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PLAN | DESIGN | ENGINEER

"Yacht Club Road Study" for

The Town of Edisto Beach

Technical Memorandum – July 2025

Edisto Beach – Yacht Club Road Study

D|F Job No.31893 / Phase 06

PREPARED FOR:

The Town of Edisto Beach

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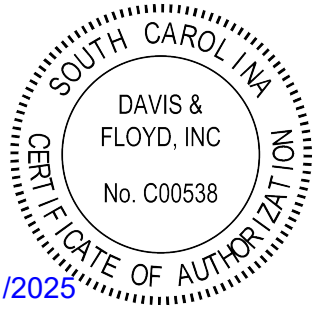

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1.0 Executive Summary

The Town of Edisto Beach contracted with Davis & Floyd (D|F) to perform a study and provide recommendations for improvements for the existing stormwater management system that provides drainage for the Yacht Club Road Basin. The analysis of the existing system demonstrated that flooding occurs due to inadequate stormwater infrastructure in its ability to adequately collect and transport stormwater, as well as the influence of tidal conditions. After going through several alternatives to support potential reductions in flooding in the Yacht Club Road Basin, three major improvements were found to be the most effective way to improve the resilience of the stormwater system. These improvements include, but are not limited to, extending the reach/footprint of the current stormwater system, upsizing of the current system to provide sufficient conveyance of the stormwater, installation of an inline check valve and reinstating the tide gate at the outfall that is currently not functioning. The total cost of the project is estimated at $1,430,000.

2.0 Introduction and Overview

The Town of Edisto Beach experiences high flooding conditions that cause difficulties for vehicle and pedestrian travel on the island and significant problems for residents. The Yacht Club Road Basin experiences these issues often and many residents of the area have expressed concerns about flooding during storm/rain and high tide events. The Town of Edisto Beach contracted with Davis & Floyd to perform a drainage study to determine the capabilities of the existing stormwater infrastructure, and to provide alternative improvements to help reduce flooding that occurs in the area. The services performed to support the study included field investigations and survey, current conditions hydrologic and hydraulic modeling, drainage improvement investigations, and a cost analysis for the proposed improvements.

3.0 Drainage System Field Investigation

A desktop analysis was performed to gather information pertinent to doing the study of the Yacht Club Road basin. The data collected included aerial LiDAR and digital elevation/terrain data, USDA soils data, land cover data products, and building footprints. A field investigation was then performed, which allowed for a geospatial inventory of the existing system to be collected. The inventory was collected using a R12i GPS unit as shown in Exhibit A. The inventory included invert elevations, size, material, and conditions of the current system. Photos were collected as well to support the study as also shown in Exhibit A. The existing drainage system that was observed in the field investigation is shown in Appendix A.

Exhibit A: Field Investigation using the R12i GPS unit and images of the system.

4.0 Existing Conditions Hydrologic and Hydraulic Modeling

An existing conditions hydrologic and hydraulic model was developed using the information gathered from the desktop analysis and field investigations. The hydrologic and hydraulic model was developed using both ArcGIS Pro and EPA SWMM computational software. The GIS software was used to delineate the watershed into several different basins. The SWMM software was then used to model the functionality of the existing stormwater system. The SWMM model incorporates various parameters including pipe and channel flow, rainfall-runoff patterns, and tidal outfall conditions.

The existing stormwater model was developed to investigate the performance of the existing system tying into the outfall located at Yacht Club Rd, which includes pipe conveyance, culvert crossings, and ditches. The flood risk was quantified using the 10- and 25-year, 24-hour storm events with normal high, normal low, and king tide conditions. The results of the modeling can be found in Appendix B.

Rainfall conditions included in the stormwater model were estimated using local gauges and rainfall data provided by the South Carolina Department of Environmental Services (SCDES). The tidal conditions were determined using monitoring stations that were installed for the previous Interior Lagoon Study for the Town of Edisto Beach.

5.0 Drainage Improvements Investigation

Modeling results were utilized to investigate different improvements that could help reduce the flood risk. The stormwater improvements considered included increased pipe and ditch sizes, extension of the drainage network, new outfalls, infiltration structures, and repair of outfall structures. The potential improvements were incorporated into the proposed conditions modeling to simulate the reductions in

flood inundation, limits, depth, and duration of flooding. The results were then compared to the existing system performance to determine the level of improvements on the extent and duration of flood conditions.

6.0 Recommended Improvements

After analyzing the existing infrastructure in the Yacht Club Road basin, D|F identified potential stormwater system improvements that would assist in reducing flooding in the area. The study found the flooding that occurs in the Yacht Club Road Basin is caused primarily by the inability of stormwater to enter the current system during rain events and certain tidal conditions causing flooding conditions to remain for longer periods during high tides.

A few observations were made that could improve some of the flooding conditions until the recommended improvements can be implemented. The tide gate structure at the outfall must be restored and functional. This tide gate is currently nonfunctional due to riprap and debris impairments that do not allow for full closure of the gate and the corresponding intrusion of saltwater into the drainage system (see Exhibit B). It is also recommended that **until improvements are made to the system,** all ditches be maintained to allow for positive drainage to the existing stormwater system. The highlighted ditches to be maintained can be seen in Appendix B.

The recommended improvements that D|F has identified will provide a reduction in the flooding for most tide conditions. The proposed improvements also allow for stormwater runoff to drain out faster during or immediately following high tide and king tide events. The recommended improvements include providing an increase to the existing drainage system to allow for a larger footprint/catchment for stormwater collection and transport. The improvements also include replacing existing undersized pipes with larger diameter pipes and the conversion of an existing junction box. The invert elevations will be lowered in the stormwater system to better support improved drainage for the upper reaches of the drainage system. The stormwater collection system will also be extended to provide better coverage over the Yacht Club Road Basin watershed. The extension involves the installation of 1020’ of 15” RCP, 140’ of 24” RCP, and 12 additional inlets/junction boxes. An alternative was considered to extend the drainage coverage of the system without making changes to the existing system; however, the elevation of the additional pipes would likely cause frequent maintenance issues such as sediment build up within the pipe structures. A WaSTOP Inline Check Valve is recommended to be installed on the outfall when it is replaced with a 36” RCP. The proposed improvements can be seen in Appendix C. The difference between the depths estimated for three (3) selected locations in the basin under existing conditions versus the depths projected for the proposed system, for the low tide and king tide events, is displayed in detail in Appendix D.

Exhibit B: The outfall Tide Gate currently is inoperable due to obstructions.

7.0 Cost Analysis

The project cost opinion for the recommended improvements were established using anticipated unit costs for each of the project elements. The costs were developed based on costing for recent projects and engineering judgement. The total cost of the project is estimated at approximately $1,430,000. The breakdown of the cost opinion can be found in Appendix E.

8.0 Conclusion

A comprehensive analysis of the Yacht Club Road Basin was carried out allowing for several improvements to be identified to reduce the flooding that is currently affecting residents and transportation in the area. These recommendations include an upsizing of the current drainage system as shown in Appendix B, an expansion of the footprint of the drainage system, the reinstatement of functionality of the tide gate at the outfall and installation of a WaSTOP Inline Check Valve on the outfall when it is replaced with a 36” RCP

Appendix A

190 LF of 18" RCP

100 LF of 18" RCP

40 LF of 18" RCP

180 LF of 15" CMP

40 LF of 18" RCP

40 LF of 8" HDPE

BIG BAY DR

BAY POINT DR

YACHT CLUB RD

BLVD

Legend

- Pipe
- Ditch
- Junction
- Outfall

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Town of Edisto Beach
Yacht Club Basin
Existing Conditions Infrastructure

7/24/2025

0 75 150 300 Feet

D|F Project. No. 031893.06

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BIG BAY DR

YACHT CLUB RD

BAY POINT DR

BLVD

Legend

- Pipe
- Ditch
- Junction
- Outfall

Depth (NAVD88)

2.4'

≤ 0.1'

- Pond

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Town of Edisto Beach Yacht Club Basin

Flood Depth
Existing Conditions
Low Tide 10-year Event

7/24/2025

0 75 150 300 Feet

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BIG BAY DR

YACHT CLUB RD

BAY POINT DR

Legend

- Pipe
- Ditch
- Junction
- Outfall

Depth (NAVD88)

2.4'

≤ 0.1'

- Pond

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Town of Edisto Beach Yacht Club Basin

Flood Depth
Existing Conditions
Low Tide 25-year Event

7/24/2025

0 75 150 300 Feet

D|F Project. No. 031893.06

BIG BAY DR

YACHT CLUB RD

BAY POINT DR

BLVD

Legend

- Pipe
- Ditch
- Junction
- Outfall

Depth (NAVD88)

2.4'

≤ 0.1'

- Pond

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Town of Edisto Beach Yacht Club Basin

Flood Depth
Existing Conditions
High Tide 10-year Event

7/24/2025

0 75 150 300 Feet

D|F Project. No. 031893.06

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BIG BAY DR

YACHT CLUB RD

BAY POINT DR

Legend

- Pipe
- Ditch
- Junction
- Outfall

Depth (NAVD88)

2.4

≤ 0.1'

- Pond

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Town of Edisto Beach Yacht Club Basin

Flood Depth
Existing Conditions
High Tide 25-year Event

7/24/2025

0 75 150 300 Feet

D|F Project. No. 031893.06

BIG BAY DR

YACHT CLUB RD

BAY POINT DR

BLVD

Legend

- Pipe
- Ditch
- Junction
- Outfall

Depth (NAVD88)

2.4'

≤ 0.1'

- Pond

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Town of Edisto Beach Yacht Club Basin

Flood Depth
Existing Conditions
King Tide 10-year Event

7/24/2025

0 75 150 300 Feet

D|F Project. No. 031893.06

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BIG BAY DR

YACHT CLUB RD

BAY POINT DR

BLVD

Legend

- Pipe
- Ditch
- Junction
- Outfall

Depth (NAVD88)

2.4

≤ 0.1'

- Pond

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Town of Edisto Beach Yacht Club Basin

Flood Depth
Existing Conditions
King Tide 25-year Event

7/24/2025

0 75 150 300 Feet

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Appendix B

BIG BAY DR

YACHT CLUB RD

BAY POINT DR

Legend

- Pipe
- Ditch
- Junction
- Outfall
- Pond
- Maintenance Priority

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Town of Edisto Beach Yacht Club Basin

Flood Duration
Proposed Improvements
Ditch Maintenance

7/29/2025

0 75 150 300 Feet

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Appendix C

Add WaSTOP Inline Check Valve

Replace existing 18" RCP with 36" RCP

Replace existing 18" RCP with 36" RCP

Existing 18" RCP

BIG BAY DR

30 LF of 15" RCP

80 LF of 15" RCP

100 LF of 15" RCP

Replace existing 18" with 24" RCP

140 LF of 24" RCP

140 LF of 15" RCP

Replace existing 15" CMP with 18" RCP

155 LF of 15" RCP

150 LF of 15" RCP

170 LF of 15" RCP

65 LF of 15" RCP

130 LF of 15" RCP

YACHT CLUB RD

BAY POINT DR

BLVD

Legend

Outfall

Junction

Pipe

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Town of Edisto Beach
Yacht Club Basin
Proposed Improvements Infrastructure

7/24/2025

0 75 150 300 Feet

D|F Project. No. 031893.06

BIG BAY DR

YACHT CLUB RD

BAY POINT DR

Legend

- Outfall
- Junction
- Pipe

Depth (NAVD88)

- 0.7'
- ≤ 0.1'
- Pond

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Town of Edisto Beach Yacht Club Basin

Flood Depth
Proposed Improvements
Low Tide 10-year Event

7/24/2025

0 75 150 300 Feet

D|F Project. No. 031893.06

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Imagery collected in 2023 by Kucera International. Imagery is managed by Adam DeMars, Sou

BIG BAY DR

YACHT CLUB RD

BAY POINT DR

BLVD

Legend

- Outfall
- Junction
- Pipe

Depth (NAVD88)

- 0.8'
- ≤ 0.1'

- Pond

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Town of Edisto Beach Yacht Club Basin

Flood Depth
Proposed Improvements
Low Tide 25-year Event

7/24/2025

0 75 150 300 Feet

D|F Project. No. 031893.06

BIG BAY DR

YACHT CLUB RD

BAY POINT DR

Legend

- Outfall
- Junction
- Pipe

Depth (NAVD88)

1.2'

≤ 0.1'

- Pond

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Town of Edisto Beach Yacht Club Basin

Flood Depth
Proposed Improvements
High Tide 10-year Event

7/24/2025

0 75 150 300 Feet

D|F Project. No. 031893.06

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BIG BAY DR

YACHT CLUB RD

BAY POINT DR

BLVD

Legend

- Outfall
- Junction
- Pipe

Depth (NAVD88)

- 2.3'
- ≤ 0.1'

- Pond

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Town of Edisto Beach Yacht Club Basin

Flood Depth
Proposed Improvements
High Tide 25-year Event

7/24/2025

0 75 150 300 Feet

D|F Project. No. 031893.06

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BIG BAY DR

YACHT CLUB RD

BAY POINT DR

BLVD

Legend

- Outfall
- Junction
- Pipe

Depth (NAVD88)

- 2.4'
- ≤ 0.1'

- Pond

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Town of Edisto Beach Yacht Club Basin

Flood Depth
Proposed Improvements
King Tide 10-year Event

7/24/2025

0 75 150 300 Feet

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BIG BAY DR

YACHT CLUB RD

BAY POINT DR

BLVD

Legend

- Outfall
- Junction
- Pipe

Depth (NAVD88)

- 2.4'
- ≤ 0.1'

- Pond

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Town of Edisto Beach Yacht Club Basin

Flood Depth
Proposed Improvements
King Tide 25-year Event

7/24/2025

0 75 150 300 Feet

D|F Project. No. 031893.06

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BIG BAY DR

YACHT CLUB RD

BAY POINT DR

BLVD

Legend

- Outfall
- Junction
- Pipe
- Proposed Flood
- Existing Flood
- Pond

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PLAN | DESIGN | ENGINEER

Town of Edisto Beach Yacht Club Basin

Flood Duration

Existing vs Proposed > 24 hr Duration

Low Tide 10-year Event

7/24/2025

0 75 150 300 Feet

D|F Project. No. 031893.06

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BIG BAY DR

YACHT CLUB RD

BAY POINT DR

Legend

- Outfall
- Junction
- Pipe
- Proposed Flood
- Existing Flood
- Pond

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Town of Edisto Beach Yacht Club Basin

Flood Duration

Existing vs Proposed > 24 hr Duration

Low Tide 25-year Event

7/24/2025

0 75 150 300 Feet

D|F Project. No. 031893.06

BIG BAY DR

YACHT CLUB RD

BAY POINT DR

BLVD

Legend

- Outfall
- Junction
- Pipe
- Proposed Flood
- Existing Flood
- Pond

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PLAN | DESIGN | ENGINEER

Town of Edisto Beach Yacht Club Basin

Flood Duration

Existing vs Proposed > 24 hr Duration

High Tide 10-year Event

7/24/2025

0 75 150 300 Feet

D|F Project. No. 031893.06

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BIG BAY DR

YACHT CLUB RD

BAY POINT DR

BLVD

Legend

- Outfall
- Junction
- Pipe
- Proposed Flood
- Existing Flood
- Pond

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Town of Edisto Beach Yacht Club Basin

Flood Duration

Existing vs Proposed > 24 hr Duration

High Tide 25-year Event

7/24/2025

0 75 150 300 Feet

D|F Project. No. 031893.06

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BIG BAY DR

YACHT CLUB RD

BAY POINT DR

BLVD

Legend

- Outfall
- Junction
- Pipe
- Proposed Flood
- Existing Flood
- Pond

DAVIS & FLOYD

PLAN | DESIGN | ENGINEER

Town of Edisto Beach Yacht Club Basin

Flood Duration

Existing vs Proposed > 24 hr Duration

King Tide 10-year Event

7/24/2025

0 75 150 300 Feet

D|F Project. No. 031893.06

BIG BAY DR

YACHT CLUB RD

BAY POINT DR

BLVD

Legend

- Outfall
- Junction
- Pipe
- Proposed Flood
- Existing Flood
- Pond

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PLAN | DESIGN | ENGINEER

Town of Edisto Beach Yacht Club Basin

Flood Duration

Existing vs Proposed > 24 hr Duration

King Tide 25-year Event

7/24/2025

0 75 150 300 Feet

D|F Project. No. 031893.06

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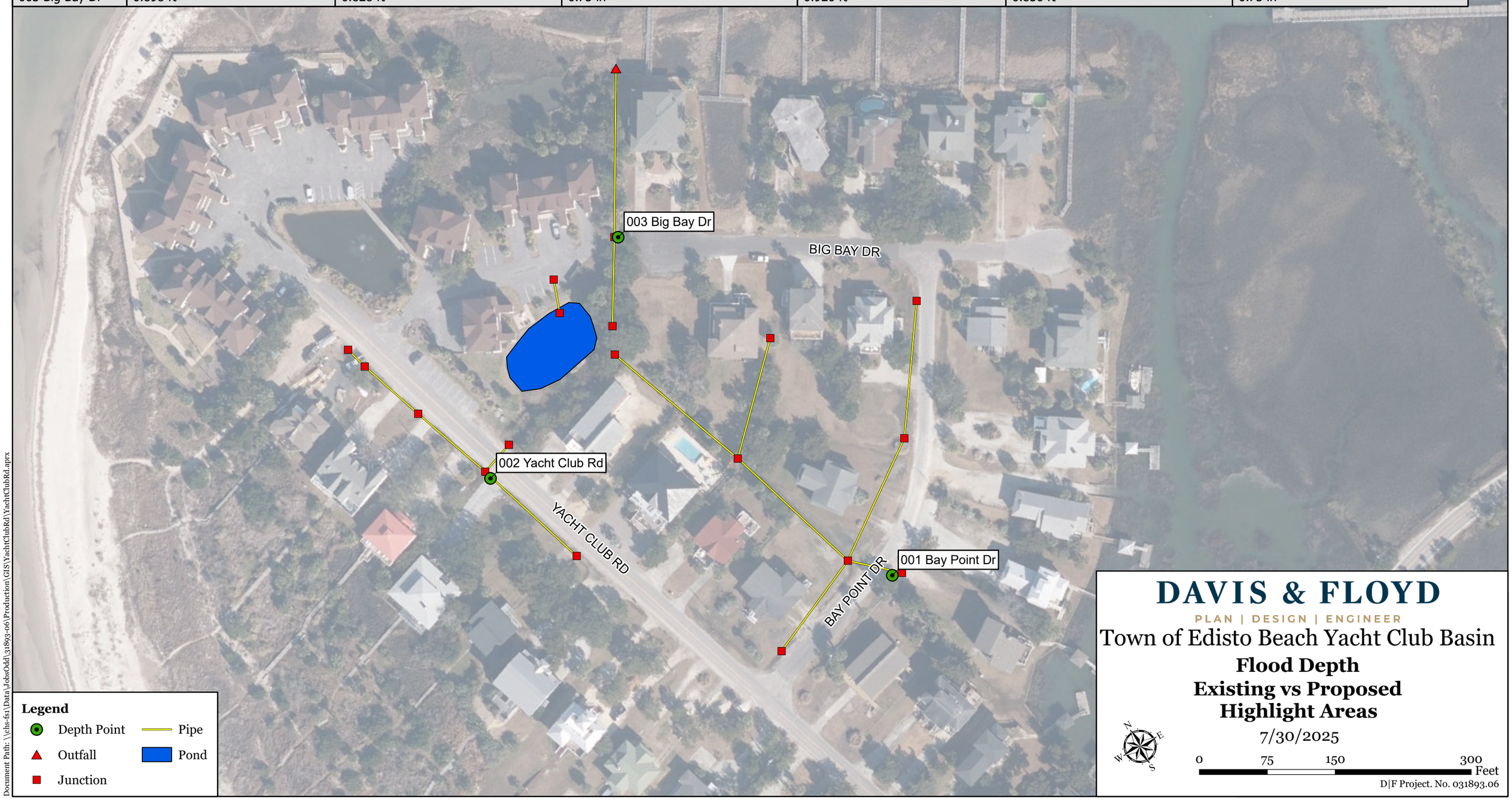
Appendix D

ID	Existing Depth 10-yr Low Tide	Proposed Depth 10-yr Low Tide	Depth Difference 10-yr Low Tide*	Existing Depth 25-yr Low Tide	Proposed Depth 25-yr Low Tide	Depth Difference 25-yr Low Tide*
001 Bay Point Dr	0.607 ft	0.287 ft	3.75 in	0.714 ft	0.484 ft	2.75 in
002 Yacht Club Rd	1.04 ft	0 ft	12.5 in	1.16 ft	0 ft	14 in
003 Big Bay Dr	0.618 ft	0 ft	7.5 in	0.650 ft	0 ft	7.75 in
ID	**Existing Depth 10-yr King Tide**	**Proposed Depth 10-yr King Tide**	**Depth Difference 10-yr King Tide***	**Existing Depth 25-yr King Tide**	**Proposed Depth 25-yr King Tide**	**Depth Difference 25-yr King Tide***
001 Bay Point Dr	0.734 ft	0.627 ft	1.25 in	0.764 ft	0.724 ft	0.5 in
002 Yacht Club Rd	1.173 ft	1.045 ft	1.50 in	1.193 ft	1.153 ft	0.5 in
003 Big Bay Dr	0.898 ft	0.828 ft	0.75 in	0.926 ft	0.856 ft	0.75 in



Legend

- Depth Point
- Outfall
- Junction
- Pipe
- Pond

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Town of Edisto Beach Yacht Club Basin

Flood Depth
Existing vs Proposed
Highlight Areas

7/30/2025

0 75 150 300 Feet

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*Difference in depth is rounded to the nearest quarter inch.

Appendix E

Proposed Improvement Costs

Project Name	Proposed Improvement	Length	Quantity	Count	Units	Unit Cost	Improvement Cost
Install New Stormwater Conveyance and Upsizing	1020 LF of Single 15" RCP	1020	-	-	LF	$ 200	$ 204,000
	· 120 LF of Single 18" RCP	180	-	-	LF	$ 230	$ 42,000
	· 120 LF of Single 24" RCP	180	-	-	LF	$ 270	$ 48,600
	· 290 LF of Single 36" RCP	290	-	-	LF	$ 330	$ 95,700
	· Removal/Disposal/Replacement of Asphalt	170	-	-	SY	$ 200	$ 34,000
	· Junction Box (Small)	-	-	13	EA	$ 8,000	$ 104,000
	· WaSTOP Inline Check Valve (36" Diameter)	-	-	1	EA	$ 40,000	$ 40,000
				Sub-Total			**$ 568,300**
				Allowance - General Conditions (20%)			$ 114,000
				Allowance - Incidental/Site Work (20%)			$ 114,000
				Allowance - Utilities (50%)			$ 285,000
				Estimated Construction			**$ 1,081,300**
				Engineering, Survey, & Design			$ 218,700
				Construction Engineering and Inspection			$ 130,000
Note: Does not include Easement Costs				**Estimated Project Cost**			**$ 1,430,000**