Port of Corpus Christi Authority

TPDES Permit No. WQ 0005253000

Receiving Water Monitoring Plan

Objective

Provide a monitoring plan to demonstrate compliance with the TPDES permit effluent limit for salinity of 2.0 parts per thousand (ppt) over ambient at a distance of 100 meters (m) from the outfall.

Scope

In-situ monitoring will be conducted in the Corpus Christi Ship Channel at a monthly frequency [twelve (12) times per year] from a motor vessel using direct-reading instrumentation during typical discharge waste type and volume conditions. If monitoring data demonstrates compliance with the 2.0 ppt over ambient salinity limit in the first year of operation, upon TCEQ approval, sampling may subsequently be conducted on a quarterly or semi-annual basis[1]. The sampling locations described in this plan will be verified by an on-board Global Positioning System (GPS) during each sampling event. Each monitoring event will consist of three tidal phases; the ebb tide phase, the slack tide phase, and the flood tide phase.

For each tidal phase, an ambient surface water monitoring station will be sampled at 1 m depth intervals beginning at 0.3 m above the channel bottom and ending at 0.3 m below the water surface. For each phase, after the ambient water monitoring station is sampled, two plume monitoring stations (the Slack Tide Plume Monitoring Station and either the Flood Tide or Ebb Tide Plume Monitoring Station depending on the phase) will then be sampled at 1 m depth intervals beginning at 0.3 m above the channel bottom and ending at 0.3 m below the water surface.

Station Locations

The three diffuser plume monitoring stations that will be referred to in this plan as "downstream"[2] locations are:

1. Ebb Tide Plume Monitoring Station – located 100 m east (toward the Gulf of Mexico) of the outermost eastern port of the diffuser. This is the downstream station during the ebb tide phase.
2. Flood Tide Plume Monitoring Station – located 100 m west (towards Corpus Christi Bay) of the outermost western port of the diffuser. This is the downstream location during flood tide phase.

[1] The determination of the frequency of sampling after the first 12 months will be based on statistical analysis of the first 12 months of data.

[2] The term "downstream" as used in this plan signifies the direction of the ambient current that carries the effluent plume away from the diffuser, or in the case of the slack tide the direction that the effluent plume travels when the current is not strong enough to deflect the effluent plume.

3. Slack Tide Plume Monitoring Station – located 100 m south (toward Port Aransas) of the center of the diffuser barrel (i.e., cross-channel). This is the downstream location during slack tide phase.

The ambient (upstream) monitoring stations will each be located 200 m from the outermost port of the outfall in the opposite direction from the location of each downstream location:

1. Ebb Tide Ambient Station – located 200 m west (toward Corpus Christi Bay) of the outermost west port of the diffuser.
2. Flood Tide Ambient Station – located 200 m east (toward the Gulf of Mexico) of the outermost east port of the diffuser.
3. Slack Tide Ambient Station – located at either the Ebb Tide Ambient Station or Flood Tide Ambient Station depending on whether the immediately preceding condition is flood or ebb tide, i.e., if the sample is collected following a flood tide (water moving into Corpus Christi Bay), then the measurements will be collected at the Flood Tide Ambient Station and vice-versa.

The GPS coordinates of each sample station will be determined after completion of construction of the diffuser and will be provided to TCEQ for approval at least 60 days before discharge from the operational desalination facility begins. Measurements will be collected at each of these stations by positioning the vessel utilizing the on-board GPS equipment.

Monitoring Data

For each applicable plume monitoring station and ambient monitoring station for each phase, the recorded monitoring data will be as follows:

1. GPS coordinates.
2. Date and time of measurements.
3. Total water depth.
4. Specific Conductance – (measured at 0.3 m above the channel bottom to 0.3 m below the water surface at 1-m intervals).
5. Temperature – (measured at 0.3 m above the channel bottom to 0.3 m below the water surface at 1-m intervals).
6. Salinity – calculated from the measured temperature and specific conductance at each interval, then averaged at each station. [3]
7. Surface elevations – calculated using the water level elevation (tides) obtained from the NOAA Port Aransas Texas Station ID 8775327 for each monitoring event.
8. Weather conditions and ship traffic during each monitoring event.

Measurements for the flood tide phase and the ebb tide phase, will begin at least two hours after slack tide occurs and more than one hour before the following slack tide is expected, based on tide tables for NOAA Port Aransas Texas Station ID 8775327.

[3] The Texas Commission on Environmental Quality (TCEQ's) surface water monitoring manual *Surface Water Quality Monitoring Procedures, Volume 1: Physical and Chemical Monitoring Methods* (RG-415) specifies that salinity (TCEQ parameter code 00480) is calculated from specific conductance and water temperature. This will be the method used in this monitoring plan.

Measurements for the slack tide phase will be collected within one hour either side of predicted slack tide based on tide tables for NOAA Port Aransas Texas Station ID 8775327.

All monitoring data will be recorded in a logbook and will be maintained in accordance with TPDES permit requirements.

Data Analysis

The average calculated salinity from the applicable ambient monitoring station during the ebb tide phase, the flood tide phase, and the slack tide phase will define the "ambient" salinity conditions for determining the increase above ambient salinity for each respective phase.

For each phase, the increase in salinity above ambient will be calculated by subtracting the average salinity at the applicable ambient monitoring station from the average salinity at the applicable plume monitoring station. Negative values will be recorded if they occur.

Salinity measurements above ambient for each monitored phase will then be averaged to determine the increase in salinity over ambient for the monitoring event, which will be reported in the discharge monitoring report (DMR) for the month the monitoring event occurs.

Compliance Determination

Compliance with the TPDES permit effluent limit for salinity of 2.0 ppt over ambient at 100 m from the outfall is demonstrated if the reported increase in salinity above ambient for the monitoring event, as described in the data analysis section above, is less than or equal to 2 ppt.

Equipment

The equipment requirements are as follows:

1. Motor vessel(s) capable of maintaining a fixed position in the channel under normal current conditions utilizing a GPS.
2. Equipment and procedures consistent with those specified in *Surface Water Quality Monitoring Procedures, Volume 1: Physical and Chemical Monitoring Methods* (RG-415), most recent edition, for measuring in-situ salinity (specific conductance) and temperature.
3. Water quality monitoring equipment calibrated as specified by RG-415 (most recent edition).
4. GPS location system calibrated in accordance with manufacturer's specifications.

Quality Assurance – Quality Control (QA/QC)

All QA/QC will be as specified in RG-415 (most recent edition) for all equipment used in this plan.

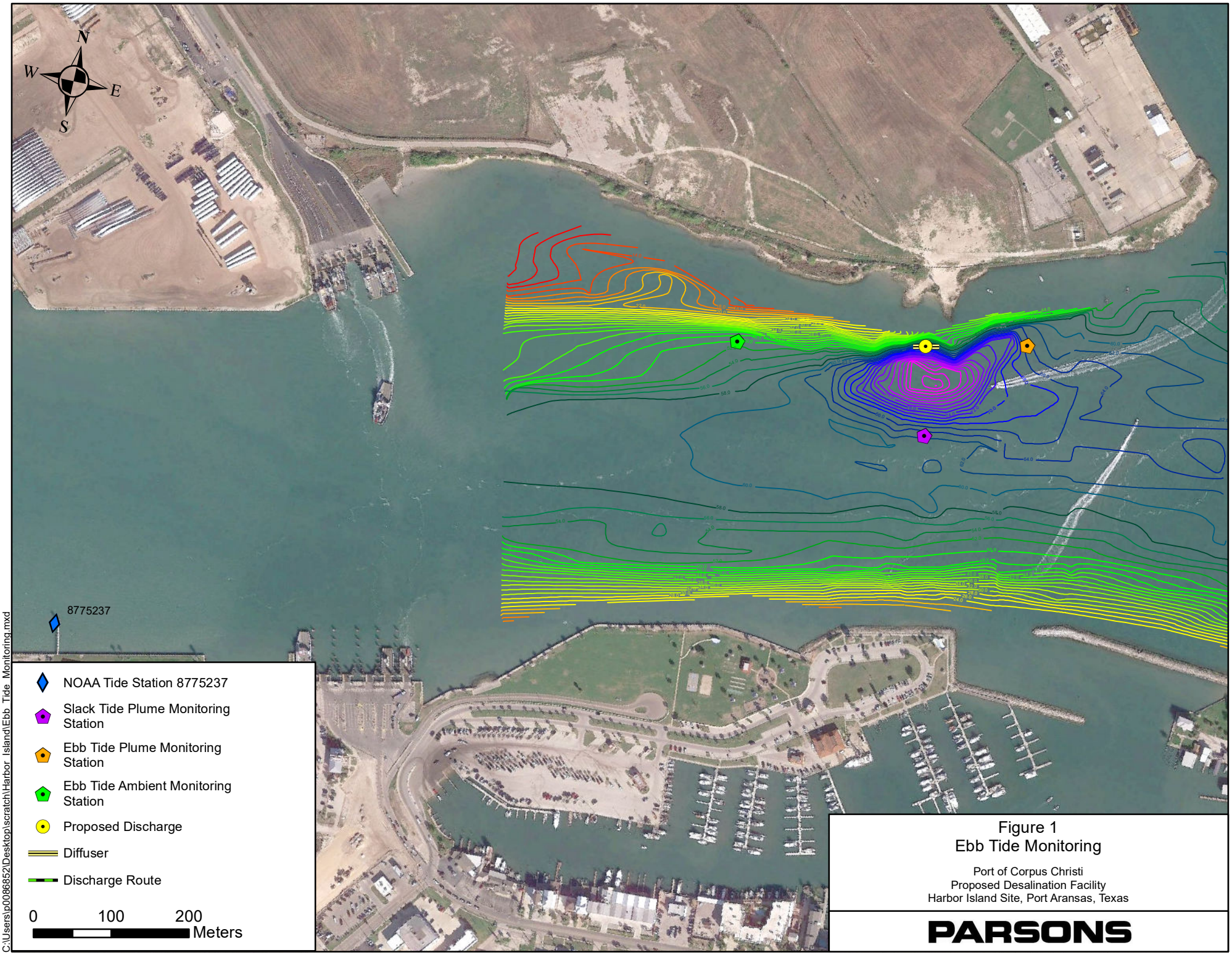

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Figure 1
Ebb Tide Monitoring

Port of Corpus Christi
Proposed Desalination Facility
Harbor Island Site, Port Aransas, Texas

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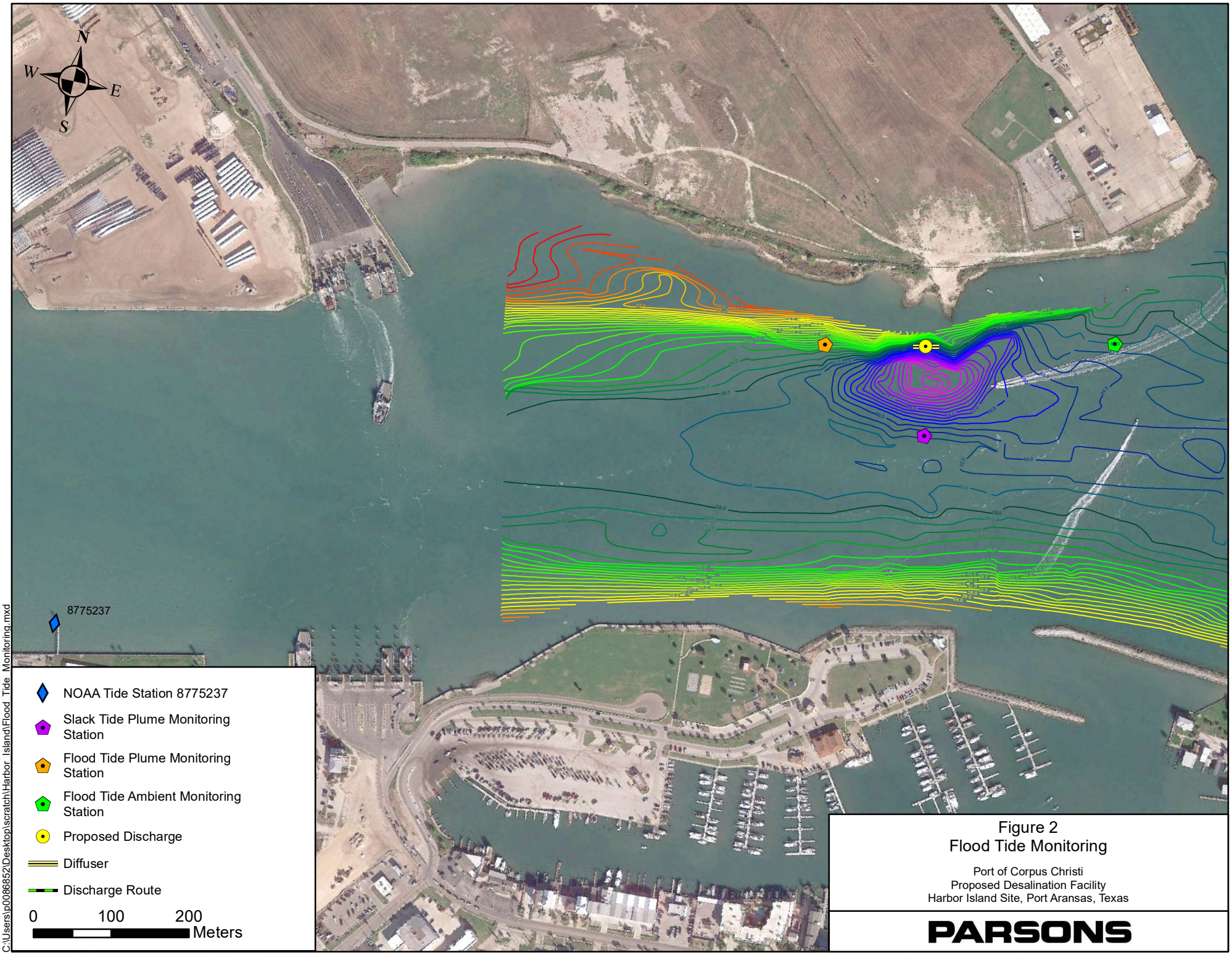

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Figure 2
Flood Tide Monitoring

Port of Corpus Christi
Proposed Desalination Facility
Harbor Island Site, Port Aransas, Texas

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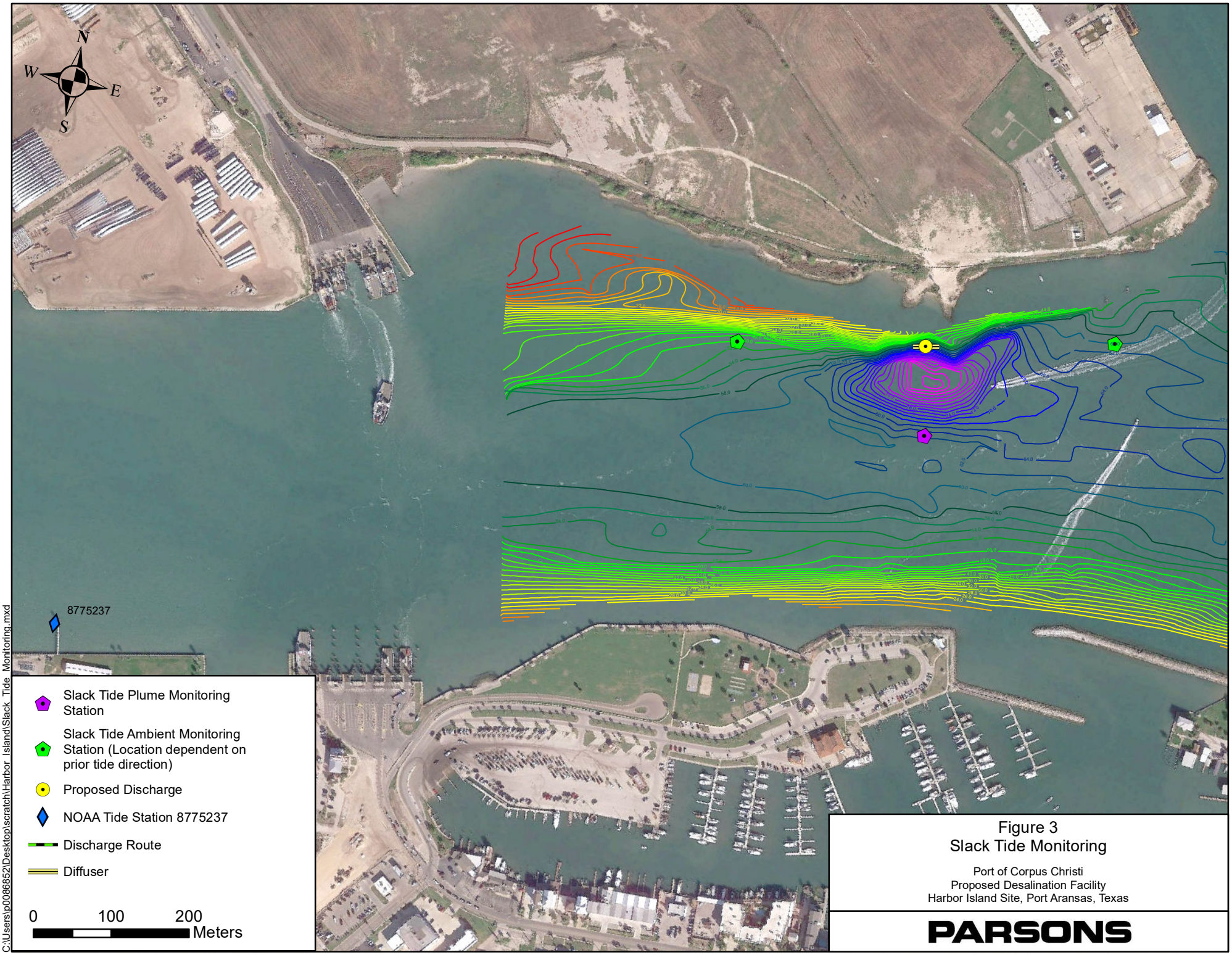

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Figure 3
Slack Tide Monitoring

Port of Corpus Christi
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Harbor Island Site, Port Aransas, Texas

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