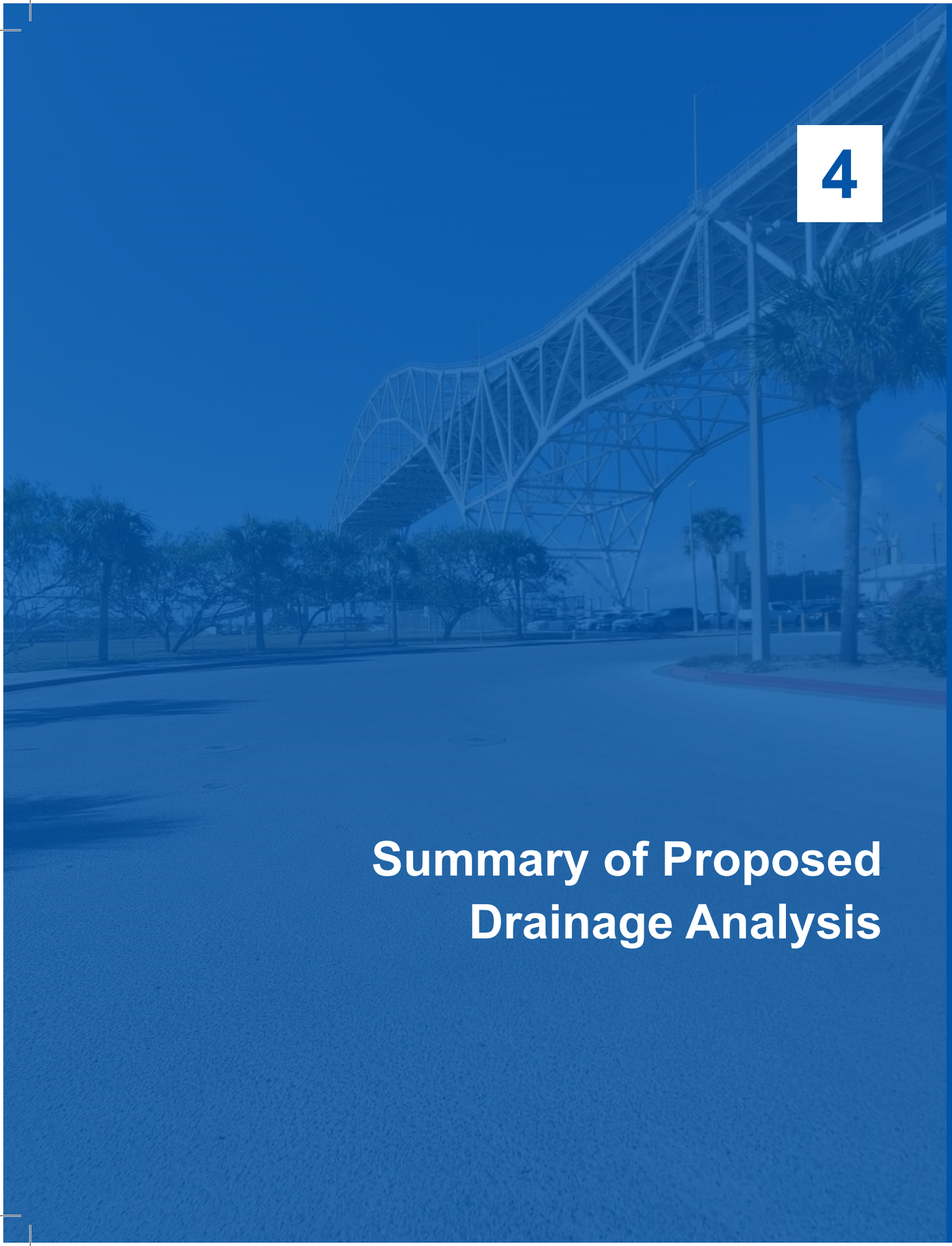

4

Summary of Proposed Drainage Analysis

4 Summary of Proposed Drainage Analysis

One of the major focused of this report is to evaluate drainage improvements of the canal. The purpose of proposed canal is to convey the flow of stormwater into the Corpus Christi Bay.

The canal will be located in the middle portion of the study area and to provide adequate freeboard from both the modeled tailwater conditions detailed in Section 2. The canal is assumed to have the bank elevations near 6.5 feet (NAVD-88).

In order to successfully connect the drainage areas to the navigable canal and achieve maximum benefit, both proposed design options would require the raising of the area adjacent to the canal to a minimum elevation of 6.5 feet in order to achieve positive overland flow into the canal.

4.1 Option 1

Two types of models were run to assess water surface elevations in the proposed canal:

- 1D steady state HEC-RAS model
- 2D rain on mesh model

Each model was run under two tailwater scenarios:

- Mean Sea Level (MSL)
- Highest Observed Tide (HOT)

The drainage areas for Option 1 are depicted in Appendix A.

The MSL model's highest water surface elevations were 0.95 feet and 0.88 feet (NAVD-88) for the 100-Year storm and 25-Year storm, respectively. Modeling results indicate that the highest observed tide was 3.30 feet, which is less than the proposed elevation of the canal bank, 6.5 feet. Both models demonstrate that stormwater from rainfall would remain within the banks of the navigable canal.

4.1.1 Drainage Area Outlet Analysis

Water surface elevations from the HEC-RAS steady state model are used as starting tail water elevations to size the proposed outlets. These outlets at each of the proposed drainage area act as outfalls for that area and will be used to connect future stormwater improvements from that area as it is developed. Results and sizing information of these outlets is shown in Appendix A.

The outlets were designed assuming a length of 150 feet, If in the future the system is extended further away from the canal, the HGL would remain below the banks of the canal. The 100-Year storm flowrate along with the HOT tailwater elevations were used to calculate the most conservative results. Outlet sizes and shapes were determined to make sure that the HGL would not result in an overflow of the system. All the outlets resulted in a HGL that is less than 6.5 feet, the top height of the canal.

A snapshot of a typical drainage area outlet is shown in Figure 4-1,below:

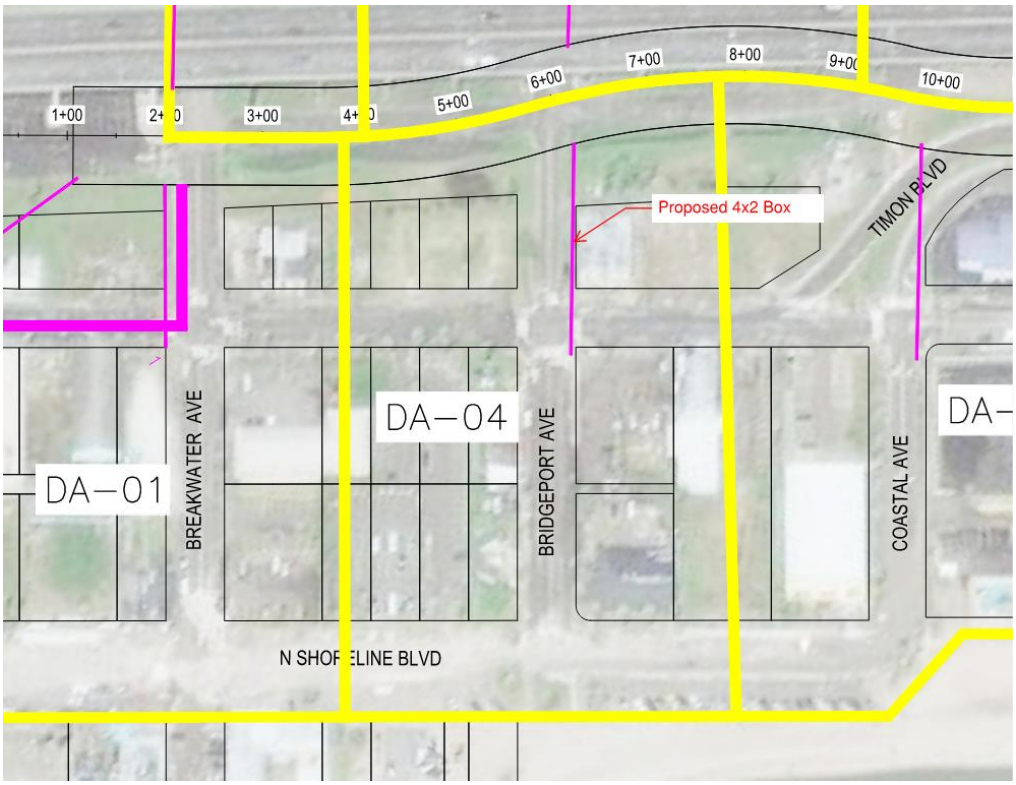

Figure 4-1 – Snapshot of DA-04 – connection to Navigable Canal

4.2 Option 2

Similar to Option 1, a second option was analyzed to evaluate the possibility of a canal with two inlets flowing towards the center of the canal. Like Option 1, the navigable canal in Option 2 runs along Surfside Boulevard. It has two upstream locations that flow towards a junction located at Breaker Avenue, which then outfalls into the Corpus Christi Bay. The two reaches along Surfside Boulevard are 90 feet wide, while the third reach that outfalls into the bay is 60 feet wide. The canal was modeled to have a constant width until it reached the outfall reach, where it reduces from 90 feet to 60 feet. All three reaches have a downstream slope of 0.1%. This canal is also assumed to have a bank elevation of +6.5 feet.

The HEC-RAS model for Option 2 was computed both 25-Year and 100-Year storm events. Although the drainage areas for this study area are the same as Option 1, it differs on the direction of the flow, which converges in from both extremities of the canal into the middle outfall.

The drainage areas for Option 2 are depicted in Appendix A.

4.2.1 Drainage Area Outlet Analysis

Option 2 was designed to have the same outlet locations and amount as Option 1. Since the drainage areas utilized for Option 2 are the exact same as the ones for Option 1, the outlet locations and sizes are applicable to the Option 2 design. The outlets have an HGL less than 6.5 feet (NAVD-88) and therefore operate as intended.

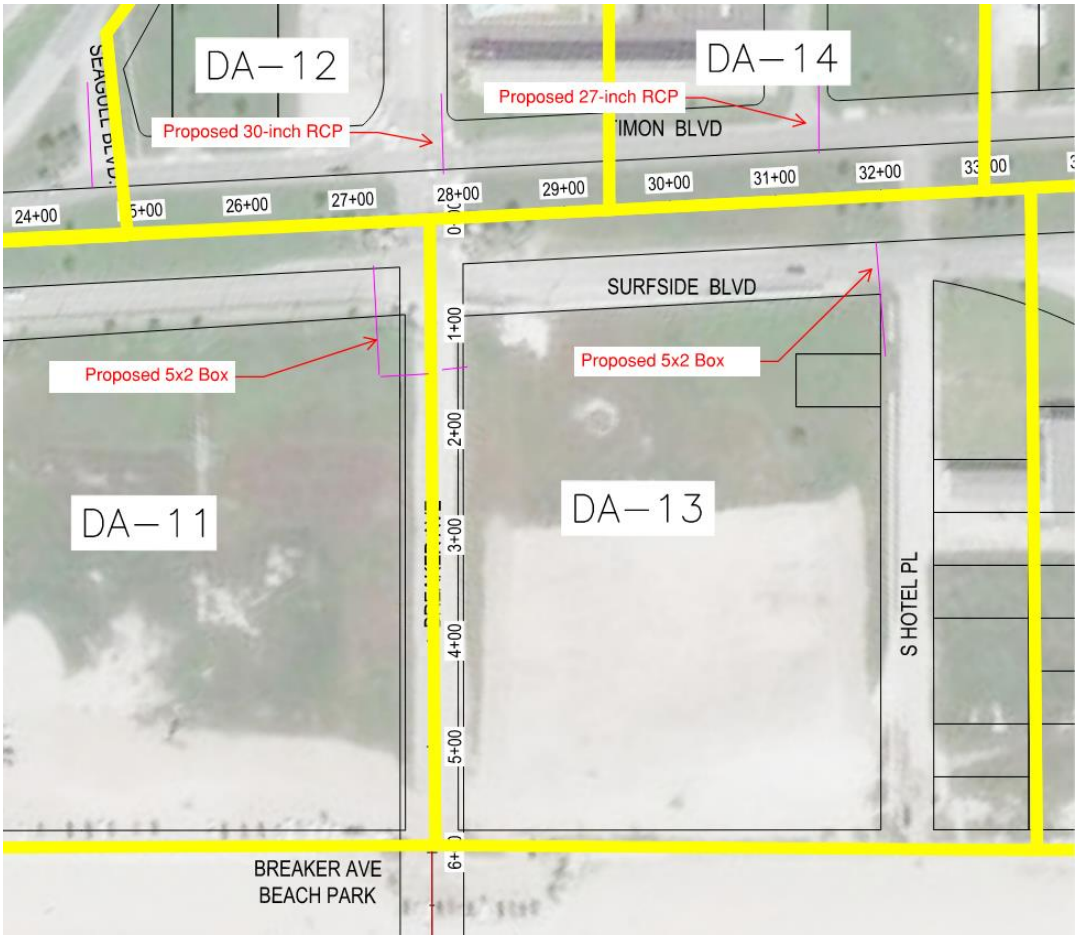

Figure 4-2 – Snapshot of DA's 11-14 – connections to Navigable Canal

4.3 Summary of Drainage Findings

The following are a summary of findings:

- Due to the location of the proposed canal, the areas adjacent to the canal need to be raised to a minimum elevation of +6.5 to properly drain toward the proposed canal and to maintain the freeboard.
- Both proposed canal options address the existing drainage issues for the studied tailwater conditions
- Both models demonstrated that water **from rainfall** would remain within the banks for both 25-year and 100-year storm events
- This drainage analysis does not consider the larger effects of storm-surge due to hurricanes and other extreme events. Unless the base elevation of North Beach is raised, the canal offers no benefit from storm surge protection. A combination of raising the elevation, rerouting and installing new storm sewer, and grading the topography to drain into the canal will protect North Beach from major rainfall events and high annual tidal events. Other options such as a seawall or pump systems need to be evaluated as solutions to these extreme events, since this is beyond the scope of this analysis.