	South side of the road, across from Andell Bluff Blvd. between the wood bridges	Mix-Use Path Improvements	Removal of existing mix-use path, filling to an elevation of 7.40 and installation of new mix-use path. Installation of underdrains, fine grading and landscaping.	$138,700
Area 1 Out-Bound Mix-Use Path (Option 2)	South side of the road, approx. 600' South-West of Andell Bluff Blvd.	Mix-Use Path Improvements	Grading approximately 250 LF of 2' swale along the existing path.	$13,300
Area 2 Out-Bound Mix-Use Path	South side of the road, approx. 100' North-East of Seabrook Island Townhall extending 350'.	Mix-Use Path Improvements	Removal of existing mix-use path, filling 6" and installation of new mix-use path. Installation of underdrains, fine grading and landscaping.	$69,000
Area 3 In-Bound Mix-Use Path (Option 1)	North side of the road, approx. 3,000' South-West of Andell Bluff Blvd. extending to intersection.	Mix-Use Path Improvements	Removal of existing mix-use path, installation of new mix-use path with ADA compliant path. Fine grading and landscaping.	$267,300
Area 3 In-Bound Mix-Use Path (Option 2)	North side of the road, approx. 3,000' South-West of Andell Bluff Blvd. extending to intersection.	Mix-Use Path Improvements	Removal of existing mix-use path and fine grading and landscaping.	$148,500
Enhancements to Out-Bound Path	Improvements to the Out-Bound Mix-Use Path	Add Alternate	Crosswalk signs, enhanced lighting, concrete pads with benches and trash cans to out bound mix-use path	$60,000

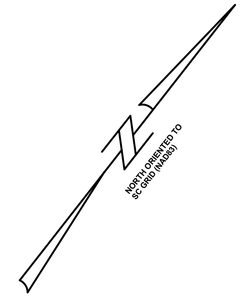
Note: These opinions of probable cost are preliminary in nature and subject to change.



OPTION 1: BIKE PATH CROSS SECTION



OPTION 2: BIKE PATH CROSS SECTION WITH SWALE



LEGEND

PROP. AREA FOR IMPROVEMENT

GRAPHIC SCALE

30' 0 15' 30' 60' 120'

(IN FEET)
1 inch = 30 ft.

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ESP Associates, Inc.
2154 N. Center Street
Suite 204
North Charleston, SC 29406
843-714-2040
www.espassociates.com

PRELIMINARY NOT FOR CONSTRUCTION

NO.	DATE	REVISION	BY

AREA 1 OUTBOUND

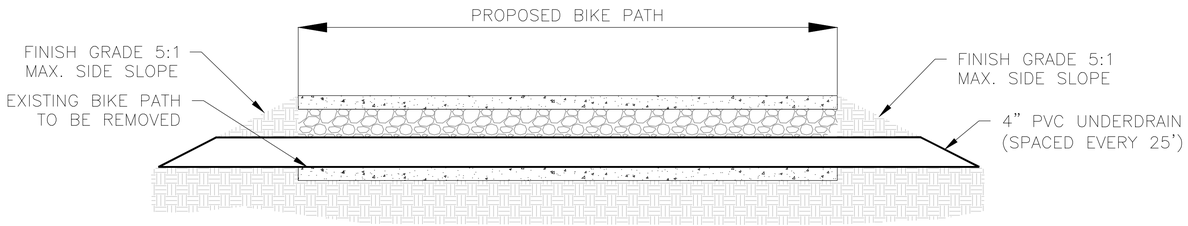
SEABROOK ISLAND ROAD

SEABROOK ISLAND, SOUTH CAROLINA

TOWN OF SEABROOK ISLAND

PROJECT INFORMATION	
PROJECT MANAGER:	CAT
DESIGNED BY:	CAT
DRAWN BY:	GMD
PROJECT NUMBER:	HM59.400
ORIGINAL DATE:	2/22/2021

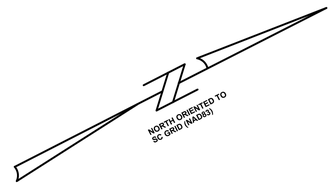
SHEET:
EX. 01



BIKE PATH CROSS SECTION

LEGEND

PROP. AREA FOR IMPROVEMENT



GRAPHIC SCALE

20' 0 10' 20' 40' 80'

(IN FEET)
1 inch = 20 ft.

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CONSTRUCTION

NO.	DATE	REVISION	BY

AREA 2 OUTBOUND

SEABROOK ISLAND ROAD

SEABROOK ISLAND, SOUTH CAROLINA

TOWN OF SEABROOK ISLAND

PROJECT INFORMATION	
PROJECT MANAGER:	CAT
DESIGNED BY:	CAT
DRAWN BY:	GMD
PROJECT NUMBER:	HM59.400
ORIGINAL DATE:	2/22/2021

SHEET:
EX. 02

LEGEND

PROP. AREA FOR IMPROVEMENT

NORTH ORIENTED TO SC GRID (NAD83)

GRAPHIC SCALE

100' 0 50' 100' 200' 400'

(IN FEET)
1 inch = 100 ft.

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NO.	DATE	REVISION	BY

AREA 3 INBOUND

SEABROOK ISLAND ROAD

SEABROOK ISLAND, SOUTH CAROLINA

TOWN OF SEABROOK ISLAND

PROJECT INFORMATION	
PROJECT MANAGER:	CAT
DESIGNED BY:	CAT
DRAWN BY:	GMD
PROJECT NUMBER:	HM59.400
ORIGINAL DATE:	2/22/2021

SHEET:

EX. 03