

Guadalupe-Blanco River Authority

Calhoun County Regional Wastewater Facility Study

Wastewater Facility Study

*Partially Funded by
Texas Water Development Board*

January 2012



SUSAN ROTH
water and wastewater consulting

CDM

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TBPE Firm Registration No. F-160



SUSAN ROTH
water and wastewater consulting

TBPE Firm Registration No. F-10095



TBPE Firm Registration No. F-3043



Matt A. Glaze
1/18/12



R. Rajenthiram P.E.
1/20/12



Allen D. Woelke
1/20/12

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EXECUTIVE SUMMARY

In December 2009, the Guadalupe-Blanco River Authority (GBRA) submitted an application to the Texas Water Development Board (TWDB) to receive funding assistance to conduct a regional wastewater planning study for Calhoun County. TWDB awarded GBRA, as the primary applicant, the planning grant in March 2010. As a result, GBRA, in conjunction with 10 other cities and entities, has promoted this study to evaluate the feasibility of developing regional wastewater facilities to serve existing and future populations in Calhoun County. A complete list of the official project participants is provided below:

- Guadalupe-Blanco River Authority;
- Calhoun County;
- Calhoun County Economic Development Corporation;
- City of Point Comfort;
- City of Port Lavaca;
- City of Seadrift;
- Alcoa;
- Dow Chemical;
- Formosa Plastics Corporation;
- INEOS Nitriles;
- Seadrift Coke L.P.

Although Port O'Connor Municipal Utility District (Port O'Connor MUD) did not sign up as an official project participant, this study references information about their service area and wastewater facilities. Their existing wastewater infrastructure is an important component in the southern portion of Calhoun County, especially if one of the regional alternatives presented later in this report is implemented.

Camp Dresser & McKee, Inc. (CDM) and their team, Urban Engineering, Inc., served as the engineering consultant for this study in Calhoun County. They were responsible for determining the wastewater flows, identifying and evaluating several options for regional wastewater collection and treatment, and developing cost estimates and implementation schedules to phase the construction of the proposed infrastructure. They also prepared wastewater reuse profiles for each of the industrial participants.

Susan Roth Consulting, LLC, served as Project Manager of the study on GBRA's behalf; she developed the scope of work for the project, secured the project partnerships, prepared the grant application for funding, coordinated and led the project meetings, developed the population projections for the cities, prepared the write-up for funding options and participated in the development of the regional alternatives and wastewater reuse analysis.

Planning for regional wastewater collection and treatment facilities is important at this time for prevention of problems due to aging infrastructure, failing septic systems and to develop a plan for efficient sharing of resources. The population in the study area has increased in the past 10 years, and the population is projected to substantially increase over the next 20 years due to future developments along the coastal area.

The Calhoun County Regional Wastewater Study considered several regional solutions and focused on the areas of interest of the project participants. This report summarizes the findings of this study; information regarding the study area, projected population and wastewater flows, description of collection and treatment alternatives, wastewater reuse alternatives, proposed effluent standards, cost estimates and potential funding options are also included in this study.

The study area was divided into four areas geographically (Refer to Figure 4-5 in Section 4) to identify regional alternatives that would be economical to implement. These areas and the regional alternatives are described in Section 6. In summary, Areas 1A & 1B are located in Figure 4-6; Area 2 is located in Figure 4-7, Area 3 in Figure 4-8 and Area 4 in Figure 4-9. In general, alternatives for regional wastewater services consisted of collecting wastewater and transporting it to existing and perhaps expanded regional wastewater treatment facilities, collecting wastewater and constructing a new package wastewater treatment plant for each subdivision, collecting wastewater and transporting it to new package wastewater treatment plants located near several subdivisions.

In addition, the subdivisions in the vicinity of the project participants that have onsite sewage facilities (OSSFs) with documented OSSF failures or subdivisions on OSSFs similar in age and density to the subdivisions with OSSF failures were included in this study to address future potential scenarios of OSSF failures currently being experienced in some of the subdivisions which might cause water quality issues. A summary of the regional options associated with each of the four geographical areas is presented below:

AREA 1A

- **Option 1** - All wastewater from the subdivisions of concern is conveyed to the existing City of Port Lavaca WWTP.
- **Option 2** - All subdivisions get their own package WWTP.

Executive Summary

- **Option 3** - The subdivisions are grouped geographically and the combined flows are directed to a new regional WWTP.
- **Option 4** - Crestview WWTP extends its service to the nearby subdivisions, while subdivisions to the north of City of Port Lavaca get a new regional WWTP and City of Port Lavaca extends its service to the Double D subdivision.

The cost comparisons for these options can be found in Table 6-1 in Section 6 of this report.

AREA 1B

- **Option 1** - All wastewater from the subdivisions of concern is conveyed to the existing City of Point Comfort WWTP.
- **Option 2** - Each subdivision has their own package WWTP.
- **Option 3** - The flows from all the subdivisions are combined and treated at a new regional WWTP.

The cost comparisons for these options can be found in Table 6-2 in Section 6 of this report.

AREA 2

- **Option 1** - all wastewater from the subdivisions of concern is conveyed to either City of Seadrift WWTP or the Port O'Connor MUD WWTP.
- **Option 2** - Each subdivision has an individual package WWTP.
- **Option 3** - The flow from each of the subdivisions is directed to a proposed regional WWTP.
- **Option 4** - The flows from the subdivisions of Lane Road, Powderhorn Ranch, Seaport Lakes and Costa Grande are directed to a new regional WWTP and the remaining subdivisions convey wastewater to the closest regional WWTP either in City of Seadrift or in Port O'Connor MUD.

The cost comparisons for these options can be found in Table 6-3 in Section 6 of this report.

AREA 3

- **Option 1** - all wastewater from the subdivisions of concern is conveyed to SCC WCID No.1 WWTP.
- **Option 2** - each subdivision will have its own package WWTP.
- **Option 3** - all the subdivisions convey wastewater to a regional WWTP.

The cost comparisons for these options can be found in Table 6-4 in Section 6 of this report.

AREA 4

One option which was considered to reduce the demand on water and wastewater facilities was water and wastewater reuse by the industrial participants. Strategies discussed included internal water reduction opportunities, internal reuse of wastewater (treated or untreated, depending on the origin and intended reuse of the wastewater), and reuse of wastewater by other industrial facilities. Some of the participants have already considered and/or implemented reduction and reuse measures. Summaries of the potential for additional reduction and reuse and measures implemented to date, as identified in this study, are presented in Section 4.

SECTION 1: INTRODUCTION

Section 1

In December 2009, the Guadalupe-Blanco River Authority (GBRA) submitted an application to the Texas Water Development Board (TWDB) to receive funding assistance to conduct a regional wastewater planning study for Calhoun County. TWDB awarded GBRA, as the primary applicant, the planning grant in March 2010. As a result, GBRA, in conjunction with 10 other cities and entities, has promoted this study to evaluate the feasibility of developing regional wastewater facilities to serve existing and future populations in Calhoun County. A complete list of the official project participants is provided below:

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This report summarizes the findings of this study; information regarding the study area, projected population and wastewater flows, description of collection and treatment alternatives, wastewater reuse alternatives, proposed effluent standards, cost estimates and funding options are also included in this study.

1.1 BACKGROUND

Service Area Description

The proposed study involves a number of cities, industrial companies and the economic development corporation located in Calhoun County. The study area includes the entire Calhoun County boundary, as well as the incorporated limits and extraterritorial jurisdictions of the Cities of Point Comfort, Port Lavaca and Seadrift and the surrounding unincorporated areas within the County. A map of the study area is shown in **Figure 1-1**.

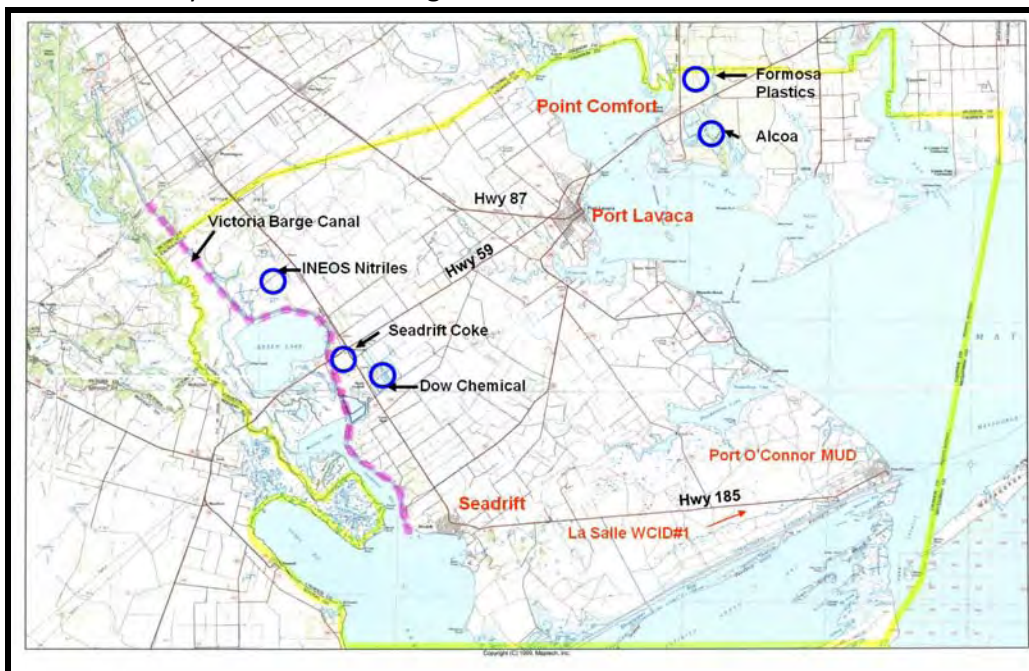


Figure 1-1: Map of Study Area

Basis for the Study

Planning for regional wastewater collection and treatment facilities is important at this time for prevention of problems due to aging infrastructure, failing septic systems and to develop a plan for efficient sharing of resources. The population in the study area has increased in the past 10 years, and the population is projected to substantially increase over the next 20 years due to future developments along the coastal area. This planning study for Calhoun County considered several regional solutions and focused on the following areas of interest of the project participants:

- Feasibility of developing a regional wastewater system to replace and/or supplement the multiple systems currently in service;
- Investigate alternatives for providing centralized wastewater service from existing and/or new treatment facilities to the unincorporated areas with failing septic systems; and,
- Determine options for regional wastewater reuse system(s) to serve the study area.

Many of the entities and industrial companies located on the western and eastern areas of Calhoun County were interested in investigating the possibility for regional wastewater reuse and finding ways to reduce their demands on the raw water supplies.

The regional wastewater system was evaluated from a phased-approach perspective with consideration of permit issues, anticipated growth areas and project cost-effectiveness. The proposed system(s) would be designed in conformance with the flow and effluent limits of the State Water Quality Management Plan and would be committed to water conservation.

1.2 SCOPE OF STUDY

The scope of work for this study involved evaluating the feasibility of developing regional wastewater collection and treatment facilities to serve existing and future development in Calhoun County. The following items were included in the study from an engineering standpoint, as well as to satisfy the requirements of the TWDB grant program:

- ***Population and Wastewater Flow Projections*** – Population and growth projections, utility development agreements and additional wastewater system information were collected from each of the entities. This data was

used to develop population and wastewater flow projections for each entity in five year increments through year 2040.

- **Collection System Alternatives** – Alternatives were developed for connecting existing collection lines into an overall regional wastewater collection system within the study area. The study also considered the feasibility of developing community or regional wastewater systems in areas of the county that have traditionally been developed with OSSFs.
- **Treatment Alternatives** – An evaluation of each existing treatment facility was made for the possibility of expansion and potential for regional operation. The quality or level of treatment required for a regional plant to discharge into Lavaca and/or San Antonio Bay was taken into consideration during the analysis of potential regional alternatives.
- **Operation and Reuse Alternatives** – Potential operation alternatives were examined for each of the entities, including the operation of individual facilities, as well as a regional system. The potential distribution of effluent from existing and proposed treatment facilities was examined in conjunction with an inventory of possible application sites.
- **Environmental Assessment** – Water quality issues and assessing the impacts of population growth and increased wastewater loadings to the San Antonio Bay were analyzed.
- **Implementation Schedule** – An implementation plan was developed for the phased construction of collection and treatment facilities for the study area through 2040. This plan takes into consideration the existing collection and treatment capacities, water quality issues, future developments, anticipated growth and cost-effectiveness.
- **Cost Estimates and Recommendations** – Estimates of the capital and O&M costs for each identified entity for the various alternatives were determined. The capital and O&M costs for the final regional collection and treatment system alternatives were combined and utilized a present worth analysis.
- **Funding Options** – Potential funding sources and traditional financing programs for the construction of various options of the Calhoun County Regional Wastewater Systems were provided.
- **Water Conservation and Drought Contingency Plans** – TWDB requires project participants receiving grant funding through the Regional Water and Wastewater Facilities Planning Grant Program to prepare and implement water conservation and drought contingency plans. Copies of

both of these plans from each of the project participants are included in **Appendix A**.

Information about each of the items listed in the scope of work is detailed in the following sections of the report.

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SECTION 2: GROWTH PROJECTION

Section 2

2.1 POPULATION (OF CITIES)

The population in the study area has increased over the past 10 years and is projected to double over the next 20 years. In order to accurately capture the population growth of the study area, the following information was collected from each participant towards the beginning of the study:

- Current population and growth projections;
- Number of water connections;
- Wastewater system information;
- Utility development agreements for planned developments; and
- Build-out schedules and conceptual plans of planned developments.

This information was used to develop population projections for each entity in five year increments through a 2040 planning horizon, including ultimate build-out of planned developments. The projected populations were compared to 2010 U.S. Census Bureau figures, as well as the TWDB population projections in the *TWDB 2011 Region L State Water Plan*. **Table 2-1** summarizes the total population projections for each entity and includes the U.S. Census Bureau figures and TWDB projections for comparison purposes.

Table 2-1: Population and Growth Projections

Entity	Growth Rate	2010	2015	2020	2025	2030	2035	2040
City of Point Comfort								
TWDB Projections	4.0%	1,276	1,573	1,870	2,415	2,959	3,520	4,081
City's Projections	0.1%	781	781	782	782	783	783	783
US Census Bureau Data	-	737	-	-	-	-	-	-

Entity	Growth Rate	2010	2015	2020	2025	2030	2035	2040
City of Port Lavaca								
TWDB Projections	0.8%	13,163	13,744	14,325	14,919	15,513	16,115	16,717
City's Projections	0.1%	12,800	12,806	12,813	12,819	12,826	12,890	12,954
US Census Bureau Data	-	12,248	-	-	-	-	-	
City of Seadrift								
TWDB Projections	0.3%	1,408	1,434	1,459	1,479	1,499	1,512	1,525
City's Projections	2.0%	1,452	1,597	1,742	1,917	2,091	2,300	2,509
US Census Bureau Data	-	1,364	-	-	-	-		
Port O'Connor MUD								
TWDB Projections	0.8%	1,346	1,406	1,465	1,526	1,587	1,649	1,710
MUD's Projections	1.0%	3,119	3,160	3,194	3,236	3,270	3,310	3,353

As presented in **Figure 2-1**, the projections provided by the City of Point Comfort show minimal growth due to Alcoa and Formosa Plastics purchasing the homes located within a certain distance from their industrial plants and leaving them vacant in order to provide a safety buffer.

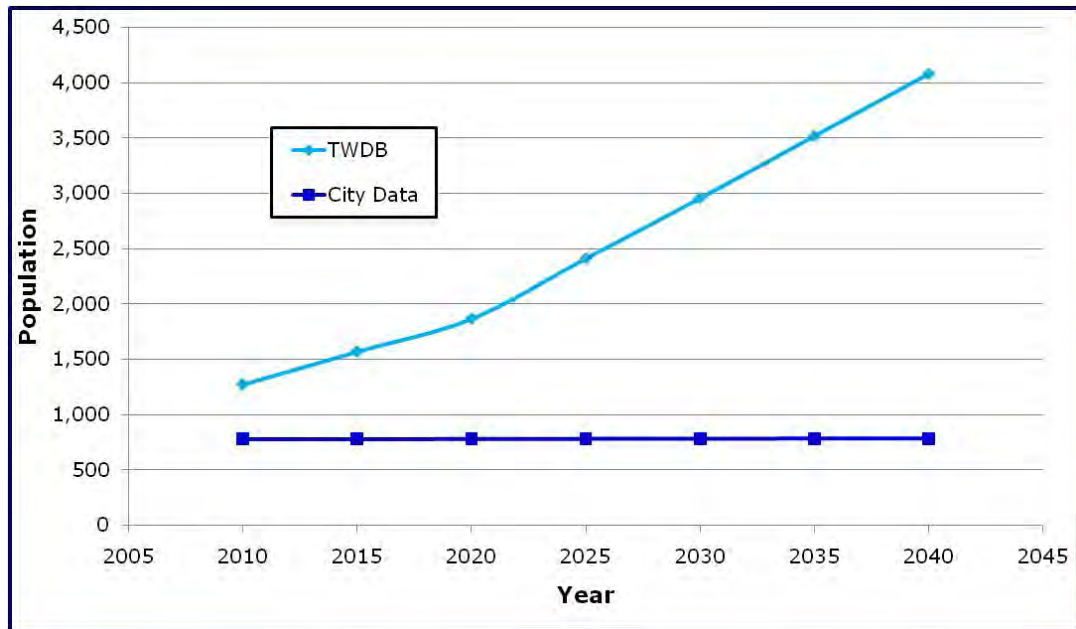


Figure 2-1: Point Comfort Population Projections – Comparison of Data

The City of Seadrift and Port O'Connor MUD have both provided projections greater than TWDB's due to the large number of residential developments planned for their areas, as shown below in **Figures 2-2 and 2-3**.



Figure 2-2: Seadrift Population Projections – Comparison of Data

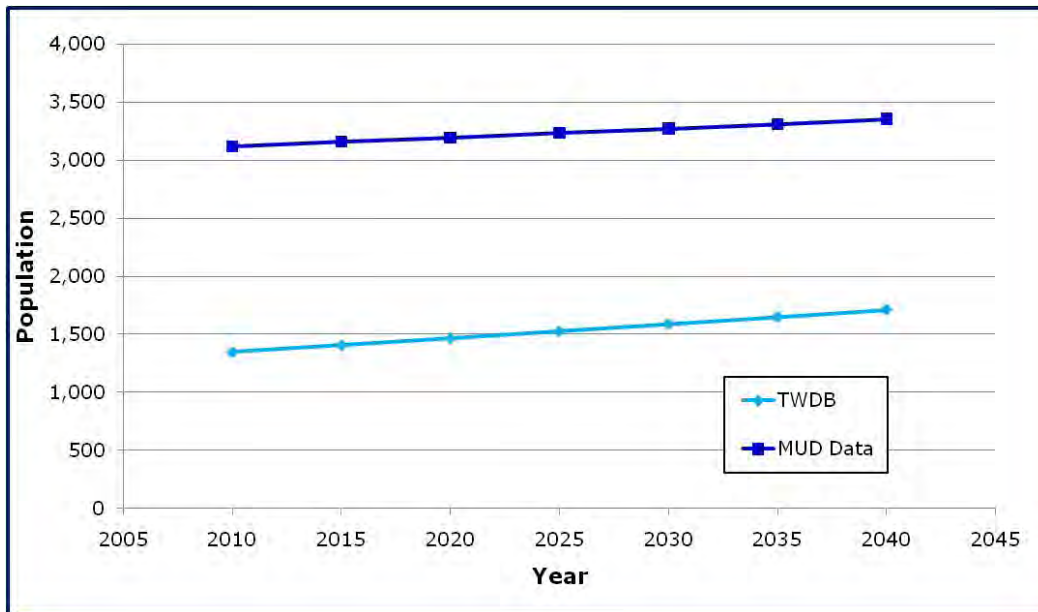


Figure 2-3: Port O'Connor Population Projections – Comparison of Data

Since each entity was able to justify the increase or decrease in population data and growth rate for their area, this data was used instead of the U.S. Census Bureau figures and the TWDB data to size the proposed regional wastewater infrastructure. The new 2010 U.S. Census population figures were also lower than the data provided by TWDB and the entities due to a number of residents owning second homes in the study area and not claiming permanent residency in Calhoun County. This methodology, used by the project team, was approved by TWDB staff on March 31, 2011. The population projections for each of the entities were used to calculate wastewater demands for the study area.

2.2 SUBDIVISIONS OF CONCERN

The subdivisions herein referred to as subdivisions of concern, are the subdivisions in the vicinity of the project participants that have onsite sewage facilities (OSSFs) with documented OSSF failures like Port Alto, Double D and Meadow Brook Park in Area 1 or subdivisions on OSSFs which are similar in age and density to the subdivisions with OSSF failures. These subdivisions have been included in this study to address future potential scenarios of OSSF failures currently being experienced in some of the subdivisions which might

cause water quality issues. The other existing subdivisions that have been included are:

- Matson, Bowman, Shoreline Acres, Six Mile, Royal Estates, Shady Acres, Hackberry Junction and Bay Meadows in Area 1A;
- Olivia in Area 1B; and
- Indianola and Alamo Beach in Area 3.

2.3 PROPOSED DEVELOPMENTS

Southern Calhoun County was experiencing significant residential development prior to the current economic downturn. These developments are at various stages of planning and construction (**See Figure 2-4**). However, once completed, the proposed developments will have a significant impact on the future wastewater flows of Calhoun County. These developments range in size from 50 lots to 9,000 lots as shown in **Table 2-2**. The developments are assumed to be at 50% development by 2040 and at 100% development by 2060 (Source: 2008 Southern Calhoun County Water Supply Study and updated data from Urban Engineering).



Figure 2-4 Current, Planned and Potential Subdivisions

Table 2-2 Proposed Units in Each Subdivision

Dev No.	Proposed Development	Estimated Number of Units (Full Development Assumed to be in 2060)
1	Swan Point Landing	89
2	The Bay Club @ Falcon Point	108
3	Seaport Lakes	56
4	Sanctuary at Costa Grande	767
5	Caracol	74
6	Harbor Mist	225
7	Sanctuary-Phase III at Costa Grande	300
8/13	Falcon Point Ranch Phase I	1,500
10	Tidelands	82
11	Bindewald Tract	300
12	Fisher Tract	300
9/15	Powderhorn Ranch	500
14	Costa Grande	8,900
16	Lane Road	300

Swan Point landing subdivision is in the process of re-platting the 89 lots to smaller lots totaling up to 255 lots with lagoons and canals. This data was received at a late date in the preparation of this study and report and hence, the cost estimates do not reflect the 255 lots. The increase in the number of lots will potentially lower the monthly cost per lot payment currently provided in Section 6 for Swan Point Landing.

SECTION 3: EXISTING WASTEWATER FACILITIES

Section 3

3.1 CITY OF POINT COMFORT WWTP

City of Point Comfort Wastewater Treatment Plant (WWTP) is located at 800 Pease Street, at the intersection of Murrah Street and Pease Street, approximately 2,900 feet northwest of the intersection of Farm-to-Market 1593 and State Highway 35 in Calhoun County, Texas (**See Figure 3-1**). The facility (WQ0010599001) is authorized to treat and discharge an annual average flow of effluent not to exceed 0.2 MGD. The effluent is permitted to discharge into Lavaca Bay/ Chocolate Bay Segment No. 2453 of the Bays and Estuaries. For the permitted flow data, refer to **Table 3-1**. The table also contains the daily average discharge limitations. The annual average flow at the City of Point Comfort WWTP calculated from historic flow data is 0.042 MGD (2007 – 2010) which accounts for 21% of the permitted flow.



Figure 3-1 City of Point Comfort WWTP

Table 3-1 Permitted Flow Data for Point Comfort WWTP

WWTP Name	Permitted Average Flow in MGD	Permitted 2-hr Peak Flow in MGD	BOD/TSS in mg/L
City of Point Comfort WWTP	0.2	0.5	20/20

3.2 CITY OF PORT LAVACA WWTP

City of Port Lavaca WWTP (WQ0010251001) is located at the southeast corner of the intersection of Newlin and Commerce Street approximately 1.4 miles northeast from the intersection of State Highway 35 and US Highway 87 in Calhoun County, Texas (**See Figure 3-2**). The facility is authorized to treat and discharge an annual average flow of effluent not to exceed 2 MGD. The effluent from the WWTP is discharged into the Lynn bayou; thence to Lavaca/Chocolate Bay in Segment No. 2453 of Bays and Estuaries. For the permitted flow data, refer to **Table 3-2**. The table also contains the daily average discharge limitations. The annual average flow at the City of Port Lavaca WWTP calculated from historic flow data is 1.11 MGD (2007 – 2010) which accounts for 55% of the permitted flow.



Figure 3-2 City of Port Lavaca WWTP

Table 3-2 Permitted Flow Data for Port Lavaca WWTP

WWTP Name	Permitted Average Flow in MGD	Permitted 2-hr Peak Flow in MGD	BOD/TSS in mg/L
City of Port Lavaca WWTP	2	7.65	20/20

3.3 CITY OF SEADRIFT WWTP

City of Seadrift WWTP (WQ0010822001) is located south of and adjacent to SH 185, between Orange and Olive Streets in City of Seadrift, Calhoun County, Texas (See Figure 3-3). The facility is authorized to treat and discharge annual average flow of effluent not to exceed 0.3 MGD. The effluent is discharged into an unnamed drainage ditch; thence to an unnamed bayou; thence to San Antonio Bay/Hynes Bay/Guadalupe Bay in Segment No.2462 of the Bays and Estuaries. For the permitted flow data, refer to Table 3-3. The table also contains the daily average discharge limitations. The annual average flow at the City of Seadrift WWTP calculated from historic flow data is 0.05 MGD (2007 – 2010) which accounts for 17% of the permitted flow. Though the WWTP is permitted for 0.3 MGD, the existing clarifier will have to be either upgraded or a clarifier added before the full capacity can be utilized.



Figure 3-3 City of Seadrift WWTP

Table 3-3 Permitted Flow Data for Seadrift WWTP

WWTP Name	Permitted Average Flow in MGD	Permitted 2-hr Peak Flow in MGD	BOD/TSS in mg/L
City of Seadrift WWTP	0.3	0.6	20/20

3.4 PORT O'CONNOR MUD WWTP

Port O'Connor MUD WWTP (See Figure 3-4) is located north of and adjacent to State Highway 185 and approximately 1,000 feet northwest of the Port O'Connor Airport in Calhoun County, Texas. The facility is authorized to treat and discharge annual average flow of effluent not to exceed 0.6 MGD. The treated effluent is discharged into the Matagorda Bay. For the permitted flow data, refer to Table 3-4. The table also contains the daily average discharge limitations. The annual average flow at the Port O'Connor MUD WWTP calculated from historic flow data is 0.15 MGD (2007 – 2010) which accounts for 25% of the permitted flow.



Figure 3-4 Port O'Connor MUD WWTP

Table 3-4 Permitted Flow Data for Port O'Connor WWTP

WWTP Name	Permitted Average Flow in MGD	Permitted 2-hr Peak Flow in MGD	BOD/TSS/Ammonia in mg/L
Port O'Connor MUD WWTP	0.6	1.8	10/15/3

3.5 OTHERS

Crestview WWTP (WQ0013954001) is located at 636 Bayou Dr, approximately 7,000 feet northwest of Farm-to-Market 2433 and State Highway 35 and approximately 7,000 feet southeast of intersection of Farm-to-Market 1679 and US Highway 87 in Calhoun County, Texas (**See Figure 3-5**). The facility is authorized to treat and discharge an annual average flow of effluent not to exceed 0.03 MGD. The effluent is discharged to a swale; thence to Chocolate Bayou (non-tidal); thence to Chocolate Bayou (tidal) and thence to Lavaca Bay/Chocolate Bay in Segment No. 2453 of the Bays and Estuaries. For the permitted flow data, refer to **Table 3-5**. The table also contains the daily average discharge limitations.



Figure 3-5 Crestview WWTP

Table 3-5 Permitted Flow Data for Crestview WWTP

WWTP Name	Permitted Average Flow in MGD	Permitted 2-hr Peak Flow in MGD	BOD/TSS in mg/L
Crestview WWTP	0.03	0.09	20/20

Southern Central Calhoun County Water Control and Improvement District No.1 (SCCWCID #1) WWTP is located at 1 Wedwig Street, 0.8 miles northeast of the intersection of State Highway 316 and FM 2670 on the south corner of the intersection of Blackburn Avenue Bay and Chocolate Bay in Magnolia Beach Subdivision which is located approximately 6 miles southeast of City of Port Lavaca in Calhoun County, Texas (See Figure 3-6). The facility is authorized to treat and discharge an annual average flow of effluent not to exceed 0.075 MGD. The effluent is directly discharged into Lavaca Bay/ Chocolate Bay in Segment No. 2453 of Bays and Estuaries. For the permitted flow data, refer to Table 3-6. The table also contains the daily average discharge limitations.



Figure 3-6 SCC WCID #1 WWTP

Table 3-6 Permitted Flow Data for SCCWCID No.1 WWTP

WWTP Name	Permitted Average Flow in MGD	Permitted 2-hr Peak Flow in MGD	BOD/TSS in mg/L
Southern Central Calhoun County	0.075	0.262	20/20

3.6 WASTEWATER FLOW PROJECTIONS

The first step in defining wastewater treatment needs is to determine future wastewater flows to be treated. The assessment of flows for the cities included an examination of historic wastewater quantities, as well as an estimate of future flows and loads based on population projections as the increase in future flow correlates to population growth. Following are the assumptions used in calculating the future wastewater flows:

- For the subdivisions, the LUE (Living Unit Equivalent) was assumed to be 2.5 (Source: U.S Census Data for Calhoun County) person per lot; and
- Wastewater production rate was assumed to 100 gallon per capita per day (gpcd).

Hence, for the cities, the population growth and per capita demand were used to calculate the future flow. For the subdivisions, number of lots, where one lot is equivalent to one LUE and per capita demand were used to calculate the future flows. For the detailed calculations, refer to **Appendix B**.

3.6.1 Area 1A (Port Lavaca) & Area 1B (Point Comfort)

The comparison of future flows for the City of Point Comfort with and without including the flow from the subdivisions of concern is provided in **Figure 3-7**. The flow from the subdivisions in 2010 is based on the existing number of lots. In years beyond 2010, growth rate in these subdivisions is assumed to be similar to the City itself. The calculated data is presented in **Table 3-7**. Including the flow from all subdivisions of concern at the Point Comfort plant only brings the total flow to 80% of the plant's permitted flow. The ability of the Point Comfort plant to accept flows from subdivisions of concern is important in developing collection/treatment options for this area.

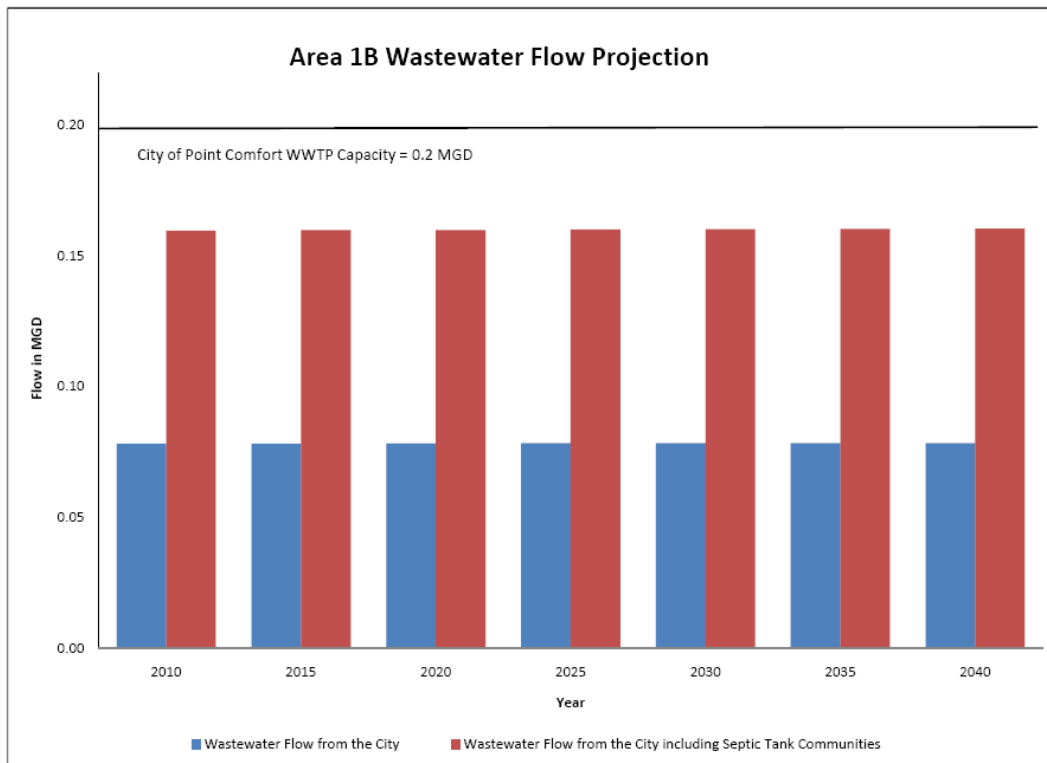


Figure 3-7 Wastewater Flow Projections for City of Point Comfort without and with the flow from Subdivisions of Concern

Table 3-7 Area 1B Flow Data - (Point Comfort)

Entity	Wastewater Flow in MGD						
	2010	2015	2020	2025	2030	2035	2040
Point Comfort	0.08	0.08	0.08	0.08	0.08	0.08	0.08
Flow from Septic Tank Communities*	0.08	0.08	0.08	0.08	0.08	0.08	0.08
Total Average Flow	0.16	0.16	0.16	0.16	0.16	0.16	0.16
Total Peak Flow	0.64	0.64	0.64	0.64	0.64	0.64	0.64

*Includes a Church, 2015 - 2040 values are summation of flow from Septic Tank Communities with the corresponding Point Comfort Flow

The comparison for future flows for the City of Port Lavaca with and without including the flow from the subdivisions of concern is provided in **Figure 3-8**. The flow from the subdivisions in 2010 is based on the existing number of lots. Beyond year 2010, it is assumed that the subdivisions have similar growth rate as the City itself. The calculated data is presented in **Table 3-8**. Including the

Section 3: Existing Wastewater Facilities

flow from all subdivisions of concern at the Port Lavaca plant only brings the total flow to 71% of the plant's permitted flow. The ability of the Port Lavaca plant to accept flows from subdivisions of concern is important in developing collection/treatment options for this area.

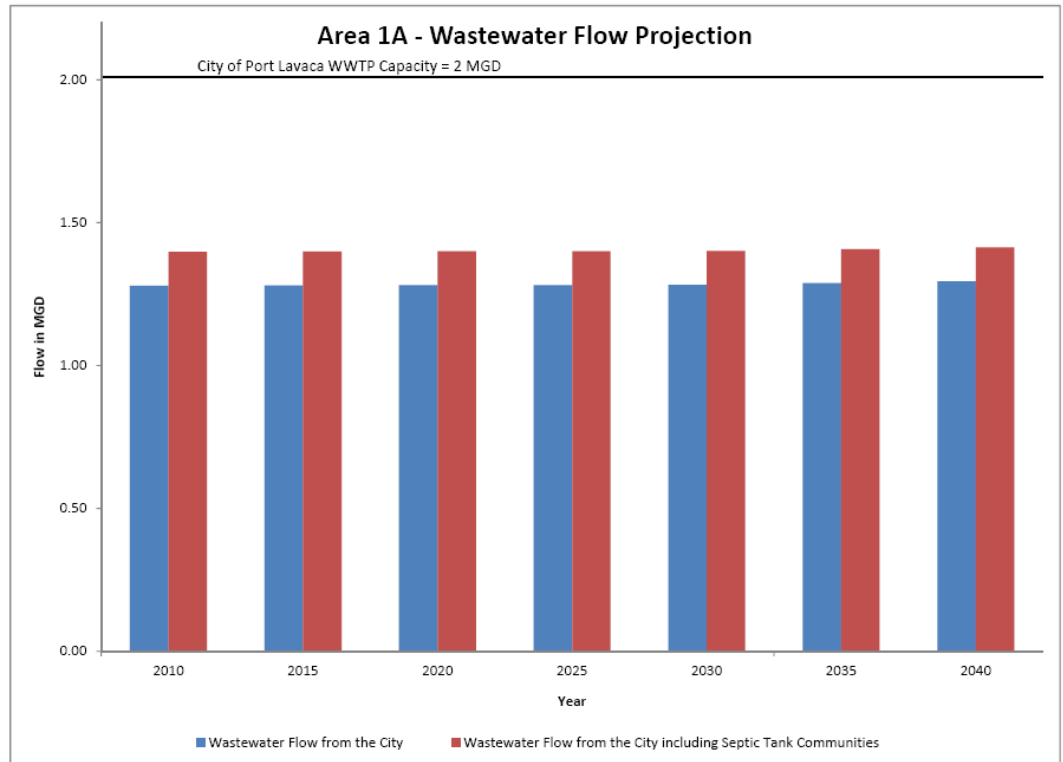


Figure 3-8 Wastewater Flow Projections for City of Port Lavaca without and with the flow from Subdivisions of Concern

Table 3-8 Area 1A - Flow Data (Port Lavaca)

Entity	Wastewater Flow in MGD						
	2010	2015	2020	2025	2030	2035	2040
Port Lavaca	1.28	1.28	1.28	1.28	1.28	1.29	1.30
Flow from Septic Tank Communities*	0.12	0.12	0.12	0.12	0.12	0.12	0.12
Total Average Flow	1.40	1.40	1.40	1.40	1.40	1.41	1.41
Peak Flows	5.59	5.60	5.60	5.60	5.60	5.63	5.66

* Includes the Hatch Bend Golf Course

3.6.2 Area 2 (Seadrift & Port O'Connor MUD)

The comparison for future flows for the City of Seadrift with and without including the flow from the proposed subdivisions is provided in **Figure 3-9**. The flow from the subdivisions in 2010 is based on the existing number of lots. Beyond 2010, the subdivisions are assumed to have linear growth until 50% development by the year 2040. The calculated data is presented in **Table 3-9**.

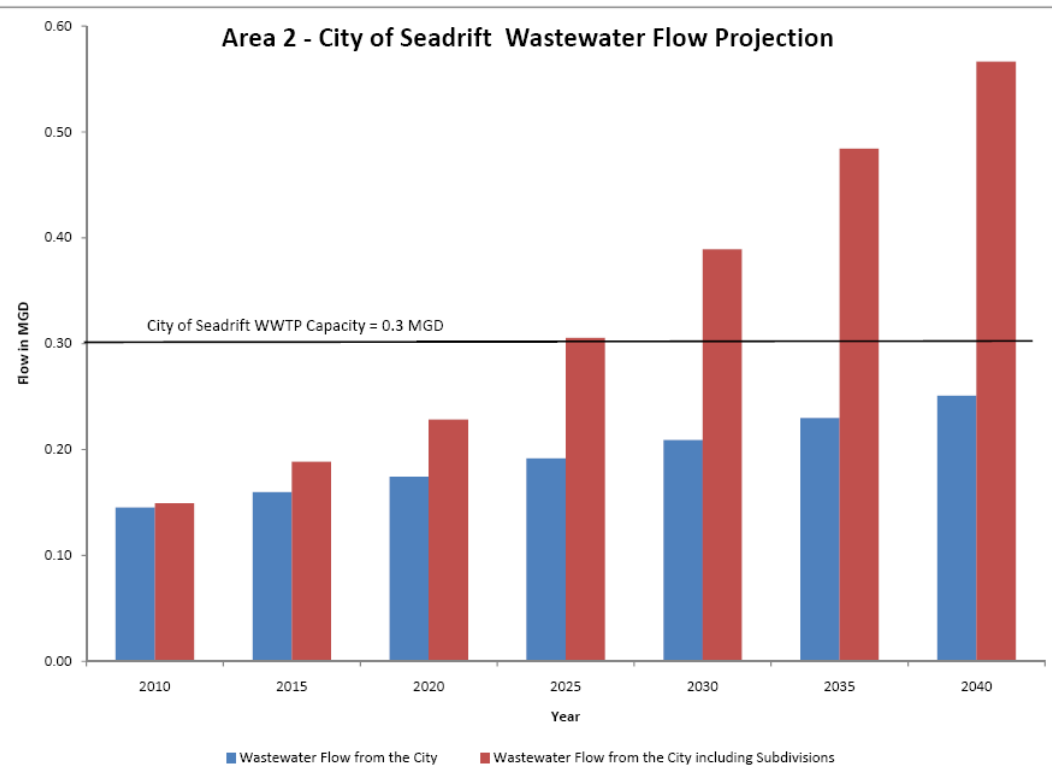


Figure 3-9 Wastewater Flow Projections for City of Seadrift without and with the flow from Proposed Subdivisions

The flows from the proposed development in the vicinity of Seadrift will exceed the permitted capacity of the existing plant. The fact that flows from the proposed developments will exceed the existing plant's capacity is important in developing collection/treatment options for this area.

The comparison for future flows for the Port O'Connor MUD with and without including the flow from the proposed subdivisions is provided in **Figure 3-10**. The flow from the subdivisions in 2010 is based on the existing number of lots. Beyond 2010, the subdivisions are assumed to

have linear growth until 50% development by the year 2040. The calculated data is presented in **Table 3-9**.

Table 3-9 Area 2 - Flow Data (Seadrift & Port O'Connor)

Entity	Wastewater Flow in MGD						
	2010	2015	2020	2025	2030	2035	2040
Seadrift	0.15	0.16	0.17	0.19	0.21	0.23	0.25
Flow from Subdivisions to Seadrift	0.00	0.03	0.05	0.11	0.18	0.25	0.32
Total Average Flow	0.15	0.19	0.23	0.31	0.39	0.48	0.57
Total Peak Flow	0.60	0.75	0.91	1.22	1.56	1.94	2.27

Entity	Wastewater Flow in MGD						
	2010	2015	2020	2025	2030	2035	2040
Port O'Connor	0.31	0.32	0.32	0.32	0.33	0.33	0.34
Flow from Subdivisions to Port O'Connor	0.00	0.21	0.43	0.63	0.90	1.11	1.37
Total Average Flow	0.31	0.53	0.74	0.95	1.23	1.44	1.71
Total Peak Flow	1.26	2.12	2.98	3.81	4.91	5.76	6.83

The flows from the proposed development in the vicinity of Port O'Connor MUD will exceed the permitted capacity of the existing plant. The fact that flows from the proposed developments will exceed the existing plant's capacity is important in developing collection/treatment options for this area.

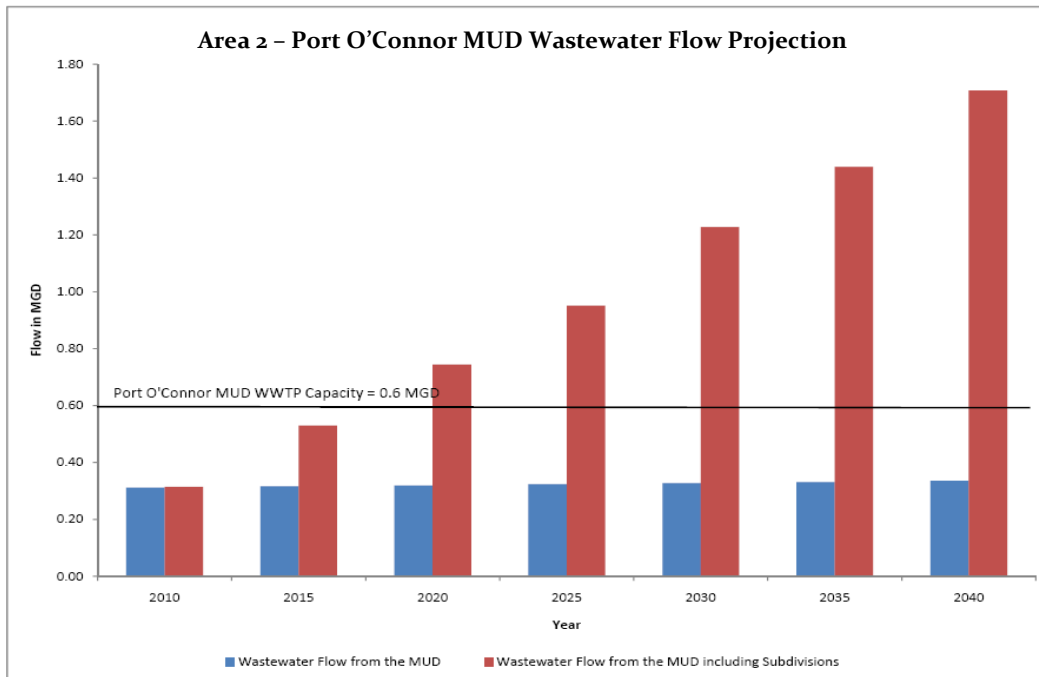


Figure 3-10 Wastewater Flow Projections for Port O'Connor MUD without and with the flow from Proposed Subdivisions

SECTION 4: DEVELOPMENT OF ALTERNATIVES

Section 4

4.1 COLLECTION AND TREATMENT ALTERNATIVES

Several wastewater collection alternatives were evaluated for the areas in Calhoun County, which currently are not served by a public wastewater collection system. Several factors were considered when identifying wastewater collection alternatives for providing new wastewater service to the un-served area. For wastewater service, one component is the consideration of conveyance/collection. Several alternatives of different technological and economic complexities are available for providing wastewater service to the area. The collection alternatives considered for this project are described herein.

4.1.1 Collection Alternatives

4.1.1.1 Gravity Sewer

A gravity sewer system is one that collects wastewater from connections (like homes and businesses) and gradually combines it into larger and larger pipes until it reaches its destination, all by gravity flow. When the destination cannot be reached by gravity alone, lift stations are constructed to allow the wastewater to continue on by gravity to the next destination without requiring deep trenching for pipe. Eventually, the wastewater is either collected and pumped through a force main to a wastewater treatment plant or is lifted a final time and allowed to flow through a wastewater treatment plant by gravity.

Gravity sewers are the most common wastewater collection system found in the United States. It is important to design them with a minimum and maximum slope in the appropriate range to ensure that solids are not settled out. It is also important to do soil borings to determine what the maximum acceptable depth for burial is constructible and cost-effective. See **Figure 4-1**.

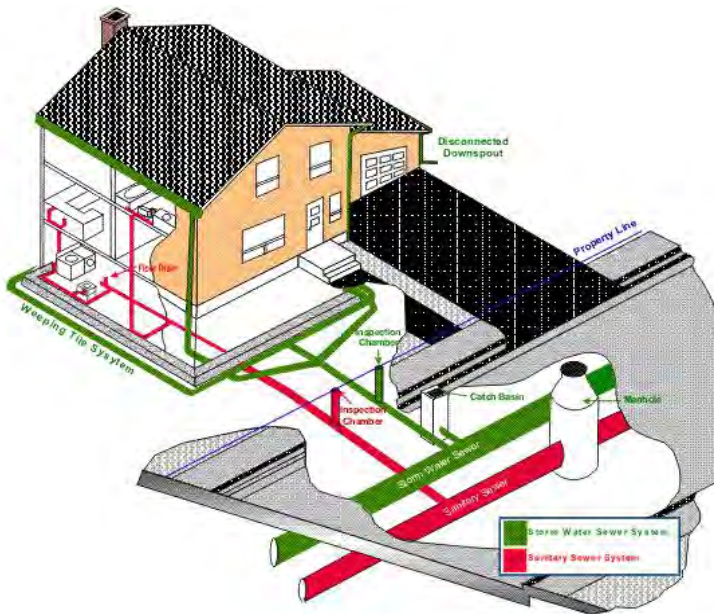


Figure 4-1 Gravity Sewer System (Source: City of Surrey)

4.1.1.2 Vacuum Sewer

A vacuum sewer system is a sewer system where wastewater flows by gravity from homes to a holding tank known as a valve pit. When the wastewater level reaches a certain level, sensors within the holding tank open a vacuum valve that allows the contents of the tank to be sucked into the network of vacuum sewer collection piping.

The vacuum or draw within the collection system is created at a vacuum station. A vacuum station consists of vacuum pumps, wastewater pumps, a collection tank, and a control panel. The vacuum pumps provide the suction to transport the sewage from each valve pit to the vacuum station, and the wastewater pumps transfer the sewage from the collection tanks to a force main for transport to the ultimate treatment or disposal destination.

Vacuum sewers were only introduced in the United States in the last 30 years and are, in general, considered as an alternative to gravity sewers when circumstances make gravity sewers impractical. It is generally recommended that there be at least 75 properties per pump station for the use of a vacuum sewer system to be cost effective. This minimum property requirement tends to make vacuum sewers most conducive for

small communities with a relatively high density of properties per acre.
(See Figure 4-2)

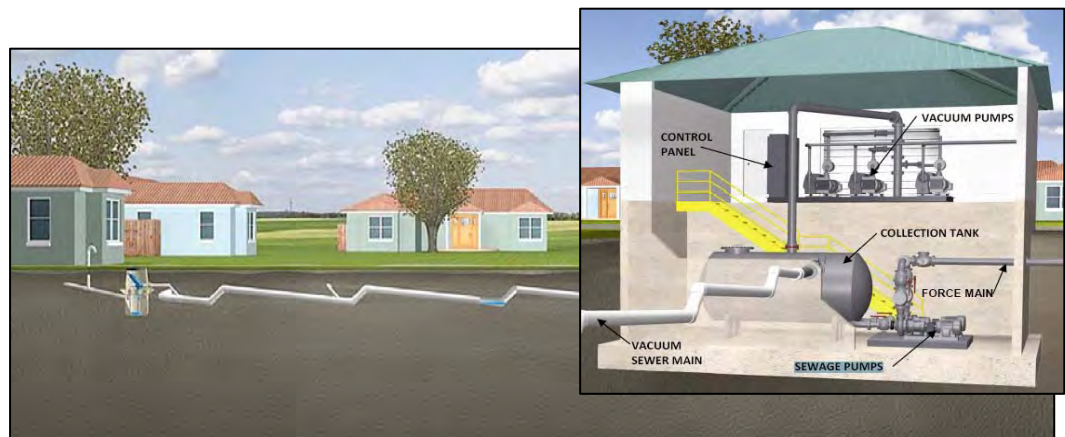


Figure 4-2 Vacuum Sewer (Source: Demi John Report by CDM INC)

4.1.1.3 Pressure Sewer

The keys to understanding the differences between conventional gravity sewer systems and pressure sewer systems are the piping network and the reduction of solids size in the wastewater. Pressure sewer systems (See Figure 4-3) use grinder type pumps located at each residence, to

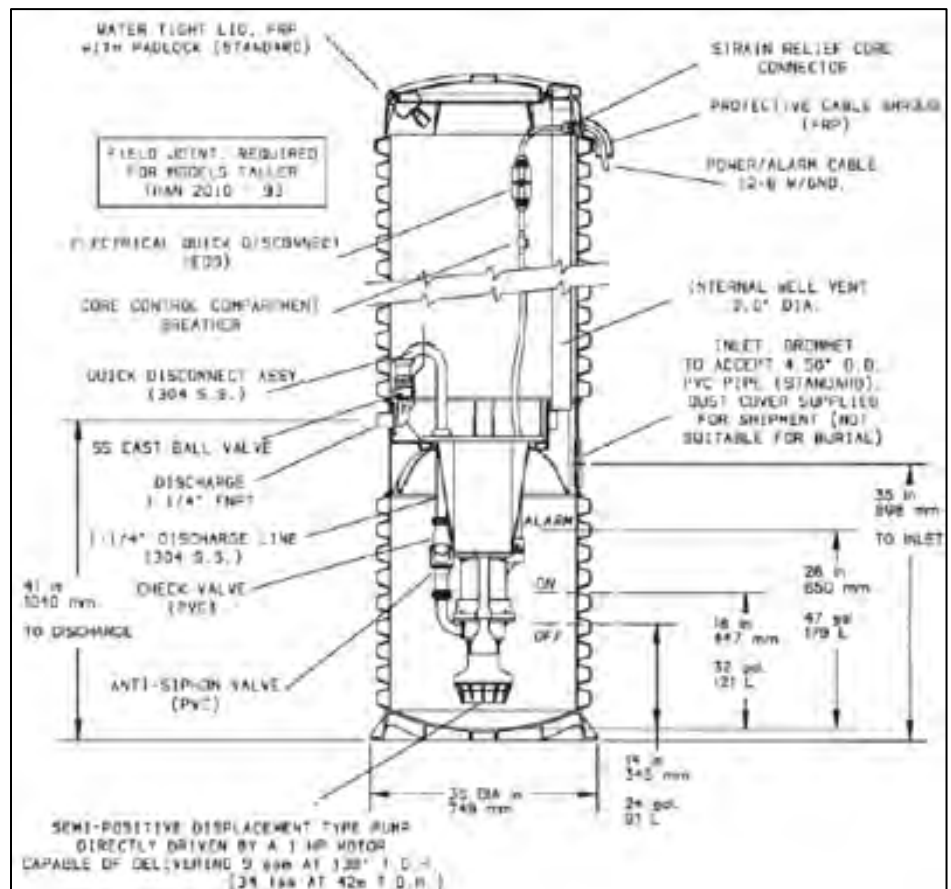


Figure 4-3 Pressure Sewer

reduce the solids present to particles, which can easily be moved through small diameter pipes. The grinder pumps pump the wastewater with reduced particle size in a network of pipes that deliver the flow to a local, package WWTP or to a conventional lift station for conveyance to a regional treatment facility. Because of smaller pipes and because the flow is pumped and the lines do not have to be installed at a constant down gradient, these systems are typically the least expensive organized collection system.

4.1.1.4 OSSF (On-Site Septic System)

As an alternative to organized collection systems, all houses built in the future on vacant lots could continue to use their own approved systems. Historically in Calhoun County, septic systems have been used, but more recent developments using OSSFs have opted to use aerobic systems.

According to EPA "adequately managed decentralized wastewater systems [e.g. septic tanks] are a cost-effective and long-term option for meeting public health and water quality goals, particularly in less densely populated areas." (EPA Report to Congress, 1997). See **Figure 4-4** for a schematic of an OSSF attached to a residence.



Figure 4-4 OSSF

However, the soils in Calhoun County are not ideal for the use of septic systems. The new systems that would be used in Calhoun County would be typically aerobic systems. An aerobic system uses a mechanism to

inject air into a tank which encourages biological decomposition that produces a higher quality effluent than septic tanks. Aerobic systems typically include pretreatment to reduce the amount of clogging solids, an aeration process, settling of suspended solids and disinfection. The effluent from aerobic systems can be disposed off in a drain field similar to a septic tank, but typically the effluent is disposed of by surface irrigation or low pressure dosing.

4.1.2 Treatment Alternatives

CDM analyzed two options for treating the collected wastewater; either conveying the sewage to a neighboring community wastewater treatment facility or building a new package type treatment facility nearby. A package plant is a pre-engineered and usually prefabricated wastewater treatment plant, scaled to meet the appropriate flows and treatment requirements of a particular wastewater source and effluent requirements. The pieces of the treatment process are trucked to the treatment site and quickly assembled.

The wastewater flows through a bar screen to remove large solids then into an aeration basin, where oxygen is added to promote growth of the microorganisms. From the aeration basin, the mixed liquor flows to a clarifier. The settled solids are returned to the aeration basin. Wasted activated sludge is sent to the digesters or removed from the plant. The clear liquid that overflows the clarifier and drains to the chlorine contact tank is chlorinated (and dechlorinated if required by permit) before being discharged. The TAC rules require that wastewater treatment plants will discharge treated effluent in compliance with its discharge permit at all times. To meet such requirements, sufficient redundancy is required among the wastewater treatment elements.

The Texas Administration Code (TAC) rules specify the design capacity of a wastewater treatment plant must be based on selected daily wastewater flow (gallons/person) and strength (mg/l BOD₅). The selection of design criteria can be based on historical records of water consumption, wastewater flow measurements and testing. When such records are not available, the TAC Rule 217.32(a)(3), Table B.1 specifies for municipality residential wastewater dischargers, 75-100 gallon/person and 200-350 mg/l BOD₅ can be used to estimate daily flow and wastewater strength respectively. The quantity and strength of wastewater flow discharged from a household depends closely on the supply of drinking water and the life style of the residents.

4.2 ADVANTAGES AND DISADVANTAGES OF COLLECTION AND TREATMENT ALTERNATIVES

4.2.1 Gravity Sewer

Advantages of a gravity wastewater collection system are discussed below.

- It is a proven, effective and widely used system for collecting wastewater from households and commercial facilities.
- It does not require individual resident's attention and maintenance effort.
- A properly designed system is usually forgiving as it is usually designed with a safety factor to provide cushioning capacity.
- Being buried deeper in the ground it does not require special means of protection for traffic loads and reduces conflict with other underground utilities.
- Access for maintenance is relatively easy.
- For a properly designed system, required routine maintenance is infrequent.
- The possibility of contaminating potable water mains by leaking wastewater from the system is less than pressure sewer system as gravity sewer lines are required to be buried lower than the water mains.
- There will be no specific odor control stations along the sewer mains to deal with odorous air released from air release valves.

Disadvantages of the gravity wastewater collection system are as follows:

- High ground water renders high construction costs from deeper trenching and the requirements of dewatering, trench shoring, etc.
- The possible infiltration and inflow (I&I) quantity from leaking joints is higher than a pressurized system in Calhoun County's high ground water table conditions.
- Pump stations installed deeper than 10 feet could require significant additional costs, for example, for dewatering and sheet piling during construction.

- The wastewater collection mains must be installed precisely to the specified slope in order to provide a minimum solids carrying velocity. As such it will take high effort and skill during construction.

4.2.2 Vacuum Sewer

A vacuum sewer system claims the following benefits over gravity sewer collection systems:

- Vacuum sewers have less I/I problems than do gravity sewer systems, resulting in less demand on the downstream wastewater treatment facility.
- Vacuum sewers are installed at shallower depths than gravity sewers, making future connections and repairs easier than deeply trenched gravity sewers.
- Vacuum sewers generate fewer odors than gravity sewers since no manholes or other openings exist within a vacuum collection system.
- Vacuum mains are significantly smaller than gravity mains, which result in decreased excavation costs.
- Vacuum stations provide a clean place for operators to work as all the wastewater is completely contained.

On the other hand, installation of a vacuum sewer system generates the following concerns:

- The maintenance and operation of this system requires a system operator with the necessary training. This can make the operation and maintenance costs of vacuum sewers exceed those of other systems.
- Vacuum sewer systems require valve pits, which will be owned and operated by the utility company, to be installed on the homeowner's private property. The utility company will require access to the homeowner's property to maintain the valve pits, which may cause problems.

Vacuum sewer systems have gained more popularity in recent years. Its use in southeast Texas is limited. However, the wastewater collection system installed at the Sanctuary Development near Port O'Connor is a vacuum sewer system.

4.2.3 Pressure Sewer

Summary of advantages of a pressure sewer system are as follows:

- Conveying pipe diameters of a pressure system are usually smaller than a gravity system as higher flow velocity could be designed into the system easily.

- Pressure pipes have no slope requirements and can be buried shallower and above the high ground water in Calhoun County. However, high points should be minimized to reduce the need of air release valves.
- System clogging probability is lower as wastewater solids will be ground into smaller pieces.
- A maintenance shop can be set up easily to keep all individual grinder pumps going without prolonged delay.
- Individual small pump maintenance is easier than heavier equipment and higher horsepower pump maintenance. There will be no hoisting or special tools required.
- I&I will not be a factor. It will reduce eventual centralized pumping to the treatment facility.
- Using pressure sewer system also reduces burial depth of pipes. Also this type of sewer system does not require the saw tooth profile and can be easily placed under large drainage ditches and creeks.

Summary of disadvantages of a pressure system are as follows:

- There will be a lot of grinder pump stations to care for at build out instead of just one centralized pump station.
- Properly located air release valves throughout the system are necessary to avoid air traps that could reduce system capacity.
- Odor control stations will be required to process odorous air released by air release valves.
- Homeowners will need to change household practices in flushing sand and hard debris into their drains to avoid damaging the grinder pump rotating cores.
- Because of the small collection pipe sizes, interior inspection for damages will not be easy.
- Damaged force mains will release wastewater out of the pipe and potentially will contaminate ground water.
- Separation from drinking water supply lines must be done according to regulations without exceptions. As such there might be more conflicts with existing utilities in the ground.

4.2.4 Package Treatment Plants

There are several advantages with constructing a package wastewater treatment plant. They are easy to design based on flows and treatment

objectives. There are similar facilities throughout the area so proper maintenance is well-known. Treatment can also be adjusted based on changing influent conditions so that there is some flexibility in the process. The disadvantages are that the facility is larger than a simple pump station and the facility would be easily visible. Also, this alternative requires a part-time operator to make daily visits to the facility to monitor the facility and take appropriate readings and samples.

- It will avoid pumping the collected wastewater flow over long distances to a remote wastewater treatment facility.
- This will avoid constructing a high horsepower transfer pump station.
- Effluent can be recycled locally, when there is a need.

The following is a summary of disadvantages of package wastewater treatment plant for communities of interest:

- It is a facility that requires constant attention in permit compliance management (testing, recording, reporting to name a few), proper operations, maintenance and security, even though it will be on a part time basis for each effort. However, when all efforts were to be provided by one person, it would be a full time job.
- The processing cost per gallon will be higher than a larger collective wastewater treatment facility.
- The construction cost per gallon will be higher than a larger collective wastewater treatment facility
- Potential discharge violation penalties from exceeding BOD and TSS concentration limits and chlorine residual.

4.2.5 Pumping to a Regional Treatment Plant

This treatment option will require all of the wastewater to be collected at a common point and then pumped the over a long distance to the nearest wastewater treatment plant. The treatment plant will charge the new customers a fee to treat their wastewater. One of the pumping options is the use of a packaged lift station. Pumping the collected wastewater to a regional treatment facility will eliminate the need of a new local treatment site. However, the force main will require space in the right of way. This option will have more construction than the local treatment alternatives due to the length of the pipeline required to reach the WWTP.

Summary of advantages from pumping wastewater to a regional WWTP are:

- The site/land to be purchased for the pump station will be much smaller than a treatment plant.
- No operation permit will be required. As a result, no permit compliance management will be necessary.
- The operation and maintenance of the pump station will be limited to a small electrical panel and two submersible pumps.
- The operation cost for the pump station will be much less than a package treatment plant.
- The operation and maintenance of the pump station and the force main could be contracted to the WWTP for their services. This will provide the public utility services similar to many other small communities and release the community from being concerned about their operation and maintenance. Paying monthly fees is no different from paying other utilities.

Summary of disadvantages for pumping wastewater to a regional WWTP:

- Due to the long conveyance distance and the low pumping quantity, wastewater could remain in the force main for several days. As a result hydrogen sulfide could increase and be trapped in the wastewater flow. The trapped hydrogen sulfide will be released as the pumped flow discharges into the headworks of the receiving WWTP. As a result, an odor control process may need to be added to the receiving WWTP, which could add cost to the option.
- Long force mains include the risk of shutting down the pumping system temporarily due to force main damages. Quick emergency response is required.
- Remote lift stations must be properly secured from being vandalized as shutting down the pump station for a prolonged period will paralyze the community.

4.3 DEVELOPMENT AND DESCRIPTION OF INITIAL ALTERNATIVES

The study area which comprises all of Calhoun County was divided into four major areas for development and evaluation of alternatives as shown in **Figure 4-5**. Full size maps of the study area and the different areas can be found in **Appendix C**.

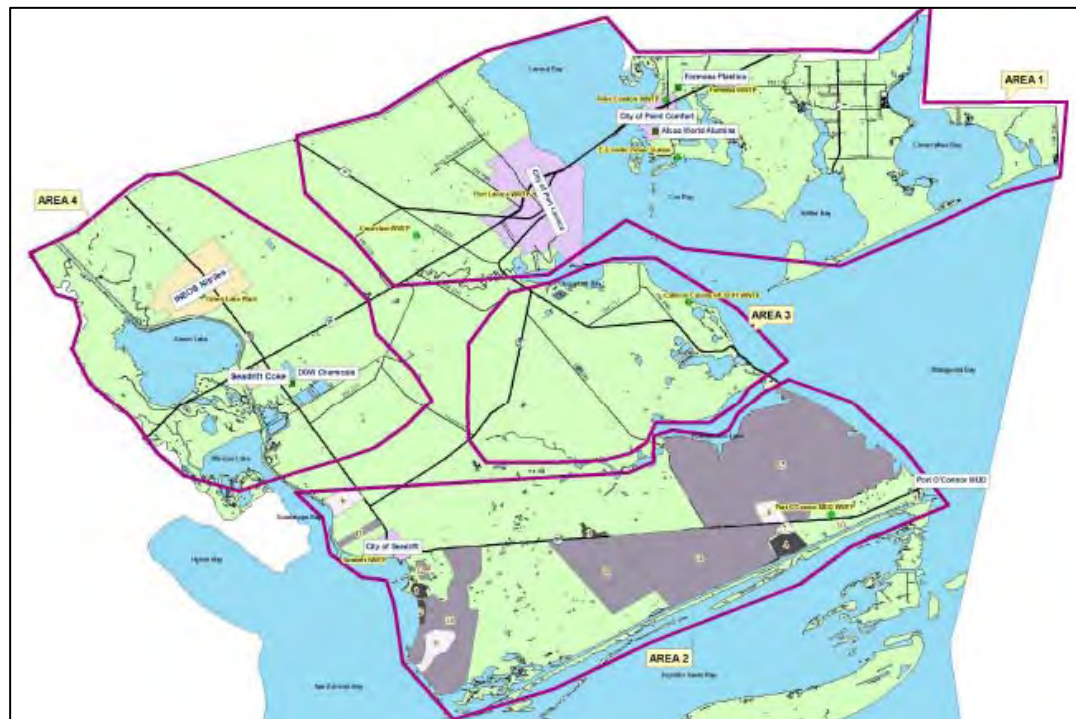


Figure 4-5 Overview Map of Study Area

Area 1 (See Figure 4-6) comprises City of Port Lavaca, City of Point Comfort and corresponding subdivisions of concern. For the study, based on the geographical constraints, Area 1 was divided into Area 1A and Area 1B.

4.3.1 Area 1A

Study Area 1A includes the City of Port Lavaca and the surrounding subdivisions of concern.

The various options considered for providing wastewater services in Area 1A are:

1. City of Port Lavaca provides wastewater service to all the subdivisions of concern.
2. Install package plants in each subdivision of concern.
3. Install a package plant to serve Royal Estates, Shoreline Acres, Bay Meadows and Six Mile Area.
4. Crestview WWTP extends service to Meadowbrook Park, Bowman, Hackberry Junction and Matson Subdivision.
5. Pump effluent from City of Port Lavaca WWTP to Formosa/Alcoa for reuse.

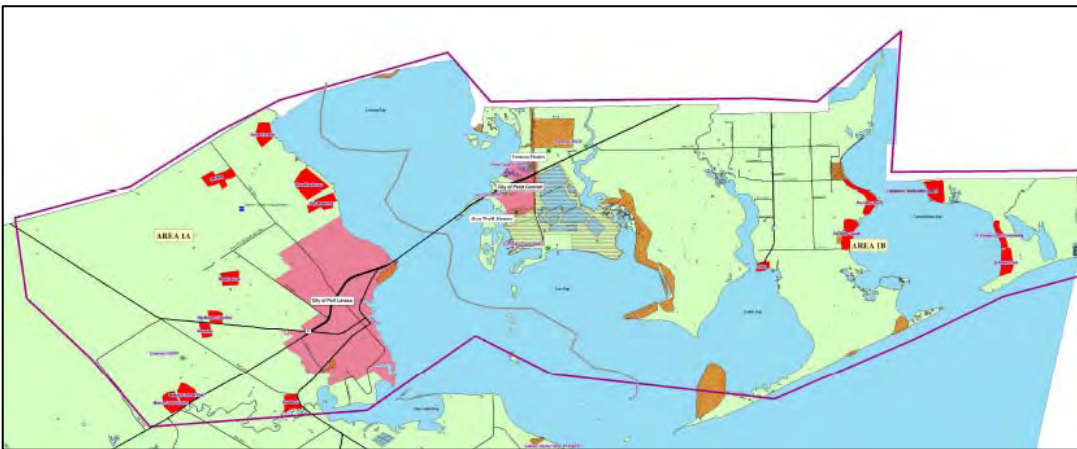


Figure 4-6 Overview Map of Area 1

4.3.2 Area 1B

Study Area 1B includes the City of Point Comfort, and surrounding subdivisions of concern, and the industries of Alcoa and Formosa plastics.

The various options considered for providing wastewater services in Area 1B are:

1. City of Point Comfort provides wastewater service to all subdivisions of concern.
2. Install package plants in each subdivision of concern.
3. Two regional WWTPs to serve the subdivisions on either side of Keller Bay (One to serve the subdivisions of Olivia, Port Alto South and Port Alto North and the other to serve the subdivisions of Schicke Point, El Campo Beach, Campbell Beach and Carancahua Beach).

4.3.3 Area 2

Area 2 (See Figure 4-7) includes the City of Seadrift, Port O'Connor MUD and current/potential/planned subdivisions between the City of Seadrift and Port O'Connor MUD.

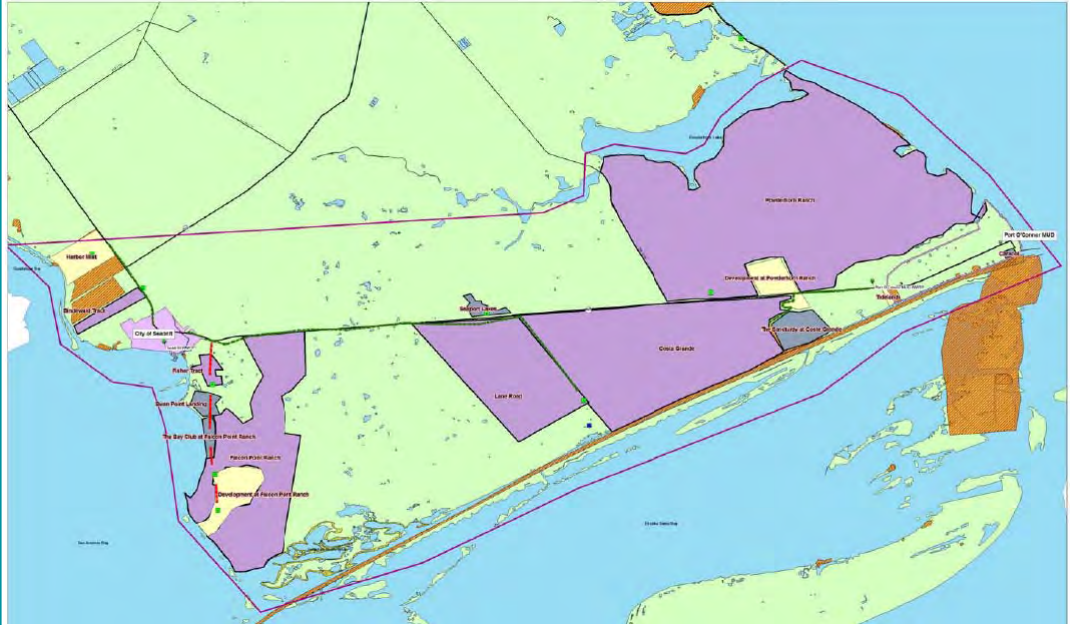


Figure 4-7 Overview Map of Area 2

The various options considered for Area 2 are:

1. Each subdivision permits, builds and operates its own package WWTP.
2. City of Seadrift serves Swan Point Landing and Lane Road development and other developments north and south on highway 185 and to the east of Lane Road development.
3. Port O' Connor MUD extends wastewater service west along highway 185 to the Sanctuary, Powderhorn Ranch, Costa Grande development and others.

4.3.4 Area 3

Area 3 (See Figure 4-8) includes the subdivisions in between City of Port Lavaca and Port O'Connor MUD namely Magnolia Beach, Alamo Beach, Baypoint and Indianola.

The various options considered for Area 3 are:

1. Each subdivision permits, builds and operates its own WWTP.
2. Southern Calhoun County WCID No.1 WWTP expands its system to serve Indianola, Alamo Beach, Baypoint Subdivision and other nearby OSSF systems.

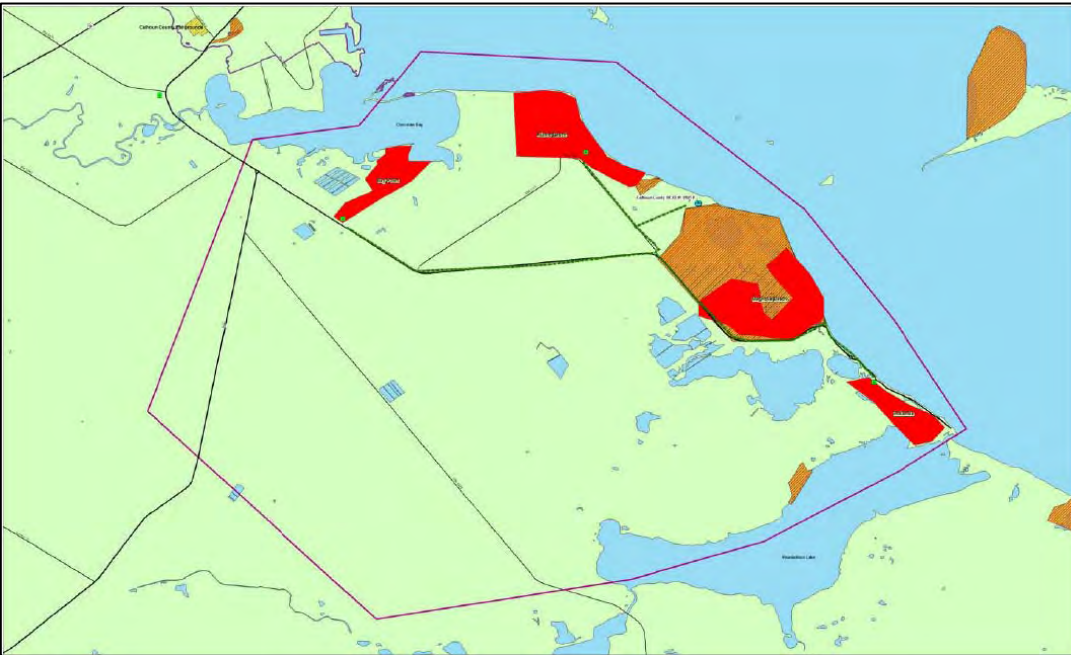


Figure 4-8 Overview Map of Area 3

4.3.5 Area 4

Area 4 (See Figure 4-9) includes the industries of DOW Chemicals, INEOS Nitriles and Seadrift Coke.

The various options considered for Area 4 are:

1. Construct small package plant to provide centralized wastewater service to 300 acre site adjacent to INEOS Nitriles.
2. Seadrift Coke and DOW Chemical receive treated effluent for reuse from City of Seadrift and new INEOS Nitriles package plant.

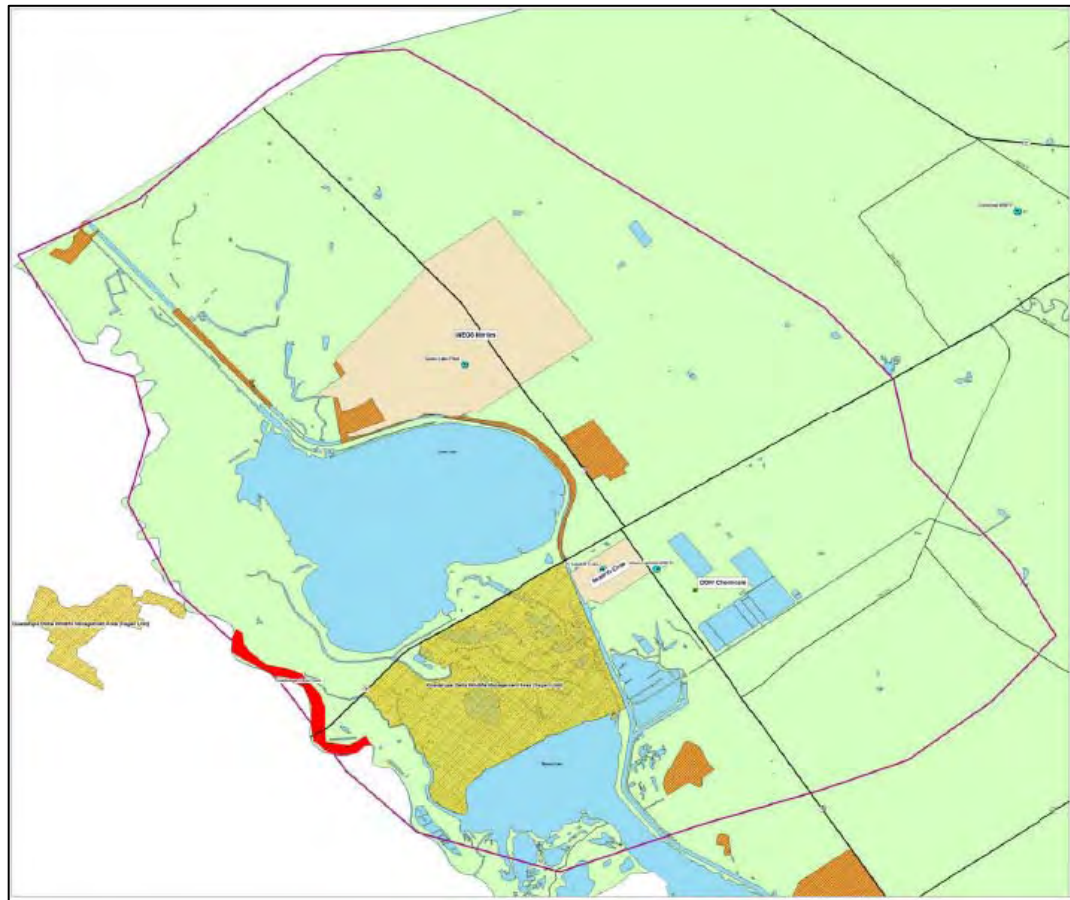


Figure 4-9 Overview Map of Area 4

4.4 ADVANTAGES AND DISADVANTAGES OF INITIAL ALTERNATIVES

A meeting was held on February 10, 2011 to present the preliminary alternative to the participants in a workshop setting. The alternatives were presented and discussed in breakout sessions for each area. Based on the feedback that was obtained from the participants, the alternatives in each area were either limited or expanded. A summary of the results of this workshop are presented below.

4.4.1 Area 1

All the options for Area 1 would address the concerns of the subdivisions which are on failing OSSFs. These options would prevent accidental discharge of wastewater, wastewater pooling and eliminate odor problems. Moreover, the possibility of the public being exposed to raw sewage as a result of a leak from OSSFs is potentially eliminated.

The subdivisions of Campbell Beach, Carancahua Beach, El Campo Club and Schicke point are located far from the City of Point Comfort service area and are also separated by the Keller Bay from the rest of the County. Hence, the conveyance of wastewater to a regional WWTP or to the City of Point Comfort WWTP would be cost prohibitive. Further consideration of these subdivisions was not recommended by the breakout group.

The option of providing effluent for reuse from the City of Port Lavaca WWTP to the industries near City of Point Comfort will potentially include directional drilling under Lavaca Bay which could potentially have other environmental and cost concerns associated with it.

4.4.2 Area 2

All options proposed for Area 2 provide wastewater service to the current, planned and potential subdivisions, which would promote population growth in the southern Calhoun County.

4.4.3 Area 3

All the options for Area 3 would address the concerns of the subdivisions which are on OSSFs. These options would prevent accidental discharge of wastewater, wastewater pooling and eliminate odor problems. Moreover, the possibility of the public being exposed to raw sewage as a result of a leak from OSSFs is potentially eliminated.

All options proposed for Area 3 provide wastewater service to the potential Baypoint subdivision, which would promote population growth in the area.

4.5 SCREENING OF INITIAL ALTERNATIVES

Based on the evaluation of initial alternatives, the following changes were made to the proposed options:

- The subdivisions of Campbell Beach, Carancahua Beach, El Campo Club and Schicke point were removed from the Area 1B study area.
- An option of sending the excess effluent from the City of Port Lavaca for reuse to DOW/INEOS Nitriles was added to be evaluated.
- The option of sending the excess effluent from City of Seadrift WWTP to Seadrift Coke and DOW Chemical for reuse was eliminated. It was determined that a more feasible alternative would be to send effluent from City of Port Lavaca WWTP for reuse.

- The evaluation of the INEOS 300 acre site was not possible because there was little information provided on the proposed concept for the development of this site. If the site is developed for an industrial use, the quality and volume wastewater produced would be highly dependent on the type of industry and without specific knowledge of industrial user, developing a wastewater plan would be meaningless. If the 300 acre site is developed for residential uses, the cost for developing a wastewater system would be similar to the cost for the developments in Area 2 using Option 2 (separate package plant for each development).

4.6 REGIONAL ALTERNATIVES SELECTED FOR DETAILED EVALUATION

4.6.1 Area 1A & 1B

The alternatives developed for the various entities in Area 1 and subdivisions of concern are listed below:

- City of Port Lavaca provides wastewater service to Royal Estates, Shoreline Acres, Bay Meadows, Double D, Shady Acres, Meadow Brook Park, Bowman, Hackberry Junction, Matson Subdivision and Six Mile Area.
- Installing a package plant for each subdivisions of concern in both Area 1A and 1B.
- Install small package plant to serve Royal Estates, Shoreline Acres, Bay Meadows & Six Mile Area/ Crestview WWTP extend service to Meadow Brook Park, Bowman, Hackberry Junction & Matson Subdivision.
- Install package plant to serve Olivia, Port Alto WSC subdivisions.
- City of Point Comfort provide centralized wastewater service to Port Alto WSC, Olivia and other developments in the area.
- Formosa Plastics and Alcoa receive treated effluent/reuse from Cities of Point Comfort and Port Lavaca.

4.6.2 Area 2

- City of Seadrift serve Swan Point Landing, Falcon Point and others located in close proximity. Port O'Connor MUD extend wastewater service west along Highway 185 to Lane Road, Sanctuary, Powderhorn Ranch and Costa Grande.
- City of Seadrift and Port O'Connor MUD provide wastewater service to their existing areas; install package plant near Lane Road Development to serve development to serve developments along Highway 185.

4.6.3 Area 3

- Southern Calhoun County WCID No. 1 WWTP expand its system to serve Indianola, Alamo Beach, Baypoint Subdivision and other area on septic systems along with the existing service area of Magnolia beach.

4.6.4 Area 4

- Seadrift Coke and DOW Chemical receive treated effluent/reuse from City of Port Lavaca.

4.7 EFFLUENT REUSE EVALUATION

4.7.1 Industrial Effluent Reuse

Effluent discharged from industries are eligible for “authorization for reuse” as reclaimed water, if the effluent satisfies special requirements specified in 30 TAC 210 Subchapter E. There are a few Standard Industrial Classification (SIC) codes under 30 TAC §210.54 that are not eligible for authorization under this subchapter regardless of effluent quality or end use. The SIC codes that are not eligible for 210 authorization and are pertinent to industries involved in this study are listed below:

- Gum and wood chemical manufacturing
- Steam electric power generating and
- Mineral mining and processing

Discharges from Formosa LLC, Alcoa and Ineos Nitriles, associated with sources classified under the above mentioned SIC codes are not eligible for reuse authorization. The complete list of the prohibited SIC’s can be found in **Appendix D**.

The effluent from Seadrift Coke L.P. and DOW chemical’s (producer) is eligible for the 30 TAC 210 Subchapter E authorization. The producer is eligible for Level 1 authorization if the producer uses any of the following wastes on-site and has a primary disposal method as an alternate to reuse. The wastewater discharged from the industries with measured effluent concentration at or below threshold levels is as listed in **Table 4-1** would qualify for use as reclaimed water. For all other priority pollutants in 40 CFR Part 122 **Appendix D**, the threshold level is set at the Maximum Allowable Limits (MAL).

Table 4-1 Threshold Levels for Industrial Reclaimed Water
Threshold Levels for Industrial Reclaimed Water

Parameter	Threshold (mg/L)	MAL (mg/L)
Conventionals & Nonconventionals		
Oil & Grease	10	-
Total Dissolved Solids	2000	-
Nitrate Nitrogen	10	-
Metals		
Antimony	0.09	0.03
Arsenic	0.03	0.01
Barium	0.03	0.01
Beryllium	0.015	0.005
Cadmium	0.003	0.001
Copper	0.03	0.01
Lead	0.015	0.005
Manganese	0.05	-
Mercury	0.002	0.0002
Nickel	0.03	0.01
Selenium	0.03	0.01
Silver	0.06	0.002
Thallium	0.03	0.01
Zinc	0.015	0.005
Cyanide	0.2	-

The water needs and reuse needs for the various industries are discussed below.

4.7.2 DOW Seadrift

The Dow Seadrift facility (Dow) has significant potential to reduce water consumption if there is sufficient financial incentive. Any water reduction/reuse programs implemented would increase the water supply available to other users.

Dow uses incoming water for the following purposes:

1. Boilers;
2. Non-contact cooling water;
3. Pad washdown water;
4. Lavatories;
5. Firewater; and
6. Miscellaneous potable water needs.

Dow purchases source water from the GBRA. Incoming source water from the Guadalupe River via the Goff Bayou is pumped to either the boiler feed water basin or the cooling water basin. Water from the boiler feed basin is pre-treated prior to use in the boilers. Dow uses a cooling water system which cycles cooling water through heat exchangers and a series of ponds so that the water is used in multiple cooling steps. The cooling water is reported to have elevated hardness.

Table 4-2 shows the average daily water usage by Dow from 2007 through 2009 in million gallons per day (MGD).

Table 4-2: Average daily water usage at Dow Seadrift.

Year	Water Usage (MGD)
2007	10.0
2008	11.9
2009	11.8

Dow's purchased water cost in 2009 totaled approximately \$616,000, equating to a purchased cost of \$0.14 per thousand gallons. This cost does not reflect Dow's internal costs for labor and maintenance associated with treatment and handling of the incoming purchased water."

With the exception of the cooling water, waste streams at Dow are comingled prior to treatment. The comingled waste streams are treated through a series of ponds and constructed wetlands. Flow data for the treated wastewater effluent, which excludes the cooling water, are provided in **Table 4-3**. Plant data show no flow for 46 days in 2009. This lack of flow is attributed to drought conditions during which the flows of comingled waste streams entering the treatment ponds and wetlands were offset by evaporation.

Table 4-3 also shows discharge data for the cooling water. This waste stream is not treated prior to discharge. Average and median values for cooling water are based on reported average monthly data.

Table 4-3: Effluent flow data at Dow Seadrift.

		Flow (MGD)			
		Average	Median	Max	No. of Flow Measurements
Treated Effluent	2008	1.02	0.85	4.51	366
	2009	1.14	0.57	5.38	365
Cooling Water	2008	3.74	3.97	13.1	11
	2009	3.62	3.98	10.4	12
	2010	4.01	4.06	8.7	12

4.7.3 INEOS Nitriles

The INEOS Nitriles (INEOS) complex consists of approximately 4,000 acres, of which approximately 300 acres are available for development. This land could be used to store or treat reuse water. Additionally, INEOS could supply effluent to another facility for reuse.

INEOS purchases raw water from the Guadalupe-Blanco River Authority (GBRA). In 2010, average water usage was approximately 3 million gallons per day (MGD).

INEOS has three major discharge streams:

1. Plant process wastewater is discharged to deep wells;
2. Treated sanitary effluent and utility wastewater is discharged to the Victoria Barge Canal via Outfall 001; and
3. Stormwater runoff discharges from ponds through permitted outfalls.

From 2008 to 2010, the Outfall 001 discharges averaged approximately 0.5 million gallons per day (MGD).

4.7.4 FORMOSA

Formosa Plastics Corporation (Formosa) needs new water supplies to meet current water demand. Formosa also generates cooling tower blowdown which is available for use by Alcoa for dust suppression and process wastewater needs.

Formosa uses incoming water for the following purposes:

1. Boilers;
2. Cooling towers (non-contact cooling water);
3. Washdown water;
4. Lavatories;
5. Firewater; and
6. Various processing needs within the 16 on-site process units.

Source water from Lake Texana is purchased from the LNRA. Incoming water is directed to one of three raw water ponds. Raw Water Pond C is routed through potable water treatment and is used for lavatories, lunch rooms, and safety showers. Flows to this pond average approximately 120,000 gallons per day (gpd). Other facility water needs are provided from Raw Water Ponds A and B, with incoming average flows of approximately 29.4 million gallons per day (MGD) and 3.4 MGD, respectively. The total site water usage thus averages approximately 33 MGD.

Formosa is exploring the use of water from new sources to supplement existing water supplies. Wastewater streams discharged from Formosa are shown in **Table 4-4** with corresponding average flow rates. The biological treatment effluent includes a reported average stormwater contribution of 590,000 gpd.

Table 4-4: Wastewater Streams at Formosa Plastics Corporation

Wastewater Stream	Average Flow Rate (gpd)
Biological Treatment Effluent (Trains A and B)	4,300,000
Treated Groundwater from the VCM Process Unit	30,000
Cooling Tower Blowdown	1,200,000
Inorganic Waste Streams from Utilities and the IEM Process Unit	2,100,000
Sanitary Wastewater (Partial Flow) to the POTW	7,200
TOTAL	7,600,000

4.7.5 ALCOA

Alcoa Point Comfort Operations (Alcoa) is interested in source water for dust suppression and process water use. However, this water source is only needed during dry weather conditions. Alcoa receives water from three sources for its operations:

1. Groundwater wells supply potable water for drinking and lavatory use;
2. Water from Lavaca Bay is used for cooling water; and
3. Water from Cox Creek is used for process needs and for dust suppression. In 2010, Alcoa used approximately 454 million gallons of water from Cox Creek.

When the capacity of water flow from Cox Creek is insufficient, groundwater is used for dust suppression and process water to meet the fresh water demands of the facility.

4.7.6 SEADRIFT COKE L.P.

Seadrift Coke L.P. is interested in opportunities to reduce costs for purchasing water and opportunities to implement water reduction and recycle strategies.

Seadrift Coke L.P. uses incoming water for the following purposes:

1. Boilers;
2. Cooling towers (non-contact cooling water);
3. Washdown water;
4. Lavatories;
5. Firewater; and
6. Process quench water.

Seadrift Coke L.P. operates a groundwater well. The groundwater passes through a Reverse Osmosis (RO) unit and feeds the boilers.

Other water needs at Seadrift Coke L.P. are supplied by water purchased from GBRA which is stored in a raw water pond. This raw water is treated through clarification, sand filtration, and chlorination prior to use. Seadrift Coke L.P. average water consumption from the GBRA from March 2010 through February 2011 was approximately 325,000 gallons per day (gpd). Note that the groundwater well was not operational throughout the entire period, so typical daily usage with the well operational is expected to be lower.

Wastewater streams generated at Seadrift Coke L.P. are shown in **Table 4-5** with corresponding average flow rates.

Table 4-5: Wastewater Streams at Seadrift Coke L.P.

Wastewater Stream	Average Flow Rate (gpd)
Industrial Wastewater	110,000
RO Reject	52,000
Sanitary	20,000
Cooling Tower Blowdown	20,000
Fire Training Drainage	Varies
Stormwater	Varies
TOTAL (Dry Weather)	202,000

4.8 WATER CONSERVATION AND DROUGHT CONTINGENCY PLANS

Senate Bill 1 (SB-1), passed by the Texas Legislature in 1997, increased the number of entities required to submit water conservation and drought contingency plans. As part of a regionalization strategy, all involved entities would need to draft and adopt Water Conservation and Drought Contingency Plans under the conditions of SB-1. In addition, the TWDB requires project participants receiving grant funding through the Regional Water/Wastewater Facilities Planning Grant Program to prepare and implement water conservation and drought contingency plans. These plans must meet all minimum requirements outlined by the Texas Commission on Environmental Quality (TCEQ).

Many of the project participants currently using treated surface water already have water conservation and drought contingency plans in place. Sample templates for preparing water conservation and drought contingency plans are provided in **Appendix A** for reference. These templates were provided by the Texas Water Development Board and have been used by previous participants of TWDB planning studies as a guide.

SECTION 5: COST ESTIMATING PROCESS

Section 5

As part of the alternatives development, conceptual (planning level) cost estimates were developed for the options being proposed. These estimates would be based on historical data, and standard treatment process capacities. When additional detail is available, more detailed estimates could be prepared than could be expected for conveyance facilities. These estimates used standard construction cost estimating procedures and formats. Every construction project presents unique conditions with respect to location, site constraints, and soil or geotechnical considerations. Also, construction industry market conditions can greatly affect project costing. By considering both historical costs as well as current cost estimating methods, an attempt was made to account for the range of potential costs. However, no estimates can be considered final until complete construction plans and specifications have been prepared. At the planning stage, these unit costs, as well project costs derived from them, need to be evaluated appropriately. Thus, these generalized costs are appropriate for comparison of alternative approaches to providing service, but additional detail should be provided for site-specific construction estimates.

5.1 SIZING OF FACILITIES

The sizing of all the wastewater treatment plant options are based on the projected flow data referenced in Section 2. In general, collection and treatment facilities were sized to meet the year 2040 Demands.

5.2 PHASING CONSIDERATIONS

In most of the subdivisions in Area 1A, 1B and 3, the subdivisions are existing and potentially built out. The phasing considerations specifically apply to the Area 2 where the planned and potential subdivisions are located. **Table 5-1** shows the flow data for the subdivisions of Lane Road, Seaport Lakes, Costa Grande and Powderhorn Ranch which are proposed to have a regional WWTP.

**Table 5-1 Projected Flow Data for Lane Road, Seaport Lakes,
Costa Grande and Powderhorn Ranch**

Year	Flow in MGD
2010	0.00
2015	0.01
2020	0.09
2025	0.26
2030	0.51
2035	0.68
2040	0.92
2060	2.14

5.3 CAPITAL COSTS

Cost estimates for each alternative were computed using costs for collection system improvements, conveyance system improvements (lift station and forcemain), treatment plant improvements and contingencies and professional services. To finance the capital costs of the new/regional WWTP, it was assumed that the existing subdivisions would obtain a 40-year loan with an interest rate of 3.92% through a municipal bond (Source: Rural Area Loan TWDB). And the proposed and new subdivisions were assumed to obtain a 22-year loan with an interest rate of 5.5% through municipal bond (Source: TWDB Loan). This data was used to calculate a monthly residential rate that provides a measure of the burden that the WWTP investment would place on the community's residents.

5.3.1 Collection System

Cost estimates for the wastewater collection system were prepared for each area assuming pressure sewers. Three types of collection systems were evaluated, vacuum sewers, pressure sewers and OSSFs. Vacuum sewers are an economical alternative in relatively flat areas, where a vacuum collection station can serve a very large area, eliminating numerous lift stations on the gravity system. A low pressure sewer system utilizing grinder stations at every one or two

homes is another viable alternative for a sewer system. The costs used for the collection systems are shown graphically in **Figure 5-1**. For detailed cost estimates, refer to **Appendix D**.

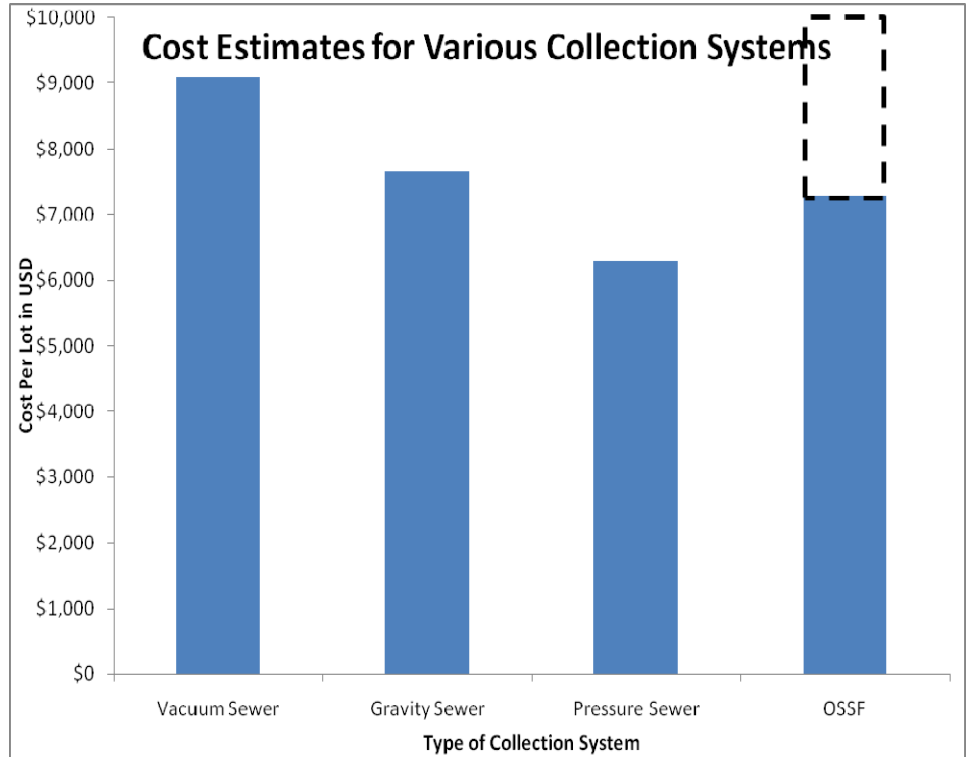


Figure 5-1 Collection System Cost Estimates

5.3.2 Conveyance System

Capital costs for the conveyance system (lift station and forcemains) were estimated by Urban Engineering using bid prices for similar work in the vicinity of Calhoun County and updated to 2011 prices using ENR construction cost indices.

5.3.3 Treatment Plants

The cost for wastewater treatment plants were calculated using historic unit construction costs for similar plants and updating them using the ENR construction cost index values for 2011. The graphic representation of the treatment plant capacity versus cost per gallon is provided in **Figure 5-2**.

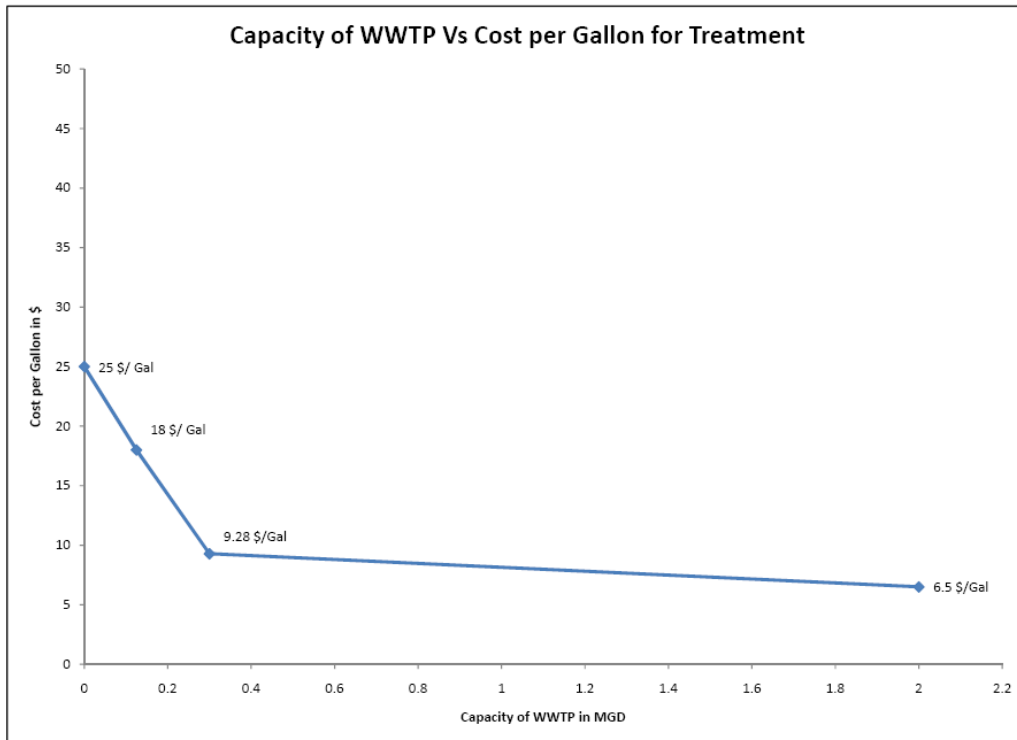


Figure 5-2 WWTP Cost Estimates in Cost per Gallon

5.3.4 Contingencies and Professional Services

The cost for unanticipated items, including variations in the construction economy and inflation are accounted for by using a contingency. For a project at this level of planning, a contingency percentage of 15% is used. At every stage of construction cost estimating, certain unknown factors need to be accounted for in the development of estimated costs. This is even true at the time final plans and specifications are completed for a specific project. It is especially critical at the planning stage. Engineering, Legal, Administrative, and Management markups account for several aspects of the projects. These include providing funds for performing the engineering design calculations, preparing plans and specifications, bidding the construction contract and awarding the work, contractor oversight, shop drawing review and approval, onsite inspection services, change order development, development of record drawings, and contract close out. They also account for the costs associated with legal review of construction contracts and the involvement of financial professionals in preparation of bond statements and the sale of bonds. The percentage of contingencies used in for estimating the construction costs are provided in Table 5-2.

Table 5-2 Contingency and Professional Services Percentage

Type of Contingency	Percentage assumed for calculations for cost estimating purposes
Construction Contingency	15
Professional Services (includes engineering services, permitting, administrative & legal)	20

5.3.5 Cost of Easements and Land Acquisition

The cost of easement and land acquisition are not included in the cost estimates. The collection system and conveyance system will be located for the most part in public right-of-ways and easements will not be required. The cost of the land for lift stations and treatment plants is difficult to estimate at this level of detail and could be considered a portion of the contingency.

5.4 OPERATION AND MAINTENANCE COSTS

The collection system operation, maintenance and replacement (O, M & R) costs are difficult to predict with the exception of electrical costs associated with lift station pumping. Wastewater treatment plant operating costs can be computed and show significant economies of scale. Historical data for plant operations of different sizes is shown in **Figure 5-3**. These treatment plant operating costs, on a per 1,000 gallon basis, along with the electrical costs for pumping wastewater from the subdivisions to either package treatment plants or regional treatment plants make up the bulk of the operations and maintenance costs for the alternatives evaluated. As with the capital costs, the operations and maintenance costs were expressed in terms of a monthly cost to each residential customer.

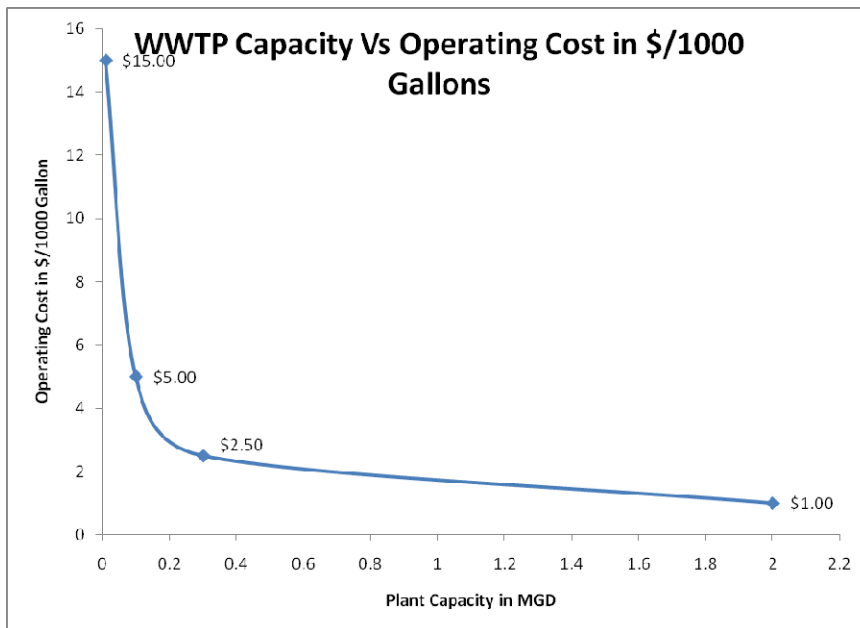


Figure 5-3 O&M Cost for WWTP

5.5 TOTAL COST

The total cost to project participants for each alternative was expressed in a monthly cost to liquidate the initial capital cost to construct the wastewater collection system, conveyance system and wastewater treatment plant, if included in the alternative, and the operating and maintenance cost. For alternatives that include package plants, this was the operating costs of the package plant. For alternatives that included pumping wastewater to an existing regional facility, the published cost for those regional entities to accept wastewater from out of city customers was determined and added to the monthly cost. Alternatives are compared on a cost per month basis. This was determined to be the most realistic method to judge the different alternatives because individual residences will have to be connected to the new wastewater collection and treatment system and if the financial burden is too large for the residents to realistically pay, then the alternative will not be financially feasible. The financial feasibility of the alternatives could be altered by the reduction of the initial capital costs by using grant funding. This will be discussed in subsequent sections of the report.

SECTION 6: EVALUATION OF FINAL ALTERNATIVES

6.1 REGIONAL OPTIONS

6.1.1 Area 1A

In Option 1, all wastewater from the subdivisions of concern is conveyed to the existing City of Port Lavaca WWTP. Each house in the subdivision would be connected to the collection system using a grinder pump system. The total monthly payment per lot for this option would include the cost of the grinder pump system, force main cost, lift station cost, contingencies, professional services, electricity cost for operating the lift station, and the City sewer fee. This option is shown schematically in **Figure 6-1**.

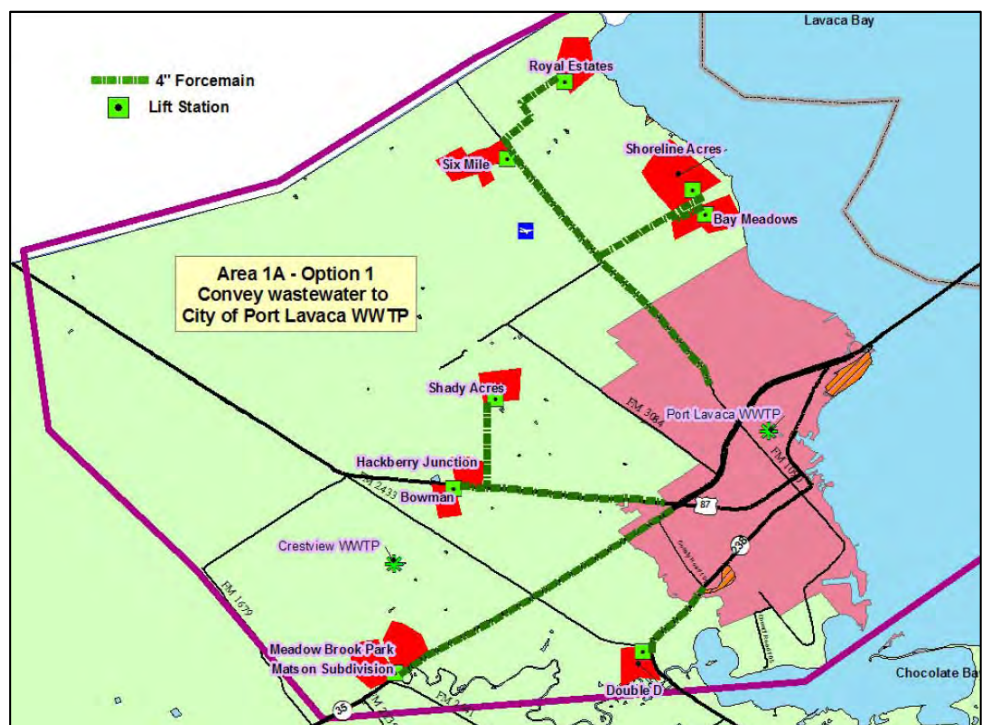


Figure 6-1 Area 1A Option 1

In Option 2, where all subdivisions get their own package WWTP, the total monthly payment per lot would include the cost of the grinder pump system, treatment plant cost, contingencies, professional services, and the operation and maintenance cost for the WWTP. This option is shown schematically in **Figure 6-2**

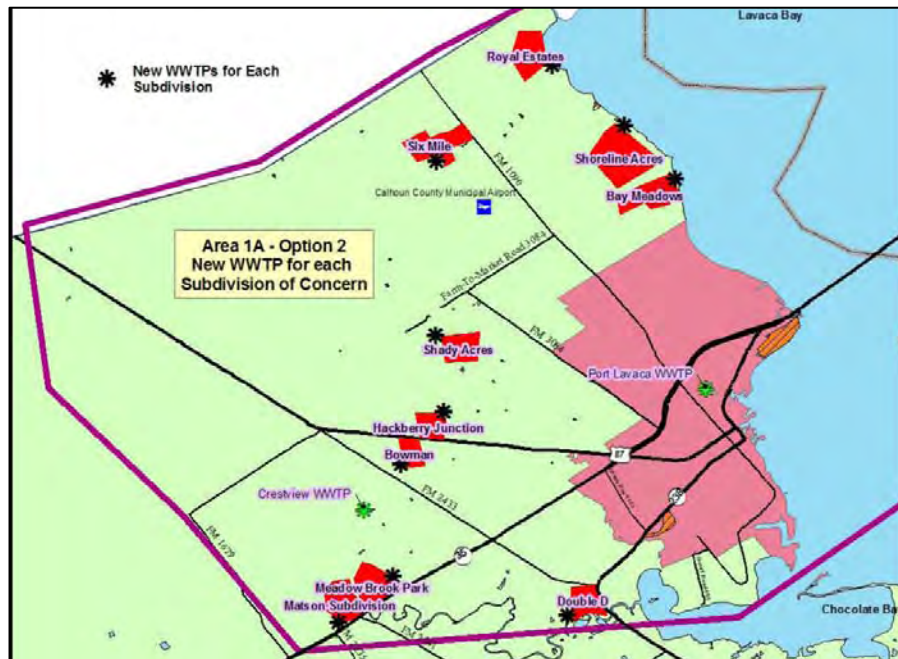


Figure 6-2 Area 1A Option 2

In Option 3 the subdivisions are grouped geographically and the combined flows are directed to a new regional WWTP. In addition to all the costs mentioned in Option 2, this would also include force main cost, lift station cost and electricity for operating the lift station. This option is shown schematically in **Figure 6-3**.

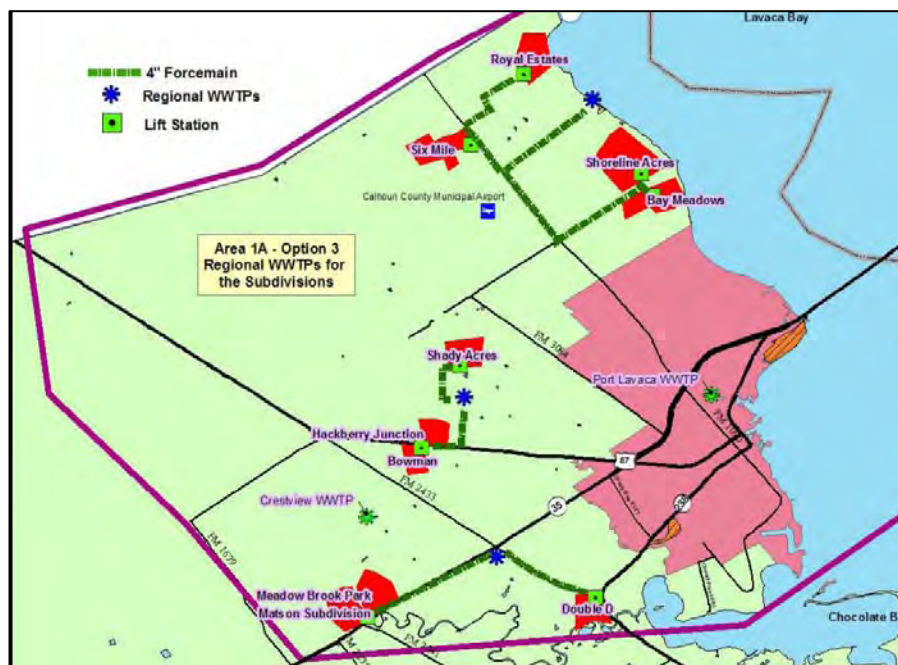


Figure 6-3 Area 1A Option 3

In Option 4 for Area 1A, Crestview WWTP extends its service to the nearby subdivisions, while subdivisions to the north of City of Port Lavaca get a new regional WWTP and City of Port Lavaca extends its service to the Double D subdivision. This option is shown schematically in **Figure 6-4**.

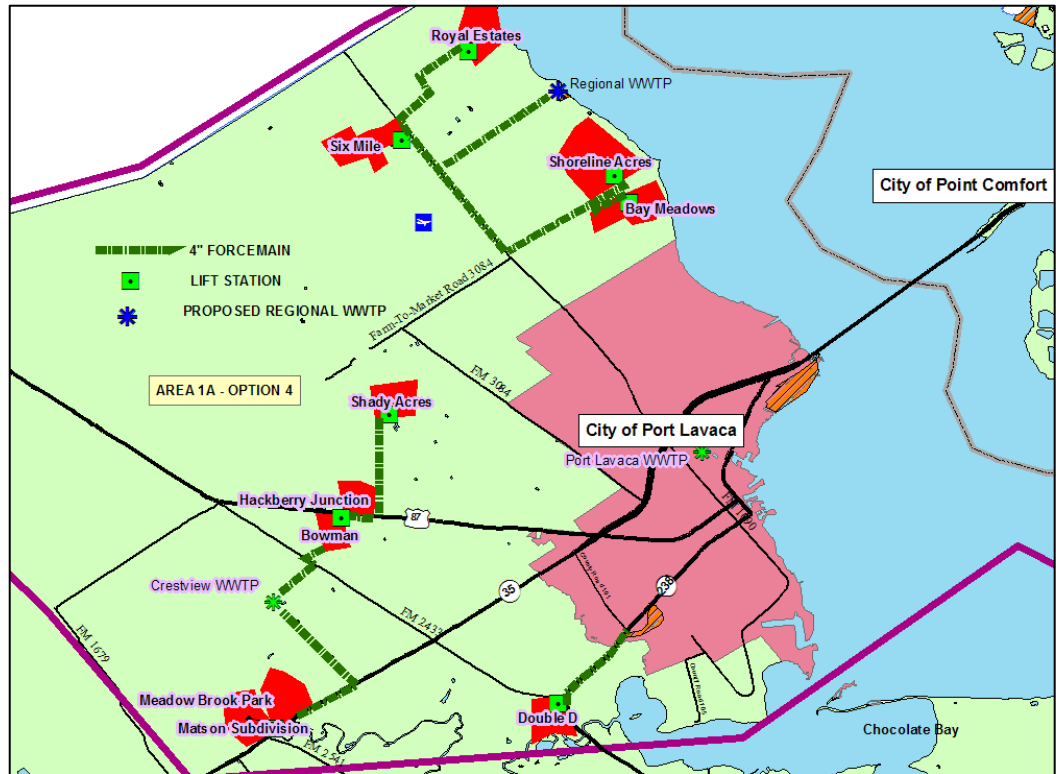


Figure 6-4 Area 1A Option 4

6.1.2 Area 1B

In Option 1, all wastewater from the subdivisions of concern is conveyed to the existing City of Point Comfort WWTP. Each house in the subdivision would be connected to the collection system using a grinder pump system. The total monthly payment per lot for this option would include the cost of the grinder pump system, force main cost, lift station cost, contingencies, professional services, electricity cost for operating the lift station, and the City sewer fee. This option is shown schematically in **Figure 6-5**.

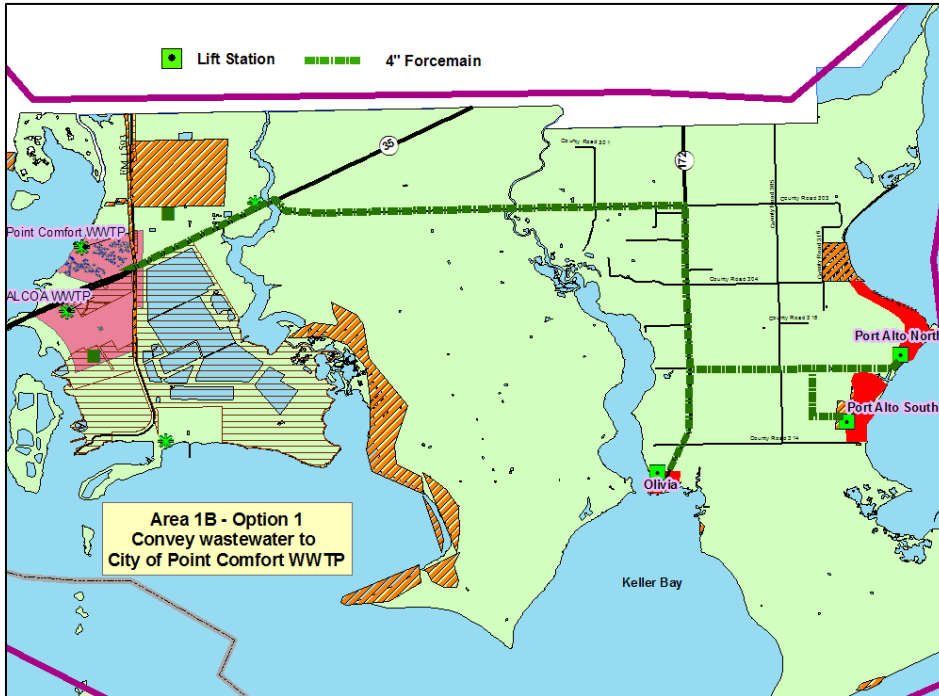


Figure 6-5 Area 1B Option 1

In Option 2, where each subdivision has their own package WWTP, the total monthly payment per lot would include the cost of the grinder pump system, treatment plant cost, contingencies, professional services, and the operation and maintenance cost for the WWTP. This option is shown schematically in **Figure 6-6**.

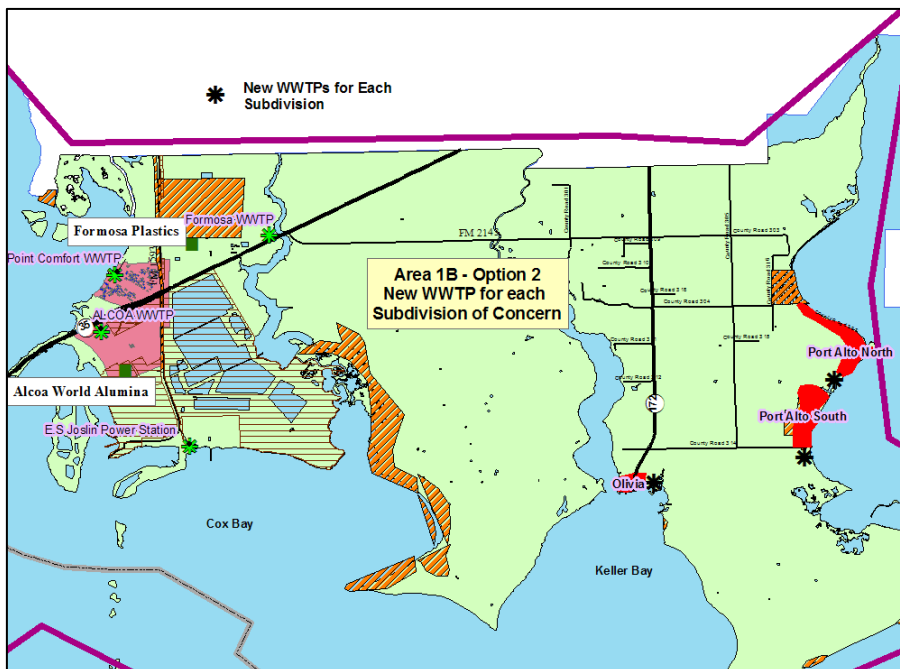


Figure 6-6 Area 1B Option 2

In Option 3 the flows from all the subdivisions are combined and treated at a new regional WWTP. In addition to all the costs mentioned in Option 2, this would also include force main cost, lift station cost and electricity for operating the lift station. This option is shown schematically in **Figure 6-7**.

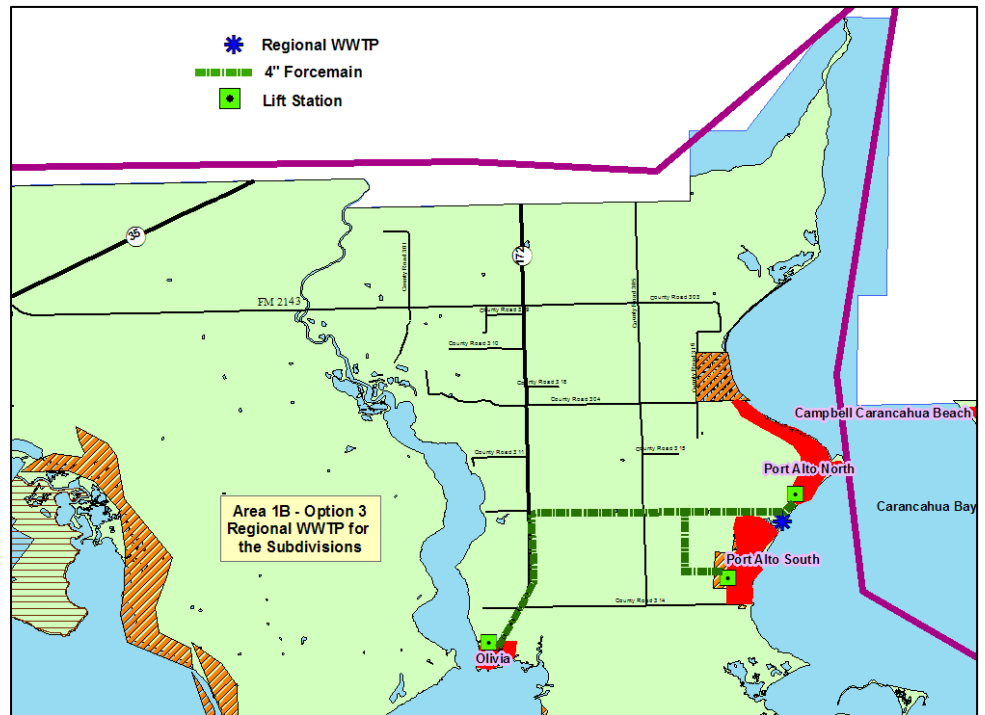
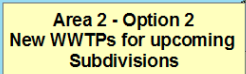
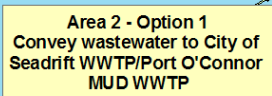


Figure 6-7 Area 1B Option 3

6.1.3 Area 2

In Option 1, all wastewater from the proposed subdivisions is conveyed to either City of Seadrift WWTP or the Port O'Connor MUD WWTP. Each lot in the subdivision would be responsible for installing an individual grinder pump system. The total monthly payment per lot for this option would include the cost of the grinder pump system, force main cost, lift station cost, contingencies, professional services, electricity cost for operating the lift station, and the City sewer fee. This option is shown schematically in **Figure 6-8**.

In Option 2, where each subdivision has an individual package WWTP, the total monthly payment per lot would include the cost of the collection system, treatment plant cost, contingencies, professional services, and the operation and maintenance cost for the WWTP. This option is shown schematically in **Figure 6-9**.



In Option 3, the flow from each of the subdivisions is directed to a proposed regional WWTP. In addition to all the costs mentioned in Option 2, this would also include force main cost, lift station cost and electricity for operating the lift station. This option is shown schematically in **Figure 6-10**.

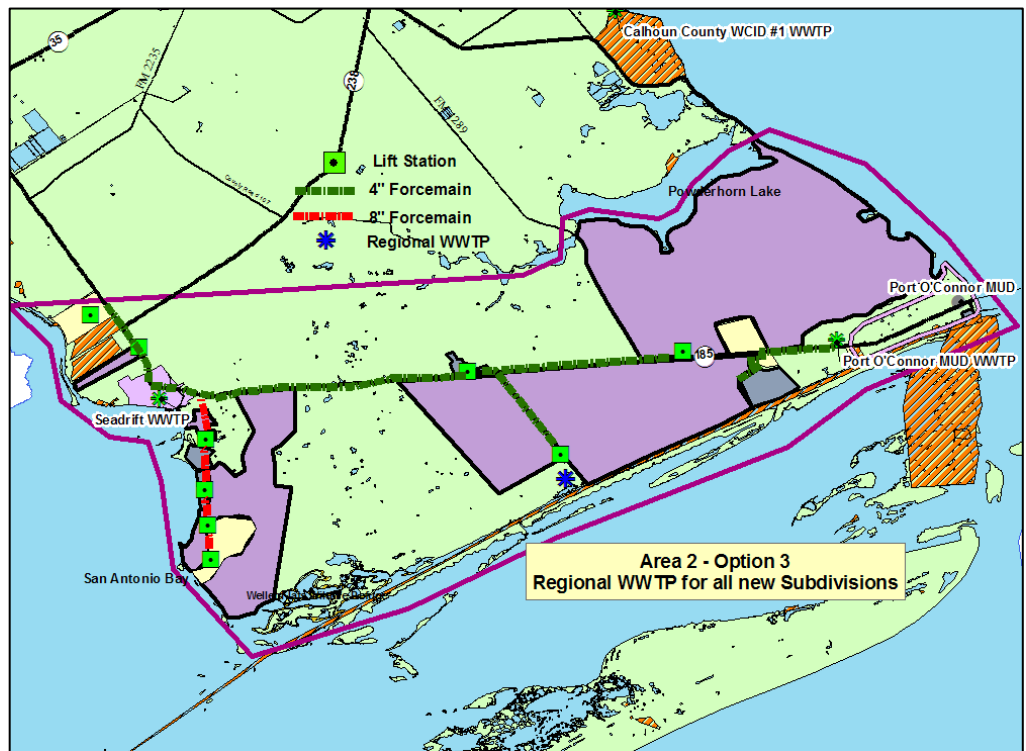


Figure 6-10 Area 2 Option 3

In Option 4, the flows from the subdivisions of Lane Road, Powderhorn Ranch, Seaport Lakes and Costa Grande are directed to a new regional WWTP and the remaining subdivisions convey wastewater to the closest regional WWTP either in City of Seadrift or in Port O'Connor MUD. This option is shown schematically in **Figure 6-11**.

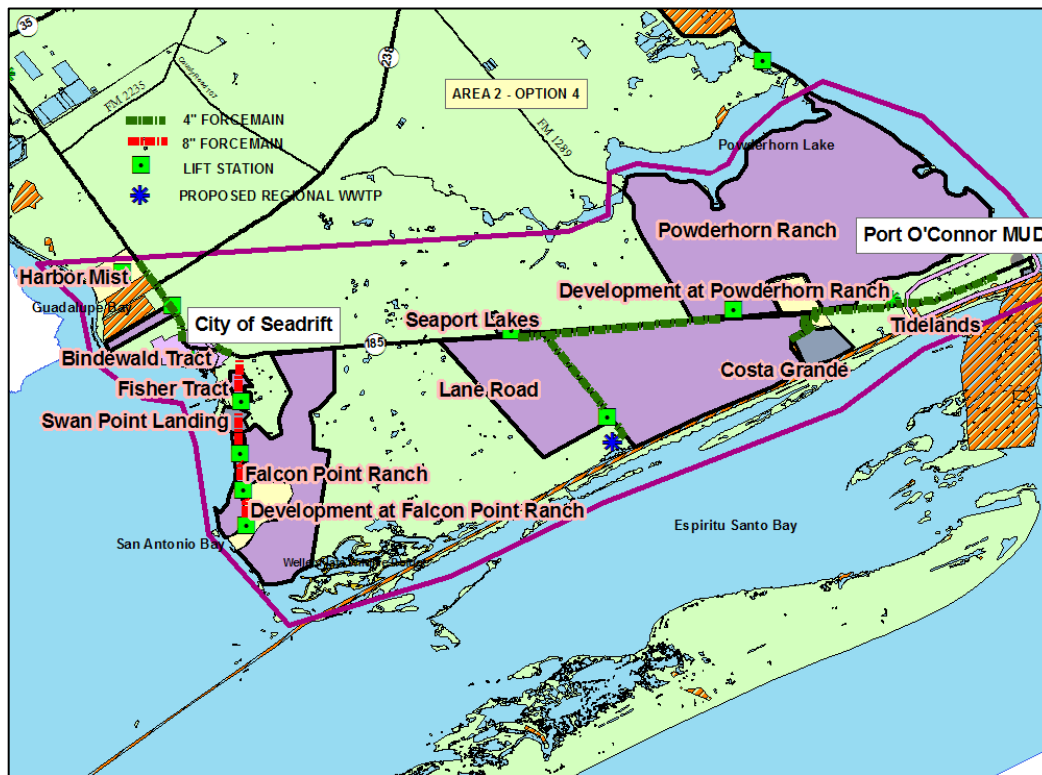


Figure 6-11 Area 2 Option 4

6.1.4 Area 3

In Option 1, all wastewater from the subdivisions of concern is conveyed to SCC WCID No.1 WWTP. Each house in the subdivision would be connected to the collection system using a grinder pump systems. The total monthly payment per lot for this option would include the cost of the grinder pump system, force main cost, lift station cost, contingencies, professional services, electricity cost for operating the lift station, and the Port O'Connor MUD sewer fee. This option is shown schematically in **Figure 6-12**.

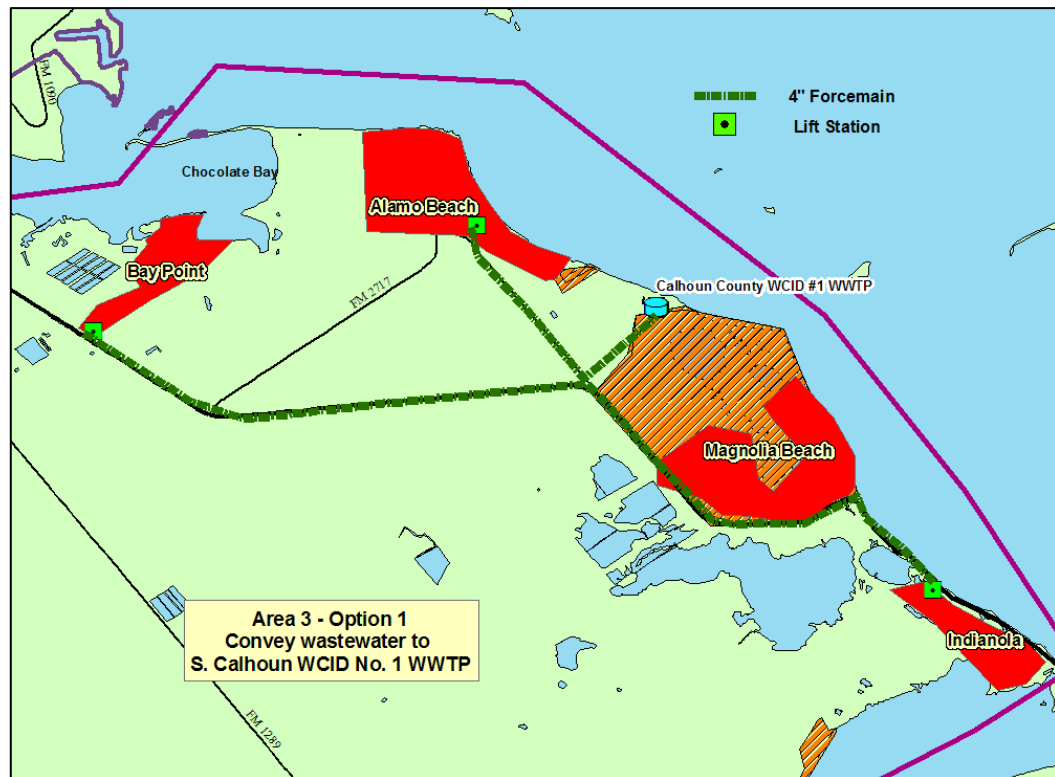


Figure 6-12 Area 3 Option 1

In Option 2, where each subdivision will have its own package WWTP, the total monthly payment per lot would include the cost of the collection system, treatment plant cost, contingencies, professional services, and the operation and maintenance cost for the WWTP. This option is shown schematically in **Figure 6-13**.

In Option 3, all the subdivisions convey wastewater to a regional WWTP. In addition to all the costs mentioned in Option 2, this would also include force main cost, lift station cost and electricity for operating the lift station. This option is shown schematically in **Figure 6-14**.

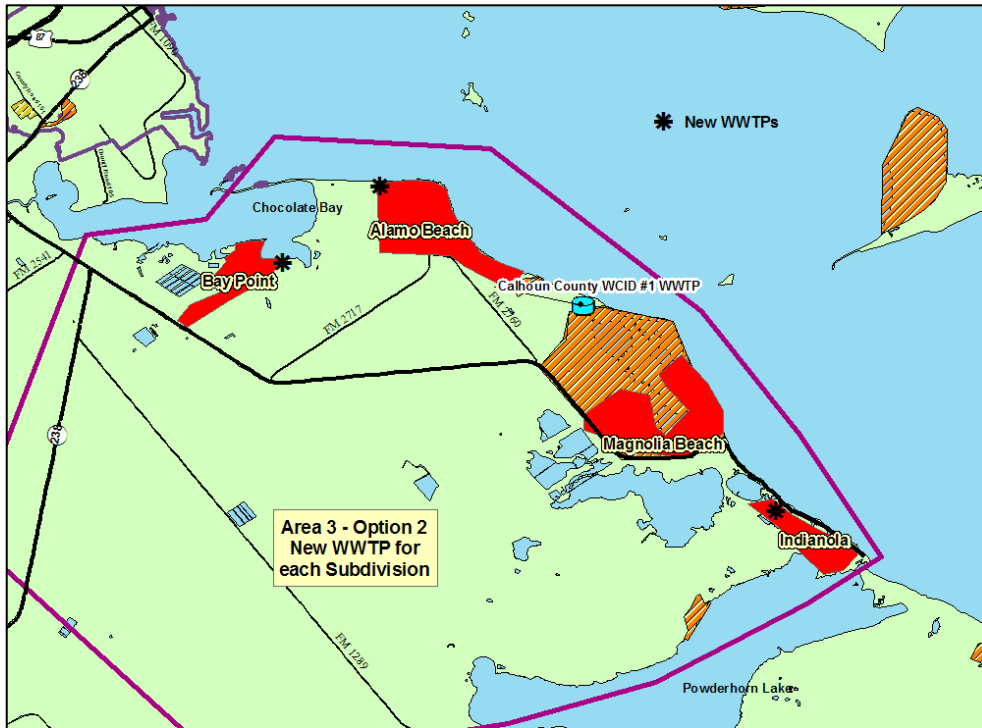


Figure 6-13 Area 3 Option 2

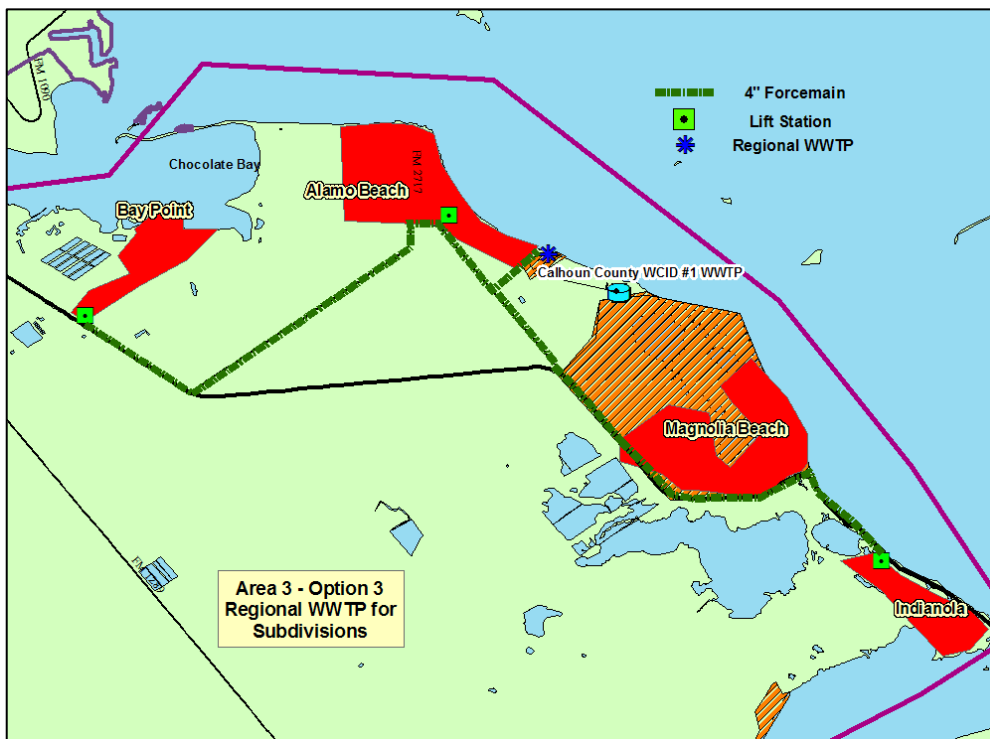


Figure 6-14 Area 3 Option 3

6.1.5 Area 4

DOW

There are two water reduction mechanisms that have been identified for Dow. The first is using treated wastewater as a source of cooling water. The second is using a recirculating cooling device such as a cooling tower instead of the existing cycled cooling system. Further evaluation would be required to assess the viability of one or both of these options.

Dow believes that the quality of the treated effluent could allow it to be used as cooling water with little if any treatment. Because the cooling water flow is greater than the flow of treated effluent, a reduced quantity of source water would still be required to meet cooling demand. Dow has considered this opportunity in the past but there has not been an economic driver to justify implementation. The technical feasibility of this option would need to be further evaluated by comparing the effluent quality to the required cooling water criteria. A cost estimate for this option would need to be developed.

Dow has previously considered implementing cooling towers, but has rejected the idea in the past because of elevated levels of water hardness. Elevated hardness causes fouling and cooling towers would tend to further increase hardness levels due to evaporation. Although water softening can be implemented, this process would cause Dow to incur additional capital and operating costs. Another cooling option that could be considered for Dow is wet surface air cooler technology. In a wet surface air cooler, the process fluid to be cooled flows through tubes in the unit and cooling water is sprayed onto the tubes. These units permit the use of poor-quality cooling water and allow greater cycles of concentration for the cooling water (i.e. lower blowdown, or cooling water discharge) than is typical for cooling towers. Further study would be required to assess the technical feasibility and economic viability of these options. However, these options could lead to substantial reductions in cooling water usage and have the single greatest water reduction potential for any of the industrial opportunities considered in this study.

INEOS Nitriles

In order to evaluate the feasibility of water reuse opportunities, a water balance study would need to be performed. INEOS has developed a water balance, which is the first step. Next, water quality constraints need to be identified for facility processes that use water and individual waste streams, including treated effluents, need to be characterized for

comparison with the identified constraints. Treatment requirements, as applicable, can be considered to facilitate reuse. Water reduction potential within the facility must be evaluated on a case-by-case basis.

Candidate streams for potential reuse by other facilities include stormwater runoff and Outfall 001 effluent.

FORMOSA

Formosa already reuses several wastewater streams internally.

- Condensate from many of the process units is routed to the cooling towers for use as makeup water.
- Effluent from Biological Treatment Train C is used as cooling tower makeup water.
- The majority of sanitary wastewater flow for the facility is used for cooling tower makeup water following treatment.
- Boiler blowdown is used for cooling tower makeup water.
- IEM Condensate is reused with the Ultra Pure water which is used in many of the process plants.
- Filter backwash returns to Raw Water Ponds A and B for reuse.
- Stormwater is reused within the Olefins Unit.

Additional water reuse opportunities and water reduction strategies may be discovered upon further evaluation. Formosa is exploring the additional reuse of stormwater. Formosa is also studying the further use of biological effluent in the cooling towers. However, the average reported Total Dissolved Solids (TDS) concentration for four recent effluent samples was approximately 17,000 mg/L. Elevated TDS concentrations likely limit additional reuse opportunities.

At present, the discharge from the Formosa complex represents approximately 20% of the water purchased from LNRA based on dry weather conditions. This relatively low discharge percentage results from the substantial water reuse measures already implemented by Formosa and from evaporative losses associated with process cooling requirements.

As previously mentioned, the cooling tower blowdown stream shown in Table 4-5 could be made available to Alcoa for dust suppression and process wastewater use.

ALCOA

Much of the water used at Alcoa for processing and cooling is already being reused for other purposes. Consequently, the discharge flow from Alcoa is minimal. Discharge data provided by Alcoa for 2010 show that the average dry weather flow was 25,300 gallons per day (gpd) and that the average wet weather flow was 45,500 gpd.

Since much of the water used at Alcoa is already being reused internally, the most prominent reuse opportunity would involve importing effluent water from another facility for dust suppression and process water needs. Alcoa, in conjunction with the Formosa Plastics Complex (Formosa), has been evaluating the feasibility of utilizing sources of water from Formosa for reuse at Alcoa.

SEADRIFT COKE L.P.

Potential opportunities for reuse at Seadrift Coke L.P. include the following:

- capturing stormwater;
- reusing treated sanitary effluent;
- reusing RO reject and/or cooling tower blowdown; and
- reusing treated combined effluent.

In order to evaluate the feasibility of water reuse opportunities, a water balance study would need to be performed. In such a study, water quality constraints are identified for facility processes that use water and individual waste streams, including treated effluents, are characterized for comparison with the identified constraints. Treatment requirements, as applicable, can be considered to facilitate reuse. The potential for reuse is often unique to each facility, but CDM has participated in projects in which RO or cooling tower blowdown has been used for irrigation, washdown, ion exchange resin regeneration, filter backwash, and many other applications. There may also be opportunity to improve the efficiency of RO separation, producing a more concentrated brine and resulting in a reduced RO feed volume to meet boiler feed requirements. Water reduction potential within the facility must be evaluated on a case-by-case basis.

Seadrift Coke L.P. has undertaken a project to improve segregation of stormwater from their process area runoff. Stormwater runoff could potentially be captured and stored in a pond for reuse.

Seadrift Coke L.P. treats industrial wastewater through a corrugated plate interceptor (CPI) oily water separator, a dissolved air flotation

(DAF) separator, and carbon polishing. The use of carbon polishing likely increases the reuse opportunity for the treated effluent. A reported average Total Dissolved Solids (TDS) concentration of 910 mg/L for four samples of treated effluent further suggests reuse opportunity. However, additional study would be required to assess the potential for reuse.

6.2 COST COMPARISONS

6.2.1 Area 1

Area 1A cost comparisons are tabulated below in **Table 6-1**. In Option 1, the wastewater is conveyed to the City of Port Lavaca WWTP. In Option 2, all subdivisions have their own package WWTP. In Option 3, the subdivisions were divided based on proximity and three new regional WWTPs are proposed. In Option 4, the wastewater from subdivisions of Matson, Meadow Brook Park, Bowman and Hackberry Junction are conveyed to the nearby Crestview WWTP, flows from the remaining subdivisions are combined and conveyed to a new regional WWTP, and flows from Double D would be conveyed to the City of Port Lavaca. All costs indicate monthly payment per lot at full development. The phasing option for existing subdivisions is not practical. These systems were sized for the lots in the subdivision and the majority of the lots already contain residences. The sizes of the facilities to be constructed for these subdivisions are not conducive to phasing.

Table 6-1 Cost Comparisons for Area 1A

Subdivision	Option 1*	Option 2*	Option 3*	Option 4*
Double D	\$123.51	\$177.08	\$157.35	\$123.51
Matson	\$141.05	\$186.11	\$157.40	\$134.05
Meadow Brook	\$137.14	\$186.11	\$154.78	\$130.79
Royal Estate	\$190.91	\$186.11	\$183.87	\$183.87
Shoreline Acres	\$129.57	\$177.08	\$148.10	\$148.10
Six Mile	\$127.66	\$177.08	\$139.72	\$139.72
Hackberry Junction	\$132.96	\$186.11	\$166.36	\$134.05
Bay Meadows	\$154.13	\$186.11	\$173.27	\$173.27
Bowman	\$140.60	\$186.11	\$173.64	\$134.05
Shady Acres	\$164.08	\$186.11	\$179.96	\$164.08

*Costs are indicated in \$/month/lot

The most financially most attractive option for each subdivision is highlighted in the table. In general, it is financially more feasible to have the wastewater conveyed to and treated by an existing regional wastewater treatment plant as included in Option 1 or Option 4. Option 2, which included an individual treatment plant for each subdivision was typically the most expensive option and was not identified as the most financially feasible for any of the subdivisions of interest.

Area 1B cost comparisons for the different options are given below in **Table 6-2**. In Option 1, wastewaters from all the subdivisions are conveyed to the City of Point Comfort WWTP. In Option 2, each subdivision has an individual package WWTP. In Option 3, wastewater flow from all three subdivisions is conveyed to a new regional WWTP. All costs indicate monthly payment per lot at full development. The most financially attractive option for Area 1B is Option 1.

Table 6-2 Cost Comparisons for Area 1B

Subdivisions	Option 1 *	Option 2*	Option 3*
Olivia	\$136.24	\$145.22	\$142.13
Port Alto South	\$100.14	\$142.22	\$109.07
Port Alto North	\$92.88	\$177.08	\$106.97

*Costs are indicated in \$/month/lot

6.2.2 Area 2

Area 2 cost comparisons for the different options are given below in **Table 6-3**. In Option 1, the wastewater from the new developments will be sent to the closest WWTP either in City of Seadrift or in Port O'Connor MUD. In Option 2, all the each subdivision will build and operate its own package WWTP. In Option 3, flow from all the subdivisions is proposed to be conveyed to a new regional WWTP. In Option 4, flows from the subdivisions of Lane Road, Seaport Lakes, Powderhorn Ranch and Costa Grande are conveyed to a new regional WWTP. The remaining subdivisions convey their wastewater to the closest WWTP either in City of Seadrift or in Port O'Connor MUD. All costs indicate monthly payment per lot at 50% development.

Table 6-3 Cost Comparisons for Area 2

Subdivisions	Option 1*	Option 2*	Option 3 *	Option 4*
Harbor Mist	\$114.17	\$180.85	\$119.02	\$114.17
Bindewald	\$105.59	\$170.96	\$107.85	\$105.59
Fisher	\$109.55	\$170.96	\$111.81	\$109.59
Swan Point Landing	\$200.76	\$224.96	\$186.20	\$200.76
Falcon Point	\$89.16	\$104.77	\$89.47	\$146.08
Seaport Lakes	\$239.76	\$224.96	\$194.67	\$202.27
Lane Road	\$101.78	\$159.93	\$96.27	\$103.88
Costa Grande	\$85.43	\$81.17	\$81.48	\$89.09
Powderhorn	\$93.86	\$141.29	\$116.99	\$124.59

*Costs are indicated in \$/month/lot

Option 1 and Option 4 which involves pumping wastewater to the nearest treatment plant is the most financially viable option for Harbor Mist, Bindewald, Fisher, Falcon Point and Powderhorn subdivisions. These subdivisions are close to the existing plants in Seadrift and Port O' Connor MUD. For the subdivision of Swan Point Landing, Seaport Lakes, Lane Road and Costa Grande Option 3, constructing a regional plant to meet their needs, is the most financially viable option. These subdivisions are more distant from the existing plants in Seadrift and Port O'Connor MUD and the cost of building and operating a new plant is offset by the conveyance cost to transport wastewater to the distant existing facilities. The cost per month assumes that all capital costs are included in the monthly wastewater bill. In reality, a great deal of the infrastructure to install the wastewater collection and treatment system will be incurred by the developer and these costs will be included in the development cost of the lots. Phasing of improvements for Area 2 could be considered because there are few lots developed at this time and a large number are included in year 2040. However, improvements for these new developments, with the notable exception of the regional WWTP, will be borne by the developer and passed onto the homeowner in the cost of

the lot. Therefore, the phasing costs will be dependent on the schedule of the developer and is difficult to estimate in a study of this scope.

6.2.3 Area 3

Area 3 cost comparisons for the different options are given below in **Table 6-4**. In Option 1, the Southern Calhoun County WCID No.1 WWTP extends its service to the subdivisions of Indianola, Alamo Beach and Bay Point. In Option 2, all the subdivisions get their own package WWTP. In Option 3, wastewater flow from all the subdivisions is proposed to be sent to a new regional WWTP. All costs indicate monthly payment per lot at full development. The most financially feasible option for Area 3 is Option 1.

Table 6-4 Cost Comparisons for Area 3

Subdivisions	Option 1*	Option 2*	Option 3*
Indianola	\$97.08	\$129.30	\$146.46
Alamo Beach	\$83.47	\$139.05	\$132.84
Bay Point	\$79.04	\$139.05	\$128.41

*Costs are indicated in \$/month/lot

6.2.4 Area 4

Area 4 cost comparisons for the different reclaimed water options are given below in **Table 6-5**. In Option 1, reclaimed wastewater from the City of Port Lavaca will be pumped across the bay in a new pipeline installed using directional drilling construction to the industries of Formosa and Alcoa for reuse. In Option 2, the effluent for reuse would be pumped in a new pipeline installed using conventional construction techniques to the industries of DOW, INEOS Nitriles and Seadrift Coke.

Table 6-5 Cost comparison for Reclaimed water options

Type of Activity	Option 1 – To Formosa/Alcoa	Option 2 – To DOW/INEOS Nitriles/Seadrift Coke L.P.
Reclaimed water from City of Port Lavaca WWTP and Point Comfort WWTP	\$878.90*	N/A
Reclaimed water from City of Port Lavaca WWTP	N/A	\$632.36*

*annual cost per acre foot

The costs include an annual debt service payment to liquidate the capital cost and an O & M component to pump the reclaimed water to the user. Because this reclaimed water should be compared to the cost of alternative water supplies, the cost is expressed in \$/ac-ft as opposed to a monthly cost. The supply available in Option 1 is approximately 1.11 MGD and 0.045 MGD from Port Lavaca WWTP and Point Comfort WWTP, respectively. The supply available in Option 2 is approximately 1.11 MGD from the Port Lavaca WWTP. It was determined that it would be infeasible to build facilities to pump and pipe 0.045 MGD from Point Comfort across the bay to the industries in western Calhoun County.

6.3 AFFORDABILITY INDEX

The cost to the individual homeowner was the basis of analysis for the evaluation of the wastewater service options. As a point of comparison, these monthly costs need to be compared to an affordability index. The Environmental Protection Agency's guidance on the affordability of wastewater systems uses an average household rate of 2 percent of Median Household Income (MHI), as cited in "National Level Affordability Criteria Under the 1996 Amendments to the Safe Drinking Water Act (Final Draft Report)". The MHI for Calhoun County as per the 2009 U.S. Census Estimate is \$43,405.00. Therefore the average monthly wastewater cost per household for Calhoun County is \$72.34.

SECTION 7: POTENTIAL FUNDING SOURCES

Section 7

Funding sources for the Calhoun County Regional Wastewater System are dependent on the selected alternative and financial viability of each political entity within the study area. Also, the type of funding source selected to finance the engineering design and construction costs will depend on the organizational structure of the entity that owns and operates the regional system.

A number of potential funding sources exist for rural utilities, which typically provide service to less than 50,000 people. Both state and federal agencies offer grant and loan programs to assist rural communities in meeting their infrastructure needs. Most are available to “political subdivisions” such as counties, municipalities, school districts, special districts, or authorities of the state with some programs providing access to private individuals.

Grant funds are typically available to those entities that demonstrate financial need based on a median household income (MHI) value below 75 to 80 percent of the State’s MHI value. The funds may be used for planning, design, and construction of wastewater construction projects. Some funds may be used to finance the consolidation or regionalization of neighboring wastewater utilities. Three Texas agencies that offer financial assistance for wastewater infrastructure are:

- ***Texas Water Development Board (TWDB)*** has several programs that offer loans at interest rates lower than the market offers to finance projects for public wastewater systems that facilitate compliance with wastewater regulations. Additional subsidies may be available for disadvantaged communities. Low interest rate loans with short and long-term finance options at tax exempt rates for wastewater projects give an added benefit by making construction purchases qualify for a sales tax exemption. Generally, the program targets customers with eligible wastewater projects for all political subdivisions of the state (at tax exempt rates).
- ***Texas Department of Rural Affairs (TDRA, formerly ORCA)*** is a state agency with a focus on rural Texas by making state and federal resources accessible to rural communities. Funds from the U.S. Department of Housing and Urban Development Community Development Block Grants (CDBG) are administered by TDRA for small, rural communities with populations less than 50,000 that cannot directly receive federal grants. These communities are known as non-entitlement areas. One of the program objectives is to meet a need having a particular urgency, which represents an immediate threat to the health and safety of residents, principally for low- and moderate-income persons. At this time, the programs may be changing since the legislative

session; the agency will become the Office of Rural Affairs at the Texas Department of Agriculture during the fall of 2011.

- ***U.S. Department of Agriculture Rural Development (USDA Rural Development)*** coordinates federal assistance to rural Texas to help rural Americans improve their quality of life. The Rural Utilities Service (RUS) programs provide funding for water and wastewater disposal systems. The application process, eligibility requirements, and funding structure vary for each of these programs. There are many conditions that must be considered by each agency to determine eligibility and ranking of projects. The principal factors that affect this choice are population, percent of the population under the State MHI, health concerns, compliance with standards, Colonia status, and compatibility with regional and state plans.

In addition to Federal and State water/wastewater programs, funding sources may also originate from revenue bonds and developer participation towards the regional infrastructure of the system. An overview of all of these financing mechanisms is presented below.

7.1 FEDERAL AND STATE INFRASTRUCTURE PROGRAMS

There are a variety of funding programs available to entities through Federal and State infrastructure programs. Depending on the type of organization that owns the proposed regional wastewater facilities, funding is most likely to be obtained from programs administered by the TWDB, TDRA and/or USDA Rural Development. Information required by these agencies for initial applications may include financial analyses, records demonstrating health concerns, failing infrastructure, and financial need.

7.1.1 TWDB Funding Options

The programs offered by the TWDB include the Clean Water State Revolving Fund (CWSRF), State Loan Program (Development Fund II) and Economically Distressed Areas Program (EDAP).

Clean Water State Revolving Fund

The Clean Water State Revolving Fund (CWSRF) provides loans (Tier II) at interest rates lower than the market to political subdivisions with the authority to own and operate a wastewater system. The CWSRF also includes Federal (Tier III) and Disadvantaged Communities funds that provide even lower interest rates for those meeting the respective criteria.

The CWSRF offers fixed and variable rate loans at subsidized interest rates. The maximum repayment period for a CWSRF loan is 20 years from the completion of project construction. A cost-recovery loan origination charge of 1.85% is imposed to cover administrative costs of operating the CWSRF; however, an additional interest rate subsidy is offered to those financing the origination charge.

TWDB accepts Project Information Forms (PIFs) from prospective loan applicants to be included on the CWSRF Intended Use Plan (IUP) during the early part of each year. The Information Form describes the applicant's existing wastewater facilities, facility needs, the nature of the project being considered and project cost estimates. This information is used to rate each proposed project and place them in priority order on the IUP. Applicants eligible for funding through the CWSRF program are notified in the summer to attend a pre-application meeting and submit an application for financial assistance. Funds would be available the following year after previously submitting the Project Information Form.

State Loan Program (Development Fund II)

The State Loan Program is a diverse lending program directly from state funding sources. As it does not receive federal subsidies, it is more streamlined. The loans can incorporate more than one project under the umbrella of one loan. Political subdivisions of the state are eligible for tax exempt rates. Projects can include purchase of treatment plants, pumping facilities, lift stations, collection lines, and acquisitions. The loan requires that the applicant pledge revenue or taxes. The maximum financing life is 50 years, and the average financing period is approximately 20 years. The lending rate scale varies according to several factors, but is set by the TWDB based on cost of funds to the board, risk factors of managing the board loan portfolio, and market rate scales.

The application materials must include an engineering feasibility report, environmental information, rates and customer base, operating budgets, financial statements, and project information. The TWDB considers the needs of the area; benefits of the project; the relationship of the project to the overall state water needs and the State Water Plan; and the availability of all sources of revenue to the rural utility for the ultimate repayment of the loan. The board considers applications on a monthly basis.

Economically Distressed Areas Program

The EDAP Program was originally designed to assist areas along the U.S./Mexico border in areas that were economically distressed. In 2008,

this program was extended to apply to the entire state so long as requirements are met. This program provides financial assistance through the provision of grants and loans to communities where present facilities are inadequate to meet resident's minimal needs. Eligible communities are those that have median household income less than 75 percent of the state household income.

The county where the project is located must adopt model rules for the regulation of subdivisions prior to application for financial assistance. If the applicant is a city, the city must also adopt Model Subdivision Rules of TWDB (31 TAC Chapter 364). The program funds design, construction, improvements, and acquisition, and includes measures to prevent future substandard development. The TWDB works with the applicant to find ways to leverage other state and federal financial resources. The loan requires that the applicant pledge revenue or taxes. The maximum financing life is 50 years, and the average financing period is approximately 20 years. The lending rate scale varies according to several factors, but it is set by the TWDB based on cost of funds to the board, risk factors of managing the board loan portfolio, and market rate scales. The TWDB seeks to make reasonable loans with minimal loss to the state. Most projects have a financial package with the majority of the project financed with grants; many recipients have received 100 percent grant funds.

7.1.2 TDRA Funding Options

The Texas Department of Rural Affairs (TDRA, previously ORCA) seeks to strengthen rural communities and assist them with community and economic development and healthcare by providing a variety of rural programs, services, and activities. Of their many programs and funds, the most appropriate programs related to drinking water are the Community Development (CD) Fund and Texas Small Towns Environment Program (STEP). These programs offer attractive funding packages to help make improvements to wastewater systems to mitigate potential health concerns.

Community Development Fund

The CD Fund is a competitive grant program for water and wastewater system improvements. Funds are distributed between 24 state planning regions where funds are allocated to address each region's utility priorities. Funds can be used for various types of public works projects, including wastewater system improvements. Cities with a population of less than 50,000 that are not eligible for direct CDBG funding from the

U.S. Department of Housing and Urban Development are eligible. Funds are awarded on a competitive basis decided twice a year by regional review committees. Awards are no less than \$75,000 and cannot exceed \$800,000.

Texas Small Towns Environment Program

Under special occasions some communities are invited to participate in grant programs when self-help is a feasible method for completing a wastewater project, the community is committed to self-help, and the community has the capacity to complete the project. The purpose is to significantly reduce the cost of the project by using the communities' own human, material, and financial capital. Projects typically are repair, rehabilitation, improvements, service connections, and yard services. Reasonable associated administration and engineering cost can be funded. A letter of interest is first submitted, and after CDBG staff determines eligibility, an application may be submitted. Awards are only given twice per year on a priority basis so long as the project can be fully funded (\$350,000 maximum award). Ranking criteria are project impact, local effort, past performance, percent of savings, and benefit to low to medium-income persons.

7.1.3 USDA Rural Development Funding Options

USDA Rural Development established a Revolving Fund Program (RFP) administered by the staff of the Water and Environment Program (WEP) to assist communities with water and wastewater systems. The purpose is to fund technical assistance and projects to help communities bring safe drinking water and sanitary, environmentally sound, waste disposal facilities to rural Americans in greatest need. WEP provides loans, grants, and loan guarantees for drinking water, sanitary sewer, solid waste, and storm drainage facilities in rural areas and cities and towns with a population of 10,000 or less. Recipients must be public entities such as municipalities, counties, special purpose districts, Indian tribes, and corporations not operated for profit. Projects include all forms of infrastructure improvement, acquisition of land and water rights, and design fees. A request for a combination of grants and loans vary on a case by case basis, and some communities may have to wait through several funding cycles until funds become available.

Water and Wastewater Disposal Program

The major components of the RFP are loan, loan guarantees, and grant funding for water and waste disposal systems. Entities must demonstrate that they cannot obtain reasonable loans at market rates, but have the

capacity to repay loans, pledge security, and operate the facilities. Grants can be up to 75 percent of the project costs, and loan guarantees can be up to 90 percent of eligible loss. Loans are not to exceed a 40-year repayment period, require tax or revenue pledges, and are offered at three rates:

- **Poverty Rate** - The lowest rate is the poverty interest rate of 4.5 percent. Loans must be used to upgrade or construct new facilities to meet health standards, and the MHI in the service area must be below the poverty line for a family of four or below 80 percent of the statewide MHI for non-metropolitan communities.
- **Market Rate** – Where the MHI in the service exceeds the state MHI, the rate is based on the average of the “Bond Buyer” 11-Bond Index over a four week period.
- **Intermediate Rate** – the average of the Poverty Rate and the Market Rate, but not to exceed seven percent.

7.2 REVENUE BONDS

In addition to Federal and State wastewater programs, a wastewater utility may pledge future earnings to fund improvements to the wastewater system through the issuance of revenue bonds. A revenue bond is a special type of municipal bond, and the income generated by the improvement or expansion of the wastewater project would be used for repayment. Unlike general obligation bonds, only the revenues specified in the legal contract between the bond holder and bond issuer are required to be used for repayment of the principal and interest of the revenue bonds. Since the pledge of security is not as great as that of general obligation (G.O.) bonds, revenue bonds may carry a slightly higher interest rate than G.O. bonds.

7.3 DEVELOPER PARTICIPATION

Developer participation typically occurs through two means: upfront capital contributions or payment of impact fees for a water/wastewater infrastructure project. Under a regional system where several political subdivisions are participating, a single independent organization or entity is recommended to manage and/or operate the regional system, such as a river authority or regional utility authority. River authorities, a regional utility authority, or other similar entities may require a developer to completely finance the entire cost of an infrastructure project and then turn it over to the utility to own and operate on their behalf. A utility may also require a developer to pledge capital towards an infrastructure project through an upfront cash payment or a letter of credit for the utility to drawdown on if needed to reduce the level of risk on the project.

Section 7: Potential Funding Sources

The utility may also require that developers contribute toward the cost of new water/wastewater infrastructure through the payment of impact fees. The intent of this funding source is that the cost of new infrastructure serving new utility customers will not be subsidized by the existing utility rate payers. In essence, growth pays for growth.

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SECTION 8: CONCLUSIONS & RECOMMENDATIONS

Section 8

Summary of conclusions and recommendations for the GBRA – Calhoun County Regional Wastewater Facility Study are discussed below.

The provision of centralized wastewater collection and treatment for subdivisions with failing onsite sewage systems was evaluated. Collection systems evaluated consisted of conventional collection systems, vacuum collection systems and pressure systems using individual grinder pumps. Treatment systems evaluated included individual package wastewater treatment plants for each subdivision, regional wastewater treatment plants treating wastes from several subdivisions and collecting and transporting the wastewater to existing wastewater treatment plants in the closest municipality. Likewise, an analysis for the proposed developments in the southern portion of the county was also completed. The analysis for the proposed developments was similar to the analysis completed for the existing subdivisions with failing onsite sewage systems.

The analysis of alternatives was conducted on a cost basis. Each alternative was broken down to the monthly cost required to liquidate the amortized capital cost for collection and treatment systems and the monthly cost to operate the collection, conveyance and treatment systems. In this cost analysis, it was assumed that all the capital cost would be funded by loans from the TWDB either through the Rural Water Assistance Fund or the D Fund. The monthly costs for providing service to the existing subdivisions ranged from \$79.05 to \$190.91. The monthly cost for providing service to the proposed developments ranged from \$81.17 to \$239.76. For the proposed developments, the monthly cost to the homeowners will be significantly different than the value computed because a large portion of the capital cost to construct the collection and treatment system will be a developer cost that will be rolled into the cost of the lots. Hence, this cost will still be collected, but not as a monthly wastewater fee, rather it will be part of the home purchase cost and collected as part of the homeowner's mortgage.

For the existing subdivisions with onsite sewage systems, unless grant funding can be obtained to defray a large portion of the capital cost, it will be difficult to finance the improvements necessary to remove the residents from their onsite sewage systems. Each existing subdivision would have to be evaluated to determine what the average resident could afford on a monthly basis and the capital cost grant funding determined. If removal of the onsite sewage systems from these priority subdivisions is desired, then Calhoun County should pursue grant funding to help it achieve this goal. Without grant funding,

it would be difficult to build and maintain a regional system that will result, on average, in a monthly wastewater bill of \$72.34 (EPA Affordability Index).

The reclaimed water options in Calhoun County were also evaluated. Sources of municipal reclaimed water include Port Lavaca, Point Comfort and Seadrift. The use of reclaimed water from Port Lavaca and Point Comfort for Formosa Plastics was evaluated. Moving reclaimed water from Point Comfort to Formosa Plastics is relatively simple. The average reclaimed water flow from Point Comfort is 0.042 MGD. Transporting water from Port Lavaca to Formosa Plastics is not simple or inexpensive. Flow from the Port Lavaca WWTP would have to be piped across Lavaca Bay to reach Formosa Plastics. The average flow from the Port Lavaca WWTP is 1.11 MGD and the cost per acre-foot for this reclaimed water is \$878.9/ac-ft. The cost to deliver reclaimed water from the Port Lavaca WWTP to the industries in western Calhoun County was also evaluated. The cost per acre-foot for this option is \$632.36/ac-ft.

DOW CHEMICALS - There are two water reduction mechanisms that have been identified for Dow. The first is using treated wastewater as a source of cooling water. The second is using a recirculating cooling device such as a cooling tower instead of the existing cycled cooling system. Further evaluation would be required to assess the viability of one or both of these options.

INEOS Nitriles - In order to evaluate the feasibility of water reuse opportunities, a complete water balance study would need to be performed. INEOS has developed a water balance, which is the first step. Next, water quality constraints need to be identified for facility processes that use water and individual waste streams, including treated effluents, need to be characterized for comparison with the identified constraints. Treatment requirements, as applicable, can be considered to facilitate reuse. Water reduction potential within the facility must be evaluated on a case-by-case basis. Candidate streams for potential reuse by other facilities include stormwater runoff and Outfall 001 effluent

FORMOSA - Formosa already reuses several wastewater streams internally.

- Condensate from many of the process units is routed to the cooling towers for use as makeup water.
- Effluent from Biological Treatment Train C is used as cooling tower makeup water.
- The majority of sanitary wastewater flow for the facility is used for cooling tower makeup water following treatment.
- Boiler blowdown is used for cooling tower makeup water.

- IEM Condensate is reused with the Ultra Pure water which is used in many of the process plants.
- Filter backwash returns to Raw Water Ponds A and B for reuse.
- Stormwater is reused within the Olefins Unit.

Additional water reuse opportunities and water reduction strategies may be discovered upon further evaluation. Formosa is exploring the additional reuse of stormwater. Formosa is also studying the further use of biological effluent in the cooling towers. However, the average reported Total Dissolved Solids (TDS) concentration for four recent effluent samples was approximately 17,000 mg/L. Elevated TDS concentrations likely limit additional reuse opportunities.

At present, the discharge from the Formosa complex represents approximately 20% of the water purchased from LNRA based on dry weather conditions. This relatively low discharge percentage results from the substantial water reuse measures already implemented by Formosa and from evaporative losses associated with process cooling requirements.

ALCOA - Since much of the water used at Alcoa is already being reused internally, the most prominent reuse opportunity would involve importing effluent water from another facility for dust suppression and process water needs. Alcoa, in conjunction with the Formosa Plastics Complex (Formosa), has been evaluating the feasibility of utilizing sources of water from Formosa for reuse at Alcoa.

SEADRIFT COKE L.P. - Seadrift Coke L.P. treats industrial wastewater through a corrugated plate interceptor (CPI) oily water separator, a dissolved air flotation (DAF) separator, and carbon polishing. The use of carbon polishing likely increases the reuse opportunity for the treated effluent. A reported average Total Dissolved Solids (TDS) concentration of 910 mg/L for four samples of treated effluent further suggests reuse opportunity. However, additional study would be required to assess the potential for reuse.

8.1 IMPLEMENTATION PLAN

This study has identified options to provide wastewater service to (1) existing subdivisions with failing OSSFs and (2) existing subdivisions with OSSFs that are not currently failing but have similar conditions to those with failing OSSFs. The study has also identified options to provide wastewater service to proposed developments in the southern portion of the county. Implementing the options for the existing subdivisions and the proposed developments are unique and are discussed below.

For the existing subdivisions, as identified in the cost analysis, the monthly cost to retrofit the existing OSSFs with pressure sewers, conveyance facilities and

wastewater treatment are higher than the EPA affordability index. To make any of these options financially viable, grant funding will be necessary. The first step in implementation of any of the proposed options would be to secure the funding sufficient to subsidize the capital cost so that the monthly cost of service is less than or equal to the affordability index. After funding is secured, the project can move forward to the preliminary engineering phase.

In the preliminary engineering phase, more detail to the wastewater collection, conveyance and treatment improvements can be developed. In this phase, the sizing of the facilities can be finalized given the initial number of customers on the system and the ultimate number of customers expected to be connected to the system. The cost per customer can be finalized based on the number of residents that will be served initially. Customer service agreements will need to be executed with the customers who will be joining the system as a show of commitment on the part of the customers. The system would then proceed to the design phase. In this phase, surveying, environmental and archaeological studies and detailed plans and specifications for the system improvements will be developed. During the design phase, land acquisition for the lift station sites would occur. After review and approval by the appropriate agencies, the project would be bid. Following execution of the construction contracts, the improvements will be constructed, tested and placed into operation.

The timeframe to obtain grant funding is difficult to estimate especially given the current fiscal condition of state and federal agencies. The preliminary engineering phase is estimated to take six months to complete. The design phase, including surveying, environmental and archaeological studies, and land acquisition will range in duration from 12 months to as long as 24 months depending on the environmental approval process commensurate with the funding source and land acquisition difficulties. The bidding phase typically lasts three months for advertisement, contract preparation and approval and issuing a notice to proceed to the contractor. Construction of the improvements depends on the final scope of the project, but for the improvements envisioned in the options to serve existing subdivisions, a construction period of 12 months is a reasonable estimate.

For the proposed developments, the collection and conveyance systems will be designed by the engineer hired by the developer as part of the site improvements necessary to prepare the raw land for housing development. The schedule for these improvements is dependent upon the construction schedule of the proposed development, which is difficult to estimate given the state of the housing market. For the regional wastewater treatment plant included in Option 3 for this area, the permitting, design and construction of the plant is described below.

For the regional wastewater treatment plant to move forward, service agreements between a regional entity and the developers would have to be executed that define the size and timing of the regional WWTP. Once these agreements are in place, the land for the treatment plant can be purchased or perhaps one of the developments can donate the land in exchange for reduced service costs. After the land for the plant is secured, a discharge permit application can be prepared and submitted to the TCEQ for the plant discharge. After the plant discharge permit is issued, preliminary engineering, final design, bidding and construction of the plant can proceed.

Preparation of the permit application and approval by TCEQ could be accomplished in as short a period as 12 months; however, depending on public opposition, the issuing of the permit could take as long as 24 months. Preliminary engineering and final design would take approximately one year. Included in the preliminary engineering phase are the environmental and archaeological studies on the plant site and outfall. The 12 month schedule assumes that there are no environmental or archaeological issues to overcome. For the plant, the bidding phase will last three months and construction of the plant will take 12 to 14 months.

Regarding the financing of the regional WWTP, it could be accomplished with upfront cash contributions by the developers. Collecting enough upfront cash seems unlikely. A more likely scenario would be that the regional entity would construct the plant using bond proceeds and that development agreements would be executed with the developers committing them to pay an impact fee for each lot brought online. The development agreement should also include a provision with a minimum reimbursement per year to cover the debt service on the plant.

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SECTION 9: ENVIRONMENTAL ASSESSMENT

Section 9

Conservation of coastal waters and wetlands in Calhoun County as well as other Texas coastal counties is intrinsically tied to recreational activities like fishing, hunting, birding and boating. The health of the coastal economy is also tied to the health of the coastal zone. Adequate supplies of clean, fresh water carrying nutrients and sediments to many different coastal wetland habitats like salt marshes and seagrass beds are essential for economically and ecologically important species of fish, shell fish, birds and wildlife. All bay and estuary systems along the Texas Coast have great commercial, recreation and conservation value. Each of these systems face conservation challenges to varying degrees that can threaten their health and productivity including diminished freshwater inflows, habitat loss and poor water quality. Similar challenges are faced in the San Antonio Bay system in Calhoun County consisting of the primary bays San Antonio and Espiritu Santo and the secondary bays Hynes, Guadalupe and Shoalwater.

In the United States, 54% of all Americans now live in 772 coastal counties adjacent to the Atlantic and Pacific Oceans, the Gulf of Mexico and the Great Lakes. Over the past 30 years, coastal populations have grown by 41 million, faster than the country as a whole. By the year 2025, nearly 75 percent of all Americans are expected to live in coastal counties. Most of the coastal property along the Atlantic and Pacific Oceans and Gulf of Mexico has already been developed. One exception is the coastal areas surrounding Calhoun County, particularly coastal properties in southern Calhoun County where recent subdivision developments in the Port O'Connor and Seadrift area identified in this study are already in place and others in the planning stages. Older coastal developments in and around the Cities of Port Lavaca and Point Comfort as well as these cities themselves, also have some potential for future growth. Increased development of these coastal areas within Calhoun County present opportunities for economic growth and prosperity but also present the challenges of balancing future growth with the protection of natural resources including the bays and estuaries impacted by this growth not only in coastal areas but inland areas of the county as well. Providing adequate wastewater treatment facilities and services to sustain future growth will be an important factor in protecting the bay and estuary systems in Calhoun County.

Discharges from treated, partially treated and untreated domestic wastewater effluent can impact the water quality of a receiving stream in various ways. The productivity of many coastal marine systems is limited by nutrient availability, and the input of additional nutrients to these systems in

moderation can help increase productivity however the consequences of nutrient over-enrichment can be detrimental to coastal marine systems. Many of the detrimental consequences are associated with eutrophication. Eutrophication increases oxygen consumption and can lead to low-oxygen or oxygen-free water bodies. This can lead to fish kills as well as more subtle changes in ecological structure and functioning, such as lowered biotic diversity and lowered recruitment of fish populations. Seagrass beds are particularly vulnerable to damage from eutrophication. Nutrient over-enrichment can also produce harmful algal blooms that can harm fish and shellfish and pose a direct public health threat to humans.

Balancing future growth with protection of natural resources will be an important issue for Calhoun County to address in the years ahead. Although the downturn in the economy over the past years has suppressed development along the coastal areas of the county, it is likely that growth will continue when economic conditions improve, especially in the southern portion of the county. The focus of this study was to evaluate the feasibility of developing regionalized and centralized wastewater facilities to serve existing and future populations in Calhoun County including unincorporated areas of the county with failing on-site septic sewage facilities (OSSF) that are experiencing public health and water quality issues. Results of the study have shown that a regionalized or centralized approach to providing wastewater services will be costly due to the current location of existing rural population areas in relation to existing wastewater treatment facilities within the county. Financial assistance through grants and low interest loans from state and federal agencies identified in this study would be a necessity to improve the cost effectiveness of a regional or centralized project.

Although a regionalized or centralized approach to providing wastewater services would be the most effective method of wastewater treatment in terms of producing a higher level of water quality in treated wastewater effluent, the high monthly cost of providing these services make it difficult for customers to afford, particularly those with limited incomes. Existing state and federal water quality standards used in the development of wastewater discharge permits for new treatment plants as well as permit renewals for existing plants could also have an impact on costs.

With the high cost of providing regional or centralized wastewater services, there will likely be a decision by some property developers as well as individual landowners to pursue the cheaper alternative of installing OSSF's. Although the state has implemented much stricter rules and regulations regarding the installation, operation and maintenance of OSSF's, counties still face the challenge of limited staff to inspect these systems once installed to insure on-

going compliance with current rules and regulations. Continued emphasis should be placed on developers and homeowner's to insure that OSSF's have been permitted in accordance with current rules and regulations and constructed by a licensed installer and that procedures are in place to inspect these systems periodically once installed. Development of a program to educate homeowners about current OSSF permit requirements as well as the proper operation and maintenance of their OSSF is also important. Continued pursuit of state and federal funding opportunities to assist existing developments within the county experiencing failing septic systems will also be important.

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APPENDIX A

WATER CONSERVATION AND
DROUGHT CONTINGENCY PLANS-
CALHOUN PROJECT PARTICIPANTS

WATER CONSERVATION PLAN GUIDANCE CHECKLIST

This guidance checklist applies to all Texas Water Development Board (TWDB) Financial Assistance Programs specified in its rules under Texas Administrative Code 31, Chapters 355, 363, 371, 375, 382, and 384. **The TWDB will accept Water Conservation Plans determined by the Texas Commission on Environmental Quality (TCEQ) to satisfy the requirements of 30 TAC Chapter 288.**

Basically, *the water conservation plan* is a strategy or combination of strategies for reducing the consumption of water, reducing the loss or waste of water, improving or maintaining the efficiency in the use of water, or increasing recycling and reuse of water. It contains best management practices measures to try to meet the targets and goals identified in the plan. *The Drought Contingency (Emergency Demand Management) Plan* is a strategy or combination of strategies for responding to temporary and potentially recurring water supply shortages and other supply emergencies.

THE WATER CONSERVATION PLAN REQUIREMENTS:

A. _____ An evaluation of the Applicant's water and wastewater system and customer use characteristics to identify water conservation opportunities and potential targets and goals. Completion of the ***Water Conservation Utility Profile, WRD-264***, as part of the evaluation is required. Attach it to the Plan.

B. _____ Inclusion of 5-year and 10 –year targets & goals. Target and goals should be specific and quantified for municipal use expressed in gallons per capita per day (gpcd) as well as goals for water loss programs. Consider state and regional targets and goals, local climate, demographics, and the utility profile. Consider the anticipated savings that can be achieved by utilizing the appropriate Best Management Practices and other conservation techniques.

C. _____ A schedule for implementing the plan to achieve the applicant's targets and goals.

D. _____ A method for tracking the implementation and effectiveness of the plan. The method should track annual water use and provide information sufficient to evaluate the implementation conservation measures. The plan should measure progress annually, and, at a minimum, evaluate the progress towards meeting the targets and goals every five years.

E. _____ A master meter to measure and account for the amount of water diverted from the source of supply.

F. _____ A program of universal metering of both customer and public uses of water, for meter testing, repair and for periodic replacement.

G. _____ Measures to determine and control unaccounted-for uses of water. (for example, periodic visual inspections along distribution lines; annual or monthly audit of the water system to determine illegal connections, abandoned services, etc.)

H. _____ A continuous program of leak detection, repair, and water loss accounting for the water transmission, delivery, and distribution system in order to control water loss.

I. _____ A program of continuing education and information regarding water conservation. This should include providing water conservation information directly to each residential, industrial and commercial customer annually, and providing water conservation literature to new customers when they apply for service.

J. _____ A water rate structure which is not “promotional,” i.e., a rate structure which is cost-based and which does not encourage the excessive use of water. Include copy of the rate structure.

K. _____ A means of implementation and enforcement which shall be evidenced by adoption of the plan:

1. a copy of the ordinance, resolution, or tariff indicating official adoption of the water conservation plan by the applicant and
2. a description of the authority by which the applicant will implement and enforce the conservation plan.

L. _____ If the Applicant will utilize the project financed by the TWDB to furnish water or wastewater services to another supplying entity that in turn will furnish the water or wastewater services to the ultimate consumer, the requirements for the water conservation plan also pertain to these supplier entities.

To comply with this requirement the applicant shall:

1. submit its own water conservation plan;
2. submit the other entity’s (or entities) water conservation plan;
3. require, by contract, that the other entity (or entities), adopt a water conservation plan that conforms to the board’s requirement and submit it to the board. If the requirement is to be included in an existing water or wastewater service contract, it may be included, at the earliest of the renewal or substantial amendment of that contract, or by other appropriate measures.

M. _____ Documentation that the regional water planning group for the service area of the applicant has been notified of the applicant’s water conservation plan.

Note: The water conservation plan may also include other conservation method or technique that the applicant deems appropriate.

N. The Drought Contingency Plan shall include:

1. _____ **Trigger conditions.** Describe information to be monitored. For example, reservoir levels, daily water demand, water production or distribution system limitations. Supply source contamination and system outage or equipment failure should be considered too. Determine specific quantified targets of water use reduction.
2. _____ **Demand management measures.** Refers to actions that will be implemented by the utility during each stage of the plan when predetermined triggering criteria are met. **Drought plans must include quantified and specific targets for water use reductions to be achieved during periods of water shortage and drought.** Supply management measures typically can be taken by the utility to better manage available water supply, as well as the use of backup or alternative water sources. The demand management measures should curtail nonessential water uses, for example, outdoor water use.
3. _____ **Initiation and termination procedures.** The drought plan must include specific procedures to be followed for the initiation or termination of each drought response stage, including procedures for notification of the public.
4. _____ **Variances and enforcement.** The plans should specify procedures for considering (approving and denying) variances to the plan. Equally as important is the inclusion of provisions for enforcement of any mandatory water use restrictions, including specification of penalties for violations of such restrictions.
5. _____ **Measures to inform and educate the public.** Involving the public in the preparation of the drought contingency plan provides an important means for educating the public about the need for the plan and its content.

0. _____ **Adopt the plan.** No plan is complete without formal adoption by the governing body of the entity. For a municipal water system, adoption would be by the city council as an ordinance, or a resolution by an entity's board of directors.

P. ____ **Reporting Requirement:** Identify who will be responsible for preparing the annual report on the utility profile form WRD-264. Loan/Grant Recipients must maintain an approved water conservation program in effect until all financial obligations to the state have been discharged and shall **report annually** to the executive administrator of the TWDB on the progress in implementing each of the minimum requirements in its water conservation plan and the status of any of its customers' water conservation plan required by contract, within one year after closing on the financial assistance and annually thereafter. The content and format for the annual reporting is included in the form: ***Water Conservation Program Annual Report, WRD-265.***

Assistance: For information and assistance contact:

Adolph L. Stickelbault (adolph.stickelbault@twdb.state.tx.us)
Texas Water Development Board
PO Box 13231
Austin, Texas 78711-3231
512-936-2391

Municipal Plan Assistance and Forms:

<http://www.twdb.state.tx.us/assistance/conservation/Municipal/Plans/CPlans.asp>

Best Management Practices Information:

<http://www.twdb.state.tx.us/assistance/conservation/TaskForceDocs/WCITFBMPGuide.pdf>

Quantification Techniques:

<http://www.twdb.state.tx.us/assistance/conservation/gdsstudy.asp>

Drought Contingency Plan for a Retail Public Water Supplier

Texas Commission on Environmental Quality

Instructions: The following form is a model of a drought contingency plan for a retail public water supplier. Not all items may apply to your system's situation. This form is supplied for your convenience, but you are not required to use this form to submit your plan to the TCEQ. Submit completed plans to: Water Supply Division MC 160, TCEQ, P.O. Box 13087, Austin TX 78711-3087.

(Name of Utility)

(Address, City, Zip Code)

(CCN#)

(PWS #s)

(Date)

Section I: Declaration of Policy, Purpose, and Intent

In order to conserve the available water supply and protect the integrity of water supply facilities, with particular regard for domestic water use, sanitation, and fire protection, and to protect and preserve public health, welfare, and safety and minimize the adverse impacts of water supply shortage or other water supply emergency conditions, the _____ (name of your water supplier) hereby adopts the following regulations and restrictions on the delivery and consumption of water through an ordinance/or resolution (see Appendix C for an example).

Water uses regulated or prohibited under this Drought Contingency Plan (the Plan) are considered to be non-essential and continuation of such uses during times of water shortage or other emergency water supply condition are deemed to constitute a waste of water which subjects the offender(s) to penalties as defined in Section XI of this Plan.

Section II: Public Involvement

Opportunity for the public to provide input into the preparation of the Plan was provided by the _____ (name of your water supplier) by means of _____ (describe methods used to inform the public about the preparation of the plan and provide opportunities for input; for example, scheduling and providing public notice of a public meeting to accept input on the Plan).

Section III: Public Education

The _____ (name of your water supplier) will periodically provide the public with information about the Plan, including information about the conditions under which each stage of the Plan is to be initiated or terminated and the drought response measures to be implemented in each stage. This information will be provided by means of _____ (describe methods to be used to provide information to the public about the Plan; for example, public events, press releases or utility bill inserts).

Section IV: Coordination with Regional Water Planning Groups

The service area of the _____ (name of your water supplier) is located within the _____ (name of regional water planning area or areas) and _____ (name of your water supplier) has provided a copy of this Plan to the _____ (name of your regional water planning group or groups).

Section V: Authorization

The _____ (designated official; for example, the mayor, city manager, utility director, general manager, etc.), or his/her designee is hereby authorized and directed to implement the applicable provisions of this Plan upon determination that such implementation is necessary to protect public health, safety, and welfare. The _____, (designated official) or his/her designee, shall have the authority to initiate or terminate drought or other water supply emergency response measures as described in this Plan.

Section VI: Application

The provisions of this Plan shall apply to all persons, customers, and property utilizing water provided by the _____ (name of your water supplier). The terms “person” and “customer” as used in the Plan include individuals, corporations, partnerships, associations, and all other legal entities.

Section VII: Definitions

For the purposes of this Plan, the following definitions shall apply:

Aesthetic water use: water use for ornamental or decorative purposes such as fountains, reflecting pools, and water gardens.

Commercial and institutional water use: water use which is integral to the operations of commercial and non-profit establishments and governmental entities such as retail establishments, hotels and motels, restaurants, and office buildings.

Conservation: those practices, techniques, and technologies that reduce the consumption of water, reduce the loss or waste of water, improve the efficiency in the use of water or increase the recycling and reuse of water so that a supply is conserved and made available for future or alternative uses.

Customer: any person, company, or organization using water supplied by _____ (name of your water supplier).

Domestic water use: water use for personal needs or for household or sanitary purposes such as drinking, bathing, heating, cooking, sanitation, or for cleaning a residence, business, industry, or institution.

Even number address: street addresses, box numbers, or rural postal route numbers ending in 0, 2, 4, 6, or 8 and locations without addresses.

Industrial water use: the use of water in processes designed to convert materials of lower value into forms having greater usability and value.

Landscape irrigation use: water used for the irrigation and maintenance of landscaped areas, whether publicly or privately owned, including residential and commercial lawns, gardens, golf courses, parks, and rights-of-way and medians.

Non-essential water use: water uses that are not essential nor required for the protection of public, health, safety, and welfare, including:

- (a) irrigation of landscape areas, including parks, athletic fields, and golf courses, except otherwise provided under this Plan;
- (b) use of water to wash any motor vehicle, motorbike, boat, trailer, airplane or other vehicle;
- (c) use of water to wash down any sidewalks, walkways, driveways, parking lots, tennis courts, or other hard-surfaced areas;
- (d) use of water to wash down buildings or structures for purposes other than immediate fire protection;
- (e) flushing gutters or permitting water to run or accumulate in any gutter or street;
- (f) use of water to fill, refill, or add to any indoor or outdoor swimming pools or jacuzzi-type pools;

- (g) use of water in a fountain or pond for aesthetic or scenic purposes except where necessary to support aquatic life;
- (h) failure to repair a controllable leak(s) within a reasonable period after having been given notice directing the repair of such leak(s); and
- (i) use of water from hydrants for construction purposes or any other purposes other than fire fighting.

Odd numbered address: street addresses, box numbers, or rural postal route numbers ending in 1, 3, 5, 7, or 9.

Section VIII: Criteria for Initiation and Termination of Drought Response Stages

The _____ (designated official) or his/her designee shall monitor water supply and/or demand conditions on a _____ (example: daily, weekly, monthly) basis and shall determine when conditions warrant initiation or termination of each stage of the Plan, that is, when the specified “triggers” are reached.

The triggering criteria described below are based on _____

(provide a brief description of the rationale for the triggering criteria; for example, triggering criteria / trigger levels based on a statistical analysis of the vulnerability of the water source under drought of record conditions, or based on known system capacity limits).

Stage 1 Triggers -- MILD Water Shortage Conditions

Requirements for initiation

Customers shall be requested to voluntarily conserve water and adhere to the prescribed restrictions on certain water uses, defined in Section VII–Definitions, when

(describe triggering criteria / trigger levels; see examples below).

Following are examples of the types of triggering criteria that might be used in one or more successive stages of a drought contingency plan. One or a combination of such criteria must be defined for each drought response stage, but usually not all will apply. Select those appropriate to your system:

Example 1: Annually, beginning on May 1 through September 30.

Example 2: When the water supply available to the _____ (name of your water supplier) is equal to or less than _____ (acre-feet, percentage of storage, etc.).

*Example 3: When, pursuant to requirements specified in the _____ (name of **your** water supplier) wholesale water purchase contract with _____ (name*

of your wholesale water supplier), notification is received requesting initiation of Stage 1 of the Drought Contingency Plan.

Example 4: When flows in the _____ (name of stream or river) are equal to or less than _____ cubic feet per second.

Example 5: When the static water level in the _____ (name of your water supplier) well(s) is equal to or less than _____ feet above/below mean sea level.

Example 6: When the specific capacity of the _____ (name of your water supplier) well(s) is equal to or less than _____ percent of the well's original specific capacity.

Example 7: When total daily water demand equals or exceeds _____ million gallons for _____ consecutive days of _____ million gallons on a single day (example: based on the "safe" operating capacity of water supply facilities).

Example 8: Continually falling treated water reservoir levels which do not refill above _____ percent overnight (example: based on an evaluation of minimum treated water storage required to avoid system outage).

The public water supplier may devise other triggering criteria which are tailored to its system.

Requirements for termination

Stage 1 of the Plan may be rescinded when all of the conditions listed as triggering events have ceased to exist for a period of _____ (e.g. 3) consecutive days.

Stage 2 Triggers -- MODERATE Water Shortage Conditions

Requirements for initiation

Customers shall be required to comply with the requirements and restrictions on certain non-essential water uses provided in Section IX of this Plan when _____ (describe triggering criteria; see examples in Stage 1).

Requirements for termination

Stage 2 of the Plan may be rescinded when all of the conditions listed as triggering events have ceased to exist for a period of _____ (example: 3) consecutive days. Upon termination of Stage 2, Stage 1 becomes operative.

Stage 3 Triggers – SEVERE Water Shortage Conditions

Requirements for initiation

Customers shall be required to comply with the requirements and restrictions on certain non-essential water uses for Stage 3 of this Plan when _____ (describe triggering criteria; see examples in

Stage 1).

Requirements for termination

Stage 3 of the Plan may be rescinded when all of the conditions listed as triggering events have ceased to exist for a period of ____ (example: 3) consecutive days. Upon termination of Stage 3, Stage 2 becomes operative.

Stage 4 Triggers -- CRITICAL Water Shortage Conditions

Requirements for initiation

Customers shall be required to comply with the requirements and restrictions on certain non-essential water uses for Stage 4 of this Plan when _____ (*describe triggering criteria; see examples in Stage 1*).

Requirements for termination

Stage 4 of the Plan may be rescinded when all of the conditions listed as triggering events have ceased to exist for a period of ____ (example: 3) consecutive days. Upon termination of Stage 4, Stage 3 becomes operative.

Stage 5 Triggers -- EMERGENCY Water Shortage Conditions

Requirements for initiation

Customers shall be required to comply with the requirements and restrictions for Stage 5 of this Plan when _____ (designated official), or his/her designee, determines that a water supply emergency exists based on:

1. Major water line breaks, or pump or system failures occur, which cause unprecedented loss of capability to provide water service; **or**
2. Natural or man-made contamination of the water supply source(s).

Requirements for termination

Stage 5 of the Plan may be rescinded when all of the conditions listed as triggering events have ceased to exist for a period of ____ (example: 3) consecutive days.

Stage 6 Triggers -- WATER ALLOCATION

Requirements for initiation

Customers shall be required to comply with the water allocation plan prescribed in Section IX of this Plan and comply with the requirements and restrictions for Stage 5 of this Plan when _____ (*describe triggering criteria, see examples in Stage 1*).

Requirements for termination - Water allocation may be rescinded when all of the conditions listed as triggering events have ceased to exist for a period of ____ (example: 3) consecutive days.

Note: The inclusion of WATER ALLOCATION as part of a drought contingency plan may not be required in all cases. For example, for a given water supplier, an analysis of water supply availability under drought of record conditions may indicate that there is essentially no risk of water supply shortage. Hence, a drought contingency plan for such a water supplier might only address facility capacity limitations and emergency conditions (example: supply source contamination and system capacity limitations).

Section IX: Drought Response Stages

The _____ (designated official), or his/her designee, shall monitor water supply and/or demand conditions on a daily basis and, in accordance with the triggering criteria set forth in Section VIII of this Plan, shall determine that a mild, moderate, severe, critical, emergency or water shortage condition exists and shall implement the following notification procedures:

Notification

Notification of the Public:

The _____ (designated official) or his/ her designee shall notify the public by means of:

Examples:

*publication in a newspaper of general circulation,
direct mail to each customer,
public service announcements,
signs posted in public places
take-home fliers at schools.*

Additional Notification:

The _____ (designated official) or his/ her designee shall notify directly, or cause to be notified directly, the following individuals and entities:

Examples:

*Mayor / Chairman and members of the City Council / Utility Board
Fire Chief(s)
City and/or County Emergency Management Coordinator(s)
County Judge & Commissioner(s)
State Disaster District / Department of Public Safety
TCEQ (required when mandatory restrictions are imposed)
Major water users*

*Critical water users, i.e. hospitals
Parks / street superintendents & public facilities managers*

Note: The plan should specify direct notice only as appropriate to respective drought stages.

Stage 1 Response -- MILD Water Shortage Conditions

Target: Achieve a voluntary ____ percent reduction in _____(example: total water use, daily water demand, etc.).

Best Management Practices for Supply Management:

Describe additional measures, if any, to be implemented directly by (name of your water supplier) to manage limited water supplies and/or reduce water demand. Examples include: reduced or discontinued flushing of water mains, activation and use of an alternative supply source(s); use of reclaimed water for non-potable purposes.

Voluntary Water Use Restrictions for Reducing Demand :

- (a) Water customers are requested to voluntarily limit the irrigation of landscaped areas to Sundays and Thursdays for customers with a street address ending in an even number (0, 2, 4, 6 or 8), and Saturdays and Wednesdays for water customers with a street address ending in an odd number (1, 3, 5, 7 or 9), and to irrigate landscapes only between the hours of midnight and 10:00 a.m. and 8:00 p.m to midnight on designated watering days.
- (b) All operations of the _____ (name of your water supplier) shall adhere to water use restrictions prescribed for Stage 2 of the Plan.
- (c) Water customers are requested to practice water conservation and to minimize or discontinue water use for non-essential purposes.

Stage 2 Response -- MODERATE Water Shortage Conditions

Target: Achieve a ____ percent reduction in _____ (example: total water use, daily water demand, etc.).

Best Management Practices for Supply Management:

Describe additional measures, if any, to be implemented directly by _____ (name of your water supplier) to manage limited water supplies and/or reduce water demand. Examples include: reduced or discontinued flushing of water mains, reduced or discontinued irrigation of public landscaped areas; use of an alternative supply source(s); use of reclaimed water for non-potable purposes.

Water Use Restrictions for Demand Reduction:

Under threat of penalty for violation, the following water use restrictions shall apply to all persons:

- (a) Irrigation of landscaped areas with hose-end sprinklers or automatic irrigation systems shall be limited to Sundays and Thursdays for customers with a street address ending in an even number (0, 2, 4, 6 or 8), and Saturdays and Wednesdays for water customers with a street address ending in an odd number (1, 3, 5, 7 or 9), and irrigation of landscaped areas is further limited to the hours of 12:00 midnight until 10:00 a.m. and between 8:00 p.m. and 12:00 midnight on designated watering days. However, irrigation of landscaped areas is permitted at anytime if it is by means of a hand-held hose, a faucet filled bucket or watering can of five (5) gallons or less, or drip irrigation system.
- (b) Use of water to wash any motor vehicle, motorbike, boat, trailer, airplane or other vehicle is prohibited except on designated watering days between the hours of 12:00 midnight and 10:00 a.m. and between 8:00 p.m. and 12:00 midnight. Such washing, when allowed, shall be done with a hand-held bucket or a hand-held hose equipped with a positive shutoff nozzle for quick rises. Vehicle washing may be done at any time on the immediate premises of a commercial car wash or commercial service station. Further, such washing may be exempted from these regulations if the health, safety, and welfare of the public is contingent upon frequent vehicle cleansing, such as garbage trucks and vehicles used to transport food and perishables.
- (c) Use of water to fill, refill, or add to any indoor or outdoor swimming pools, wading pools, or jacuzzi-type pools is prohibited except on designated watering days between the hours of 12:00 midnight and 10:00 a.m. and between 8 p.m. and 12:00 midnight.
- (d) Operation of any ornamental fountain or pond for aesthetic or scenic purposes is prohibited except where necessary to support aquatic life or where such fountains or ponds are equipped with a recirculation system.
- (e) Use of water from hydrants shall be limited to fire fighting, related activities, or other activities necessary to maintain public health, safety, and welfare, except that use of water from designated fire hydrants for construction purposes may be allowed under special permit from the _____ (name of your water supplier).
- (f) Use of water for the irrigation of golf course greens, tees, and fairways is prohibited except on designated watering days between the hours 12:00 midnight and 10:00 a.m. and between 8 p.m. and 12:00 midnight. However, if the golf course utilizes a water source other than that provided by the _____ (name of your water supplier), the facility shall not be subject to these regulations.

- (g) All restaurants are prohibited from serving water to patrons except upon request of the patron.
- (h) The following uses of water are defined as non-essential and are prohibited:
 - 1. wash down of any sidewalks, walkways, driveways, parking lots, tennis courts, or other hard-surfaced areas;
 - 2. use of water to wash down buildings or structures for purposes other than immediate fire protection;
 - 3. use of water for dust control;
 - 4. flushing gutters or permitting water to run or accumulate in any gutter or street; and
 - 5. failure to repair a controllable leak(s) within a reasonable period after having been given notice directing the repair of such leak(s).

Stage 3 Response -- SEVERE Water Shortage Conditions

Target: Achieve a ____ percent reduction in _____ (example: total water use, daily water demand, etc.).

Best Management Practices for Supply Management:

Describe additional measures, if any, to be implemented directly by _____ (name of your water supplier) to manage limited water supplies and/or reduce water demand. Examples include: reduced or discontinued flushing of water mains, reduced or discontinued irrigation of public landscaped areas; use of an alternative supply source(s); use of reclaimed water for non-potable purposes.

Water Use Restrictions for Demand Reduction:

All requirements of Stage 2 shall remain in effect during Stage 3 except:

- (a) Irrigation of landscaped areas shall be limited to designated watering days between the hours of 12:00 midnight and 10:00 a.m. and between 8 p.m. and 12:00 midnight and shall be by means of hand-held hoses, hand-held buckets, drip irrigation, or permanently installed automatic sprinkler system only. The use of hose-end sprinklers is prohibited at all times.
- (b) The watering of golf course tees is prohibited unless the golf course utilizes a water source other than that provided by the _____ (name of your water supplier).
- (c) The use of water for construction purposes from designated fire hydrants under special permit is to be discontinued.

Stage 4 Response -- CRITICAL Water Shortage Conditions

Target: Achieve a ____ percent reduction in _____ (example: total water use, daily water demand, etc.).

Best Management Practices for Supply Management:

Describe additional measures, if any, to be implemented directly by _____ (name of your water supplier) to manage limited water supplies and/or reduce water demand. Examples include: reduced or discontinued flushing of water mains, reduced or discontinued irrigation of public landscaped areas; use of an alternative supply source(s); use of reclaimed water for non-potable purposes.

Water Use Restrictions for Reducing Demand: All requirements of Stage 2 and 3 shall remain in effect during Stage 4 except:

- (a) Irrigation of landscaped areas shall be limited to designated watering days between the hours of 6:00 a.m. and 10:00 a.m. and between 8:00 p.m. and 12:00 midnight and shall be by means of hand-held hoses, hand-held buckets, or drip irrigation only. The use of hose-end sprinklers or permanently installed automatic sprinkler systems are prohibited at all times.
- (b) Use of water to wash any motor vehicle, motorbike, boat, trailer, airplane or other vehicle not occurring on the premises of a commercial car wash and commercial service stations and not in the immediate interest of public health, safety, and welfare is prohibited. Further, such vehicle washing at commercial car washes and commercial service stations shall occur only between the hours of 6:00 a.m. and 10:00 a.m. and between 6:00 p.m. and 10 p.m.
- (c) The filling, refilling, or adding of water to swimming pools, wading pools, and jacuzzi-type pools is prohibited.
- (d) Operation of any ornamental fountain or pond for aesthetic or scenic purposes is prohibited except where necessary to support aquatic life or where such fountains or ponds are equipped with a recirculation system.
- (e) No application for new, additional, expanded, or increased-in-size water service connections, meters, service lines, pipeline extensions, mains, or water service facilities of any kind shall be approved, and time limits for approval of such applications are hereby suspended for such time as this drought response stage or a higher-numbered stage shall be in effect.

Stage 5 Response -- EMERGENCY Water Shortage Conditions

Target: Achieve a ____ percent reduction in _____ (example: total water use, daily water demand, etc.).

Best Management Practices for Supply Management:

Describe additional measures, if any, to be implemented directly by _____ (name of your water supplier) to manage limited water supplies and/or reduce water demand. Examples include: reduced or discontinued flushing of water mains, reduced or discontinued irrigation of public landscaped areas; use of an alternative supply source(s); use of reclaimed water for non-potable purposes.

Water Use Restrictions for Reducing Demand. All requirements of Stage 2, 3, and 4 shall remain in effect during Stage 5 except:

- (a) Irrigation of landscaped areas is absolutely prohibited.
- (b) Use of water to wash any motor vehicle, motorbike, boat, trailer, airplane or other vehicle is absolutely prohibited.

Stage 6 Response -- WATER ALLOCATION

In the event that water shortage conditions threaten public health, safety, and welfare, the _____ (designated official) is hereby authorized to allocate water according to the following water allocation plan:

Single-Family Residential Customers

The allocation to residential water customers residing in a single-family dwelling shall be as follows:

Persons per Household	Gallons per Month
1 or 2	6,000
3 or 4	7,000
5 or 6	8,000
7 or 8	9,000
9 or 10	10,000
11 or more	12,000

“Household” means the residential premises served by the customer’s meter. “Persons per household” includes only those persons currently physically residing at the premises and expected to reside there for the entire billing period. It shall be assumed that a particular customer’s household is comprised of two (2) persons unless the customer notifies the _____ (name of your water supplier) of a greater number of persons per household on a form prescribed by the _____ (designated official). The _____ (designated official) shall give his/her best effort to see that such forms are mailed, otherwise provided, or made available to every residential customer. If, however, a customer does not receive such a

form, it shall be the customer’s responsibility to go to the _____ (name of your water supplier) offices to complete and sign the form claiming more than two (2) persons per household. New customers may claim more persons per household at the time of applying for water service on the form prescribed by the _____ (designated official). When the number of persons per household increases so as to place the customer in a different allocation category, the customer may notify the _____ (name of water supplier) on such form and the change will be implemented in the next practicable billing period. If the number of persons in a household is reduced, the customer shall notify the _____ (name of your water supplier) in writing within two (2) days. In prescribing the method for claiming more than two (2) persons per household, the _____ (designated official) shall adopt methods to insure the accuracy of the claim. Any person who knowingly, recklessly, or with criminal negligence falsely reports the number of persons in a household or fails to timely notify the _____ (name of your water supplier) of a reduction in the number of person in a household shall be fined not less than \$_____.

Residential water customers shall pay the following surcharges:

- \$_____ for the first 1,000 gallons over allocation.
- \$_____ for the second 1,000 gallons over allocation.
- \$_____ for the third 1,000 gallons over allocation.
- \$_____ for each additional 1,000 gallons over allocation.

Surcharges shall be cumulative.

Master-Metered Multi-Family Residential Customers

The allocation to a customer billed from a master meter which jointly measures water to multiple permanent residential dwelling units (example: apartments, mobile homes) shall be allocated 6,000 gallons per month for each dwelling unit. It shall be assumed that such a customer’s meter serves two dwelling units unless the customer notifies the _____ (name of your water supplier) of a greater number on a form prescribed by the _____ (designated official). The _____ (designated official) shall give his/her best effort to see that such forms are mailed, otherwise provided, or made available to every such customer. If, however, a customer does not

receive such a form, it shall be the customer's responsibility to go to the _____ (name of your water supplier) offices to complete and sign the form claiming more than two (2) dwellings. A dwelling unit may be claimed under this provision whether it is occupied or not. New customers may claim more dwelling units at the time of applying for water service on the form prescribed by the _____ (designated official). If the number of dwelling units served by a master meter is reduced, the customer shall notify the _____ (name of your water supplier) in writing within two (2) days. In prescribing the method for claiming more than two (2) dwelling units, the _____ (designated official) shall adopt methods to insure the accuracy of the claim. Any person who knowingly, recklessly, or with criminal negligence falsely reports the number of dwelling units served by a master meter or fails to timely notify the _____ (name of your water supplier) of a reduction in the number of person in a household shall be fined not less than \$ _____. Customers billed from a master meter under this provision shall pay the following monthly surcharges:

- \$ ____ for 1,000 gallons over allocation up through 1,000 gallons for each dwelling unit.
- \$ ____, thereafter, for each additional 1,000 gallons over allocation up through a second 1,000 gallons for each dwelling unit.
- \$ ____, thereafter, for each additional 1,000 gallons over allocation up through a third 1,000 gallons for each dwelling unit.
- \$ ____, thereafter for each additional 1,000 gallons over allocation.

Surcharges shall be cumulative.

Commercial Customers

A monthly water allocation shall be established by the _____ (designated official), or his/her designee, for each nonresidential commercial customer other than an industrial customer who uses water for processing purposes. The non-residential customer's allocation shall be approximately ____ (e.g. 75%) percent of the customer's usage for corresponding month's billing period for the previous 12 months. If the customer's billing history is shorter than 12 months, the monthly average for the period for which there is a record shall be used for any monthly period for which no history exists. Provided, however, a customer, ____ percent of whose monthly usage is less than ____ gallons, shall be allocated ____ gallons. The _____ (designated official) shall give his/her best effort to see that notice of each non-residential customer's allocation is mailed to such customer. If, however, a customer does not receive such notice, it shall be the customer's responsibility to contact the _____ (name of your water supplier) to determine the allocation. Upon request of the customer or at the initiative of the _____ (designated official), the allocation may be reduced or increased if, (1) the designated period does not accurately reflect the customer's normal water usage, (2) one nonresidential customer agrees to transfer part of its allocation to another nonresidential customer, or (3) other objective evidence demonstrates that the designated allocation is inaccurate under present conditions. A customer

may appeal an allocation established hereunder to the _____ (designated official or alternatively, a special water allocation review committee). Nonresidential commercial customers shall pay the following surcharges:

Customers whose allocation is _____ gallons through _____ gallons per month:

- \$_____ per thousand gallons for the first 1,000 gallons over allocation.
- \$_____ per thousand gallons for the second 1,000 gallons over allocation.
- \$_____ per thousand gallons for the third 1,000 gallons over allocation.
- \$_____ per thousand gallons for each additional 1,000 gallons over allocation.

Customers whose allocation is _____ gallons per month or more:

- _____ times the block rate for each 1,000 gallons in excess of the allocation up through 5 percent above allocation.
- _____ times the block rate for each 1,000 gallons from 5 percent through 10 percent above allocation.
- _____ times the block rate for each 1,000 gallons from 10 percent through 15 percent above allocation.
- _____ times the block rate for each 1,000 gallons more than 15 percent above allocation.

The surcharges shall be cumulative. As used herein, “block rate” means the charge to the customer per 1,000 gallons at the regular water rate schedule at the level of the customer’s allocation.

Industrial Customers

A monthly water allocation shall be established by the _____ (designated official), or his/her designee, for each industrial customer, which uses water for processing purposes. The industrial customer’s allocation shall be approximately ____ (example: 90%) percent of the customer’s water usage baseline. Ninety (90) days after the initial imposition of the allocation for industrial customers, the industrial customer’s allocation shall be further reduced to ____ (example: 85%) percent of the customer’s water usage baseline. The industrial customer’s water use baseline will be computed on the average water use for the _____ month period ending prior to the date of implementation of Stage 2 of the Plan. If the industrial water customer’s billing history is shorter than ____ months, the monthly average for the period for which there is a record shall be used for any monthly period for which no billing history exists. The _____ (designated official) shall give his/her best effort to see that notice of each industrial customer’s allocation is mailed to such customer. If, however, a customer does not receive such notice, it shall be the customer’s responsibility to contact the _____ (name of your water supplier) to determine the allocation, and the allocation shall be fully effective notwithstanding the lack of

receipt of written notice. Upon request of the customer or at the initiative of the _____ (designated official), the allocation may be reduced or increased, (1) if the designated period does not accurately reflect the customer's normal water use because the customer had shutdown a major processing unit for repair or overhaul during the period, (2) the customer has added or is in the process of adding significant additional processing capacity, (3) the customer has shutdown or significantly reduced the production of a major processing unit, (4) the customer has previously implemented significant permanent water conservation measures such that the ability to further reduce water use is limited, (5) the customer agrees to transfer part of its allocation to another industrial customer, or (6) if other objective evidence demonstrates that the designated allocation is inaccurate under present conditions. A customer may appeal an allocation established hereunder to the _____ (designated official or alternatively, a special water allocation review committee). Industrial customers shall pay the following surcharges:

Customers whose allocation is _____ gallons through _____ gallons per month:

- \$_____ per thousand gallons for the first 1,000 gallons over allocation.
- \$_____ per thousand gallons for the second 1,000 gallons over allocation.
- \$_____ per thousand gallons for the third 1,000 gallons over allocation.
- \$_____ per thousand gallons for each additional 1,000 gallons over allocation.

Customers whose allocation is _____ gallons per month or more:

- _____ times the block rate for each 1,000 gallons in excess of the allocation up through 5 percent above allocation.
- _____ times the block rate for each 1,000 gallons from 5 percent through 10 percent above allocation.
- _____ times the block rate for each 1,000 gallons from 10 percent through 15 percent above allocation.
- _____ times the block rate for each 1,000 gallons more than 15 percent above allocation.

The surcharges shall be cumulative. As used herein, "block rate" means the charge to the customer per 1,000 gallons at the regular water rate schedule at the level of the customer's allocation.

Section X: Enforcement

- (a) No person shall knowingly or intentionally allow the use of water from the _____ (name of your water supplier) for residential, commercial, industrial, agricultural, governmental, or any other purpose in a manner contrary to any provision of this Plan, or in an amount in excess of that permitted by the drought response stage in effect at the

time pursuant to action taken by _____ (designated official), or his/her designee, in accordance with provisions of this Plan.

- (b) Any person who violates this Plan is guilty of a misdemeanor and, upon conviction shall be punished by a fine of not less than _____ dollars (\$___) and not more than _____ dollars (\$___). Each day that one or more of the provisions in this Plan is violated shall constitute a separate offense. If a person is convicted of three or more distinct violations of this Plan, the _____ (designated official) shall, upon due notice to the customer, be authorized to discontinue water service to the premises where such violations occur. Services discontinued under such circumstances shall be restored only upon payment of a re-connection charge, hereby established at \$_____, and any other costs incurred by the _____ (name of your water supplier) in discontinuing service. In addition, suitable assurance must be given to the _____ (designated official) that the same action shall not be repeated while the Plan is in effect. Compliance with this plan may also be sought through injunctive relief in the district court.
- (c) Any person, including a person classified as a water customer of the _____ (name of your water supplier), in apparent control of the property where a violation occurs or originates shall be presumed to be the violator, and proof that the violation occurred on the person's property shall constitute a rebuttable presumption that the person in apparent control of the property committed the violation, but any such person shall have the right to show that he/she did not commit the violation. Parents shall be presumed to be responsible for violations of their minor children and proof that a violation, committed by a child, occurred on property within the parents' control shall constitute a rebuttable presumption that the parent committed the violation, but any such parent may be excused if he/she proves that he/she had previously directed the child not to use the water as it was used in violation of this Plan and that the parent could not have reasonably known of the violation.
- (d) Any employee of the _____ (name of your water supplier), police officer, or other _____ employee designated by the _____ (designated official), may issue a citation to a person he/she reasonably believes to be in violation of this Ordinance. The citation shall be prepared in duplicate and shall contain the name and address of the alleged violator, if known, the offense charged, and shall direct him/her to appear in the _____ (example: municipal court) on the date shown on the citation for which the date shall not be less than 3 days nor more than 5 days from the date the citation was issued. The alleged violator shall be served a copy of the citation. Service of the citation shall be complete upon delivery of the citation to the alleged violator, to an agent or employee of a violator, or to a person over 14 years of age who is a member of the violator's immediate family or is a resident of the violator's residence. The alleged violator shall appear in _____ (example: municipal court) to enter a plea of guilty or not guilty for the violation of this Plan. If the alleged violator fails to appear in _____ (example: municipal court), a warrant for his/her arrest may be issued. A summons to appear may be issued in lieu of an arrest warrant. These cases shall be expedited and

given preferential setting in _____ (example: municipal court) before all other cases.

Section XI: Variances

The _____ (designated official), or his/her designee, may, in writing, grant temporary variance for existing water uses otherwise prohibited under this Plan if it is determined that failure to grant such variance would cause an emergency condition adversely affecting the health, sanitation, or fire protection for the public or the person requesting such variance and if one or more of the following conditions are met:

- (a) Compliance with this Plan cannot be technically accomplished during the duration of the water supply shortage or other condition for which the Plan is in effect.
- (b) Alternative methods can be implemented which will achieve the same level of reduction in water use.

Persons requesting an exemption from the provisions of this Ordinance shall file a petition for variance with the _____ (name of your water supplier) within 5 days after the Plan or a particular drought response stage has been invoked. All petitions for variances shall be reviewed by the _____ (designated official), or his/her designee, and shall include the following:

- (a) Name and address of the petitioner(s).
- (b) Purpose of water use.
- (c) Specific provision(s) of the Plan from which the petitioner is requesting relief.
- (d) Detailed statement as to how the specific provision of the Plan adversely affects the petitioner or what damage or harm will occur to the petitioner or others if petitioner complies with this Ordinance.
- (e) Description of the relief requested.
- (f) Period of time for which the variance is sought.
- (g) Alternative water use restrictions or other measures the petitioner is taking or proposes to take to meet the intent of this Plan and the compliance date.
- (h) Other pertinent information.



Texas Water Development Board
Water Conservation Program Annual Report
for Non-Water Suppliers

Texas Water Code requires that each entity that is required to submit a water conservation plan to the Texas Commission on Environmental Quality (TCEQ) shall file an annual report to the Texas Water Development Board (TWDB) on the entity's progress in implementing each of the minimum requirements in their water conservation plan. Implementation reports prepared for the TCEQ providing the required information may be submitted to the TWDB to fulfill this reporting requirement.

The following questions are designed to provide the TWDB this information in a concise and consistent format. Please fill in the blanks that pertain to your program as completely and objectively as possible. Your water conservation plan should contain long-term elements such as ongoing education activities, metering, water accounting and estimated water savings from water reuse and recycling activities, leak detection and repair and other conservation activities. **As you complete the report form, please review your entity's water conservation plan to see if you are making progress toward meeting your stated goal(s).**

Return completed form to:

Executive Administrator
Texas Water Development Board
P.O. Box 13231
Austin, Texas 78711-3231
ATTN: CONSERVATION

ENTITY DATA

Name of Entity: Alcoa World Alumina LLC, Point Comfort Operations

Water Right Number : 1842A, Certificate of Adjudication: 15-4792A & System ID # 0290014.

Address: State Highway 35 City: Point Comfort

State: TX Zip Code: 77978 Email: _____

Telephone Number: (361) 987-6439 Fax: (361) 987-6102

Regional Water Planning Group: L

Groundwater Conservation District: _____

Form Completed By: Lindley Jarrett Title: Staff Environmental Engineer

Signature: Jarrett, Lindley Digitally signed by Jarrett, Lindley
DN: cn=Lindley, o=Alcoa, ou=PTC, email=jarrett.lindley@alcoa.com, c=US
Reason: I am the author of this document
Date: 2011.04.29 13:10:17 -0500 Date: 04/29/2011

Reporting Period: January 01, 2010 to December 31, 2010

Total Gallons of Water Used (treated or raw)	Total Gallons per Day (GPD)*	Number of Acres Irrigated if for Agricultural Irrigation Use
761,782,121	2,087,074.30	0

* **Total GPD:** the calculation is made by dividing the total water diverted or treated by 365

Please provide the **specific and quantified five and ten-year targets** as listed in your water conservation plan:

		Date to Achieve Target
Five-year target	1562 acre-feet	2014
Ten-year target	1562 acre-feet	2019

LONG TERM WATER CONSERVATION PROGRAM

- Approximately how much water was saved during the reporting period due to the overall conservation program?

Gallons of Water Saved	Dollar Value of Water Savings*
Undetermined	NA

* Based on water savings and the cost of treatment or purchase of your water, and any deferred capital costs due to conservation.

2. In your opinion, how you would rank the effectiveness of your conservation program?

Effective



**Somewhat
Effective**



**Less than
Effective**



Not Effective



Do Not Know



Please provide additional information about any successes or problems you may have experienced in implementing your plan.

Point Comfort Operations water conservation strategy includes metering of potable and surface water lines, effectuating early repairs when leaks are detected, ongoing training and education as well as other water conservation practices . Metering accounts for water use on an ongoing basis and allows the location to make informed decisions with respect to trends in historical and current water usage. The location continued demonstration in

3. Please provide information on the water conservation activities your entity undertook during the reporting period:

The location continued to monitor, track and report potable water use which provided a trigger to identify anomalies in water usage. Maintenance is carried out on pipelines, water storage vessels and other aspects of the location's water distribution system on an ongoing basis. Ongoing good maintenance practices reduces the occurrence of leaks as well as provide opportunities for early leak detection and effectuating repairs.

As mentioned above, the location recycled and reused chlorinated potable water at the sanitary treatment plant which has the potential to reduce potable water usage by over 3,000,000 gallons per year.

Operators received ongoing appropriate training and licensing with respect to the operation, treatment and distribution of potable water systems under their control. Ongoing education and training is a proven water conservation activity.

In addition to the above the location sought and received a beneficial re-use permit which will allow for the re-use of industrial waste water and the reduction of potable water use for irrigation purposes.

4. How often does your entity review your water conservation program?
Once per year
5. What year did your entity adopt, or revise, their water conservation plan? 2006
6. What might your entity do to improve the effectiveness of your water conservation program?

Continue dialogue with local community on potable water sharing and review policy with respect to supplying treated potable water to neighboring industrial facilities while exploring water conservation opportunities for the secondary reuse of waste water with surrounding industrial facilities.

7. What might the TWDB or TCEQ do to assist you in improving the effectiveness of your water conservation program?

Develop programs that promote and encourage beneficial reuse of industrial wastewater and the use and reuse of secondary waste water amongst neighboring industrial facilities.

8. **(Optional)** If known, how much expense did your entity incur in implementing your water conservation program during the reporting period (*equipment, materials, staff time, etc.*)?
 _____ (dollars/year)

9. Recycling and Reuse of Water or Wastewater Effluent

Please provide the following data regarding what types of water recycling or reuse activities were practiced by your entity during the reporting period, and what volume:

Use	Total Annual Volume (in gallons)
Plant wash down	
Chlorination/de-chlorination	
Industrial	307,984,553
Landscape irrigation (parks, golf courses)	
Agricultural	
Other, please describe: dust control	453,797,568
Total	761,782,121

Could treated effluent be substituted for certain potable water now being used? Yes ☒ No ☐

10. Drought Contingency and Emergency Water Demand Management

During the reporting period, did your entity activate its Drought Contingency Plan?

Yes ☐ No ☒

If yes, please check all the appropriate boxes for the reason why:

Reason	
Water Shortage	☐
High Demand	☐
Capacity Issues	☐
Equipment Failure	☐
Other, please describe:	

Start Date January 1, 2010

End Date December 1, 2010

Submit Form by Email

Print Form

Reset Form

ORDINANCE NO. 2011-0-4

AN ORDINANCE ADOPTING A DROUGHT CONTINGENCY PLAN;
ESTABLISHING CRITERIA FOR THE INITIATION AND
TERMINATION OF DROUGHT RESPONSE STAGES;
ESTABLISHING RESTRICTIONS ON CERTAIN WATER USES;
ESTABLISHING PENALTIES FOR THE VIOLATION OF AND
PROVISIONS FOR ENFORCEMENT OF THESE RESTRICTIONS;
ESTABLISHING PROCEDURES FOR GRANTING VARIANCES; AND
PROVIDING SEVERABILITY AND AN EFFECTIVE DATE.

WHEREAS, the City of Point Comfort, Texas recognizes that the amount of water available to the City and its water utility customers is limited and subject to depletion during periods of extended drought;

WHEREAS, the City recognizes that natural limitations due to drought conditions and other acts of God cannot guarantee an uninterrupted water supply for all purposes;

WHEREAS, Section 11.1272 of the Texas Water Code and applicable rules of the Texas Commission on Environmental Quality require all public water supply systems in Texas to prepare a drought contingency plan; and

WHEREAS, as authorized under law, and in the best interests of the citizens of Point Comfort, Texas, the City Council deems it expedient and necessary to establish certain rules and policies for the orderly and efficient management of limited water supplies during drought and other water supply emergencies;

NOW THEREFORE, BE IT ORDAINED BY THE CITY COUNCIL OF POINT COMFORT, TEXAS:

SECTION 1

That the City of Point Comfort, Texas Drought Contingency Plan attached hereto as Exhibit "A" and made a part hereof for all purposes be, and the same is hereby, adopted as the official policy of the City.

SECTION 2

That all ordinances that are in conflict with the provisions of this ordinance be, and the same are hereby, repealed and all other ordinances of the City not in conflict with the provisions of this ordinance shall remain in full force and effect.

SECTION 3

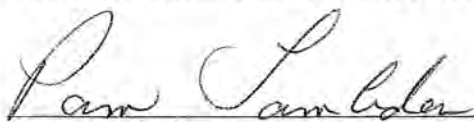
Should any paragraph, sentence, subdivision, clause, phrase, or section of this ordinance be adjudged or held to be unconstitutional, illegal or invalid, the same shall not affect the validity of this ordinance as a whole or any part of provision thereof, other than the part so declared to be invalid, illegal or unconstitutional.

SECTION 4

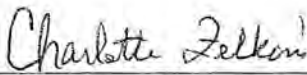
This ordinance shall take effect immediately from and after its passage and the publication of the caption, as the law in such cases provides.

PASSED, ADOPTED AND APPROVED, on this 29th day of August, 2011.

CITY OF POINT COMFORT, TEXAS


Pam Lambden, Mayor

ATTEST:


Charlotte Felkins, City Secretary



Drought Contingency Plan for a Retail Public Water Supplier

Texas Commission on Environmental Quality

Instructions: The following form is a model of a drought contingency plan for a retail public water supplier. Not all items may apply to your system's situation. This form is supplied for your convenience, but you are not required to use this form to submit your plan to the TCEQ. Submit completed plans to: Water Supply Division MC 160, TCEQ, P.O. Box 13087, Austin TX 78711-3087.

**City of Point Comfort, Texas
902 Lamar St.
Point Comfort, Texas**

**CCN#: P0766
PWS #s:0290001
August 29, 2011**

Section I: Declaration of Policy, Purpose, and Intent

In order to conserve the available water supply and protect the integrity of water supply facilities, with particular regard for domestic water use, sanitation, and fire protection, and to protect and preserve public health, welfare, and safety and minimize the adverse impacts of water supply shortage or other water supply emergency conditions, the CITY OF POINT COMFORT, TEXAS hereby adopts the following regulations and restrictions on the delivery and consumption of water through an ordinance.

Water uses regulated or prohibited under this Drought Contingency Plan (the Plan) are considered to be non-essential and continuation of such uses during times of water shortage or other emergency water supply condition are deemed to constitute a waste of water which subjects the offender(s) to penalties as defined in Section XI of this Plan.

Section II: Public Involvement

Opportunity for the public to provide input into the preparation of the Plan was provided by the CITY OF POINT COMFORT, TEXAS by means of scheduling and providing public notice of a public meeting to discuss water shortage measures.

Section III: Public Education

The CITY OF POINT COMFORT, TEXAS will periodically provide the public with information about the Plan, including information about the conditions under which each stage of the Plan is to be initiated or terminated and the drought response measures to be implemented in each stage. This information will be provided by means of the holding of public meetings and utility bill inserts.



Section IV: Coordination with Regional Water Planning Groups

The service area of the CITY OF POINT COMFORT, TEXAS is located within the Region L Regional Planning Area and CITY OF POINT COMFORT, TEXAS will provide a copy of this Plan to the Region L Regional Planning Area.

Section V: Authorization

The Mayor, or his/her designee is hereby authorized and directed to implement the applicable provisions of this Plan upon determination that such implementation is necessary to protect public health, safety, and welfare. The Mayor, or his/her designee shall have the authority to initiate or terminate drought or other water supply emergency response measures as described in this Plan.

Section VI: Application

The provisions of this Plan shall apply to all persons, customers, and property utilizing water provided by the CITY OF POINT COMFORT, TEXAS. The terms "person" and "customer" as used in the Plan include individuals, corporations, partnerships, associations, and all other legal entities.

Section VII: Definitions

For the purposes of this Plan, the following definitions shall apply:

Aesthetic water use: water use for ornamental or decorative purposes such as fountains, reflecting pools, and water gardens.

Commercial and institutional water use: water use which is integral to the operations of commercial and non-profit establishments and governmental entities such as retail establishments, hotels and motels, restaurants, and office buildings.

Conservation: those practices, techniques, and technologies that reduce the consumption of water, reduce the loss or waste of water, improve the efficiency in the use of water or increase the recycling and reuse of water so that a supply is conserved and made available for future or alternative uses.

Customer: any person, company, or organization using water supplied by CITY OF POINT COMFORT, TEXAS.

Domestic water use: water use for personal needs or for household or sanitary purposes such as drinking, bathing, heating, cooking, sanitation, or for cleaning a residence, business, industry, or institution.

Even number address: street addresses, box numbers, or rural postal route numbers ending in 0, 2, 4, 6, or 8 and locations without addresses.

Industrial water use: the use of water in processes designed to convert materials of lower value into forms having greater usability and value.

Landscape irrigation use: water used for the irrigation and maintenance of landscaped areas, whether publicly or privately owned, including residential and commercial lawns, gardens, golf courses,

parks, and rights-of-way and medians.

Non-essential water use: water uses that are not essential nor required for the protection of public, health, safety, and welfare, including:

- (a) irrigation of landscape areas, including parks, athletic fields, and golf courses, except otherwise provided under this Plan;
- (b) use of water to wash any motor vehicle, motorbike, boat, trailer, airplane or other vehicle;
- (c) use of water to wash down any sidewalks, walkways, driveways, parking lots, tennis courts, or other hard-surfaced areas;
- (d) use of water to wash down buildings or structures for purposes other than immediate fire protection;
- (e) flushing gutters or permitting water to run or accumulate in any gutter or street;
- (f) use of water to fill, refill, or add to any indoor or outdoor swimming pools or Jacuzzi-type pools;
- (g) use of water in a fountain or pond for aesthetic or scenic purposes except where necessary to support aquatic life;
- (h) failure to repair a controllable leak(s) within a reasonable period after having been given notice directing the repair of such leak(s); and
- (i) use of water from hydrants for construction purposes or any other purposes other than fire fighting.

Odd numbered address: street addresses, box numbers, or rural postal route numbers ending in 1, 3, 5, 7, or 9.

Section VIII: Criteria for Initiation and Termination of Drought Response Stages

The Mayor, or his/her designee shall monitor water supply and/or demand conditions on a weekly basis and shall determine when conditions warrant initiation or termination of each stage of the Plan, that is, when the specified “triggers” are reached.

The triggering criteria described below are based on trigger levels based on a statistical analysis of the vulnerability of the water source under drought of record conditions, the supplier of the City’s raw water supply or based on known system capacity limits.

Stage 1 Triggers -- MILD Water Shortage Conditions

Requirements for initiation

Customers shall be requested to voluntarily conserve water and adhere to the prescribed restrictions on certain water uses, defined in Section VII. Definitions, when (1) the water supply available to the CITY OF POINT COMFORT, TEXAS is equal to or greater than fifty-one percent OR MORE (51%) percentage of storage; or (2) pursuant to requirements specified in the CITY OF POINT COMFORT, TEXAS wholesale water purchase contract with the LAVACA NAVIDAD RIVER AUTHORITY, notification is received requesting initiation of Stage 1 of the Drought Contingency Plan, or (3) because of conditions outside of the control of the CITY OF POINT COMFORT,

TEXAS the CITY OF POINT COMFORT, TEXAS cannot supply a sufficient water supply to its customers.

Requirements for termination

Stage 1 of the Plan may be rescinded when all of the conditions listed as triggering events have ceased to exist for a period of 3 consecutive days.

Stage 2 Triggers -- MODERATE Water Shortage Conditions

Requirements for initiation

Customers shall be required to comply with the requirements and restrictions on certain non-essential water uses provided in Section IX of this Plan when (1) the water supply available to the CITY OF POINT COMFORT, TEXAS is equal to or less than fifty (50%) percentage of storage; or (2) pursuant to requirements specified in the CITY OF POINT COMFORT, TEXAS wholesale water purchase contract with the LAVACA NAVIDAD RIVER AUTHORITY, notification is received requesting initiation of Stage 1 of the Drought Contingency Plan, or (3) because of conditions outside of the control of the CITY OF POINT COMFORT, TEXAS the CITY OF POINT COMFORT, TEXAS cannot supply a sufficient water supply to its customers.

Requirements for termination

Stage 2 of the Plan may be rescinded when all of the conditions listed as triggering events have ceased to exist for a period of 3 consecutive days. Upon termination of Stage 2, Stage 1 becomes operative.

Stage 3 Triggers -- SEVERE Water Shortage Conditions

Requirements for initiation

Customers shall be required to comply with the requirements and restrictions on certain non-essential water uses for Stage 3 of this Plan when (1) the water supply available to the CITY OF POINT COMFORT, TEXAS is equal to or less than forty (40%) percentage of storage; or (2) pursuant to requirements specified in the CITY OF POINT COMFORT, TEXAS wholesale water purchase contract with the LAVACA NAVIDAD RIVER AUTHORITY, notification is received requesting initiation of Stage 1 of the Drought Contingency Plan, or (3) because of conditions outside of the control of the CITY OF POINT COMFORT, TEXAS the CITY OF POINT COMFORT, TEXAS cannot supply a sufficient water supply to its customers.

Requirements for termination

Stage 3 of the Plan may be rescinded when all of the conditions listed as triggering events have ceased to exist for a period of 3 consecutive days. Upon termination of Stage 3, Stage 2 becomes operative.

Stage 4 Triggers -- CRITICAL Water Shortage Conditions

Requirements for initiation

Customers shall be required to comply with the requirements and restrictions on certain non-essential

water uses for Stage 4 of this Plan when (1) the water supply available to the CITY OF POINT COMFORT, TEXAS is equal to or less than thirty (30%) percentage of storage; or (2) pursuant to requirements specified in the CITY OF POINT COMFORT, TEXAS wholesale water purchase contract with the LAVACA NAVIDAD RIVER AUTHORITY, notification is received requesting initiation of Stage 1 of the Drought Contingency Plan, or (3) because of conditions outside of the control of the CITY OF POINT COMFORT, TEXAS the CITY OF POINT COMFORT, TEXAS cannot supply a sufficient water supply to its customers.

Requirements for termination

Stage 4 of the Plan may be rescinded when all of the conditions listed as triggering events have ceased to exist for a period of 3 consecutive days. Upon termination of Stage 4, Stage 3 becomes operative.

Stage 5 Triggers -- EMERGENCY Water Shortage Conditions

Requirements for initiation

Customers shall be required to comply with the requirements and restrictions for Stage 5 of this Plan when the Mayor, or his/her designee, determines that a water supply emergency exists based on:

1. Major water line breaks, or pump or system failures occur, which cause unprecedented loss of capability to provide water service; **or**
2. Natural or man-made contamination of the water supply source(s).

Requirements for termination

Stage 5 of the Plan may be rescinded when all of the conditions listed as triggering events have ceased to exist for a period of 3 consecutive days.

Stage 6 Triggers -- WATER ALLOCATION

Requirements for initiation

Customers shall be required to comply with the water allocation plan prescribed in Section IX of this Plan and comply with the requirements and restrictions for Stage 5 of this Plan when (1) the water supply available to the CITY OF POINT COMFORT, TEXAS is equal to or less than twenty (20) percentage of storage; or (2) pursuant to requirements specified in the CITY OF POINT COMFORT, TEXAS wholesale water purchase contract with the LAVACA NAVIDAD RIVER AUTHORITY, notification is received requesting initiation of Stage 1 of the Drought Contingency Plan, or (3) because of conditions outside of the control of the CITY OF POINT COMFORT, TEXAS the CITY OF POINT COMFORT, TEXAS cannot supply a sufficient water supply to its customers.

Requirements for termination - Water allocation may be rescinded when all of the conditions listed as triggering events have ceased to exist for a period of 3 consecutive days.

Section IX: Drought Response Stages

The Mayor, or his/her designee, shall monitor water supply and/or demand conditions on a daily basis and, in accordance with the triggering criteria set forth in Section VIII of this Plan, shall determine that a mild, moderate, severe, critical, emergency or water shortage condition exists and shall implement the following notification procedures:

Notification

Notification of the Public:

The Mayor, or his/ her designee shall notify the public by means of:

publication in a newspaper of general circulation,
signs posted in public places

Additional Notification:

The Mayor, or his/ her designee shall notify directly, or cause to be notified directly, the following individuals and entities:

Members of the City Council
Fire Chief
County Emergency Management Coordinator
County Judge
TCEQ (required when mandatory restrictions are imposed)
Major water users

Stage 1 Response -- MILD Water Shortage Conditions

Target: Achieve a voluntary 10 percent reduction in total water use.

Voluntary Water Use Restrictions for Reducing Demand :

- (a) Water customers are requested to voluntarily limit the irrigation of landscaped areas, filling of swimming pools, and washing of vehicles to Tuesdays and Fridays for all customers, between the hours of 6:00 p.m. and 10:00 p.m.
- (b) All operations of the CITY OF POINT COMFORT, TEXAS shall adhere to water use restrictions prescribed for Stage 2 of the Plan.
- (c) Water customers are requested to practice water conservation and to minimize or discontinue water use for non-essential purposes.

Stage 2 Response -- MODERATE Water Shortage Conditions

Target: Achieve a 10 percent reduction in total water use.

Water Use Restrictions for Demand Reduction:

Under threat of penalty for violation, the following water use restrictions shall apply to all persons:

- (a) Water customers are required to limit the irrigation of landscaped areas to Tuesdays and Fridays for all customers, between the hours of 6:00 p.m. and 10:00 p.m. However, irrigation of landscaped areas is permitted at anytime if it is by means of a hand-held hose, a faucet filled bucket or watering can of five (5) gallons or less, or drip irrigation system.
- (b) Use of water to wash any motor vehicle, motorbike, boat, trailer, airplane or other vehicle is prohibited except on Tuesdays and Fridays between the hours of 6:00 p.m. and 10:00 p.m. Such washing, when allowed, shall be done with a hand-held bucket or a hand-held hose equipped with a positive shutoff nozzle for quick rises. Vehicle washing may be done at any time on the immediate premises of a commercial car wash or commercial service station. Further, such washing may be exempted from these regulations if the health, safety, and welfare of the public is contingent upon frequent vehicle cleansing, such as garbage trucks and vehicles used to transport food and perishables.
- (c) Use of water to fill, refill, or add to any indoor or outdoor swimming pools, wading pools, or Jacuzzi-type pools is prohibited except on Tuesdays and Fridays between the hours of 6:00 p.m. and 10:00 p.m.
- (d) Operation of any ornamental fountain or pond for aesthetic or scenic purposes is prohibited except where necessary to support aquatic life or where such fountains or ponds are equipped with a recirculation system.
- (e) Use of water from hydrants shall be limited to fire fighting, related activities, or other activities necessary to maintain public health, safety, and welfare, except that use of water from designated fire hydrants for construction purposes may be allowed under special permit from the CITY OF POINT COMFORT, TEXAS.
- (f) All restaurants are prohibited from serving water to patrons except upon request of the patron.
- (g) The following uses of water are defined as non-essential and are prohibited:
 - 1. wash down of any sidewalks, walkways, driveways, parking lots, tennis courts, or other hard-surfaced areas;
 - 2. use of water to wash down buildings or structures for purposes other than immediate fire protection;
 - 3. use of water for dust control;
 - 4. flushing gutters or permitting water to run or accumulate in any gutter or street; and

5. failure to repair a controllable leak(s) within a reasonable period after having been given notice directing the repair of such leak(s).

Stage 3 Response -- SEVERE Water Shortage Conditions

Target: Achieve a 20 percent reduction in total water use.

Water Use Restrictions for Demand Reduction:

All requirements of Stage 2 shall remain in effect during Stage 3 except:

- (a) Irrigation of landscaped areas shall be limited to Tuesdays and Fridays between the hours of 8 p.m. and 10:00 p.m. and shall be by means of hand-held hoses, hand-held buckets, drip irrigation, or permanently installed automatic sprinkler system only. The use of hose-end sprinklers is prohibited at all times.

Stage 4 Response -- CRITICAL Water Shortage Conditions

Target: Achieve a 35 percent reduction in total water use.

Water Use Restrictions for Reducing Demand:. All requirements of Stage 2 and 3 shall remain in effect during Stage 4 except:

- (a) Irrigation of landscaped areas shall be limited to Fridays between the hours of 8:00 p.m. and 10:00 p.m. and shall be by means of hand-held hoses, hand-held buckets, or drip irrigation only. The use of hose-end sprinklers or permanently installed automatic sprinkler systems are prohibited at all times.
- (b) Use of water to wash any motor vehicle, motorbike, boat, trailer, airplane or other vehicle not occurring on the premises of a commercial car wash and commercial service stations and not in the immediate interest of public health, safety, and welfare is prohibited.
- (c) The filling, refilling, or adding of water to swimming pools, wading pools, and Jacuzzi-type pools is prohibited.
- (d) Operation of any ornamental fountain or pond for aesthetic or scenic purposes is prohibited except where necessary to support aquatic life or where such fountains or ponds are equipped with a recirculation system.
- (e) No application for new, additional, expanded, or increased-in-size water service connections, meters, service lines, pipeline extensions, mains, or water service facilities of any kind shall be approved, and time limits for approval of such applications are hereby suspended for such time as this drought response stage or a higher-numbered stage shall be in effect.

Stage 5 Response -- EMERGENCY Water Shortage Conditions

Target: Achieve a 50 percent reduction in total water use.

Water Use Restrictions for Reducing Demand. All requirements of Stage 2, 3, and 4 shall remain in effect during Stage 5 except:

- (a) Irrigation of landscaped areas is absolutely prohibited.
- (b) Use of water to wash any motor vehicle, motorbike, boat, trailer, airplane or other vehicle is absolutely prohibited.

Stage 6 Response -- WATER ALLOCATION

In the event that water shortage conditions threaten public health, safety, and welfare, the Mayor, or his/her designee is hereby authorized to allocate water according to the following water allocation plan:

Single-Family Residential Customers

The allocation to residential water customers residing in a single-family dwelling shall be as follows:

Persons per Household	Gallons per Month
1 or 2	6,000
3 or 4	7,000
5 or 6	8,000
7 or 8	9,000
9 or 10	10,000
11 or more	12,000

“Household” means the residential premises served by the customer’s meter. “Persons per household” include only those persons currently physically residing at the premises and expected to reside there for the entire billing period. It shall be assumed that a particular customer’s household is comprised of two (2) persons unless the customer notifies the Mayor or his/her designee of a greater number of persons per household on a form prescribed by the Mayor, or his/her designee. The Mayor, or his/her designee shall give his/her best effort to see that such forms are mailed, otherwise provided, or made available to every residential customer. If, however, a customer does not receive such a form, it shall be the customer’s responsibility to go to the CITY OF POINT COMFORT, TEXAS offices to complete and sign the form claiming more than two (2) persons per household. New customers may claim more persons per household at the time of applying for water service on the form prescribed by the Mayor, or his/her designee. When the number of persons per household increases so as to place the customer in a different allocation category, the customer may notify the CITY

OF POINT COMFORT, TEXAS on such form and the change will be implemented in the next practicable billing period. If the number of persons in a household is reduced, the customer shall notify the CITY OF POINT COMFORT, TEXAS in writing within two (2) days. In prescribing the method for claiming more than two (2) persons per household, the Mayor, or his/her designee shall adopt methods to insure the accuracy of the claim. Any person who knowingly, recklessly, or with criminal negligence falsely reports the number of persons in a household or fails to timely notify the CITY OF POINT COMFORT, TEXAS of a reduction in the number of person in a household shall be fined not less than \$200.00.

Residential water customers shall pay the following surcharges:

- \$3.50 for the first 1,000 gallons over allocation.
- \$4.50 for the second 1,000 gallons over allocation.
- \$5.50 for the third 1,000 gallons over allocation.
- \$6.50 for each additional 1,000 gallons over allocation.

Surcharges shall be cumulative.

Master-Metered Multi-Family Residential Customers

The allocation to a customer billed from a master meter which jointly measures water to multiple permanent residential dwelling units (example: apartments, mobile homes) shall be allocated 6,000 gallons per month for each dwelling unit. It shall be assumed that such a customer's meter serves two dwelling units unless the customer notifies the CITY OF POINT COMFORT, TEXAS of a greater number on a form prescribed by the Mayor or his/her designee. The Mayor or his/her designee shall give his/her best effort to see that such forms are mailed, otherwise provided, or made available to every such customer. If, however, a customer does not receive such a form, it shall be the customer's responsibility to go to the CITY OF POINT COMFORT, TEXAS offices to complete and sign the form claiming more than two (2) dwellings. A dwelling unit may be claimed under this provision whether it is occupied or not. New customers may claim more dwelling units at the time of applying for water service on the form prescribed by the Mayor or his/her designee. If the number of dwelling units served by a master meter is reduced, the customer shall notify the CITY OF POINT COMFORT, TEXAS in writing within two (2) days. In prescribing the method for claiming more than two (2) dwelling units, the Mayor or his/her designee shall adopt methods to insure the accuracy of the claim. Any person who knowingly, recklessly, or with criminal negligence falsely reports the number of dwelling units served by a master meter or fails to timely notify the CITY OF POINT COMFORT, TEXAS of a reduction in the number of person in a household shall be fined not less than \$200.00. Customers billed from a master meter under this provision shall pay the following monthly surcharges:

- \$3.50 for 1,000 gallons over allocation up through 1,000 gallons for each dwelling unit.
- \$4.50, thereafter, for each additional 1,000 gallons over allocation up through a second 1,000 gallons for each dwelling unit.

\$5.50, thereafter, for each additional 1,000 gallons over allocation
up through a third 1,000 gallons for each dwelling unit.
\$6.50, thereafter for each additional 1,000 gallons over allocation.

Surcharges shall be cumulative.

Commercial Customers

A monthly water allocation shall be established by the Mayor, or his/her designee, for each nonresidential commercial customer other than an industrial customer who uses water for processing purposes. The non-residential customer's allocation shall be approximately 75% percent of the customer's usage for corresponding month's billing period for the previous 12 months. If the customer's billing history is shorter than 12 months, the monthly average for the period for which there is a record shall be used for any monthly period for which no history exists. Provided, however, a customer of whose monthly usage is less than 10,000 gallons, shall be allocated 10,000 gallons. The Mayor or his/her designee shall give his/her best effort to see that notice of each non-residential customer's allocation is mailed to such customer. If, however, a customer does not receive such notice, it shall be the customer's responsibility to contact the CITY OF POINT COMFORT, TEXAS to determine the allocation. Upon request of the customer or at the initiative of the Mayor or his/her designee the allocation may be reduced or increased if, (1) the designated period does not accurately reflect the customer's normal water usage, (2) one nonresidential customer agrees to transfer part of its allocation to another nonresidential customer, or (3) other objective evidence demonstrates that the designated allocation is inaccurate under present conditions. A customer may appeal an allocation established hereunder to the Mayor or his/her designee. Nonresidential commercial customers shall pay the following surcharges:

Customers whose allocation is 10,000 gallons through 50,000 gallons per month:

\$3.50 per thousand gallons for the first 1,000 gallons over allocation.
\$4.50 per thousand gallons for the second 1,000 gallons over allocation.
\$5.50 per thousand gallons for the third 1,000 gallons over allocation.
\$6.50 per thousand gallons for each additional 1,000 gallons over allocation.

Industrial Customers

A monthly water allocation shall be established by the Mayor or his/her designee, for each industrial customer, which uses water for processing purposes. The industrial customer's allocation shall be approximately 90% percent of the customer's water usage baseline. Ninety (90) days after the initial imposition of the allocation for industrial customers, the industrial customer's allocation shall be further reduced to 85% percent of the customer's water usage baseline. The industrial customer's water use baseline will be computed on the average water use for the 12 month period ending prior to the date of implementation of Stage 2 of the Plan. If the industrial water customer's billing history is shorter than 12 months, the monthly average for the period for which there is a record shall be used for any

monthly period for which no billing history exists. The Mayor or his/her designee shall give his/her best effort to see that notice of each industrial customer's allocation is mailed to such customer. If, however, a customer does not receive such notice, it shall be the customer's responsibility to contact the CITY OF POINT COMFORT, TEXAS to determine the allocation, and the allocation shall be fully effective notwithstanding the lack of receipt of written notice. Upon request of the customer or at the initiative of the Mayor or his/her designee, the allocation may be reduced or increased, (1) if the designated period does not accurately reflect the customer's normal water use because the customer had shutdown a major processing unit for repair or overhaul during the period, (2) the customer has added or is in the process of adding significant additional processing capacity, (3) the customer has shutdown or significantly reduced the production of a major processing unit, (4) the customer has previously implemented significant permanent water conservation measures such that the ability to further reduce water use is limited, (5) the customer agrees to transfer part of its allocation to another industrial customer, or (6) if other objective evidence demonstrates that the designated allocation is inaccurate under present conditions. A customer may appeal an allocation established hereunder to the designated official. Industrial customers shall pay the following surcharges:

Customers whose allocation is 50,001 gallons per month or more:

- One (1) times the block rate for each 1,000 gallons in excess of the allocation up through 5 percent above allocation.
- One and one-half (1.5) times the block rate for each 1,000 gallons from 5 percent through 10 percent above allocation.
- Two (2) times the block rate for each 1,000 gallons from 10 percent through 15 percent above allocation.
- Three (3) times the block rate for each 1,000 gallons more than 15 percent above allocation.

The surcharges shall be cumulative. As used herein, "block rate" means the charge to the customer per 1,000 gallons at the regular water rate schedule at the level of the customer's allocation.

Section X: Enforcement

- (a) No person shall knowingly or intentionally allow the use of water from the CITY OF POINT COMFORT, TEXAS for residential, commercial, industrial, agricultural, governmental, or any other purpose in a manner contrary to any provision of this Plan, or in an amount in excess of that permitted by the drought response stage in effect at the time pursuant to action taken by Mayor, or his/her designee, in accordance with provisions of this Plan.
- (b) Any person who violates this Plan is guilty of a misdemeanor and, upon conviction shall be punished by a fine of not less than TWO HUNDRED dollars (\$200.00) and not more than FIVE HUNDRED dollars (\$500.00). Each day that one or more of the provisions in this Plan is violated shall constitute a separate offense. If a person is convicted of three or more

distinct violations of this Plan, the Mayor, or his/her designee shall, upon due notice to the customer, be authorized to discontinue water service to the premises where such violations occur. Services discontinued under such circumstances shall be restored only upon payment of a re-connection charge, hereby established at \$50.00, and any other costs incurred by the CITY OF POINT COMFORT, TEXAS in discontinuing service. In addition, suitable assurance must be given to the Mayor, or his/her designee that the same action shall not be repeated while the Plan is in effect. Compliance with this plan may also be sought through injunctive relief in the district court.

- (c) Any person, including a person classified as a water customer of the CITY OF POINT COMFORT, TEXAS, in apparent control of the property where a violation occurs or originates shall be presumed to be the violator, and proof that the violation occurred on the person's property shall constitute a rebuttable presumption that the person in apparent control of the property committed the violation, but any such person shall have the right to show that he/she did not commit the violation. Parents shall be presumed to be responsible for violations of their minor children and proof that a violation, committed by a child, occurred on property within the parents' control shall constitute a rebuttable presumption that the parent committed the violation, but any such parent may be excused if he/she proves that he/she had previously directed the child not to use the water as it was used in violation of this Plan and that the parent could not have reasonably known of the violation.
- (d) Any employee of the CITY OF POINT COMFORT, TEXAS, police officer, or other employee designated by the Mayor, may issue a citation to a person he/she reasonably believes to be in violation of this Ordinance. The citation shall be prepared in duplicate and shall contain the name and address of the alleged violator, if known, the offense charged, and shall direct him/her to appear in the municipal court on the date shown on the citation for which the date shall not be less than 3 days nor more than 5 days from the date the citation was issued. The alleged violator shall be served a copy of the citation. Service of the citation shall be complete upon delivery of the citation to the alleged violator, to an agent or employee of a violator, or to a person over 14 years of age who is a member of the violator's immediate family or is a resident of the violator's residence. The alleged violator shall appear in municipal court to enter a plea of guilty or not guilty for the violation of this Plan. If the alleged violator fails to appear in municipal court, a warrant for his/her arrest may be issued. A summons to appear may be issued in lieu of an arrest warrant. These cases shall be expedited and given preferential setting in municipal court before all other cases.

Section XI: Variances

The Mayor, or his/her designee, may, in writing, grant temporary variance for existing water uses otherwise prohibited under this Plan if it is determined that failure to grant such variance would cause an emergency condition adversely affecting the health, sanitation, or fire protection for the public or the person requesting such variance and if one or more of the following conditions are met:

- (a) Compliance with this Plan cannot be technically accomplished during the duration of the water supply shortage or other condition for which the Plan is in effect.

- (b) Alternative methods can be implemented which will achieve the same level of reduction in water use.

Persons requesting an exemption from the provisions of this Ordinance shall file a petition for variance with the CITY OF POINT COMFORT, TEXAS within 5 days after the Plan or a particular drought response stage has been invoked. All petitions for variances shall be reviewed by the Mayor, or his/her designee, and shall include the following:

- (a) Name and address of the petitioner(s).
- (b) Purpose of water use.
- (c) Specific provision(s) of the Plan from which the petitioner is requesting relief.
- (d) Detailed statement as to how the specific provision of the Plan adversely affects the petitioner or what damage or harm will occur to the petitioner or others if petitioner complies with this Ordinance.
- (e) Description of the relief requested.
- (f) Period of time for which the variance is sought.
- (g) Alternative water use restrictions or other measures the petitioner is taking or proposes to take to meet the intent of this Plan and the compliance date.
- (h) Other pertinent information.

RESOLUTION NO. 2002- 008

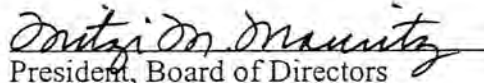
RESOLUTION APPROVING ADDENDUM TO AUTHORITY'S JANUARY 2000,
WATER CONSERVATION AND DROUGHT CONTINGENCY PLAN

BE IT RESOLVED that the Addendum to Authority's January 2000, Water Conservation and Drought Contingency Plan, attached hereto, is hereby approved.

BE IT FURTHER RESOLVED, the General Manager or his designee is authorized to file such Addendum with the appropriate state regulatory agencies.

BE IT FURTHER RESOLVED, that the General Manager, and staff be, and they are hereby authorized to do all things necessary and proper to carry out the intent and purpose of this resolution.

Passed and approved this 20th day of February, 2002.


President, Board of Directors
Lavaca-Navidad River Authority

ATTEST:

Secretary-Treasurer, Board of Directors
Lavaca-Navidad River Authority

LAVACA-NAVIDAD RIVER AUTHORITY WATER CONSERVATION PLAN ADDENDUM

Introduction

The following information is to be incorporated into the existing January 2000 Lavaca-Navidad River Authority (LNRA) Water Conservation and Drought Contingency Plan (Chapter II, Section 2.0 Water Conservation Goals; and Section 8.0 Customer Conservation Strategies) in order to meet state requirements for Water Conservation Plans (WCPs) for Wholesale Water Suppliers. These requirements are detailed in Texas Administrative Code Rules - Title 30/Part1/Chapter 288/ Subchapter A, which are available on the TNRCC's website (<http://www.tnrcc.state.tx.us/oprd/index.html>), under "View Rules". *Appendix A* contains an excerpt from the TAC Rules for the water conservation plan requirements that are addressed in this document.

As a wholesale water supplier, in accordance with state law, LNRA must require its wholesale customers to prepare TNRCC-approved water conservation plans. Wholesale customers include the City of Corpus Christi (CCC), the City of Point Comfort, Formosa Plastics, Inteplast Corporation, Calhoun County Navigation District (CCND), and American Electric Power (AEP; formerly CP&L). The LNRA currently provides its wholesale customers with advice and assistance in preparing their individual WCPs (review, comment, sources of useful information).

The purpose of this addendum is to quantify the measurable reduction in municipal and industrial water use by the wholesale customers that is projected to occur over the next 50 years and the resources that will be used to achieve these reductions. The LNRA will adopt the goals stated in this addendum and they will assist their customers in achieving these goals.

Existing Water Supplies and Demands

The LNRA currently holds a water rights permit from the TNRCC for a total of 79,000 acre-feet per year (ac-ft/yr) firm yield water from Lake Texana. LNRA has the following contracts to sell that water to municipal and industrial customers: CCC = 31,440 ac-ft/yr (and 10,400 ac-ft/yr on a

temporary basis until the water is needed to meet future demands in Jackson County); City of Point Comfort = 178 ac-ft/yr; Formosa Plastics = 30,000 ac-ft/yr; Inteplast Corp. = 1,832 ac-ft/yr; CCND = 594 ac-ft/yr; AEP = 56 ac-ft/yr. These contracts total 74,500 ac-ft/yr; the remaining 4,500 ac-ft of supply has been contracted to the City of Corpus Christi on an interruptible basis and is diverted to the City of Corpus Christi when the reservoir pool elevation is at or above elevation 43' MSL. (See *Table 1*)

Formosa Plastics currently uses approximately 56% of its contract allocation of 30,000 acre-feet per year. Formosa has implemented a highly successful program of water conservation through water reuse. Formosa is currently contemplating allowing the City of Corpus Christi to utilize 10,000 ac-ft/yr of their unused contractual water on a short-term basis. Plant process water at Formosa Plastics is reused until the Total Dissolved Solids (TDS) concentration exceeds the plant process requirements. At this point, the process water is treated and discharged; and additional makeup water is introduced into the recycle stream.

Inteplast Corporation also has a significant water reuse program. Process water is reused by Inteplast until the TDS concentration increases to an unacceptable level and it becomes more cost effective to clean and discharge the waste stream.

The City of Corpus Christi currently obtains raw water from Choke Canyon Reservoir, Lake Corpus Christi, and Lake Texana (firm and interruptible supplies). The CCC uses the interruptible supply from Lake Texana first when possible, in increments as available. This interruptible supply is available approximately 87% of the time. The CCC serves a significant industrial demand along its port area, and the scarcity of water available to the CCC in past years has driven these industries to a high level of conservation in order for them to continue to operate during periods of shortage. The CCC also encourages the use of reclaimed water, but has not promoted this effort as aggressively as other cities because of return flow requirements to the Nueces River Estuary included in the Certificate of Adjudication issued for the construction of the Choke Canyon Dam and Reservoir.

At this time, the AEP and the CCND are not utilizing their contracted industrial water allocations and they do not have water delivery systems constructed from Lake Texana. As a result, there

are no existing conservation plans for these entities and conservation plans will only be required by LNRA when they begin taking their contract water.

The LNRA's permitted firm yield water is fully contractually committed and there is no available firm-yield water left in the basin. Therefore, the LNRA is currently applying for a new amendment to the existing water rights permit with the TNRCC that will allow it to sell an additional supply of 7,500 ac-ft of water per year on an interruptible basis to the City of Corpus Christi. This interruptible supply is available less frequently than the instream flow reserve discussed previously. As a part of this amendment process, the LNRA will incorporate this addendum into the Authority's existing Water Conservation Plan. The LNRA's existing WCP was included in the SB1 Lavaca-Navidad Regional Water Plan (Region P) in December 2000.

Unaccounted-for-Water

The LNRA operates two raw water delivery systems from Lake Texana. The East Delivery System is wholly owned by the LNRA; however, the City of Corpus Christi owns the delivery pipeline for the West Delivery System starting at LNRA's property line. Currently the East Delivery System has no unaccounted-for-water between the pump station and the customer delivery point. The West Delivery System has experienced and corrected several waterline breaks in the past few years; however, the system losses have remained negligible.

Problem Identification

The LNRA's wholesale customers have both short-term and long-term water needs based on the most recent Regional Planning work (see January 2001 Adopted Regional Water Plans for Region N and Region P for specific customer information). Part of the LNRA's Water Conservation Plan is to identify conservation methods as well as to develop additional interruptible water supplies in the Lavaca River Basin that can be used to help meet the needs of their customers.

Water Conservation Goals

The LNRA has both municipal and industrial water conservation goals for their wholesale customers, which include:

1. Decreasing and maintaining per capita water usage below the average of the previous five years consumption for cities situated in the central climatological region of the state. Currently, this average water consumption is 165 gallons per capita per day (gpcd).
2. Limiting unaccounted-for-water from the customer's water distribution systems to no more than 15 percent of the volume of water delivered, based on a moving five-year average.
3. Limiting unaccounted-for-water from the LNRA's water delivery systems to no more than 10 percent of the volume of water delivered to their wholesale customers, based on a moving five-year average.
4. Reducing industrial water consumption 20% - 40% through the implementation and increased use of wastewater reuse/recycle programs.
5. Providing all wholesale customers advice and assistance in preparing their individual Water Conservation Plans (the LNRA will review, comment, and provide sources of useful information).
6. Assisting the Region P Regional Water Planning Group in completing/implementing the Lavaca Regional Water Plan.
7. Pass-through water conservation goals (a measurable goal for per capita water use for municipalities and a range of percent of total demand met by reuse for industrial entities) will be negotiated as a part of each wholesale water customer's contract with the LNRA upon modification or extension.

Water Conservation Methods

The LNRA does not own or control any of the internal distributions systems of its wholesale water customers; therefore the LNRA cannot mandate customer conservation methods. Each wholesale customer employs Best Management Practices (BMPs) to ensure the maximum economic benefit will be realized for their business and/or individual retail water customers.

The LNRA does lend its full support to its customers in their conservation plans and has included the methods listed in those plans for achieving conservation goals.

Methods to be employed for achieving the customer's stated water conservation goals include leak detection and repair programs, plumbing and landscape ordinances, public education programs, cost-based water rate structures, and reuse/recycling of wastewater and greywater.

Measures to determine and control unaccounted-for-water should include:

1. Metering water from fire hydrants used for construction purposes on a temporary basis.
2. The Fire Department should report to the Water Department estimated flow times from fire hydrants either during fires or as part of the hydrants testing program.
3. Water department crews should provide timely responses to leaks and estimate the volume of water lost.
4. Water department crews should estimate the volume of water discharged as part of a main-flushing program.
5. When retail water accounts are closed, water service is currently turned off at the meter. If it is anticipated that the building will be vacant for an extended period or if there is evidence of unauthorized water use the meter should be removed.

Plumbing and Landscape Ordinances that promote water conservation should be implemented.

Examples include:

1. Requiring water saving plumbing fixtures for all new construction.
2. Requiring the use of drip irrigation systems in certain circumstances, such as any irrigation system designed to irrigate vegetation located within the following areas - in the right-of-way (ROW) between the curb and sidewalk; within five feet of the paved surface of the ROW where there is no sidewalk; narrow strips of vegetation less than five feet wide between the sidewalk or curb and the parking lot; narrow strips of vegetation less than five feet wide within a parking lot; any median or traffic island which is less than five feet wide.
3. Requiring the use of Xeriscaping and drought tolerant plant species in commercial development landscaping.

Aggressive Leak Detection and Repair programs should be implemented for all water distribution systems. Citizens as well as city employees from other departments should be encouraged to promptly report any leaks. City personnel such as meter readers, solid waste collectors, and street maintenance workers, as well as those from other utility departments (Wastewater, Gas, and Stormwater) that routinely travel throughout a city make the most effective leak detectors. A 24-hour, 365-day dispatching service should be provided to assure rapid response, as well as work crews that are devoted exclusively to repairing leaks. Crews normally assigned to construction of new water mains can, in emergency situations, augment these crews. The leak repair crews should be on duty for two daily eight-hour shifts. The remaining eight hours should have a crew that is on pager call to respond. The city's goal should be to respond to any leak within four hours of it being reported. In order to maintain the integrity

of the distribution system, the city should also budget for water main replacement. The operating budget should provide for replacing lines that have a high leak incidence or are the very oldest lines. The capital improvements budget should provide for system replacements and upgrades associated with other improvements such as major street reconstruction projects.

Educational Programs should be implemented to inform retail water customers of the need to conserve water and the available methods for attaining this goal. The three basic components of an educational program are media campaigns, school programs, and public exhibitions. Media campaigns include local TV and radio stations advertisements; handouts mailed to provide information on water conservation issues, such as Xeriscape and simple water conserving tips; printed newspaper and billboard advertisements. Establish a telephone Water Hotline to encourage public access to water conservation information. Customers can utilize a dedicated telephone line to request water conservation kits and other information. Establish school programs to teach children water conservation concepts through various school-related activities. School programs target young water consumers who will hopefully retain a water-use ethic into their adult life. Children also have direct contact with their parents and may have a better opportunity to influence their behavior than traditional advertising campaigns. The City of Corpus Christi currently has the following school programs implemented – “Major Rivers Educational Program”, “Water Conservation Fair; Xeriscape- A Water Wise Educational Program”, “Toilet Training- It's Not Just for Kids”, “Learning to be Water Wise”, “The Water Source Book”, water-conservation school book covers, and the “Teacher Outreach - Super Saturday Workshop”. Public Water Conservation Exhibitions should include information booths set up by the city’s water conservation department at various public events throughout the year. Staff distributes practical literature on learning to read water meters, xeriscape planning, rainwater harvesting, and other water conservation issues; toilet retrofit kits and low-flow showerheads; and, promotional items such as stickers, beach balls, etc. at these events. Other exhibitions could include the establishment of an educational garden and learning center that teaches the seven principles of Xeriscape and beneficial horticulture practices.

Conservation-oriented water rate structures should be implemented by the LNRA’s wholesale customers for serving their retail customers. There are many ways to design this type of rate structure; however, a common rate scheme has a two-part approach consisting of:

1. A monthly minimum customer charge based on customer class and meter size; and
2. A volume charge based on water usage above the minimum base amount.

Reclaimed Wastewater Programs can be established for both municipal and industrial discharges. Municipal water and wastewater treatment plants as well as industrial process plants are well suited to incorporate reclaimed water technology. Currently, two of the LNRA's industrial wholesale customers, Formosa Plastics and Inteplast Corporation, have implemented major water reuse/recycle programs. Formosa Plastics is meeting approximately 30 percent of its current demand with reclaimed process water. The City of Corpus Christi has prepared a long-range plan for reusing effluent from its six wastewater treatment plants within their treatment processes as well as to irrigate the plants' on-site landscaping. This reclaimed water is also used to irrigate golf courses, ballpark complexes, the city landfill, etc. During drought conditions, the City has made reclaimed wastewater effluent available to other water users free of charge. Distribution sites at the treatment plants are established to allow homeowners the opportunity for obtaining treated wastewater for private use. Training and instructions are provided to ensure safe use and handling of the treated wastewater. Few owners take advantage of this service, however, primarily due to the cost of transporting the effluent. It must be noted, however, that the widespread reuse of effluent in the CCC service area is subject to the return flow limitations in the existing Nueces River watershed, so the majority of the reuse must take place with water obtained from the LNRA.

Summary

The LNRA has in place valid raw water contracts with municipal and industrial wholesale customers. To varying degrees these contracts contain language relating to water conservation during drought situations. However, all of the firm-yield water in the Lavaca River Basin has already been allocated. In addition, the LNRA's largest water customer has a provision in its contract that allows 10,400 acre-feet of water to be taken out of the contract for use in Jackson County when local water demands require this additional water. It is in the best interests of all of the current customers to attain maximum utilization of all existing water supplies. To this end, while the LNRA itself has no retail water usage, it is working with all of its wholesale customers to identify their water conservation goals and practices; and is committed to assist them in their efforts. Consistent with TNRCC rules the LNRA will require its customers, as part

of future contract extensions and modifications, to provide conservation goals for inclusion into the LNRA's Water Conservation Plan.

Table 1: Water Supplies and Demands in the Lavaca-Navidad River Basin ¹

Entity		Contract Water Use	Contract Type	Contract Volume ⁵ (ac-ft/yr)	Current Demand ³ (ac-ft/yr)	Unused Contract Volume	Water Source	Water Conservation Plan ⁴
1	Lavaca-Navidad River Authority (LNRA)	Supplier	Water Rights Permit	79,000	-	-	Lake Texana, firm yield	Jan-00
	LNRA	Supplier	Pending WR Permit Amendment ²	7,500	-	-	Lake Texana, interruptible	
2	City of Corpus Christi	Municipal	Longterm	(31,400)	(31,400)	0	Lake Texana, firm yield	Aug-99
	City of Corpus Christi	Municipal	Temporary	(10,440)	(10,440)	0	Lake Texana, firm yield	
	City of Corpus Christi	Municipal	Longterm	(4,500)	(4,500)	0	Lake Texana, interruptible	
	City of Corpus Christi	Municipal	Pending ²	(7,500)	0	0	Lake Texana, interruptible	
3	City of Point Comfort	Municipal	Longterm	(178)	(178)	0	Lake Texana, firm yield	Aug-95
4	Formosa Plastics	Industrial	Longterm	(30,000)	(17,000)	13,000	Lake Texana, firm yield	will be required at next contract renewal/amendment
5	Inteplast	Industrial	Longterm	(1,832)	(476)	1,356	Lake Texana, firm yield	will be required at next contract renewal/amendment
6	Calhoun Cty Navigation District (CCND)	Industrial	Longterm	(594)	0	594	Lake Texana, firm yield	Not Needed
7	American Electric Power (AEP)	Industrial	Longterm	(56)	0	56	Lake Texana, firm yield	Not Needed
8	TNRCC Instream Flows	Environmental	Longterm	(4,500)	-	-	Lake Texana, firm yield	Not Needed
Existing Water Rights Supply Total				79,000				
Pending Future (Additional Only) Supply Total				7,500				
Existing Contracted Demand Total				(79,000)	(63,994)	15,006		
Pending Future (Additional Only) Demand Total				(7,500)				

¹ The data for this table was compiled from information from the LNRA and the existing LNRA January 2000 WCP

² The LNRA is currently applying to the TNRCC for a Water Rights Permit Amendment for an additional 7,500 ac-ft/yr of interruptible water supply.

³ Formosa Plastics & CCND are currently contemplating allowing Corpus Christi to use 10,000 ac-ft & 594 ac-ft of water per year, respectively, on a short-term basis.

⁴ A Water Conservation Plan is not needed for CCND or AE&P because they are not currently using their water allocation and do not have a water delivery system in place.

⁵ Water Supplies are represented as + numbers; Demands are represented as (-) numbers; Pending supplies/demands are italicized.

APPENDIX A APPLICABLE TAC RULES

This addendum contains information to satisfy the TNRCC's WCP requirements as presented in the Texas Administrative Code. Specifically, TAC Title 30/Part1/Chapter 288/Subchapter A/Rule 288.5/(1)(B), (1)(C), (1)(H), (1)(I), and (2):

A water conservation plan for a wholesale water supplier shall provide information, where applicable, in response to each of the following paragraphs.

(1) Minimum requirements. All water conservation plans for wholesale water suppliers shall include the following elements:

(A) a description of the wholesaler's service area, including population and customer data, water use data, water supply system data, and wastewater data;

(B) specification of conservation goals including, where appropriate, target per capita water use goals for the wholesaler's service area, maximum acceptable unaccounted-for water, the basis for the development of said goals, and a time frame for achieving those goals;

(C) a description as to which practice(s) and/or device(s) will be utilized to measure and account for the amount of water diverted from the source(s) of supply;

(D) a monitoring and record management program for determining water deliveries, sales, and losses;

(E) a program of metering and leak detection and repair for the wholesaler's water storage, delivery, and distribution system;

(F) a requirement in every water supply contract entered into or renewed after official adoption of the water conservation plan, and including any contract extension, that each successive wholesale customer develop and implement a water conservation plan or water conservation measures using the applicable elements of this chapter. If the customer intends to resell the water, then the contract between the initial supplier and customer must provide that the contract for the resale of the water must have water conservation requirements so that each successive customer in the resale of the water will be required to implement water conservation measures in accordance with applicable provisions of this chapter;

(G) a reservoir systems operations plan, if applicable, providing for the coordinated operation of reservoirs owned by the applicant within a common watershed or river basin. The reservoir systems operations plans shall include optimization of water supplies as one of the significant goals of the plan;

(H) a means for implementation and enforcement, which shall be evidenced by: a copy of the ordinance, rule, resolution, or tariff, indicating official adoption of the water conservation plan by the water supplier; and a description of the authority by which the water supplier will implement and enforce the conservation plan; and

(I) documentation of coordination with the Regional Water Planning Groups for the service area of the wholesale water supplier in order to insure consistency with the appropriate approved regional water plans.

(2) Additional conservation strategies. Any combination of the following strategies shall be selected by the water wholesaler, in addition to the minimum requirements of paragraph (1) of this section, if they are necessary in order to achieve the stated water

conservation goals of the plan. The commission may require by commission order that any of the following strategies be implemented by the water supplier if the commission determines that the strategies are necessary in order for the conservation plan to be achieved:

- (A) conservation-oriented water rates and water rate structures such as uniform or increasing block rate schedules, and/or seasonal rates, but not flat rate or decreasing block rates;
- (B) a program to assist customers in the development of conservation pollution prevention and abatement plans;
- (C) a program for reuse and/or recycling of wastewater and/or greywater; and
- (D) any other water conservation practice, method, or technique which the wholesaler shows to be appropriate for achieving the stated goal or goals of the water conservation plan.

Source Note: The provisions of this §288.5 adopted to be effective May 3, 1993, 18 TexReg 2558; amended to be effective February 21, 1999, 24 TexReg 949; amended to be effective April 27, 2000, 25 TexReg 3544

DROUGHT CONTINGENCY PLAN
FOR THE
CITY OF PORT LAVACA

APRIL 7, 2003

Section I: Declaration of Policy, Purpose, and Intent

In order to conserve the available water supply and protect the integrity of water supply facilities, with particular regard for domestic water use, sanitation, and fire protection, and to protect and preserve public health, welfare, and safety and minimize the adverse impacts of water supply shortage or other water supply emergency conditions, the City of Port Lavaca hereby adopts the following regulations and restrictions on the delivery and consumption of water.

Water uses regulated or prohibited under this Drought Contingency Plan (the Plan) are considered to be non-essential and continuation of such uses during times of water shortage or other emergency water supply condition are deemed to constitute a waste of water which subjects the offender(s) to penalties as defined in Section XI of this Plan.

Section II: Public Involvement

Opportunity for the public to provide input into the preparation of the Plan was provided by the City of Port Lavaca by means of a notice to the customers on *their monthly water bill* and a Public Notice in the Port Lavaca Wave, an area newspaper.

Section III: Public Education

The City of Port Lavaca will periodically provide the public with information about the Plan, including information about the conditions under which each stage of the Plan is to be initiated or terminated and the drought response measures to be implemented in each stage. This information will be provided by means of utility bill inserts or a public notice in the Port Lavaca Wave.

Section IV: Coordination with Regional Water Planning Groups

The service area of the City of Port Lavaca is located within the South Central Texas Regional Water Planning Group (Region L) and the City of Port Lavaca has provided a copy of this Plan to SCTRWPG.

Section V: Authorization

The City Manager for the City of Port Lavaca (hereinafter City Manager) or his/her designee is hereby authorized and directed to implement the applicable provisions of this Plan upon determination that such implementation is necessary to protect public health, safety, and welfare. The City Manager, or his/her designee, shall have the authority to initiate or terminate drought or other water supply emergency response measures as described in this Plan.

Section VI: Application

The provisions of this Plan shall apply to all persons, customers, and property utilizing water provided by the City of Port Lavaca. The terms "person" and "customer" as used in the Plan include individuals, corporations, partnerships, associations, and all other legal entities.

Section VII: Definitions

For the purposes of this Plan, the following definitions shall apply:

Aesthetic water use: water use for ornamental or decorative purposes such as fountains, reflecting pools, and water gardens.

Commercial and institutional water use: water use which is integral to the operations of commercial and non-profit establishments and governmental entities such as retail establishments, hotels and motels, restaurants, and office buildings.

Conservation: those practices, techniques, and technologies that reduce the consumption of water, reduce the loss or waste of water, improve the efficiency in the use of water or increase the recycling and reuse of water so that a supply is conserved and made available for future or alternative uses.

Customer: any person, company, or organization using water supplied by the City of Port Lavaca.

Domestic water use: water use for personal needs or for household or sanitary purposes such as drinking, bathing, heating, cooking, sanitation, or for cleaning a residence, business, industry, or institution.

Even number address: street addresses, box numbers, or rural postal route numbers ending in 0, 2, 4, 6, or 8 and locations without addresses.

Industrial water use: the use of water in processes designed to convert materials of lower value into forms having greater usability and value.

Landscape irrigation use: water used for the irrigation and maintenance of landscaped areas, whether publicly or privately owned, including residential and commercial lawns, gardens, golf courses, parks, and rights-of-way and medians.

Non-essential water use: water uses that are not essential nor required for the protection of public, health, safety, and welfare, including:

- (a) irrigation of landscape areas, including parks, athletic fields, and golf courses, except otherwise provided under this Plan;
- (b) use of water to wash any motor vehicle, motorbike, boat, trailer, airplane or other vehicle;
- (c) use of water to wash down any sidewalks, walkways, driveways, parking lots, tennis courts, or other hard-surfaced areas;
- (d) use of water to wash down buildings or structures for purposes other than immediate fire protection;
- (e) flushing gutters or permitting water to run or accumulate in any gutter or street;
- (f) use of water to fill, refill, or add to any indoor or outdoor swimming pools or jacuzzi-type pools;
- (g) use of water in a fountain or pond for aesthetic or scenic purposes except where necessary to support aquatic life;
- (h) failure to repair a controllable leak(s) within a reasonable period after having been given notice directing the repair of such leak(s); and
- (i) use of water from hydrants for construction purposes or any other purposes other than fire fighting.

Odd numbered address: street addresses, box numbers, or rural postal route numbers ending in 1, 3, 5, 7, or 9.

Section VIII: Criteria for Initiation and Termination of Drought Response Stages

The City Manager or his/her designee shall monitor water supply and/or demand conditions on a daily basis and shall determine when conditions warrant initiation or termination of each stage of the Plan, that is, when the specified “triggers” are reached.

The triggering criteria described below are based on information provided to the City of Port Lavaca by the Guadalupe Blanco River Authority (GBRA) Port Lavaca Water Treatment Plant Division. GBRA supplies all the treated drinking water to the City of Port Lavaca.

Water for GBRA’s customers are secured by run-of-river water rights granted GBRA or by storage rights owned by GBRA in Canyon Dam and Reservoir near New Braunfels, Texas. If drought or

demand conditions fully engage all of the available GBRA run-of-river water supply, and the water demand continues to increase, then the further water demand will be satisfied by Canyon stored water rights. The Water Supply Division of GBRA, in coordination with the TCEQ Watermaster for the Guadalupe river, will determine when these trigger demand points occur, and will inform all GBRA customers affected.

Stage 1 Triggers -- MILD Water Shortage Conditions

Requirements for initiation

Customers shall be requested to voluntarily conserve water and adhere to the prescribed restrictions on certain water uses, defined in Section VII - Definitions, when the City of Port Lavaca has received notification from GBRA that they have begun operating the Barrier at river mile 10 on the Guadalupe River in order to raise the normal pool level immediately upstream of the Barrier to an elevation sufficient for the efficient diversion of water through the outtake structure. Operation of the Barrier at river mile 10 will be based on:

Demand of all GBRA and other permitted customers for surface water
Available surface water flow from the Guadalupe River and its tributaries at river mile 10.

Requirements for termination

Stage 1 of the Plan may be rescinded upon notification by GBRA that the operation of the Barrier to raise the pool level has ceased.

Stage 2 Triggers -- MODERATE Water Shortage Conditions

Requirements for initiation

Customers shall be required to comply with the requirements and restrictions on certain non-essential water uses provided in Section IX of this Plan upon notification from GBRA that Stage I conditions are active and in addition, no flow over the Barrier and downstream toward the mouth of the river is occurring.

Requirements for termination

Stage 2 of the Plan may be rescinded upon notification by GBRA that the triggering event (no flow over the Barrier) has ceased. Stage I (Mild Water Shortage Conditions) will go into effect at this time.

Stage 3 Triggers -- SEVERE Water Shortage Conditions

Requirements for initiation

Customers shall be required to comply with the requirements and restrictions on certain non-essential water uses for Stage 3 of this Plan when Stage 1 and Stage 2 conditions are active and in addition:

The release of stored water from Canyon Dam to meet demand in Calhoun County is being executed by GBRA, to supplement its run-of-the river permitted supply available at the Barrier.

Requirements for termination

Stage 3 of the Plan may be rescinded when the triggering event (the release of stored water for Calhoun County customers from Canyon Dam) ceases. Stage 2 conditions go into effect upon termination of Stage 3.

Stage 4 Triggers -- CRITICAL Water Shortage Conditions

Requirements for initiation

Customers shall be required to comply with the requirements and restrictions on certain non-essential water uses for Stage 4 of this Plan when Stage 3 conditions are active and, in addition, all customer demand in Calhoun County is being met by the permitted release of stored water in Canyon Dam. The initiation of Stage 4 will also depend on:

The cessation of flow from one or both of the two major springs, Comal and San Marcos Springs (equivalent to the drought of record).

Encroachment of salt water from San Antonio bay toward the Barrier.

Requirements for termination

Stage 4 of the Plan may be rescinded when all of the conditions listed as triggering events have ceased to exist. Upon termination of Stage 4, Stage 3 becomes operative.

Stage 5 Triggers -- EMERGENCY Water Shortage Conditions

Requirements for initiation

Customers shall be required to comply with the requirements and restrictions for Stage 5 of this Plan when the City Manager, or his/her designee, determines that a water supply emergency exists based on:

Major water line breaks, or pump or system failures occur, which cause unprecedented loss of capability to provide water service; or

Natural or man-made contamination of the water supply source(s).

Requirements for termination

Stage 5 of the Plan may be rescinded when all of the conditions listed as triggering events have ceased to exist for a period of 3 consecutive days.

Stage 6 Triggers -- WATER ALLOCATION

Requirements for initiation

In accordance with TCEQ/TWDB Drought Contingency Planning Handbook guidelines, a water allocation policy is not required for any system that will not, based upon historical analysis, experience a water supply shortage during the drought of record.

Section IX: Drought Response Stages

The City Manager, or his/her designee, shall monitor water supply and/or demand conditions on a daily basis and, in accordance with the triggering criteria set forth in Section VIII of this Plan, shall determine that a mild, moderate, severe, critical, emergency or water shortage condition exists and shall implement the following notification procedures:

Notification

Notification of the Public:

The City Manager or his/ here designee shall notify the public by means of:

- Publication in the local newspaper
- Public service announcements
- Postings on the City Web Pages

Additional Notification:

The City Manager or his/ her designee shall notify directly, or cause to be notified directly, the following individuals and entities:

- Mayor and members of the City Council
- Fire Chief
- County Judge & Commissioner(s)
- TCEQ Corpus Christi Regional Office
- Major water customers

Stage 1 Response – MILD Water Shortage Conditions

Goal: Achieve a voluntary 10% percent reduction in total water use.

Supply Management Measures:

Reduced flushing of water mains.

Voluntary Water Use Restrictions:

- (a) Water customers are requested to voluntarily limit the irrigation of landscaped areas to Sundays and Thursdays for customers with a street address ending in an even number (0, 2, 4, 6 or 8), and Saturdays and Wednesdays for water customers with a street address ending in an odd number (1, 3, 5, 7 or 9), and to irrigate landscapes only

between the hours of midnight and 10:00 a.m. and 8:00 p.m. to midnight on designated watering days.

- (b) All operations of the City of Port Lavaca shall adhere to the same water use restrictions.
- (c) Water customers are requested to practice water conservation and to minimize or discontinue water use for non-essential purposes.

Stage 2 Response – MODERATE Water Shortage Conditions

Goal: Achieve a 15% reduction in total domestic water use.

Supply Management Measures:

See Stage I. Also reduced irrigation of public landscaped areas.

Water Use Restrictions. Under threat of penalty for violation, the following water use restrictions shall apply to all persons:

- (a) Irrigation of landscaped areas with hose-end sprinklers or automatic irrigation systems shall be limited to Sundays and Thursdays for customers with a street address ending in an even number (0, 2, 4, 6 or 8), and Saturdays and Wednesdays for water customers with a street address ending in an odd number (1, 3, 5, 7 or 9), and irrigation of landscaped areas is further limited to the hours of 12:00 midnight until 10:00 a.m. and between 8:00 p.m. and 12:00 midnight on designated watering days. However, irrigation of landscaped areas is permitted at anytime if it is by means of a hand-held hose, a faucet filled bucket or watering can of five (5) gallons or less, or drip irrigation system.
- (b) Use of water to wash any motor vehicle, motorbike, boat, trailer, airplane or other vehicle is prohibited except on designated watering days between the hours of 12:00 midnight and 10:00 a.m. and between 8:00 p.m. and 12:00 midnight. Such washing, when allowed, shall be done with a hand-held bucket or a hand-held hose equipped with a positive shutoff nozzle for quick rises. Vehicle washing may be done at any time on the immediate premises of a commercial car wash or commercial service station. Further, such washing may be exempted from these regulations if the health, safety, and welfare of the public is contingent upon frequent vehicle cleansing, such as garbage trucks and vehicles used to transport food and perishables.
- (c) Use of water to fill, refill, or add to any indoor or outdoor swimming pools, wading pools, or jacuzzi-type pools is prohibited except on designated watering days between the hours of 12:00 midnight and 10:00 a.m. and between 8 p.m. and 12:00 midnight.
- (d) Operation of any ornamental fountain or pond for aesthetic or scenic purposes is prohibited except where necessary to support aquatic life or where such fountains or ponds are equipped with a recirculation system.

- (e) Use of water from hydrants shall be limited to fire fighting, related activities, or other activities necessary to maintain public health, safety, and welfare, except that use of water from designated fire hydrants for construction purposes may be allowed under special permit from the City of Port Lavaca.
- (f) Use of water for the irrigation of golf course greens, tees, and fairways is prohibited except on designated watering days between the hours 12:00 midnight and 10:00 a.m. and between 8 p.m. and 12:00 midnight. However, if the golf course utilizes a water source other than that provided by the City of Port Lavaca, the facility shall not be subject to these regulations.
- (g) All restaurants are prohibited from serving water to patrons except upon request of the patron.
- (h) The following uses of water are defined as non-essential and are prohibited:
 - 1. wash down of any sidewalks, walkways, driveways, parking lots, tennis courts, or other hard-surfaced areas;
 - 2. use of water to wash down buildings or structures for purposes other than immediate fire protection;
 - 3. use of water for dust control;
 - 4. flushing gutters or permitting water to run or accumulate in any gutter or street; and
 - 5. failure to repair a controllable leak(s) within a reasonable period after having been given notice directing the repair of such leak(s).

Stage 3 Response – SEVERE Water Shortage Conditions

Goal: Achieve a 20% reduction in total domestic water use.

Supply Management Measures:

See Stage 2. Eliminate the flushing of all water mains except for decontamination purposes, Discontinue irrigation of public landscaped areas and all water use for street sweeping.

Water Use Restrictions. All requirements of Stage 2 shall remain in effect during Stage 3 except:

- (a) Irrigation of landscaped areas shall be limited to designated watering days between the hours of 12:00 midnight and 10:00 a.m. and between 8 p.m. and 12:00 midnight and shall be by means of hand-held hoses, hand-held buckets, drip irrigation, or permanently installed automatic sprinkler system only. The use of hose-end sprinklers is prohibited at all times.
- (b) The watering of golf course tees is prohibited unless the golf course utilizes a water

source other than that provided by the City of Port Lavaca.

(c) The use of water for construction purposes from designated fire hydrants under special permit is to be discontinued.

Stage 4 Response -- CRITICAL Water Shortage Conditions

Goal: Achieve a 20% reduction in total water use.

Supply Management Measures:

See Stage 3. Upon implementation of Stage 4 the City of Port Lavaca, upon having issued written notice, will disconnect the water services of willful violators if necessary to prevent the deliberate wasting of water.

Water Use Restrictions. All requirements of Stage 2 and 3 shall remain in effect during Stage 4 except:

(a) Irrigation of landscaped areas shall be limited to designated watering days between the hours of 6:00 a.m. and 10:00 a.m. and between 8:00 p.m. and 12:00 midnight and shall be by means of hand-held hoses, hand-held buckets, or drip irrigation only. The use of hose-end sprinklers or permanently installed automatic sprinkler systems are prohibited at all times.

(b) Use of water to wash any motor vehicle, motorbike, boat, trailer, airplane or other vehicle not occurring on the premises of a commercial car wash and commercial service stations and not in the immediate interest of public health, safety, and welfare is prohibited. Further, such vehicle washing at commercial car washes and commercial service stations shall occur only between the hours of 6:00 a.m. and 10:00 a.m. and between 6:00 p.m. and 10 p.m.

(c) The filling, refilling, or adding of water to swimming pools, wading pools, and jacuzzi-type pools is prohibited.

(d) Operation of any ornamental fountain or pond for aesthetic or scenic purposes is prohibited except where necessary to support aquatic life or where such fountains or ponds are equipped with a recirculation system.

(e) No application for new, additional, expanded, or increased-in-size water service connections, meters, service lines, pipeline extensions, mains, or water service facilities of any kind shall be approved, and time limits for approval of such applications are hereby suspended for such time as this drought response stage or a higher-numbered stage shall be in effect.

Stage 5 Response -- EMERGENCY Water Shortage Conditions

Goal: Achieve a 50% percent reduction in total water use.

Supply Management Measures:

See Stage 4. Notify the Port Lavaca Fire Department and Calhoun County Emergency Management Coordinator. Contact the top 10 water customers and coordinate the usage of water in accordance with their respective needs.

Water Use Restrictions. All requirements of Stage 2, 3, and 4 shall remain in effect during Stage 5 except:

- (a) Irrigation of landscaped areas is absolutely prohibited.
- (b) Use of water to wash any motor vehicle, motorbike, boat, trailer, airplane or other vehicle is absolutely prohibited.

Stage 6 Response – WATER ALLOCATION

In the event that water shortage conditions threaten public health, safety, and welfare, the City Manager is hereby authorized to allocate water according to the following water allocation plan:

Single-Family Residential Customers

The allocation to residential water customers residing in a single-family dwelling shall be as follows:

Persons per Household	Gallons per Month
1 or 2	6,000
3 or 4	7,000
5 or 6	8,000
7 or 8	9,000
9 or 10	10,000
11 or more	12,000

“Household” means the residential premises served by the customer’s meter. “Persons per household” includes only those persons currently physically residing at the premises and expected to reside there for the entire billing period. It shall be assumed that a particular customer’s household is comprised of two (2) persons unless the customer notifies the City of Port Lavaca of a greater number of persons per household on a form prescribed by the City Manager. The City Manager shall give his/her best effort to see that such forms are mailed, otherwise provided, or made available to every residential customer. If, however, a customer does not receive such a form, it shall be the customer’s responsibility to go to the City of Port Lavaca offices to complete and sign the form claiming more than two (2) persons per household. New customers may claim more persons per household at the time of applying for water service on the form prescribed by the City Manager. When the number of persons per household increases so as to place the customer in a different allocation category, the customer may notify the City of Port Lavaca on such form and the change will be implemented in the next practicable billing period. If the number of persons in a household is reduced, the customer shall notify the City of Port Lavaca in writing within two (2) days. In prescribing the method for claiming more than two (2) persons per household, the City Manager shall adopt methods to insure the accuracy of the claim. Any person who knowingly, recklessly, or with

criminal negligence falsely reports the number of persons in a household or fails to timely notify the City of Port Lavaca of a reduction in the number of person in a household shall be two hundred dollars (\$200).

Residential water customers shall pay the following surcharges:

Up to the threshold amounts, the monthly bill will be calculated in the normal manner. Over and above the threshold amounts indicated above, an additional 50% will be calculated for the existing block rate (the amount typically paid per 1000 gallons for all water used above the monthly minimum) per thousand gallon increment.

Surcharges shall be cumulative.

Master-Metered Multi-Family Residential Customers

The allocation to a customer billed from a master meter which jointly measures water to multiple permanent residential dwelling units (e.g., apartments, mobile homes) shall be allocated 6,000 gallons per month for each dwelling unit. It shall be assumed that such a customer's meter serves two dwelling units unless the customer notifies the City of Port Lavaca of a greater number on a form prescribed by the City Manager. The City Manager shall give his/her best effort to see that such forms are mailed, otherwise provided, or made available to every such customer. If, however, a customer does not receive such a form, it shall be the customer's responsibility to go to the City of Port Lavaca offices to complete and sign the form claiming more than two (2) dwellings. A dwelling unit may be claimed under this provision whether it is occupied or not. New customers may claim more dwelling units at the time of applying for water service on the form prescribed by the City Manager. If the number of dwelling units served by a master meter is reduced, the customer shall notify the City of Port Lavaca in writing within two (2) days. In prescribing the method for claiming more than two (2) dwelling units, the City Manager shall adopt methods to insure the accuracy of the claim. Any person who knowingly, recklessly, or with criminal negligence falsely reports the number of dwelling units served by a master meter or fails to timely notify the City of Port Lavaca of a reduction in the number of dwelling units served by a master meter shall be fined two hundred dollars (\$200).

Customers billed from a master meter under this provision shall pay the following monthly surcharges:

Up to the threshold amounts (6000 gallons/month/dwelling unit), the monthly bill will be calculated in the normal manner. Over and above the threshold amounts an additional 50% will be calculated for the existing block rate (the amount typically paid per 1000 gallons for all water used above the monthly minimum) per thousand gallon increment.

Surcharges shall be cumulative.

Commercial Customers

A monthly water allocation shall be established by the City Manager, or his/her designee, for each nonresidential commercial customer other than an industrial customer who uses water for processing purposes. The non-residential customer's allocation shall be approximately 75% of the customer's usage for corresponding month's billing period for the previous 12 months. If the customer's billing history is shorter than 12 months, the monthly average for the period for which there is a record shall

be used for any monthly period for which no history exists, but in any case not less than 6000 gallons per month. The City Manager shall give his/her best effort to see that notice of each non-residential customer's allocation is mailed to such customer. If, however, a customer does not receive such notice, it shall be the customer's responsibility to contact the City of Port Lavaca to determine the allocation. Upon request of the customer or at the initiative of the City Manager, the allocation may be reduced or increased if, (1) the designated period does not accurately reflect the customer's normal water usage, (2) one nonresidential customer agrees to transfer part of its allocation to another nonresidential customer, or (3) other objective evidence demonstrates that the designated allocation is inaccurate under present conditions. A customer may appeal an allocation established hereunder to the City Manager.

Nonresidential commercial customers shall pay the following surcharges:

Up to the threshold amounts, the monthly bill will be calculated in the normal manner. Over and above the threshold amounts an additional 50% will be calculated for the existing block rate (the amount typically paid per 1000 gallons for all water used above the monthly minimum) per thousand gallon increment.

The surcharges shall be cumulative.

Industrial Customers

A monthly water allocation shall be established by the City Manager, or his/her designee, for each industrial customer, which uses water for processing purposes. The industrial customer's allocation shall be approximately 90% percent of the customer's water usage baseline. Ninety (90) days after the initial imposition of the allocation for industrial customers, the industrial customer's allocation shall be further reduced to 80% percent of the customer's water usage baseline. The industrial customer's water use baseline will be computed on the average water use for the 12 month period ending prior to the date of implementation of Stage 2 of the Plan. If the industrial water customer's billing history is shorter than 12 months, the monthly average for the period for which there is a record shall be used for any monthly period for which no billing history exists.

The City Manager shall give his/her best effort to see that notice of each industrial customer's allocation is mailed to such customer. If, however, a customer does not receive such notice, it shall be the customer's responsibility to contact the City of Port Lavaca to determine the allocation, and the allocation shall be fully effective notwithstanding the lack of receipt of written notice. Upon request of the customer or at the initiative of the City Manager, the allocation may be reduced or increased, (1) if the designated period does not accurately reflect the customer's normal water use because the customer had shutdown a major processing unit for repair or overhaul during the period, (2) the customer has added or is in the process of adding significant additional processing capacity, (3) the customer has shutdown or significantly reduced the production of a major processing unit, (4) the customer has previously implemented significant permanent water conservation measures such that the ability to further reduce water use is limited, (5) the customer agrees to transfer part of its allocation to another industrial customer, or (6) if other objective evidence demonstrates that the designated allocation is inaccurate under present conditions. A customer may appeal an allocation established hereunder to the City Manager.

Industrial customers shall pay the following surcharges:

Up to the threshold amounts, the monthly bill will be calculated in the normal manner. Over and above the threshold amounts an additional 50% will be calculated for the existing block rate (the amount typically paid per 1000 gallons for all water used above the monthly minimum) per thousand gallon increment.

The surcharges shall be cumulative.

Section X: Enforcement

- (a) No person shall knowingly or intentionally allow the use of water from the City of Port Lavaca for residential, commercial, industrial, agricultural, governmental, or any other purpose in a manner contrary to any provision of this Plan, or in an amount in excess of that permitted by the drought response stage in effect at the time pursuant to action taken by the City Manager, or his/her designee, in accordance with provisions of this Plan.
- (b) Any person who violates this Plan is guilty of a misdemeanor and, upon conviction shall be punished by a fine of two hundred dollars (\$200). Each day that one or more of the provisions in this Plan is violated shall constitute a separate offense. If a person is convicted of three or more distinct violations of this Plan, the City Manager, shall, upon due notice to the customer, be authorized to discontinue water service to the premises where such violations occur. Services discontinued under such circumstances shall be restored only upon payment of a re-connection charge, as indicated in the City of Port Lavaca Water Rates and Service Ordinance, and any other costs incurred by the City of Port Lavaca in discontinuing service. In addition, suitable assurance must be given to the City Manager that the same action shall not be repeated while the Plan is in effect. Compliance with this plan may also be sought through injunctive relief in the district court.
- (c) Any person, including a person classified as a water customer of the City of Port Lavaca, in apparent control of the property where a violation occurs or originates shall be presumed to be the violator, and proof that the violation occurred on the person's property shall constitute a rebuttable presumption that the person in apparent control of the property committed the violation, but any such person shall have the right to show that he/she did not commit the violation. Parents shall be presumed to be responsible for violations of their minor children and proof that a violation, committed by a child, occurred on property within the parents' control shall constitute a rebuttable presumption that the parent committed the violation, but any such parent may be excused if he/she proves that he/she had previously directed the child not to use the water as it was used in violation of this Plan and that the parent could not have reasonably known of the violation.
- (d) Any employee of the City of Port Lavaca, police officer, or other individual designated by the City Manager, may issue a citation to a person he/she reasonably believes to be in violation of this Ordinance. The citation shall be prepared in duplicate and shall contain the name and address of the alleged violator, if known, the offense charged, and shall direct him/her to appear in municipal court on the date shown on the citation for which the date shall not be less than 3 days nor more than 5 days from the date the citation was issued. The alleged violator shall be served a copy of the citation. Service of the citation shall be complete upon delivery of the citation to the alleged violator, to an agent or employee of a violator, or to a person over 14

years of age who is a member of the violator's immediate family or is a resident of the violator's residence. The alleged violator shall appear in municipal court to enter a plea of guilty or not guilty for the violation of this Plan. If the alleged violator fails to appear in municipal court, a warrant for his/her arrest may be issued. A summons to appear may be issued in lieu of an arrest warrant. These cases shall be expedited and given preferential setting in municipal court before all other cases.

Section XI: Variances

The City Manager, or his/her designee, may, in writing, grant temporary variance for existing water uses otherwise prohibited under this Plan if it is determined that failure to grant such variance would cause an emergency condition adversely affecting the health, sanitation, or fire protection for the public or the person requesting such variance and if one or more of the following conditions are met:

- (a) Compliance with this Plan cannot be technically accomplished during the duration of the water supply shortage or other condition for which the Plan is in effect.
- (b) Alternative methods can be implemented which will achieve the same level of reduction in water use.

Persons requesting an exemption from the provisions of this Ordinance shall file a petition for variance with the City of Port Lavaca within 5 days after the Plan or a particular drought response stage has been invoked. All petitions for variances shall be reviewed by the City Manager, or his/her designee, and shall include the following:

- (a) Name and address of the petitioner(s).
- (b) Purpose of water use.
- (c) Specific provision(s) of the Plan from which the petitioner is requesting relief.
- (d) Detailed statement as to how the specific provision of the Plan adversely affects the petitioner or what damage or harm will occur to the petitioner or others if petitioner complies with this Ordinance.
- (e) Description of the relief requested.
- (f) Period of time for which the variance is sought.
- (g) Alternative water use restrictions or other measures the petitioner is taking or proposes to take to meet the intent of this Plan and the compliance date.
- (h) Other pertinent information.

Variances granted by the City of Port Lavaca shall be subject to the following conditions, unless waived or modified by the City Manager or his/her designee:

- (a) Variances granted shall include a timetable for compliance.
- (b) Variances granted shall expire when the Plan is no longer in effect, unless the petitioner has failed to meet specified requirements.

No variance shall be retroactive or otherwise justify any violation of this Plan occurring prior to the issuance of the variance.

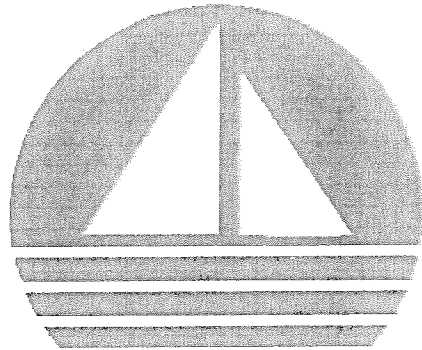
MAYOR AND COUNCIL COMMUNICATION

CITY COUNCIL MEETING: DECEMBER 13, 2010 - REGULAR

SUBJECT: CONSIDER RESOLUTION #R-121310-1 FOR THE PURPOSE OF ADOPTING THE 2010 WATER CONSERVATION PLAN FOR THE CITY OF PORT LAVACA TO PROMOTE RESPONSIBLE USE OF WATER CONSUMPTION REDUCTION AS REQUIRED BY 2007 HOUSE BILL 4 OF THE TEXAS STATE LEGISLATURE

INFORMATION:

AGENDA ITEM
NUMBER 2



CITY OF PORT LAVACA

WATER CONSERVATION PLAN

City of Port Lavaca
202 N. Virginia St.
Port Lavaca, Texas 77979
Phone: 361.552.9798
Fax: 361.552.6062

December 8, 2010

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Appendix A. Correspondence, Coordination, and Notification	
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Appendix C. Water Conservation Utility Profile (TWDB Form WRD-264)	
Appendix D. Water and Sewer Rates (Excerpt from City Fee Schedule Ordinance)	
Appendix E. Plumbing Ordinance	
Appendix F. Water Conservation Implementation Report (TCEQ-20159)	
Exhibit A. Certificate of Convenience and Necessity and Service Area Map	

SECTION I

INTRODUCTION

The City of Port Lavaca is located in Calhoun County, Texas at the intersection of U.S. Highway 87 and state Highway 35. According to the 2000 Census, Port Lavaca had a population of 11,968. The City not only provides water and sewer to persons within the city limits but also those areas within the city's ETJ. Exhibit A shows the Certificate of Convenience and Necessity (CCN) and Service Area Map.

The City of Port Lavaca purchases treated water from the Guadalupe Blanco River Authority (GBRA) Water System (PWS #2460155) via a long-term water purchase contract. GBRA supplies water through treated surface water from the Guadalupe River which is located approximately 17.5 miles south of Port Lavaca. The City delivers this treated water via their distribution system (PWS #0290002) to Port Lavaca's citizens.

The wastewater treatment plant and collection system are owned and operated by the City. The current plant was constructed in 1982 and upgraded in 2004 and is permitted with the TCEQ (TPDES Permit No. WQ0010251001, EPA ID No. TX0047562). The plant has a capacity of 2.0 MGD, a permitted average annual flow of 2.0 MGD, and a peak two hour flow of 5,319 gpm (8 MGD). The wastewater collection system provides service for approximately 95% of the City's retail water customers.

The City currently has a Drought Contingency Plan adopted 6-23-2003. This document only addresses reduction in water use during emergency conditions. It is not intended to encourage on-going reduction in water use through conservation efforts. To aid the City in its efforts to conserve water and remain in compliance with the Texas Commission on Environmental Quality (TCEQ) requirements for Water Conservation Plans set forth by the amendment of the Texas Administration Code, Title 30, Chapter 288 in January 2008, the City of Port Lavaca finds that a stand-alone document outlining the water conservation efforts, goals, and updated water system data is needed.

The information found herein represents the Water Conservation Plan developed for and implemented by the City of Port Lavaca. This document had been developed, in part, in accordance with the guidelines and direction of the Texas Water Development Board (TWDB) and through consultation with City officials.

1. Utility Evaluation Data

In order to develop a comprehensive and effective water conservation plan, the conditions of the existing water and wastewater systems must be evaluated. The Water Conservation Utility Profile (TWBD Form WRD-264) was completed with the most updated information available. This profile is included as Appendix C. this form refers to the Certificate of Convenience and Necessity (CCN) and Service Area Map which is included as Exhibit A to this Plan.

2. Program Goals

The City of Port Lavaca recognizes the importance of developing an effective water conservation plan. Proper planning will help all users in the system conserve water and reduce the City's contribution to the water needs of Texas today and in future.

The City of Port Lavaca is committed to conservation to avoid waste, save costs, and conserve Texas's natural resources. The City has already accomplished many goals in its efforts to conserve water. These include installing meters at all City facilities, implementing a plan for meter replacement, and providing information on non-wasteful uses of water and techniques that can be employed to conserve water to all customers. The City has also adopted standard construction details and specifications which require proper embedment of all water lines and provides standards for all services and meters.

To further the City's progress, Port Lavaca proposes to establish the following goals for its long-term water conservation plan:

- 1) Promote water conservation, non-wasteful uses of water and techniques that can be employed to conserve water through education and information efforts that will be provided on a yearly basis.
- 2) Reduce unaccounted-for water (from the metered purchase amounts from GBRA to the metered sales) in the system from the current levels of 22% to 12%. This water loss percentage should be obtained within the next 10 years.
- 3) Maintain water meters and a water meter testing program and expand the Automatic Meter Reading (AMR) System to accurately account for water sold by City.
- 4) Establish and maintain water rate structures that promote conservation of water.

3. Coordination with Regional Water Planning Group

The water service area of the City of Port Lavaca is located within the South Central Texas Regional Water Planning Group (Region L). The city of Port Lavaca actively participates in the Regional water planning effort and has provided a copy of this Plan to the SCTRWPG to seek comment and insure consistency with the approved regional water plan. A copy of this correspondence is provided in Water Conservation Plan Appendix A.

4. Public Involvement

Opportunity for the public to provide input into the preparation of this Plan by the City of Port Lavaca in form of:

- City Council meeting seeking public comment before adoption of the Plan (see Appendix B for adoption resolution)
- Correspondence with the City's wholesale supplier- the Guadalupe Blanco River Authority (see Appendix A)

In addition, this Plan will be continually available for public review during normal business hours of the City at the City Hall located at 202 N. Virginia St., Port Lavaca, Texas 77979. Any comments received should be considered for inclusion in a revision or amendment to the Water Conservation Plan.

5. Plan Implementation

This Plan and Subsequent Plan elements discussed in this document were adopted by City Resolution of the City of Port Lavaca (see attached Resolution in Appendix B).

Section II

Long-Term Water Conservation Plan

The main goals associated with the long-term water conservation planning for the City of Port Lavaca involve maintaining a non-wasteful water rate structure, reducing unaccounted for water, maintaining city meters through testing and replacement, and providing education and information to all customers. These long-term water conservation goals can only be achieved through adherence to the following plan elements and methods.

1. Education and Information

According to the document titled "Guidelines for Municipal Water Conservation and Emergency Water Demand Management" prepared by the TWDB (November 1991), statistics for municipal water uses in Texas indicate many areas in which water can be conserved or better utilized. Some of the facts about municipal water use include:

- . Seasonal use (primarily for landscaping irrigation) averages 20-30% of the total annual municipal use.
- . Single family homes often use half of the water purchased in the summer months for exterior purposes such as lawn watering car washing.
- . Residential in-home water consumption indicates that 40% is used for toilet flushing, 35% for bathing, 14% for laundry, and 11% for kitchen needs.

As can be seen from these water use facts, a great potential exists for reducing water consumption if the public is informed about water conservation practices.

Various media outlets exist for effectively communicating water conservation information. Some of these methods include television, radio, and newspaper announcements and advertisements; posters and public displays; exhibits at fairs, contests and school programs; bill inserts, brochures, pamphlets, and newsletters; and speaker's programs. The vehicle by which information is distributed is dependant on the future approaches taken by City officials in educating the public. At a minimum, the City of Port Lavaca will provide education and information on a yearly basis to all customers presenting non-wasteful uses of water and techniques that can be employed to conserve water through the following vehicles:

1. Annual Education Water Conservation Activity

The City can provide annual water conservation education through media advertisements in local newspaper or other local publication. Publication materials could include selected material from the TWDB giving water conservation strategies for residential, commercial, and industrial customers. Providing city water use data concerning variations in seasonal consumption and yearly/ monthly changes in per capita use can illustrate time periods where water conservation is the most important. Timely publications of these conservation tips during peak seasons can help initiate conservation when per capita consumption is the highest.

2. Water Conservation Literature for Customers

The City can maintain water conservation materials to customers at all times. General water conservation brochures (such as those available through the TWDB) can be mailed to each customer on an annual or biannual basis. New customer packets can also be developed as deemed appropriate and necessary by City officials. The City maintains an up-to-date website containing useful information for residents, and water conservation material can be published online to help reach a wider audience of water users.

The public education program can also include information about techniques and practices that can be employed to conserve water. Specific consideration should be given to the following:

1. Water-Conservation Landscaping (Xeriscape):
Public education on Xeriscape should include landscaping and irrigation procedures which reduce water consumption while lowering water bills. The City can strive to provide an example by applying these procedures to public property whenever and wherever practical.
2. Retrofit Program:
Through the education and information program, plumbers and water consumers can be encouraged to retrofit old fixtures (such as interior plumbing fixtures, lawn watering equipment, and water-using appliances) with water saving devices. The educational process should focus on the advantages of installing water conservation devices as well as the availability of these items.

2. Conservation-Oriented Water Rate Structures

The City maintains a rate structure as shown in Table 1, and a copy of the utility rate ordinance is found in Appendix D. Such a structure is a step towards maintaining a rate that promotes water conservation.

The flat-rate water structure used by the City applies a base charge by meter size for the first 2,000 gallons of water use and a flat charge for each 1,000 gallons thereafter. Wastewater is billed in a similar manner dependant on water use. This rate structure is more conducive to water conservation than a regressive rate structure since increasing water and sewer use is charged a flat rate instead of a declining rate.

However, the City's current rate structure is not as water conservation oriented as a progressive rate structure, where increasing water and sewer use is charged at an increasing rate. It remains the responsibility of the future City government to maintain a water conservation-oriented rate structure for their water and wastewater utilities and consider the adoption of progressive rate structures as a further step to advance the City's goal of reduced water use. Maintaining a water conservation oriented rate structure and evaluating its effectiveness is an ongoing task.

Table 1. City of Port Lavaca Water Rate Structure

Residential:

1-2,000 gallons	\$15.00
Over 2,000 gallons	\$4.75 per 1,000 gallons

Small commercial:

Minimum Charge	Amount for usage of 2,000 gallons
Over 2,000 gallons	\$4.95 per 1,000 gallons
$\frac{5}{8}$ -1 $\frac{1}{2}$ Meter	\$17.50 per month

Large commercial:

Water Usage	\$4.95 per each 1,000 gallons
2-6 inch meter	\$35.00 per month

Table 2. City of Port Lavaca Sewer Rate Structures

Residential wastewater user rates:

1-2,000 gallons	\$14.00
Over 2,000 gallons	\$4.90 per 1,000 gallons

*Residential wastewater user rate
for customer outside city limits:*

1½ times rate for customers inside city limits

*Commercial and industrial wastewater
user rates:*

1-2,000 gallons	\$15.75
Over 2,000 gallons	\$4.95 per 1,000 gallons
Customers outside city limits	1½ times user rate for customers inside city limits

Extra strength surcharge:

Over 250 ppm BOD or TSS	\$60.00 per week, per test
Additional tests at customers request	\$70.00 per test
Industrial wastewater discharge over 250 ppm BOD or TSS	Based on formula

The average of all samples taken during the month that exceed 250 ppm shall be used to determine the BOD and TSS used in the following formula:

Surcharge equals	$\frac{\text{Total usage } (\$2.56 \text{ [BOD-250]})}{1,000 \text{ gal.}}$
and/or	$\frac{\text{Total usage } (\$2.34 \text{ [TSS-250]})}{1,000 \text{ gal.}}$

Low pressure sewer systems (LPSS)

1. The minimum monthly charge for each residential customer with LPSS within the city limits shall be \$14.00 for the first 2,000 gallons or a fraction thereof plus \$4.90 per thousand gallons of water used in excess of 2,000 gallons.
2. There will be a \$10.00 monthly maintenance fee to all LPSS customers.
3. For residential customers located outside the city limits the rates for discharging normal wastewater into the sanitary sewer system shall be 1½ times the rate for customers inside the city limits.

3. Universal Metering and Meter Repair and Replacement

Unaccounted-for water is water that is supplied to the system but not metered. An example of un-metered water is flushing of water distribution mains. Unaccounted for water also involves any losses to the system through faulty meter readings of distribution line leaks. These losses to the system should be calculated and reported on an annual basis. To meet this objective, the following concepts should be included in a water loss audit program:

1. Universal Metering of Customer Uses

It is essential that all customers and water users be metered. In addition to installing new meters on previously unmetered connections, the City can also implement a meter replacement program whereby old and faulty meters are replaced with new ones and connected to an automatic meter reading system. This generally improves the accuracy of the meter system and therefore reduce the potential for unaccounted-for water.

2. Periodic Meter Testing and Repair

A maintenance program of meter testing and repair is essential in gathering accurate data on the water system. To ensure problems are detected on a consistent and methodical basis, all meters owned by the City should be tested according to the following schedule:

- Master Meters- test annually
- Customer Meters (larger than 1 ½")- test every 5 years
- Customers Meters (smaller than 1 ½") – test sample group of Meters of similar age every 10 years

To avoid testing every customer meter in one year, stagger testing should be utilized to ensure that an equal number of meters are tested each year. Monthly meter readings should also be checked versus previous readings to determine if there is a dramatic change in water use. A large variation could indicate that the meter is not operating properly and should be investigated further.

4. Leak Detection and Repair Programs

A leak detection, location, and repair program is an important part of reducing water losses in the system. Such a program will tend to finance itself through savings in water purchased by the City.

A monthly accounting of the amount of water purchased from GBRA versus the water metered to the consumers should be maintained and updated on a continual basis. Unaccounted-for water can be monitored by examining these records and reduced as sources are located and eliminated. These sources could include defective hydrants, abandoned services, un-metered water used for fire fighting or other municipal uses, inaccurate meters, illegal hookups, unauthorized use of fire hydrants, and leaks in mains and services.

5. Plumbing Codes

According to the TWDB, “the single most effective method of conserving water inside the home is to replace older, inefficient plumbing fixtures with modern, efficient fixtures”. A strong plumbing ordinance is, therefore, essential in meeting water conservation goals. The City of Port Lavaca has adopted the 2009 International Plumbing Code via City ordinance. A copy of this ordinance is located in Appendix E. enforcement of this ordinance is vital to achieving the City’s water conservation goals. Additionally, future plumbing code modifications must include the most current Texas Legislature regulations and additional standards as appropriate.

Table 3. Plumbing Minimum Standards

Fixture	Standard
Shower heads	No more than 2.75 gpm at 80 psi
Lavatory & Sinks Faucets and Aerators	No more than 2.2 gpm at 60 psi
Wall-mounted, Flushometer Toilets	No more than 2.0 gallons per flush
All other Toilets	No more than 1.6 gallons per flush
Urinals	No more than 1.0 gallons per flush
Drinking Water Fountains	Must be self-closing
Additional Requirements	
All Hot Water Lines	Must be insulated
New Swimming Pools	Must have recirculating filtration equipment

6. Recycling and Reuse

Recycling or reuse of waters is currently not practiced in Port Lavaca. The effluent from the wastewater treatment plant is available for reuse by an authorized entity. Although it is possible to use the treated effluent for irrigation or cleaning at the WWTP, the City of Port Lavaca does not practice this currently. The City will evaluate and consider possible implementation of a reuse program to help achieve the water conservation goals outlined in this plan.

7. Pressure Reduction

Excessive pressures in water distribution systems and customer connections are directly related to the mechanical wear experienced on plumbing fixtures and the quantities of water lost through system leaks. With lower pressures in a system, line and valve breaks occur less frequently and less water is lost when breaks do occur. It is essential that an updated water distribution system model be maintained to examine impacts of new lines to the existing variations in pressures. At such time that pressures exceed 80 psi in certain portions of the City, installation of pressure reducing valves (PRV) will be warranted to reduce the potential for increases in unaccounted-for water through system leaks. Furthermore, the City is currently conducting improvements to help alleviate pressure differentials found within the distribution system.

8. Targeted Goals for Municipal Water Use Conservation

In order to advance water conservation efforts, the City has established 5-year and 10-year target goals for reduction in municipal use including a schedule for implementing the Plan to achieve the targeted reductions and a method of tracking its implementation and effectiveness.

The TWDB provided a tool for use in estimating the targeted goals for municipal water use conservation. The Water Conservation Utility Profile (TWDB Form WRD-264) was completed with updated information from the original plan. This form refers to the Certificate of Convenience and Necessity (CCN) and Service Area Map which is included as Exhibit A to this Water Conservation Plan. The City of Port Lavaca had made great strides in accomplishing water use reduction before the statement of the following targeted goals, and the TWDB estimate for water savings have been adjusted to reflect local conditions. The estimated water savings from the previously described long term goals are as follows:

1. Education and information will be provided on a yearly basis to all customers presenting non-wasteful uses of water and techniques that can be employed to conserve water. Based on the TWDB “most likely” scenario, a 2% savings in the average annual per capita use can be realized through education programs and 5% for the “advanced” scenario. The “most likely” scenario equates to 2.26 gallons per capita per day (gpcpd) reduction (5-year average annual gpcpd of 113 multiplied by 2.0%) and the advanced scenario equates to 5.65 gallons per capita per day (gpcpd) reduction (5-year average annual gpcpd of 113 multiplied by 5%).
2. As part of education measures, customers will be encouraged to retrofit old plumbing fixtures with water-conserving units. The TWDB has set a “most-likely” goal of 20.5 gpcpd and an “advanced” goal of 21.7 gpcpd by replacing old plumbing fixtures. The City of Port Lavaca has already realized some savings from the retrofit and new installation of water-conserving plumbing fixtures. Substantial new development in the City utilizes water efficient plumbing fixtures required by the City’s building code. These existing local conditions allow for an estimated savings of 4.5 gpcpd for an “advanced” goal.
3. Education will also help in reduction of summer usage. Seasonal water uses from June to August have represented approximately 30% of the total annual production over the last 5 years. This seasonal peak can be offset with an increasing water charge as the usage rises and increased public awareness of water-conserving activities. The seasonal per capita usage contributes 15.8 gpcpd (5-year average per capita use of 113 multiplied by 14%). With consideration for existing local conditions, the “most likely” conservation scenario can achieve a 3% reduction in this use and the “advanced” can achieve a 10% reduction. The resulting gpcpd seasonal use reduction provides approximately 1.58 gpcpd in water savings (15.8 multiplied by 10%) for the “advanced” scenario.
4. Unaccounted for water from water production to the consumers on the system should be reduced from the previous 5-year average of 16% (average calculated from water losses for 2005 through 2009). This loss should be reduced to no more than 12%. The associated potential savings by reducing unaccounted for water loss is 4.52 gpcpd (113 gpcpd multiplied by difference between 16% and 12%) for the “advanced” scenario and 50% of the potential savings for the “most likely” scenario. This goal will require on-going metering and operational adjustments as well as continual repair of old lines and meters in the distribution system. The result will be a decrease in per capita water consumption thus reducing water demands on the system.

These goals provide a total potential for reducing water usage in the most likely scenario by 2.26 gpcpd. This would reduce the average year annual per capita use from 113 to 110.7 gpcpd. An advanced scenario gives a maximum reduction in water usage of 4.5 gpcpd. This would reduce the average year annual per capita use from 113 to 108.5 gpcpd. The City intends to meet one-half of this goal within 5 years of plan adoption (2015) and the second-half of this goal within 10 years of plan adoption (2020). The following table summarizes the targeted goals.

Table 4. Targeted 5 and 10 Year Goals

	Average Annual Per Capita Use (gpcpd)	Water Savings (gpcpd)
Current	113	0
2015 (5 Year Goal) Most Likely	111.9	1.13
2015 (5 Year Goal) Advanced	110.75	2.25
2020 (10 Year Goal) Most Likely	110.7	2.26
2020 (10 Year Goal) Advanced	108.5	4.5

It is important to note that the 2006 Region L Water Plan adopted by the South Central Texas Regional Water Planning Group and accepted by the TWDB estimated the per Capita use for Port Lavaca in 2020 to be 117 gpcpd.

These stated targeted 5 and 10 year goals do not account for possible future changes in the makeup of the City's water users. For example, additionally heavy water users are expected to be added to the system, including new educational facilities and regional parks currently under construction. Changes to the makeup and usage patterns of the City's water users will affect the per capita water usage, but the water conservation strategies outlined in this Plan will still apply to all the city's water users, and the City will make every effort to accommodate new heavy water users while maintaining its goals for water use reduction.

It is also important that updates to the Region L Water Plan be coordinated with the City so that water use demand and projections accurately reflect the trends in Port Lavaca's water use. The City believes that historical production volumes from years as far back as a decade provide a better representation of the City's historical water use, and this data coupled with current and future water use trends would provide greater accuracy for modeling future water use projections.

9. Schedule of Program

In order to maintain a schedule for its program, the city must consider a wide variety of tasks in order to successfully meet the goals of its Plan. The City has made significant progress on many conservation efforts before the adoption of this Plan. Programs to inform the public about water conservation exists, new water conservation oriented rates have been adopted, and most meters have been replaced. However, many of these programs have ongoing steps that that will need to be performed consistently in order to maintain effectiveness. The following is a schedule of tasks for the City's Water Conservation Plan.

1. The City of Port Lavaca should complete a Public Information Plan encompassing all aspects of information and education programs already mentioned within 6 months of adopting the 2010 Water Conservation Plan. In the second year after the Public Information Plan is complete, the City of Port Lavaca should revise the Public Information Plan and conduct a survey of its customers to measure the effectiveness of its plan. For each subsequent year, a revision of the Public Information Plan should be completed. Every other year after the first survey has been completed; the City should survey its customers or determine some method to measure the effectiveness of its information campaign.
2. Once a year, the City of Port Lavaca should review consumption patterns and its income and expense levels and evaluate whether or not the current water rates are effective and appropriate. Adjustments should be made as needed, and consideration should be given to the adoption of a progressive water and sewer rate structure.
3. The City of Port Lavaca should provide information regarding the water rate structure to each of its customers once a year. Also, every five years, or when the billing software is changed, the City of Port Lavaca should provide customers with historical water use for the previous 12 months.
4. Meters will be tested according to Periodic Meter Testing and Repair on page 11 of this plan.
5. A leak detection and repair program will be maintained as mentioned previously. Accounting data of the water purchased from GBRA versus the measured consumption from the City water meters should be maintained on a continual basis. These records can be monitored to determine water loss and unaccounted-for water. In addition, the City should also consider implementing surveys of the water system once a year to find possible leaks in the system.

6. Replacement of old and leaking water lines should be completed as soon as practical when a leak is identified. Even when leaks are not apparent, a schedule for replacement of old water lines should be maintained and updated as needed.
7. The City should consider adopting provisions to require the installation of pressure reducing valves for areas with pressure greater than 80 psi. A water distribution system model should be updated on a periodic basis and can be used to determine information about the City's water system and where pressure problems can be alleviated.

10. Method of Tracking

In order to track the progress, the City should collect information about its programs and conduct surveys of the population to evaluate the effectiveness of the program. For literature pieces, the number of such pieces and topics covered should be documented. The number of news programs or advertisements should be documented and the total population of the service area should be conducted and recorded to evaluate the effectiveness of the program.

1. For information programs, the City should collect information about its programs and conduct surveys of the population to evaluate the effectiveness of the program. For literature pieces, the number of such pieces and topics covered should be documented. The number of news programs or advertisements should be documented and the total population of the service area should be tracked. After this information is collected, surveys should be conducted and recorded to evaluate the effectiveness of the program.
2. The billing structure should be evaluated annually. Several pieces of information are required to evaluate this structure effectively. A copy of the rate ordinance should be documented. Billing and customer records should be kept and water consumption by each customer class at the beginning and end of the reporting period should be recorded.
3. In order to evaluate the meter installation program, guidelines of meter installation based upon customer usage should be written and available, a meter repair and replacement policy should be documented, and meter number, size, make, and model should be recorded for each meter repair and replacement.
4. To track the progress of the City's Leak Detection and Repair Program, the City should maintain a water distribution model, records of water consumption of its customers, and accounting information of

water bought from GBRA. This information will also be helpful in evaluating the City's Pressure Reduction Program.

5. The effectiveness of the City's Water Conservation Plan can be Measured by tracking information similar to that found in the Utility Profile in Attachment C.

The Water Conservation Implementation Report, found in Appendix F, should be completed periodically to gauge the effectiveness of the City's water conservation efforts. Accounting data of water purchased from GBRA and records of water consumption by the City's customers can be performed annually to measure progress toward the 5 and 10 year goals in water usage reduction. If no progress is apparent, the City may want to consider alternative water conservation programs.

11. Means of Implementation and Enforcement

The City Manager of Port Lavaca or his/her duly appointed representative will act as the Administrator of the Water Conservation Plan. The Administrator will oversee the execution and implementation of all elements of the plan and be responsible to oversee the keeping of adequate records for program verification.

As a means of implementing and enforcing this plan, all plan elements discussed in this document were adopted by the City Resolution of the City of Port Lavaca (see attached Resolution and Appendix B).

12. Periodic Reviews and Evaluations

The TCEQ requires (under 30 TAC 288.30) that the Water Conservation Implementation Report located in Appendix F be completed every 5 years and whenever this Plan is updated or amended.

When under financial obligation to the TWDB, the City is required (under 31 TAC 363.71) to submit an annual report describing the implementation, status, and quantitative effectiveness of the water conservation program. This annual report can be completed in the form of the Water Conservation Report, which is found in Appendix F, and is due within 60 days after the anniversary date of the loan closing for each year the City is under financial obligation to the TWDB. The Administration will undertake the task of completing this annual report.

13. Contracts with Other Entities

The adoption of this plan does not affect the water contracts with GBRA or the City's wholesale customers. The City will require, through contractual agreements, that any political subdivision or utility contracting with the City in the future for treated water adopt a water conservation plan acceptable to the TWDB and TCEQ.

Appendix A
Correspondence, Coordination, and Notification

City Manager
Ext. 222

December 2, 2010

City Secretary
Ext. 224

Attention: Herb Wittliff
Guadalupe Blanco River Authority
Port Lavaca Operations
P.O. Box 146
Port Lavaca, Texas 77979

Code Enforcement
Ext. 225

Finance
Ext. 224

Inspections Permits
Ext. 229

Re: City of Port Lavaca-2010 Water Conservation Plan

Municipal Court
Ext. 226

The City of Port Lavaca is seeking to adopt the 2010 Water Conservation Plan. This Plan will incorporate the TCEQ requirements set forth by the passage of 2007 House Bill 4.

Personnel
Ext. 224

Utility Billing
Ext. 228

As the City's water supplier, a copy of this plan is herewith submitted for your review and to provide you the opportunity for input in the preparation of this document.

Animal Control
361-552-5726

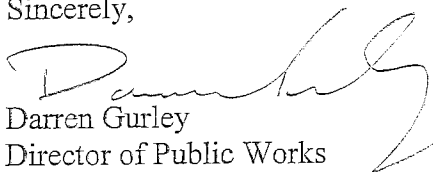
If you have any questions or require additional information please feel free to call me at (361) 552-3347.

Bauer Center
361-552-1234

Fire Station
361-552-3240

Sincerely,

Public Works Director
361-552-3347


Darren Gurley
Director of Public Works

Parks & Recreation
361-552-1234

Police
361-552-3788

Streets
361-552-3347

Utilities Operation
361-552-3347

City Manager
Ext. 222

December 2, 2010

City Secretary
Ext. 224

Attention: Laura Raun
South Central Texas Regional Water Planning Group
111 W. 8th Street
Austin, Texas 78701

Code Enforcement
Ext. 228

Finance
Ext. 234

Inspections/Permits
Ext. 229

Re: City of Port Lavaca-2010 Water Conservation Plan

Municipal Court
Ext. 226

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If you have any questions or require additional information please feel free to call me at (361) 552-3347.

Animal Control
361-552-5726

Bauer Center
361-552-1234

Fire Station
361-552-3241

Sincerely,

Public Works Director
361-552-3347


Darren Gurley
Director of Public Works

Parks & Recreation
361-552-1234

Police
361-552-3788

Streets
361-552-3347

Utilities Operation
361-552-3347

Appendix B
Adoption Resolution

A RESOLUTION ADOPTING THE 2010 WATER CONSERVATION PLAN FOR THE CITY OF PORT LAVACA TO PROMOTE RESPONSIBLE USE OF WATER CONSUMPTION REDUCTION AS REQUIRED BY 2007 HOUSE BILL 4 OF THE TEXAS STATE LEGISLATURE.

WHEREAS, the City of Port Lavaca, Texas, recognizes that the amount of water available to its citizens and customers is limited; and

WHEREAS, the City desires to conserve water resources; and

WHEREAS, the City desires to comply with section 11.1271 of the Texas Water Code and applicable rules of the Texas Commission on Environmental Quality which require these plans for all public water supply; and

WHEREAS, pursuant to chapter 54 of the Local Government Code and in the best interests of its citizens, the City is authorized to adopt Resolutions it deems are necessary and expedient to preserve and conserve its water resources;

NOW THEREFORE, BE IT RESOLVED BY THE CITY COUNCIL OF THE CITY OF PORT LAVACA, TEXAS THAT:

Section 1. The City Council does hereby find and declare that sufficient and timely written notice of place and subject matter of this meeting adoption this Resolution was posted. The City Council further ratifies, approves and confirms such written notice and posting therefore.

Section 2. The City Council adopts the 2010 Water Conservation Plan attached to this resolution. All resolutions that are in conflict with the provisions of this Resolution are hereby repealed.

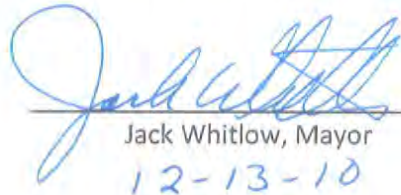
Section 3. Should any paragraph, sentence, clause, phrase or word of this Resolution be declared unconstitutional or invalid for any reason, the remainder of this Resolution shall not be affected.

Section 4. The City Secretary is hereby authorized and directed to publish this Resolution.

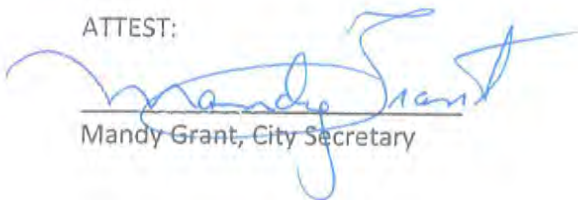
Section 5. The City Manager or Chief Administrative Officer or his designee is hereby directed to file a copy of the plan and this Resolution with the Texas Water Development Board in accordance with Title 31, Chapter 363 of the Texas Administrative Code.

Section 6. This Resolution shall take effect after passage and publication.

Passed and approved by the City Council on this 8th day of November, 2010.


Jack Whitlow, Mayor
12-13-10

ATTEST:


Mandy Grant, City Secretary

Appendix C
Water Conservation Utility Profile
(TWDB Form WRD-264)



TEXAS WATER DEVELOPMENT BOARD

UTILITY PROFILE

The purpose of the Utility Profile is to assist with water conservation plan development and to ensure that important information and data be considered when preparing your water conservation plan and its target and goals. Please complete all questions as completely and objectively as possible. See *Water Conservation Plan Guidance Checklist* (WRD-022) for information on other water conservation plan provisions. You may contact the Municipal Water Conservation Unit of the TWDB at 512-936-2391 for assistance.

APPLICANT DATA

Name of Utility: City of Port Lavaca

Public Water Supply Identification Number (PWS ID): 0290002

Address: 202 N. Virginia St. City: Port Lavaca

State: TX Zip Code: 77979 Email: opena@portlavaca.org

Telephone Number: (361) 552-3347 Fax: (361) 558-1481

Regional Water Planning Group: L

Groundwater Conservation District: _____

Form Completed By: Oscar Pena Title: Utility Superintendent

Signature: _____ Date: 10/27/2010

Contact information for the person or department responsible for implementing the water conservation program:

Name: Darren Gurley Phone: (361) 552-3347

Email: dgurley@portlavaca.org

UTILITY DATA

A. Population and Service Area Data

1. Current population of service area: 11,489

2. Current population served by utility: Water: 11,489

Wastewater: 11,489

3. Population served by water utility for the previous five years starting with the most recent year:

Year	Population
2009	11,489
2008	11,465
2007	11,405
2006	11,471
2005	11,509

4. Projected population for service area in the following decades:

Year	Population
2010	11,489
2020	12,566
2030	13,743
2040	15,031
2050	16,440

5. List source(s)/method(s) for the calculation of current and projected population:

Current Population: U. S. Census Bureau
 Projected Population: U. S. Census Population Estimates, April 1, 2000 to July 1, 2009.

B. Active Connections

1. Current number of active connections by user type. If not a separate classification, check whether multi-family service is counted as Residential ☐ or Commercial ☒

Water User Type*	Metered	Un-metered	Total
Residential Single Family	3,944		3,944
Residential Multi-family			0
Commercial/Institutional	575		575
Industrial			0
Other (please describe):			0

* See Appendix A #1.

2. List the net number of new connections per year for most recent three years:

Water User Type*	2009	2008	2007
Residential Single Family	11	11	14
Residential Multi-family			
Commercial/Institutional	7	5	5
Industrial			
Other (please describe):			

* See Appendix A #1.

C. High Volume Customers

List annual water use for the five highest volume retail and wholesale customers.
Please indicate if treated or raw water delivery.

Customer	Water User Type*	Annual Water Use (in gallons)	Treated	Raw
Memorial Medical	Retail	99,452	☒	☐
HEB	Retail	74,887	☒	☐
Bordeaux Apts.	Retail	68,956	☒	☐
Regency nursing	Retail	60,020	☒	☐
Hillman Shrimp	Retail	49,989	☒	☐

* See Appendix A #1

D. Water Supply System

- Design daily capacity of system: _____ gallons per day
- Storage Capacity: Elevated 1,000,000 gallons per day
Ground _____ gallons per day
- If surface water, do you recycle filter backwash to the head of the plant?
Yes ☐ No ☐. If yes, approximately _____ gallons per day.

E. Water Accounting Data

- Amount of water use in gallons for previous five years.
Please indicate whether: Treated Water ☒ or Raw Water ☐

YEAR	2009	2008	2007	2006	2005
January	37,325,000	35,222,000	35,136,000	37,402,000	34,028,000
February	32,899,000	33,058,000	31,132,000	33,261,000	31,450,000
March	37,232,000	35,869,000	35,727,000	40,678,000	35,151,000
April	38,506,000	38,321,000	33,465,000	43,733,000	38,049,000
May	44,690,000	42,560,000	37,722,000	48,174,000	39,969,000
June	45,592,000	53,313,000	35,571,000	39,151,000	45,132,000
July	61,886,000	48,336,000	34,957,000	39,783,000	48,988,000
August	56,122,000	42,300,000	38,090,000	41,983,000	47,425,000
September	38,900,000	40,087,000	37,192,000	38,081,000	43,253,000
October	35,949,000	43,616,000	37,175,000	37,385,000	43,238,000
November	33,015,000	39,213,000	37,213,000	34,703,000	39,493,000
December	34,503,000	37,969,000	36,907,000	36,496,000	37,149,000
TOTAL	496,619,000	489,864,000	430,287,000	470,830,000	483,325,000

Please indicate how the above figures were determined (e.g., from a master meter located at the point of a diversion from a stream or located at a point where raw water enters the treatment plant).

Master meter at entry point of Distribution System.

2. Amount of water sold in gallons as recorded by Water User Type for the previous five years
(See Appendix A #1)

Year	Residential Single Family	Residential Multi Family	Commercial/ Institutional	Industrial	Other	Wholesale	Total Sold
2009	256,299,000	163,038,000					419,337,000
2008	250,429,000	162,055,000	3,992,000				416,476,000
2007	212,742,000	153,525,000	4,412,000				370,679,000
2006	228,575,000	163,910,000	3,842,000				396,327,000
2005	209,489,000	167,183,000	1,098,000				377,770,000

3. GPCD and Seasonal Water Use for the previous five years

Year	Population	Total Water Use	Total gallons per capita per day (GPCD)*	Residential GPCD**	SEASONAL WATER USE***	
					Winter per capita per day	Summer per capita per day
2009	11,489	496,619,000	118	100	101	158
2008	11,465	489,864,000	117	99	103	140
2007	11,405	430,287,000	103	88	101	106
2006	11,471	470,830,000	112	94	104	117
2005	11,509	483,325,000	115	90	99	137
Five Year Average	11,468	474,185,000	113	94	102	131

* Total GPCD (See Appendix A #2):

** Residential GPCD (See Appendix A #3):

*** Seasonal Water Use (See Appendix A #4)

4. Water Loss Data for the previous five years
(See Appendix A #5)

Year	Water Loss expressed in gallons	Water Loss expressed in GPCD	Water Loss expressed as a percentage
2009	77,342,000	18	15.57%
2008	73,388,000	18	14.98%
2007	59,608,000	14	13.85%
2006	74,503,000	18	15.82%
2005	105,555,000	25	21.84%
Five Year Average	78,079,200	19	16.41%

5. Peak Day Use (in gallons) to Average Daily Use (in gallons) Ratio for the previous five years
(See Appendix A #6)

Year	Average Daily Use	Peak Day Use	Ratio
2009	1,360,600	2,202,000	1.62
2008	1,342,093	2,010,000	1.50
2007	1,178,868	1,643,000	1.39
2006	1,289,945	2,024,000	1.57
2005	1,324,178	2,138,000	1.61

F. Projected Demands

Estimate water supply requirements for at least the next ten years using population trends, historical water use, and economic growth, etc.

Year	Population	Water Demand (in gallons)
2011	11,597	487,491,492
2012	11,705	492,031,380
2013	11,813	496,571,268
2014	11,921	501,111,156
2015	12,029	505,651,044
2016	12,137	510,190,932
2017	12,245	514,730,820
2018	12,353	519,270,708
2019	12,461	523,810,596
2020	12,569	528,350,484

Indicate sources of data and how projected water demands were determined. Attach additional sheets if necessary.

Population: TWDB, 2006 Regional Water Plan, City Water Demand Projections 2000-2060
Water Demand: 5 year average of total gallons per capita per day (current usage)

G. Wastewater System Data

- Design capacity of wastewater treatment plant(s): 2,000,000 gallons per day
- Is treated effluent used for:

Use	Total Annual Volume (in gallons)
On-site irrigation	
Plant wash down	
Chlorination/de-chlorination	
Industrial	
Landscape irrigation (parks, golf courses)	
Agricultural	
Other (please describe):	

Could treated effluent be substituted for certain potable water now being used? Yes ☒ No ☐

H. Wastewater Data for Service Area

- Percent of water service area served by wastewater system: 95 %
- Monthly wastewater volume in gallons, treated for previous five years.

YEAR	2009	2008	2007	2006	2005
January	30,230,000	28,530,000	28,460,000	30,300,000	27,560,000
February	26,650,000	26,780,000	25,220,000	26,940,000	25,470,000
March	30,160,000	29,050,000	28,940,000	32,950,000	28,470,000
April	31,190,000	31,040,000	27,110,000	35,420,000	30,820,000
May	36,200,000	34,470,000	30,550,000	39,020,000	32,370,000
June	36,930,000	43,180,000	28,810,000	31,710,000	36,560,000
July	50,130,000	39,150,000	28,320,000	32,220,000	39,680,000
August	45,460,000	34,260,000	30,850,000	34,010,000	38,410,000
September	31,510,000	32,470,000	30,130,000	30,850,000	35,030,000
October	29,120,000	35,330,000	30,110,000	30,280,000	35,020,000
November	26,740,000	31,760,000	30,140,000	28,110,000	31,990,000
December	27,950,000	30,750,000	29,890,000	29,560,000	30,090,000
TOTAL	402,270,000	396,770,000	348,530,000	381,370,000	391,470,000

Submit Form by Email

Print Form

Reset Form

Appendix A

Definitions of Utility Profile Terms

1. Residential – Single Family should include water sold to single family and duplexes. Residential – Multi-Family should include water sold to this class of customers only. Commercial/Institutional sales should include water sold to retail businesses, offices, hospitals, etc. Industrial sales should include water sold to manufacturing and other heavy industry. Wholesale sales should include water sold to another utility for resale to the public. Other water sales should be noted as necessary.
2. Total use in gallons per capita per day is defined as total average daily amount of water treated or raw water provided for potable use by a public water supply system. The calculation is made by dividing the water diverted or pumped for treatment by population served. Indirect reuse volumes shall be credited against total diversion volumes for the purpose of calculation gallons per capita per day for targets and goals developed for the water conservation plan. Total water use is calculated by subtracting the wholesale sales from the total treated or raw water.
3. Residential use in gallons per capita per day is calculated by dividing the total single family plus multi-family residential water sales by the population served and then dividing by 365.
4. Seasonal water use is the difference between winter daily per capita use and summer daily per capita use. To calculate the winter daily per capita use, add the monthly diversions for December, January, and February, and divide by 90. Then divide this figure by the population. To calculate the summer daily per capita use, use the months of June, July, and August.
5. Water Loss is the difference between water a utility purchases or produces and the amount of water that it can account for in sales and other use, metered and unmetered, such as firefighting, line flushing, and water for public buildings and water treatment plants. Water loss can result from:
 1. Inaccurate or incomplete record keeping;
 2. Meter error;
 3. Leaks; and
 4. Water theft and unauthorized use.
6. The peak-day to average-day ratio is calculated by dividing the maximum daily pumpage by the average daily pumpage. Average daily pumpage is the total pumpage for the year divided by 365.

Appendix D
Water and Sewer Rates
(Excerpt from City Fee Schedule Ordinance)

PORT LAVACA CODE

<i>Section Number</i>	<i>Subject</i>	<i>Fee Amount</i>
	Marching band units, pedestrians, floats and animals	\$25.00
(Ord. No. G-2-75, § 7, 2-24-1975)		

CHAPTER 50—UTILITIES

Water service deposits

	<i>Type of Deposit:</i>	
50-49(a)	Residential	\$90.00-\$190.00
50-49(b)	Commercial	Up to 60-day average bill
50-50(2)	Fire hydrant	\$1,500.00
50-64	Contractor's deposit	\$50.00

Water tap and meter installation fees.

50-52(a), 42-105	<i>Water tap / meter set fees:</i>	
	¾-inch water tap	\$700.00
	¾-inch meter set fee	\$175.00
	1-inch water tap	\$800.00
	1-inch meter set fee	\$240.00
	2-inch or greater tap	Based on current materials and labor
50-52(b)	Inspection fee	TBD
50-52(c)	Capital recovery fee	TBD

Water table

50-67	<i>Water user rates:</i>	
50-67	<i>Residential:</i>	
	1—2,000 gallons	\$15.00
	Over 2,000 gallons	\$4.75 per 1,000 gallons
50-67	<i>Small commercial:</i>	

APPENDIX A—FEES, RATES AND CHARGES

<i>Section Number</i>	<i>Subject</i>	<i>Fee Amount</i>
	Minimum charge	Amount for usage of 2,000 gallons
	Over 2,000 gallons	\$4.95 per 1,000 gallons
	5/8—1½-inch meter	\$17.50 per month
50-67	<i>Large commercial:</i>	
	Water usage	\$4.95 per each 1,000 gallons
	2—6-inch water meter	\$35.00 per month
<i>Sewer table</i>		
50-111(a)(1), 42-105	<i>Sewer tap fees:</i>	
	4-inch sewer tap	\$600.00
	6-inch sewer tap	\$700.00
	8-inch or greater	Based on current materials and labor
	Pavement break will be charged at \$20.00 per linear foot	
	Street bore will be charged based on current contractor fees	
50-111(b)	Inspection fee	\$25.00 per tap
50-111(c)	Capital recovery fee	\$25.00
50-120(a)	Annual industrial wastewater permit	\$2.00
50-122	<i>Residential wastewater user rates:</i>	
	1—2,000 gallons	\$14.00
	Over 2,000 gallons	\$4.90 per 1,000 gallons
50-122	<i>Residential wastewater user rate for customer outside city limits:</i>	1½ times rate for customers inside city limits
50-123	<i>Commercial and industrial wastewater user rates:</i>	
	1—2,000 gallons	\$15.75

PORT LAVACA CODE

<i>Section Number</i>	<i>Subject</i>	<i>Fee Amount</i>
	Over 2,000 gallons	\$4.95 per 1,000 gallons
	Customers outside city limits	1½ times user rate for customers inside city limits
50-124	<i>Extra strength surcharge:</i>	
	Over 250 ppm BOD or TSS	\$60.00 per week, per test
	Additional tests at customer request	\$70.00 per test
	Industrial wastewater discharge over 250 ppm BOD or TSS	Based on formula

Note—Average usage rate: Wastewater user rates shall be computed by averaging the water usage of the customer for the months of December, January and February. The average usage rate computed during these months shall apply notwithstanding any change in residence. During March of each year, the wastewater user rates shall be recomputed for each residential customer.

Note—New residences: New residences or residences which have no water usage history, shall be charged based upon actual usage at a rate of \$14.00 for the first 2,000 gallons and \$4.90 per thousand in excess of 2,000 gallons until an average can be computed based upon the formula in subsection (a) of this section.

Note—Variations: The director of finance or his designee is authorized to establish a wastewater user rate for a newly constructed residence or a residence with a change in occupancy or to make necessary adjustments in the event of a water leak upon request by the customer.

*Note—*The director of finance or his designee is also authorized to modify an individual's rate if application of the winter average would result in an unusual burden on the customer because their usage is relatively constant. At the request of the customer, they may be placed on a volume rate of \$4.90 per 1,000 gallons in excess of 2,000 gallons, based upon actual volumes each month.

*Note—*Mobile home parks and apartment complexes shall be considered commercial.

*Note—*For residential customers located outside the city limits the rates for discharging normal wastewater into the sanitary sewer system shall be 1½ times the rate for customers inside the city limits.

*Note—*The average of all samples taken during the month that exceed 250 ppm shall be used to determine the BOD and TSS used in the following formula:

Surcharge equals

$$\frac{\text{Total usage } (\$2.56 \text{ [BOD-250]})}{1,000 \text{ gal.}}$$

and/or

$$\frac{(\$2.34 \text{ [TSS-250]})}{1,000 \text{ gal.}}$$

Note—Low pressure sewer system (LPSS).

(1) The minimum monthly charge for each residential customer with LPSS within the city limits shall be \$14.00 for the first 2,000 gallons or fraction thereof plus \$4.90 per thousand gallons of water used in excess of 2,000 gallons.

APPENDIX A—FEES, RATES AND CHARGES

(2) There will be a \$10.00 monthly maintenance fee to all LPSS customers.

(3) For residential customers located outside the city limits the rates for discharging normal wastewater into the sanitary sewer system shall be 1½ times the rate for customers inside the city limits.

<i>Section Number</i>	<i>Subject</i>	<i>Fee Amount</i>
-----------------------	----------------	-------------------

LPSS tap. E-one LPSS: \$6,000.00.

Utility billing fees.

	<i>Type of Fee:</i>	
50-41(b), 50-49(4)	Tampering	\$100.00
50-42	Meter inaccessible	\$30.00
50-45	Meter testing	\$50.00
50-49(3)	Nonsufficient funds	\$30.00
50-51	Trip charge	\$30.00
50-57, 50-59(b)	Disconnection	\$30.00
50-59(a)(2)	After-hours reconnection	\$40.00
50-61	Transfer service	\$30.00
50-65	Temporary service	\$45.00
50-67	Missed turn on	\$30.00
50-67	Rereads-customer	\$30.00
(Ord. No. G-3-85, § 6, 7-8-1985; Ord. No. G-4-85, §§ 15, 17, 18, 7-8-1985; Ord. No. G-2-08, §§ I(18, 19), 9-8-2008; Ord. No. G-4-08, § 29, 9-22-2008)		

CHAPTER 52—VEHICLES FOR HIRE

Taxicab businesses

52-40(a)	Business permit	2% of gross receipts, with certificate of convenience and necessity payment attached to application
52-40(b)	Certificate of public convenience and necessity	\$25.00

(Ord. No. G-2-74, § 5, 2-11-1974)

Appendix E
Plumbing Ordinance

ARTICLE I. IN GENERAL

Secs. 12-1—12-18. Reserved.

ARTICLE II. BUILDING TRADE CODES

Sec. 12-19. Purpose.

The purpose of this article is the practical safeguarding of persons and property. The requirements of this article and of the codes adopted in this article are to be considered the minimum requirements for all types of construction and maintenance in the city and outside the city where property is or may be connected to the city water and sewer system. The chief building official is assigned the responsibility for the licensing, permitting, interpretation and enforcement required by the codes.

(Ord. No. G-7-06, § 1, 9-11-2006)

Sec. 12-20. Building trade codes—Adopted.

In order to establish uniform rules, regulations and provisions for the placement, construction, enlargement, alteration, repair, moving, removal, conversion, demolition, occupancy, equipment, use, height, area and maintenance of buildings, signs and structures, there is hereby adopted by the city the following building trade codes:

- (1) The International Building Code 2009 edition, including appendix B (board of appeals), appendix C (group U-agricultural buildings), appendix E (supplementary accessibility requirements for qualified historic buildings and facilities), appendix F (rodent proofing), appendix H (signs), and appendix I (patio covers);
- (2) The International Property Maintenance Code, 2009 edition;
- (3) The International Residential Code, 2009 edition, including appendix G (swimming pools, spas and hot tubs), appendix J (existing buildings and structures), and appendix K (sound transmission);
- (4) The International Plumbing Code, 2009 edition, including appendix E (sizing of water piping system), appendix F (structural safety), and appendix G (vacuum drainage system);
- (5) The International Gas Code, 2009 edition;
- (6) The International Mechanical Code, 2009 edition, including appendix A (combustion air openings and chimney connector pass-throughs);
- (7) The International Energy Conservation Code, 2009 edition, including the appendix;
- (8) The International Electrical Code Administrative Provisions, 2009 edition;
- (9) The National Electrical Code, 2008 edition; and

Appendix F
Water Conservation Implementation Report
(TCEQ-20159)



Texas Water Development Board Water Conservation Program Annual Report

Texas Water Code requires that each entity that is required to submit a water conservation plan to the Texas Water Development Board (TWDB) or the Texas Commission on Environmental Quality (TCEQ) shall file an annual report to the TWDB on the entity's progress in implementing each of the minimum requirements in their water conservation plan. This requirement applies to those entities receiving financial assistance of \$500,000 or more from the TWDB; entities with 3,300 connections or more; and those entities that have a water right through TCEQ. The first report is due by May 1, 2010. Entities receiving financial assistance from the TWDB are to maintain an approved water conservation plan in effect until all financial obligations to the state have been discharged and file a report with the TWDB on the progress in implementing each of the minimum requirements in its water conservation plan and the status of any of its customers' water conservation plans required by contract, within one year after closing on the financial assistance and annually thereafter until all financial obligations to the state have been discharged. Implementation reports prepared for the TCEQ providing the required information may be submitted to the TWDB to fulfill this reporting requirement.

The following questions are designed to provide the TWDB this information in a concise and consistent format. Please fill in the blanks that pertain to your program as completely and objectively as possible. Your water conservation plan should contain long-term elements such as ongoing public education activities, universal metering, water accounting and estimated water savings from water reuse and recycling activities, leak detection and repair and other conservation activities. As you complete the report form, please review your utility's water conservation plan to see if you are making progress toward meeting your stated goal(s).

For additional information please check out our website at

<http://www.twdb.state.tx.us/assistance/conservation/MunicipalPlans/CPlans.asp>

Return completed form to:

Executive Administrator
Texas Water Development Board
P.O. Box 13231
Austin, Texas 78711-3231
ATTN: MUNICIPAL CONSERVATION

UTILITY DATA

Name of Utility: City of Port Lavaca

Public Water Supply Identification Number (PWS ID), WR No. : 0290002

Address: 202 N. Virginia St. City: Port Lavaca

State: TX Zip Code: 77979 Email: opena@portlavaca.org

Telephone Number: (361) 552-3347 Fax: (361) 552-1481

Regional Water Planning Group: _____

Groundwater Conservation District: _____

Form Completed By: Oscar Pena Title: Utility Superintendent

Signature: _____ Date: _____

Reporting Period: _____ to _____

Total Gallons of Water (Treated or Raw)	Population of Service Area	Total Gallons per Capita per Day (GPCD)*	Residential GPCD**	Total Number of Connections	Water Loss in Gallons per Capita per Day (GPCD)***

* **Total GPCD:** form calculation is made by dividing the total water treated or raw by the population served and then dividing by 365

** **Residential GPCD:** user calculation is made by dividing the total single family plus multi-family residential water sales by the population served and then dividing by 365

*** **Water Loss GPCD:** form calculation is made by dividing the amount you provided in number 7G. on page 4 by the population served and then dividing by 365

Please provide the specific and quantified five and ten-year targets as listed in your water conservation plan:

	Total GPCD Target	Water Loss Target	Date to Achieve Target
Five-year target			
Ten-year target			

LONG TERM WATER CONSERVATION PROGRAM

1. Approximately how much did the utility save during the reporting period due to the overall conservation program?

Gallons of Water Saved	Dollar Value of Water Savings*

* Based on water savings and the cost of treatment or purchase of your water, and any deferred capital costs due to conservation

2. In your opinion, how you would rank the effectiveness of your utility's conservation program?

Effective

☐

Somewhat
Effective

☐

Less than
Effective

☐

Not Effective

☐

Do Not Know

☐

Please provide additional information about any successes or problems you may have experienced in implementing your plan.

3. Education and Information Program

Please check the appropriate boxes regarding any educational and information activities your utility has provided during the reporting period:

	Implemented	Frequency
Brochures Distributed	☐	
Messages Provided on Utility Bills	☒	
Press Releases	☐	
TV Public Service Announcements	☐	
Radio Public Service Announcements	☐	
School Program	☐	
Displays and Presentations	☐	
Plant Tours	☐	
Other, please describe:		

4. Water Conservation Retrofit and Plumbing Rebate Programs

Please check the appropriate boxes regarding any plumbing fixture programs your utility has provided during the reporting period:

	Give-away	Rebate	Retrofit
Toilets	☐	☐	☐
Showerheads	☐	☐	☐
Faucet Aerators	☐	☐	☐
Other, please describe:			

5. Rate Structure

Have your rates or rate structure changed since your last report? Yes ☒ No ☐
If yes, please describe the changes, or attach a copy of the new rate structure.

--

6. Universal Metering and Meter Repair

During the reporting period what was the system-wide number of:

	Total Number	Total Tested	Total Repaired	Total Replaced
Production Meters	1		0	0
Meters larger than 1 1/2"				
Meters 1 1/2 or smaller				

Does your system have automated meter reading? Yes ☒ No ☐

7. Water Loss and Leak Detection

Please provide the following data regarding water loss in your utility during the reporting period:

	Total Gallons During the Reporting Period
A. PRODUCTION - Water treated or raw	
B. Water sold	
C. Water used for line flushing	
D. Water used for fire department use	
E. Water used for flushing and storage tank cleaning	
F. Water used for any un-metered use (facility use, etc.)	
G. WATER LOSS* = A minus B,C,D,E,F	0

* WATER LOSS includes un-accounted-for water, water lost from main line breaks and customer service line breaks, and storage over-flow.

How many leaks were repaired in the system or at service connections during the reporting period? _____

Please check the appropriate boxes regarding the main cause of water loss in your utility during the reporting period:

Leaks	☒
Un-metered utility or city uses	☐
Master meter problems	☐
Customer meter problems	☐
Record and data problems	☐
Other, please describe:	

Would you like to receive free technical assistance or equipment from the TWDB regarding leak detection and water loss? Yes ☐ No ☐

8. Water Conservation Programs

Please check the appropriate boxes regarding what conservation programs your utility provided during the reporting period:

Landscape Program	☐
Educational and Information Program	☐
School Education Program	☐
Rainwater Harvesting	☐
Leak Detection	☐
Water Loss	☐
Reuse	☐
Treated Effluent	☐
Other, please describe:	

9. How often does your utility staff review your water conservation program?

10. What year did your utility adopt, or revise, their water conservation plan? _____

11. What might your utility do to improve the effectiveness of your water conservation program?

12. What might the TWDB do to assist you in improving the effectiveness of your water conservation program?

13. If known, how much expense has your utility incurred in implementing your water conservation program during the reporting period (*literature, materials, staff time, etc.*)?
_____ (dollars/year)

14. Recycling and Reuse of Water or Wastewater Effluent

Please provide the following data regarding what types of water recycling or reuse activities were practiced by your utility during the reporting period, and what volume:

Use	Total Annual Volume (in gallons)
On-site irrigation	
Plant wash down	
Chlorination/de-chlorination	
Industrial	
Landscape irrigation (parks, golf courses)	
Agricultural	
Other, please describe:	
Total	0

Could treated effluent be substituted for certain potable water now being used? Yes ☒ No ☐

15. Drought Contingency and Emergency Water Demand Management

During the reporting period, did your utility activate its Drought Contingency Plan?

Yes ☐ No ☒

If yes, please check all the appropriate boxes for the reason why:

Reason	
Water Shortage	☐
High Demand	☐
Capacity Issues	☐
Equipment Failure	☐
Other, please describe:	

Start Date _____

End Date _____

Submit Form by Email

Print Form

Reset Form

Exhibit A
Certificate OF Convenience and Necessity
And
Service Area Map

WRS-29
GENERAL HIGHWAY MAP
CALHOUN COUNTY
TEXAS

PREPARED BY THE
STATE DEPARTMENT OF HIGHWAYS
AND PUBLIC TRANSPORTATION
TRANSPORTATION PLANNING DIVISION
IN COOPERATION WITH THE
U.S. DEPARTMENT OF TRANSPORTATION

STATE OF TEXAS
COUNTY OF TRAVIS
I HEREBY CERTIFY THIS TO BE A TRUE AND CORRECT COPY OF
A TRUE AND CORRECT COPY OF THE ORIGINAL RECORD

DEC 29 1986

RECORDED
INDEXED
FILED
COUNTY CLERK
TRAVIS COUNTY
TELEPHONE 462-1111
FAX 462-1112

CITY OF SEADRIFT
DROUGHT CONTINGENCY PLAN
FOR THE
WATER AND WASTEWATER SYSTEM

*Currently under
review and revision
11/3/2012
Elm. H.*

INTRODUCTION

Drought or a number of other uncontrollable circumstances can disrupt the normal availability of the City's water supply. Even though the City has an adequate water supply, the supply could become contaminated, or a disaster could destroy the supply. During drought periods, consumer demand is often significantly higher than normal. The Water system may not have the capacity to meet higher than average demands without system failure or other unwanted consequences.

It is important to distinguish drought contingency planning from water conservation planning. While water conservation involves implementing permanent water use efficiency or reuse practices, drought contingency plans establish temporary methods or techniques designed to be used only as long as the emergency exist.

A. PLAN ELEMENTS

The City of Seadrift, in an effort to meet emergency conditions affecting the City's ability to produce an adequate supply of water, has established the following conditions which will trigger certain emergency procedures regarding the use of water by the residents of Seadrift.

1. Based upon certain weather conditions or at such time when water usage reaches 90 % of the City's plant capacity, the following measures will be implemented:
 - a. The public will be given notice of mild drought conditions affecting the water supply system. Notice will be posted at

locations accessible to the public and the news media will be informed of the notice.

- b. Recommendations to all water users for ways to conserve water will be included in the notice.
- c. The public will be kept advised of existing conditions.

2. During periods of acute water shortage, the following measures will be taken to implement the Emergency Water Rationing Program.

a. Declaring an Emergency

When the system demand exceeds supply or storage capacity measured over a twenty-four hour (24) period, and refilling the storage facilities is rendered impossible, the City may declare an emergency to exist, and thereafter ration water in the following manner.

b. Notice Requirement

Written notice of the proposed rationing shall be mailed or delivered to each paying customer seventy-two (72) hours before the City actually starts the program, and notice shall also be placed in a local newspaper. The customer notice shall contain the following information:

- (1) The date the rationing shall begin.
- (2) The anticipated date rationing shall end.
- (3) The stage (Level) of rationing to be imposed.
- (4) A copy of the notice shall be made available at City Hall for residents who desire a copy.

3. Implementing the rationing of water usage, the following Stage Levels are established.

- a. STAGE 1 (Mild Rationing Conditions) - Alternate day usage of water for outdoor purposes such as lawns, gardens, car

washing, etc.. The provisions for alternate day use shall be specified by the City in the written notice.

b. **STAGE 1-A (Limited Water Usage)** - The City may limit water usage to a gallonage determined by the water system's supply capability to provide continuous service prorated over all customers to be served by the water plant. Water restrictors may be installed for customers that exceed the limited gallonage determined by the system's mechanical capability. A flow restrictor shall be installed at the customer's expense (not to exceed actual installed cost). Tampering with the flow restrictor will result in water service termination for seven (7) days. The normal Service Tap Fee of the City shall apply for restoration of service. The maximum number of gallons per meter per month shall be contained in the notice to each customer.

c **STAGE 11 (Moderate Rationing Conditions)** - All outdoor water usage is prohibited; however, usage for livestock is exempt.

d **STAGE 111 (Severe Rationing Conditions)** - All outdoor water usage is prohibited: livestock may be exempted by the City. All consumption shall be limited to each customer in one of the following ways:

(1) A fixed percentage of each customer's average use in the prior month, the percentage to be uniformly applied on a system wide basis, each customer being notified of the percentage amount,

OR

(2) A maximum number of gallons per meter per week, with notice to each customer notifying them of this number.

4. VIOLATIONS OF EMERGENCY RATIONING RULES

Violating the Emergency Rationing Rules established by the City of Seadrift, will be dealt with in the following manner.

a. **FIRST VIOLATION** - The City may install a flow restrictor in the line to limit the amount of water which will pass through the meter in a twenty-four (24) hour period. The cost to be charged to the customer shall be the actual installed cost to the City.

b. **SUBSEQUENT VIOLATIONS** - the City may terminate service at the meter for a period of seven (7) days. The normal Service tap Fee of the City shall be charged for restoration of service.

5. EXEMPTIONS OR VARIANCES FROM RATIONING RULES

The City may grant any customer an exemption or variance from the uniform rationing program, for good cause. The City shall treat all customers equally concerning exemptions and variances, and shall not employ discrimination in such actions.

6. RATES

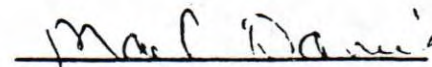
All existing rate schedules shall remain in effect during the rationing period, and no charges may be levied against a customer other than the charges outlined above in this plan.

The purpose of this Emergency Rationing Program is to conserve the total amount of water demanded from the city until the supply can be restored to normal levels. The rationing program shall not exceed sixty (60) days without an extension by the City Council.

PASSED AND ADOPTED THIS 6TH DAY OF JANUARY, 1998.

ATTEST:


Paula Moncrief
City Secretary


Mark Daniel, Mayor



Lavaca-Navidad River Authority

P.O. Box 429 Edna, Texas 77957

December 1, 2011

Mr. Randy Smith
Formosa Plastics
P. O. Box 700
Point Comfort, Texas 77978

The Honorable Pam Lambden
Mayor, City of Point Comfort
P. O. Box 497
Point Comfort, Texas 77978

Mr. Robert Coen
Site Manager
Inteplast Group Ltd.
P. O. Box 405
Lolita, Texas 77971

Gustavo Gonzales P. E.
Director of Water Operations
City of Corpus Christi
P. O. Box 9277
Corpus Christi, Texas 78469

Re: Current Water Supply Condition
Drought Contingency Implementation

Dear Water Supply Customer:

I am sending this letter to notify you that implementation of drought contingency measures in addition to the 10% percent pro-rata delivery restriction, which I provided notice of to each water customer by letter dated September 15, 2011, is imminent. Based on the latest weather forecast, inflow and usage data, it is Lavaca Navidad River Authority's (LNRA) prediction that by the end of December, 2011, Lake Texana will have fallen to elevation 30.73 feet mean sea level (msl) or will have reached 40% percent capacity. In accordance with LNRA's Drought Contingency Plan (DCP), a pro-rata water reduction of 20% should be achieved when Lake Texana is at 40% storage capacity. After capacity falls to 40%, LNRA will provide each water customer notice of the date to begin the 20% reduction.

Consistent with Section 8.0 of the DCP, in an effort to sustain the remaining volume in Lake Texana and prolong the availability of this fresh water supply, in the event that an established criteria is triggered, LNRA, in coordination with the TCEQ South Texas Water Master and our water customers, will allocate water supplies on a pro-rata basis in accordance with Texas Water Code § 11.039. The reduction-in-use figure shown in the DCP and as noted herein will be applied to all customers and will continue to adjust according to the change in the capacity of Lake Texana.

To ensure each customer understands what is to be anticipated, based on a review of the 12-month flow data ending August 31, 2011, the table below shows the twelve-month average daily delivered water arranged by water customer, and the corresponding reduced daily volume to be achieved by implementing a 20% pro-rata reduction.

Customer	Avg Daily Rate and Volume		Reduced Daily Volume (20 %)
City of Corpus Christi	30,906 gpm	134.57 ac-ft	107.65 ac-ft
Formosa Plastics	13,875 gpm	62.40 ac-ft	49.92 ac-ft
Inteplast	297 gpm	1.31 ac-ft	1.05 ac-ft
City of Point Comfort	127 gpm	0.56 ac-ft	0.44 ac-ft

Considering the drought may persist and force further restrictions, upon attainment of 30% percent capacity or elevation 27.45 feet msl all diversions would be reduced by 35%; at 20% percent capacity or elevation 23.56 feet msl all diversions would be reduced by 50%. Please advise me as to the impact that this new reduction, and aforementioned future reductions, may have on your operation.

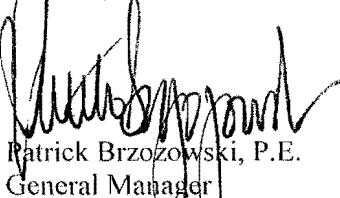
Regarding municipal and industrial diversions, LNRA is in the process of identifying what additional operational measures may need to be taken in the event our existing delivery systems become compromised should the conditions continue to worsen and water levels in the intake pump stations are reduced to a level below our pumping equipments capabilities. Once this information is ascertained, I will advise our customers.

In accordance with TCEQ guidelines on water conservation and drought contingency, the public within your jurisdiction should be notified of the widespread conditions and advised of the appropriate conservation measures that should be implemented. As we have discussed, if LNRA can be of assistance in implementing your individual contingency plans, please advise me.

Saying this, over the past years, LNRA has investigated new and additional water supplies for use in the area. In addition to our evaluation of other longer-term surface water supply strategies, LNRA has listed desalination as an alternative management strategy in LNRA's Management Plan and will be holding a workshop for our Board of Directors (BOD) that is focused on the desalination process. The BOD workshop will be held 6:00 p.m. December 13th at LNRA's office off FM 3131 near Edna. The workshop is an open meeting. If your group has an interest in desalination, please attend.

If you have any questions, or need additional information, please call me.

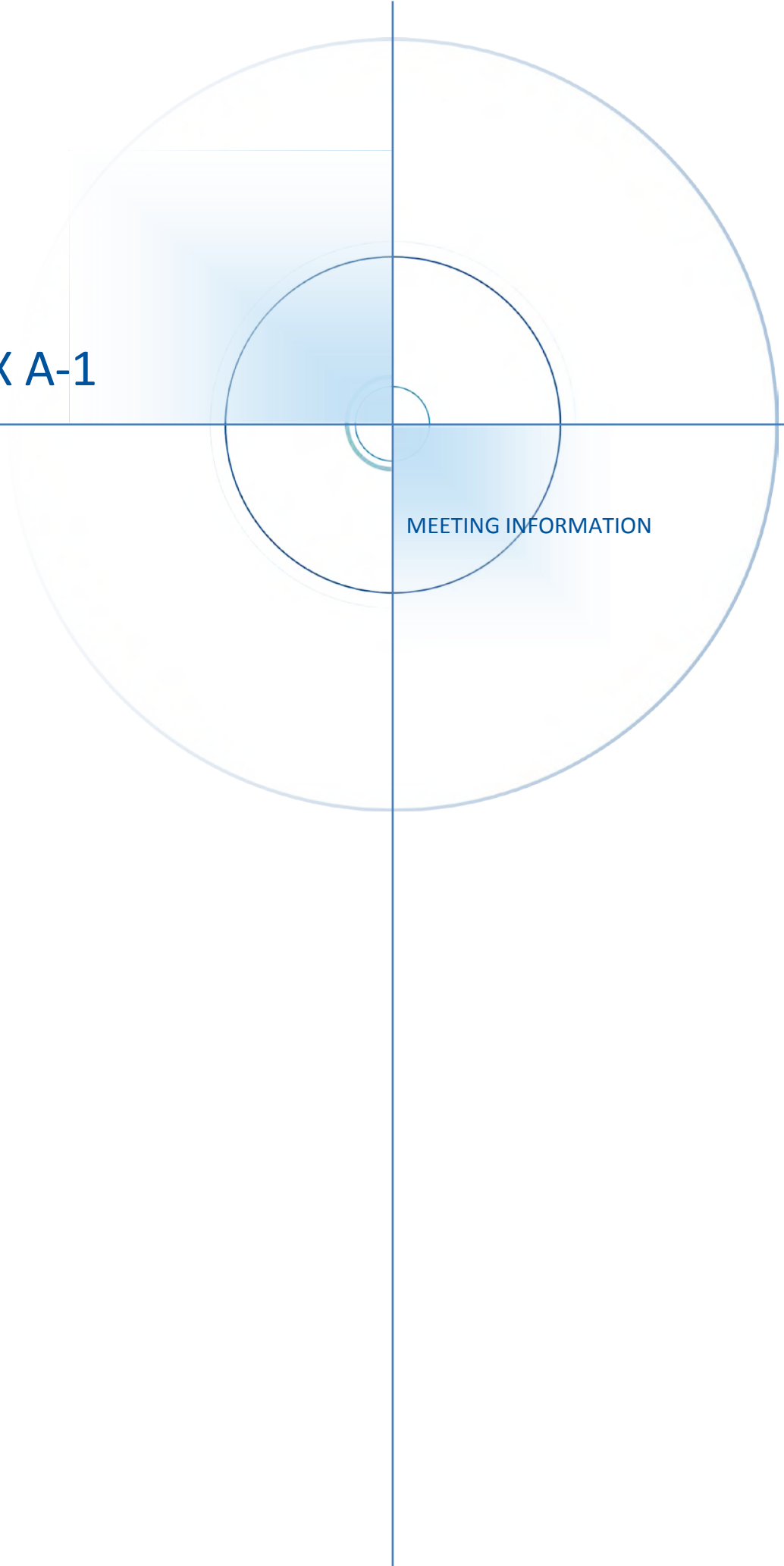
Sincerely,



Patrick Brzozowski, P.E.
General Manager

cc: Bill Dugat, Bickerstaff Heath Delgado Acosta LLP
Bob Wallace, Formosa Plastics
Jack Wu, Formosa Plastics
Danny Su, Formosa Plastics
Chris Cavazos, City of Point Comfort
LNRA Board of Directors

APPENDIX A-1



MEETING INFORMATION

Drought Contingency Plan for a Retail Public Water Supplier

Texas Commission on Environmental Quality

Instructions: The following form is a model of a drought contingency plan for a retail public water supplier. Not all items may apply to your system's situation. This form is supplied for your convenience, but you are not required to use this form to submit your plan to the TCEQ. Submit completed plans to: Water Supply Division MC 160, TCEQ, P.O. Box 13087, Austin TX 78711-3087.

(Name of Utility)

(Address, City, Zip Code)

(CCN#)

(PWS #s)

(Date)

Section I: Declaration of Policy, Purpose, and Intent

In order to conserve the available water supply and protect the integrity of water supply facilities, with particular regard for domestic water use, sanitation, and fire protection, and to protect and preserve public health, welfare, and safety and minimize the adverse impacts of water supply shortage or other water supply emergency conditions, the _____ (name of your water supplier) hereby adopts the following regulations and restrictions on the delivery and consumption of water through an ordinance/or resolution (see Appendix C for an example).

Water uses regulated or prohibited under this Drought Contingency Plan (the Plan) are considered to be non-essential and continuation of such uses during times of water shortage or other emergency water supply condition are deemed to constitute a waste of water which subjects the offender(s) to penalties as defined in Section XI of this Plan.

Section II: Public Involvement

Opportunity for the public to provide input into the preparation of the Plan was provided by the _____ (name of your water supplier) by means of _____ (describe methods used to inform the public about the preparation of the plan and provide opportunities for input; for example, scheduling and providing public notice of a public meeting to accept input on the Plan).

Section III: Public Education

The _____ (name of your water supplier) will periodically provide the public with information about the Plan, including information about the conditions under which each stage of the Plan is to be initiated or terminated and the drought response measures to be implemented in each stage. This information will be provided by means of _____ (describe methods to be used to provide information to the public about the Plan; for example, public events, press releases or utility bill inserts).

Section IV: Coordination with Regional Water Planning Groups

The service area of the _____ (name of your water supplier) is located within the _____ (name of regional water planning area or areas) and _____ (name of your water supplier) has provided a copy of this Plan to the _____ (name of your regional water planning group or groups).

Section V: Authorization

The _____ (designated official; for example, the mayor, city manager, utility director, general manager, etc.), or his/her designee is hereby authorized and directed to implement the applicable provisions of this Plan upon determination that such implementation is necessary to protect public health, safety, and welfare. The _____, (designated official) or his/her designee, shall have the authority to initiate or terminate drought or other water supply emergency response measures as described in this Plan.

Section VI: Application

The provisions of this Plan shall apply to all persons, customers, and property utilizing water provided by the _____ (name of your water supplier). The terms “person” and “customer” as used in the Plan include individuals, corporations, partnerships, associations, and all other legal entities.

Section VII: Definitions

For the purposes of this Plan, the following definitions shall apply:

Aesthetic water use: water use for ornamental or decorative purposes such as fountains, reflecting pools, and water gardens.

Commercial and institutional water use: water use which is integral to the operations of commercial and non-profit establishments and governmental entities such as retail establishments, hotels and motels, restaurants, and office buildings.

Conservation: those practices, techniques, and technologies that reduce the consumption of water, reduce the loss or waste of water, improve the efficiency in the use of water or increase the recycling and reuse of water so that a supply is conserved and made available for future or alternative uses.

Customer: any person, company, or organization using water supplied by _____ (name of your water supplier).

Domestic water use: water use for personal needs or for household or sanitary purposes such as drinking, bathing, heating, cooking, sanitation, or for cleaning a residence, business, industry, or institution.

Even number address: street addresses, box numbers, or rural postal route numbers ending in 0, 2, 4, 6, or 8 and locations without addresses.

Industrial water use: the use of water in processes designed to convert materials of lower value into forms having greater usability and value.

Landscape irrigation use: water used for the irrigation and maintenance of landscaped areas, whether publicly or privately owned, including residential and commercial lawns, gardens, golf courses, parks, and rights-of-way and medians.

Non-essential water use: water uses that are not essential nor required for the protection of public, health, safety, and welfare, including:

- (a) irrigation of landscape areas, including parks, athletic fields, and golf courses, except otherwise provided under this Plan;
- (b) use of water to wash any motor vehicle, motorbike, boat, trailer, airplane or other vehicle;
- (c) use of water to wash down any sidewalks, walkways, driveways, parking lots, tennis courts, or other hard-surfaced areas;
- (d) use of water to wash down buildings or structures for purposes other than immediate fire protection;
- (e) flushing gutters or permitting water to run or accumulate in any gutter or street;
- (f) use of water to fill, refill, or add to any indoor or outdoor swimming pools or jacuzzi-type pools;

- (g) use of water in a fountain or pond for aesthetic or scenic purposes except where necessary to support aquatic life;
- (h) failure to repair a controllable leak(s) within a reasonable period after having been given notice directing the repair of such leak(s); and
- (i) use of water from hydrants for construction purposes or any other purposes other than fire fighting.

Odd numbered address: street addresses, box numbers, or rural postal route numbers ending in 1, 3, 5, 7, or 9.

Section VIII: Criteria for Initiation and Termination of Drought Response Stages

The _____ (designated official) or his/her designee shall monitor water supply and/or demand conditions on a _____ (example: daily, weekly, monthly) basis and shall determine when conditions warrant initiation or termination of each stage of the Plan, that is, when the specified “triggers” are reached.

The triggering criteria described below are based on _____

(provide a brief description of the rationale for the triggering criteria; for example, triggering criteria / trigger levels based on a statistical analysis of the vulnerability of the water source under drought of record conditions, or based on known system capacity limits).

Stage 1 Triggers -- MILD Water Shortage Conditions

Requirements for initiation

Customers shall be requested to voluntarily conserve water and adhere to the prescribed restrictions on certain water uses, defined in Section VII–Definitions, when

(describe triggering criteria / trigger levels; see examples below).

Following are examples of the types of triggering criteria that might be used in one or more successive stages of a drought contingency plan. One or a combination of such criteria must be defined for each drought response stage, but usually not all will apply. Select those appropriate to your system:

Example 1: Annually, beginning on May 1 through September 30.

Example 2: When the water supply available to the _____ (name of your water supplier) is equal to or less than _____ (acre-feet, percentage of storage, etc.).

*Example 3: When, pursuant to requirements specified in the _____ (name of **your** water supplier) wholesale water purchase contract with _____ (name*

of your wholesale water supplier), notification is received requesting initiation of Stage 1 of the Drought Contingency Plan.

Example 4: When flows in the _____ (name of stream or river) are equal to or less than _____ cubic feet per second.

Example 5: When the static water level in the _____ (name of your water supplier) well(s) is equal to or less than _____ feet above/below mean sea level.

Example 6: When the specific capacity of the _____ (name of your water supplier) well(s) is equal to or less than _____ percent of the well's original specific capacity.

Example 7: When total daily water demand equals or exceeds _____ million gallons for _____ consecutive days of _____ million gallons on a single day (example: based on the "safe" operating capacity of water supply facilities).

Example 8: Continually falling treated water reservoir levels which do not refill above _____ percent overnight (example: based on an evaluation of minimum treated water storage required to avoid system outage).

The public water supplier may devise other triggering criteria which are tailored to its system.

Requirements for termination

Stage 1 of the Plan may be rescinded when all of the conditions listed as triggering events have ceased to exist for a period of _____ (e.g. 3) consecutive days.

Stage 2 Triggers -- MODERATE Water Shortage Conditions

Requirements for initiation

Customers shall be required to comply with the requirements and restrictions on certain non-essential water uses provided in Section IX of this Plan when _____ (describe triggering criteria; see examples in Stage 1).

Requirements for termination

Stage 2 of the Plan may be rescinded when all of the conditions listed as triggering events have ceased to exist for a period of _____ (example: 3) consecutive days. Upon termination of Stage 2, Stage 1 becomes operative.

Stage 3 Triggers – SEVERE Water Shortage Conditions

Requirements for initiation

Customers shall be required to comply with the requirements and restrictions on certain non-essential water uses for Stage 3 of this Plan when _____ (describe triggering criteria; see examples in

Stage 1).

Requirements for termination

Stage 3 of the Plan may be rescinded when all of the conditions listed as triggering events have ceased to exist for a period of ____ (example: 3) consecutive days. Upon termination of Stage 3, Stage 2 becomes operative.

Stage 4 Triggers -- CRITICAL Water Shortage Conditions

Requirements for initiation

Customers shall be required to comply with the requirements and restrictions on certain non-essential water uses for Stage 4 of this Plan when _____ (*describe triggering criteria; see examples in Stage 1*).

Requirements for termination

Stage 4 of the Plan may be rescinded when all of the conditions listed as triggering events have ceased to exist for a period of ____ (example: 3) consecutive days. Upon termination of Stage 4, Stage 3 becomes operative.

Stage 5 Triggers -- EMERGENCY Water Shortage Conditions

Requirements for initiation

Customers shall be required to comply with the requirements and restrictions for Stage 5 of this Plan when _____ (designated official), or his/her designee, determines that a water supply emergency exists based on:

1. Major water line breaks, or pump or system failures occur, which cause unprecedented loss of capability to provide water service; **or**
2. Natural or man-made contamination of the water supply source(s).

Requirements for termination

Stage 5 of the Plan may be rescinded when all of the conditions listed as triggering events have ceased to exist for a period of ____ (example: 3) consecutive days.

Stage 6 Triggers -- WATER ALLOCATION

Requirements for initiation

Customers shall be required to comply with the water allocation plan prescribed in Section IX of this Plan and comply with the requirements and restrictions for Stage 5 of this Plan when _____ (*describe triggering criteria, see examples in Stage 1*).

Requirements for termination - Water allocation may be rescinded when all of the conditions listed as triggering events have ceased to exist for a period of ____ (example: 3) consecutive days.

Note: The inclusion of WATER ALLOCATION as part of a drought contingency plan may not be required in all cases. For example, for a given water supplier, an analysis of water supply availability under drought of record conditions may indicate that there is essentially no risk of water supply shortage. Hence, a drought contingency plan for such a water supplier might only address facility capacity limitations and emergency conditions (example: supply source contamination and system capacity limitations).

Section IX: Drought Response Stages

The _____ (designated official), or his/her designee, shall monitor water supply and/or demand conditions on a daily basis and, in accordance with the triggering criteria set forth in Section VIII of this Plan, shall determine that a mild, moderate, severe, critical, emergency or water shortage condition exists and shall implement the following notification procedures:

Notification

Notification of the Public:

The _____ (designated official) or his/ her designee shall notify the public by means of:

Examples:

*publication in a newspaper of general circulation,
direct mail to each customer,
public service announcements,
signs posted in public places
take-home fliers at schools.*

Additional Notification:

The _____ (designated official) or his/ her designee shall notify directly, or cause to be notified directly, the following individuals and entities:

Examples:

*Mayor / Chairman and members of the City Council / Utility Board
Fire Chief(s)
City and/or County Emergency Management Coordinator(s)
County Judge & Commissioner(s)
State Disaster District / Department of Public Safety
TCEQ (required when mandatory restrictions are imposed)
Major water users*

*Critical water users, i.e. hospitals
Parks / street superintendents & public facilities managers*

Note: The plan should specify direct notice only as appropriate to respective drought stages.

Stage 1 Response -- MILD Water Shortage Conditions

Target: Achieve a voluntary ____ percent reduction in _____(example: total water use, daily water demand, etc.).

Best Management Practices for Supply Management:

Describe additional measures, if any, to be implemented directly by (name of your water supplier) to manage limited water supplies and/or reduce water demand. Examples include: reduced or discontinued flushing of water mains, activation and use of an alternative supply source(s); use of reclaimed water for non-potable purposes.

Voluntary Water Use Restrictions for Reducing Demand :

- (a) Water customers are requested to voluntarily limit the irrigation of landscaped areas to Sundays and Thursdays for customers with a street address ending in an even number (0, 2, 4, 6 or 8), and Saturdays and Wednesdays for water customers with a street address ending in an odd number (1, 3, 5, 7 or 9), and to irrigate landscapes only between the hours of midnight and 10:00 a.m. and 8:00 p.m to midnight on designated watering days.
- (b) All operations of the _____ (name of your water supplier) shall adhere to water use restrictions prescribed for Stage 2 of the Plan.
- (c) Water customers are requested to practice water conservation and to minimize or discontinue water use for non-essential purposes.

Stage 2 Response -- MODERATE Water Shortage Conditions

Target: Achieve a ____ percent reduction in _____ (example: total water use, daily water demand, etc.).

Best Management Practices for Supply Management:

Describe additional measures, if any, to be implemented directly by _____ (name of your water supplier) to manage limited water supplies and/or reduce water demand. Examples include: reduced or discontinued flushing of water mains, reduced or discontinued irrigation of public landscaped areas; use of an alternative supply source(s); use of reclaimed water for non-potable purposes.

Water Use Restrictions for Demand Reduction:

Under threat of penalty for violation, the following water use restrictions shall apply to all persons:

- (a) Irrigation of landscaped areas with hose-end sprinklers or automatic irrigation systems shall be limited to Sundays and Thursdays for customers with a street address ending in an even number (0, 2, 4, 6 or 8), and Saturdays and Wednesdays for water customers with a street address ending in an odd number (1, 3, 5, 7 or 9), and irrigation of landscaped areas is further limited to the hours of 12:00 midnight until 10:00 a.m. and between 8:00 p.m. and 12:00 midnight on designated watering days. However, irrigation of landscaped areas is permitted at anytime if it is by means of a hand-held hose, a faucet filled bucket or watering can of five (5) gallons or less, or drip irrigation system.
- (b) Use of water to wash any motor vehicle, motorbike, boat, trailer, airplane or other vehicle is prohibited except on designated watering days between the hours of 12:00 midnight and 10:00 a.m. and between 8:00 p.m. and 12:00 midnight. Such washing, when allowed, shall be done with a hand-held bucket or a hand-held hose equipped with a positive shutoff nozzle for quick rises. Vehicle washing may be done at any time on the immediate premises of a commercial car wash or commercial service station. Further, such washing may be exempted from these regulations if the health, safety, and welfare of the public is contingent upon frequent vehicle cleansing, such as garbage trucks and vehicles used to transport food and perishables.
- (c) Use of water to fill, refill, or add to any indoor or outdoor swimming pools, wading pools, or jacuzzi-type pools is prohibited except on designated watering days between the hours of 12:00 midnight and 10:00 a.m. and between 8 p.m. and 12:00 midnight.
- (d) Operation of any ornamental fountain or pond for aesthetic or scenic purposes is prohibited except where necessary to support aquatic life or where such fountains or ponds are equipped with a recirculation system.
- (e) Use of water from hydrants shall be limited to fire fighting, related activities, or other activities necessary to maintain public health, safety, and welfare, except that use of water from designated fire hydrants for construction purposes may be allowed under special permit from the _____ (name of your water supplier).
- (f) Use of water for the irrigation of golf course greens, tees, and fairways is prohibited except on designated watering days between the hours 12:00 midnight and 10:00 a.m. and between 8 p.m. and 12:00 midnight. However, if the golf course utilizes a water source other than that provided by the _____ (name of your water supplier), the facility shall not be subject to these regulations.

- (g) All restaurants are prohibited from serving water to patrons except upon request of the patron.
- (h) The following uses of water are defined as non-essential and are prohibited:
 - 1. wash down of any sidewalks, walkways, driveways, parking lots, tennis courts, or other hard-surfaced areas;
 - 2. use of water to wash down buildings or structures for purposes other than immediate fire protection;
 - 3. use of water for dust control;
 - 4. flushing gutters or permitting water to run or accumulate in any gutter or street; and
 - 5. failure to repair a controllable leak(s) within a reasonable period after having been given notice directing the repair of such leak(s).

Stage 3 Response -- SEVERE Water Shortage Conditions

Target: Achieve a ____ percent reduction in _____ (example: total water use, daily water demand, etc.).

Best Management Practices for Supply Management:

Describe additional measures, if any, to be implemented directly by _____ (name of your water supplier) to manage limited water supplies and/or reduce water demand. Examples include: reduced or discontinued flushing of water mains, reduced or discontinued irrigation of public landscaped areas; use of an alternative supply source(s); use of reclaimed water for non-potable purposes.

Water Use Restrictions for Demand Reduction:

All requirements of Stage 2 shall remain in effect during Stage 3 except:

- (a) Irrigation of landscaped areas shall be limited to designated watering days between the hours of 12:00 midnight and 10:00 a.m. and between 8 p.m. and 12:00 midnight and shall be by means of hand-held hoses, hand-held buckets, drip irrigation, or permanently installed automatic sprinkler system only. The use of hose-end sprinklers is prohibited at all times.
- (b) The watering of golf course tees is prohibited unless the golf course utilizes a water source other than that provided by the _____ (name of your water supplier).
- (c) The use of water for construction purposes from designated fire hydrants under special permit is to be discontinued.

Stage 4 Response -- CRITICAL Water Shortage Conditions

Target: Achieve a ____ percent reduction in _____ (example: total water use, daily water demand, etc.).

Best Management Practices for Supply Management:

Describe additional measures, if any, to be implemented directly by _____ (name of your water supplier) to manage limited water supplies and/or reduce water demand. Examples include: reduced or discontinued flushing of water mains, reduced or discontinued irrigation of public landscaped areas; use of an alternative supply source(s); use of reclaimed water for non-potable purposes.

Water Use Restrictions for Reducing Demand: All requirements of Stage 2 and 3 shall remain in effect during Stage 4 except:

- (a) Irrigation of landscaped areas shall be limited to designated watering days between the hours of 6:00 a.m. and 10:00 a.m. and between 8:00 p.m. and 12:00 midnight and shall be by means of hand-held hoses, hand-held buckets, or drip irrigation only. The use of hose-end sprinklers or permanently installed automatic sprinkler systems are prohibited at all times.
- (b) Use of water to wash any motor vehicle, motorbike, boat, trailer, airplane or other vehicle not occurring on the premises of a commercial car wash and commercial service stations and not in the immediate interest of public health, safety, and welfare is prohibited. Further, such vehicle washing at commercial car washes and commercial service stations shall occur only between the hours of 6:00 a.m. and 10:00 a.m. and between 6:00 p.m. and 10 p.m.
- (c) The filling, refilling, or adding of water to swimming pools, wading pools, and jacuzzi-type pools is prohibited.
- (d) Operation of any ornamental fountain or pond for aesthetic or scenic purposes is prohibited except where necessary to support aquatic life or where such fountains or ponds are equipped with a recirculation system.
- (e) No application for new, additional, expanded, or increased-in-size water service connections, meters, service lines, pipeline extensions, mains, or water service facilities of any kind shall be approved, and time limits for approval of such applications are hereby suspended for such time as this drought response stage or a higher-numbered stage shall be in effect.

Stage 5 Response -- EMERGENCY Water Shortage Conditions

Target: Achieve a ____ percent reduction in _____ (example: total water use, daily water demand, etc.).

Best Management Practices for Supply Management:

Describe additional measures, if any, to be implemented directly by _____ (name of your water supplier) to manage limited water supplies and/or reduce water demand. Examples include: reduced or discontinued flushing of water mains, reduced or discontinued irrigation of public landscaped areas; use of an alternative supply source(s); use of reclaimed water for non-potable purposes.

Water Use Restrictions for Reducing Demand. All requirements of Stage 2, 3, and 4 shall remain in effect during Stage 5 except:

- (a) Irrigation of landscaped areas is absolutely prohibited.
- (b) Use of water to wash any motor vehicle, motorbike, boat, trailer, airplane or other vehicle is absolutely prohibited.

Stage 6 Response -- WATER ALLOCATION

In the event that water shortage conditions threaten public health, safety, and welfare, the _____ (designated official) is hereby authorized to allocate water according to the following water allocation plan:

Single-Family Residential Customers

The allocation to residential water customers residing in a single-family dwelling shall be as follows:

Persons per Household	Gallons per Month
1 or 2	6,000
3 or 4	7,000
5 or 6	8,000
7 or 8	9,000
9 or 10	10,000
11 or more	12,000

“Household” means the residential premises served by the customer’s meter. “Persons per household” includes only those persons currently physically residing at the premises and expected to reside there for the entire billing period. It shall be assumed that a particular customer’s household is comprised of two (2) persons unless the customer notifies the _____ (name of your water supplier) of a greater number of persons per household on a form prescribed by the _____ (designated official). The _____ (designated official) shall give his/her best effort to see that such forms are mailed, otherwise provided, or made available to every residential customer. If, however, a customer does not receive such a

form, it shall be the customer’s responsibility to go to the _____ (name of your water supplier) offices to complete and sign the form claiming more than two (2) persons per household. New customers may claim more persons per household at the time of applying for water service on the form prescribed by the _____ (designated official). When the number of persons per household increases so as to place the customer in a different allocation category, the customer may notify the _____ (name of water supplier) on such form and the change will be implemented in the next practicable billing period. If the number of persons in a household is reduced, the customer shall notify the _____ (name of your water supplier) in writing within two (2) days. In prescribing the method for claiming more than two (2) persons per household, the _____ (designated official) shall adopt methods to insure the accuracy of the claim. Any person who knowingly, recklessly, or with criminal negligence falsely reports the number of persons in a household or fails to timely notify the _____ (name of your water supplier) of a reduction in the number of person in a household shall be fined not less than \$_____.

Residential water customers shall pay the following surcharges:

- \$_____ for the first 1,000 gallons over allocation.
- \$_____ for the second 1,000 gallons over allocation.
- \$_____ for the third 1,000 gallons over allocation.
- \$_____ for each additional 1,000 gallons over allocation.

Surcharges shall be cumulative.

Master-Metered Multi-Family Residential Customers

The allocation to a customer billed from a master meter which jointly measures water to multiple permanent residential dwelling units (example: apartments, mobile homes) shall be allocated 6,000 gallons per month for each dwelling unit. It shall be assumed that such a customer’s meter serves two dwelling units unless the customer notifies the _____ (name of your water supplier) of a greater number on a form prescribed by the _____ (designated official). The _____ (designated official) shall give his/her best effort to see that such forms are mailed, otherwise provided, or made available to every such customer. If, however, a customer does not

receive such a form, it shall be the customer's responsibility to go to the _____ (name of your water supplier) offices to complete and sign the form claiming more than two (2) dwellings. A dwelling unit may be claimed under this provision whether it is occupied or not. New customers may claim more dwelling units at the time of applying for water service on the form prescribed by the _____ (designated official). If the number of dwelling units served by a master meter is reduced, the customer shall notify the _____ (name of your water supplier) in writing within two (2) days. In prescribing the method for claiming more than two (2) dwelling units, the _____ (designated official) shall adopt methods to insure the accuracy of the claim. Any person who knowingly, recklessly, or with criminal negligence falsely reports the number of dwelling units served by a master meter or fails to timely notify the _____ (name of your water supplier) of a reduction in the number of person in a household shall be fined not less than \$ _____. Customers billed from a master meter under this provision shall pay the following monthly surcharges:

- \$ ____ for 1,000 gallons over allocation up through 1,000 gallons for each dwelling unit.
- \$ ____, thereafter, for each additional 1,000 gallons over allocation up through a second 1,000 gallons for each dwelling unit.
- \$ ____, thereafter, for each additional 1,000 gallons over allocation up through a third 1,000 gallons for each dwelling unit.
- \$ ____, thereafter for each additional 1,000 gallons over allocation.

Surcharges shall be cumulative.

Commercial Customers

A monthly water allocation shall be established by the _____ (designated official), or his/her designee, for each nonresidential commercial customer other than an industrial customer who uses water for processing purposes. The non-residential customer's allocation shall be approximately ____ (e.g. 75%) percent of the customer's usage for corresponding month's billing period for the previous 12 months. If the customer's billing history is shorter than 12 months, the monthly average for the period for which there is a record shall be used for any monthly period for which no history exists. Provided, however, a customer, ____ percent of whose monthly usage is less than ____ gallons, shall be allocated ____ gallons. The _____ (designated official) shall give his/her best effort to see that notice of each non-residential customer's allocation is mailed to such customer. If, however, a customer does not receive such notice, it shall be the customer's responsibility to contact the _____ (name of your water supplier) to determine the allocation. Upon request of the customer or at the initiative of the _____ (designated official), the allocation may be reduced or increased if, (1) the designated period does not accurately reflect the customer's normal water usage, (2) one nonresidential customer agrees to transfer part of its allocation to another nonresidential customer, or (3) other objective evidence demonstrates that the designated allocation is inaccurate under present conditions. A customer

may appeal an allocation established hereunder to the _____ (designated official or alternatively, a special water allocation review committee). Nonresidential commercial customers shall pay the following surcharges:

Customers whose allocation is _____ gallons through _____ gallons per month:

- \$_____ per thousand gallons for the first 1,000 gallons over allocation.
- \$_____ per thousand gallons for the second 1,000 gallons over allocation.
- \$_____ per thousand gallons for the third 1,000 gallons over allocation.
- \$_____ per thousand gallons for each additional 1,000 gallons over allocation.

Customers whose allocation is _____ gallons per month or more:

- _____ times the block rate for each 1,000 gallons in excess of the allocation up through 5 percent above allocation.
- _____ times the block rate for each 1,000 gallons from 5 percent through 10 percent above allocation.
- _____ times the block rate for each 1,000 gallons from 10 percent through 15 percent above allocation.
- _____ times the block rate for each 1,000 gallons more than 15 percent above allocation.

The surcharges shall be cumulative. As used herein, “block rate” means the charge to the customer per 1,000 gallons at the regular water rate schedule at the level of the customer’s allocation.

Industrial Customers

A monthly water allocation shall be established by the _____ (designated official), or his/her designee, for each industrial customer, which uses water for processing purposes. The industrial customer’s allocation shall be approximately ____ (example: 90%) percent of the customer’s water usage baseline. Ninety (90) days after the initial imposition of the allocation for industrial customers, the industrial customer’s allocation shall be further reduced to ____ (example: 85%) percent of the customer’s water usage baseline. The industrial customer’s water use baseline will be computed on the average water use for the _____ month period ending prior to the date of implementation of Stage 2 of the Plan. If the industrial water customer’s billing history is shorter than ____ months, the monthly average for the period for which there is a record shall be used for any monthly period for which no billing history exists. The _____ (designated official) shall give his/her best effort to see that notice of each industrial customer’s allocation is mailed to such customer. If, however, a customer does not receive such notice, it shall be the customer’s responsibility to contact the _____ (name of your water supplier) to determine the allocation, and the allocation shall be fully effective notwithstanding the lack of

receipt of written notice. Upon request of the customer or at the initiative of the _____ (designated official), the allocation may be reduced or increased, (1) if the designated period does not accurately reflect the customer's normal water use because the customer had shutdown a major processing unit for repair or overhaul during the period, (2) the customer has added or is in the process of adding significant additional processing capacity, (3) the customer has shutdown or significantly reduced the production of a major processing unit, (4) the customer has previously implemented significant permanent water conservation measures such that the ability to further reduce water use is limited, (5) the customer agrees to transfer part of its allocation to another industrial customer, or (6) if other objective evidence demonstrates that the designated allocation is inaccurate under present conditions. A customer may appeal an allocation established hereunder to the _____ (designated official or alternatively, a special water allocation review committee). Industrial customers shall pay the following surcharges:

Customers whose allocation is _____ gallons through _____ gallons per month:

- \$_____ per thousand gallons for the first 1,000 gallons over allocation.
- \$_____ per thousand gallons for the second 1,000 gallons over allocation.
- \$_____ per thousand gallons for the third 1,000 gallons over allocation.
- \$_____ per thousand gallons for each additional 1,000 gallons over allocation.

Customers whose allocation is _____ gallons per month or more:

- _____ times the block rate for each 1,000 gallons in excess of the allocation up through 5 percent above allocation.
- _____ times the block rate for each 1,000 gallons from 5 percent through 10 percent above allocation.
- _____ times the block rate for each 1,000 gallons from 10 percent through 15 percent above allocation.
- _____ times the block rate for each 1,000 gallons more than 15 percent above allocation.

The surcharges shall be cumulative. As used herein, "block rate" means the charge to the customer per 1,000 gallons at the regular water rate schedule at the level of the customer's allocation.

Section X: Enforcement

- (a) No person shall knowingly or intentionally allow the use of water from the _____ (name of your water supplier) for residential, commercial, industrial, agricultural, governmental, or any other purpose in a manner contrary to any provision of this Plan, or in an amount in excess of that permitted by the drought response stage in effect at the

time pursuant to action taken by _____ (designated official), or his/her designee, in accordance with provisions of this Plan.

- (b) Any person who violates this Plan is guilty of a misdemeanor and, upon conviction shall be punished by a fine of not less than _____ dollars (\$___) and not more than _____ dollars (\$___). Each day that one or more of the provisions in this Plan is violated shall constitute a separate offense. If a person is convicted of three or more distinct violations of this Plan, the _____ (designated official) shall, upon due notice to the customer, be authorized to discontinue water service to the premises where such violations occur. Services discontinued under such circumstances shall be restored only upon payment of a re-connection charge, hereby established at \$_____, and any other costs incurred by the _____ (name of your water supplier) in discontinuing service. In addition, suitable assurance must be given to the _____ (designated official) that the same action shall not be repeated while the Plan is in effect. Compliance with this plan may also be sought through injunctive relief in the district court.
- (c) Any person, including a person classified as a water customer of the _____ (name of your water supplier), in apparent control of the property where a violation occurs or originates shall be presumed to be the violator, and proof that the violation occurred on the person's property shall constitute a rebuttable presumption that the person in apparent control of the property committed the violation, but any such person shall have the right to show that he/she did not commit the violation. Parents shall be presumed to be responsible for violations of their minor children and proof that a violation, committed by a child, occurred on property within the parents' control shall constitute a rebuttable presumption that the parent committed the violation, but any such parent may be excused if he/she proves that he/she had previously directed the child not to use the water as it was used in violation of this Plan and that the parent could not have reasonably known of the violation.
- (d) Any employee of the _____ (name of your water supplier), police officer, or other _____ employee designated by the _____ (designated official), may issue a citation to a person he/she reasonably believes to be in violation of this Ordinance. The citation shall be prepared in duplicate and shall contain the name and address of the alleged violator, if known, the offense charged, and shall direct him/her to appear in the _____ (example: municipal court) on the date shown on the citation for which the date shall not be less than 3 days nor more than 5 days from the date the citation was issued. The alleged violator shall be served a copy of the citation. Service of the citation shall be complete upon delivery of the citation to the alleged violator, to an agent or employee of a violator, or to a person over 14 years of age who is a member of the violator's immediate family or is a resident of the violator's residence. The alleged violator shall appear in _____ (example: municipal court) to enter a plea of guilty or not guilty for the violation of this Plan. If the alleged violator fails to appear in _____ (example: municipal court), a warrant for his/her arrest may be issued. A summons to appear may be issued in lieu of an arrest warrant. These cases shall be expedited and

given preferential setting in _____ (example: municipal court) before all other cases.

Section XI: Variances

The _____ (designated official), or his/her designee, may, in writing, grant temporary variance for existing water uses otherwise prohibited under this Plan if it is determined that failure to grant such variance would cause an emergency condition adversely affecting the health, sanitation, or fire protection for the public or the person requesting such variance and if one or more of the following conditions are met:

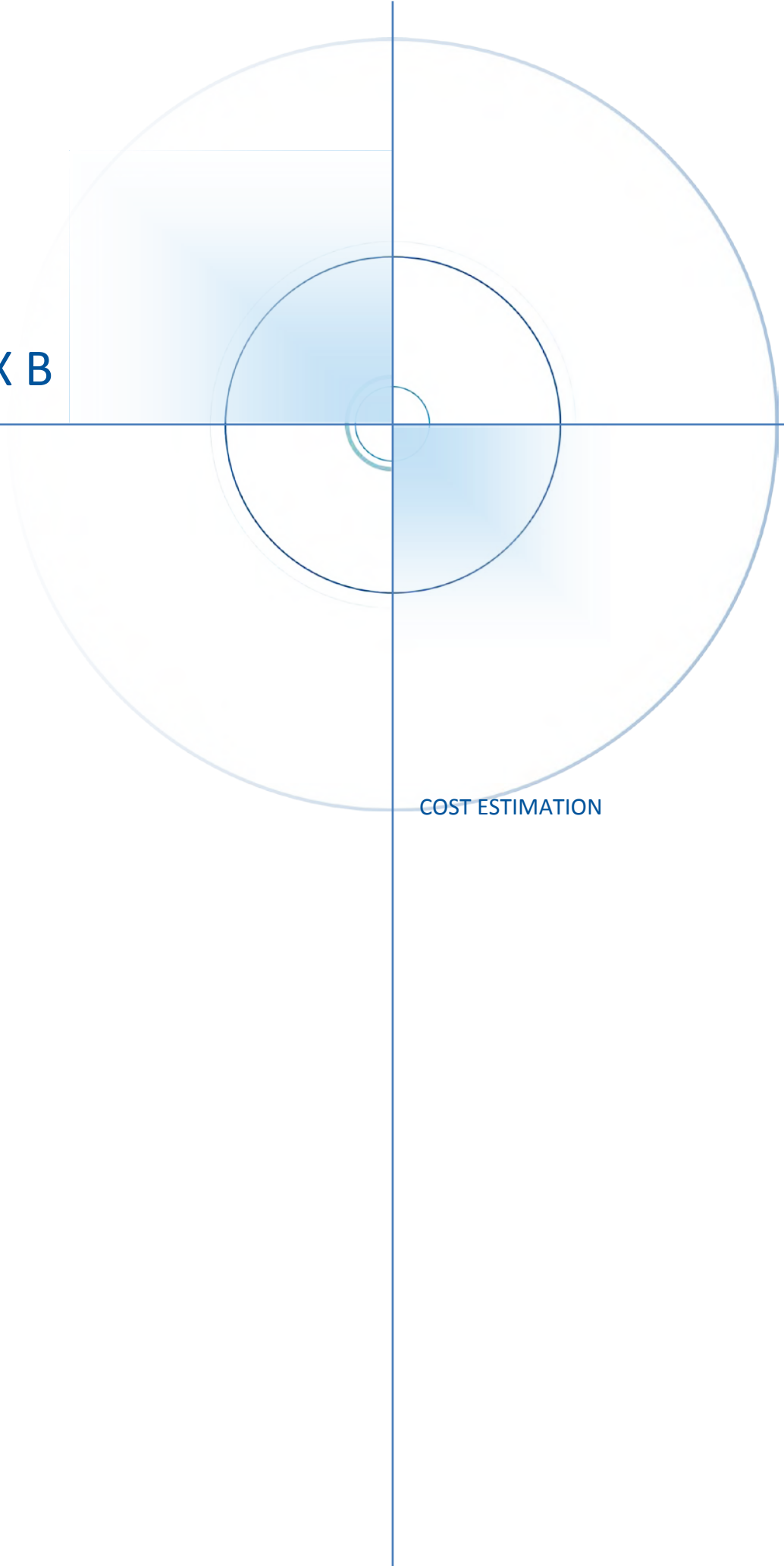
- (a) Compliance with this Plan cannot be technically accomplished during the duration of the water supply shortage or other condition for which the Plan is in effect.
- (b) Alternative methods can be implemented which will achieve the same level of reduction in water use.

Persons requesting an exemption from the provisions of this Ordinance shall file a petition for variance with the _____ (name of your water supplier) within 5 days after the Plan or a particular drought response stage has been invoked. All petitions for variances shall be reviewed by the _____ (designated official), or his/her designee, and shall include the following:

- (a) Name and address of the petitioner(s).
- (b) Purpose of water use.
- (c) Specific provision(s) of the Plan from which the petitioner is requesting relief.
- (d) Detailed statement as to how the specific provision of the Plan adversely affects the petitioner or what damage or harm will occur to the petitioner or others if petitioner complies with this Ordinance.
- (e) Description of the relief requested.
- (f) Period of time for which the variance is sought.
- (g) Alternative water use restrictions or other measures the petitioner is taking or proposes to take to meet the intent of this Plan and the compliance date.
- (h) Other pertinent information.

APPENDIX B

COST ESTIMATION



Option 1 Convey WW to Existing Port Lavaca Plant

	Double D	Matson	Meadow Brook	Royal Estate	Shoreline Acres	Six Mile	Hackberry Junct	Bay Meadows	Bowman	Shady Acres
Lots	90	50	55	38	80	90	39	45	32	43
Flow (MGD)	0.02	0.01	0.01	0.01	0.02	0.02	0.01	0.01	0.01	0.01
Collection System \$	\$567,000.00	\$315,000.00	\$346,500.00	\$239,400.00	\$504,000.00	\$567,000.00	\$245,700.00	\$283,500.00	\$201,600.00	\$270,900.00
Force Main (4")	\$150,000.00	\$250,000.00	\$250,000.00	\$275,000.00	\$100,000.00	\$125,000.00	\$112,500.00	\$100,000.00	\$112,500.00	\$245,000.00
Force Main (6")	\$0.00	\$0.00	\$0.00	\$90,000.00	\$90,000.00	\$90,000.00	\$0.00	\$90,000.00	\$0.00	\$0.00
Lift Station (<0.50 MGD)	\$250,000.00	\$125,000.00	\$125,000.00	\$250,000.00	\$250,000.00	\$250,000.00	\$125,000.00	\$250,000.00	\$125,000.00	\$250,000.00
Subtotal	\$967,000.00	\$690,000.00	\$721,500.00	\$854,400.00	\$944,000.00	\$1,032,000.00	\$483,200.00	\$723,500.00	\$439,100.00	\$765,900.00
Contingencies (15%)	\$145,050.00	\$103,500.00	\$108,225.00	\$128,160.00	\$141,600.00	\$154,800.00	\$72,480.00	\$108,525.00	\$65,865.00	\$114,885.00
Subtotal	\$1,112,050.00	\$793,500.00	\$829,725.00	\$982,560.00	\$1,085,600.00	\$1,186,800.00	\$555,680.00	\$832,025.00	\$504,965.00	\$880,785.00
Professional Services (20%)	\$222,410.00	\$158,700.00	\$165,945.00	\$196,512.00	\$217,120.00	\$237,360.00	\$111,136.00	\$166,405.00	\$100,993.00	\$176,157.00
Subtotal	\$1,334,460.00	\$952,200.00	\$995,670.00	\$1,179,072.00	\$1,302,720.00	\$1,424,160.00	\$666,816.00	\$998,430.00	\$605,958.00	\$1,056,942.00
Total Capital Cost	\$1,334,460.00	\$952,200.00	\$995,670.00	\$1,179,072.00	\$1,302,720.00	\$1,424,160.00	\$666,816.00	\$998,430.00	\$605,958.00	\$1,056,942.00
Capital Cost/Lot	\$14,827.33	\$19,044.00	\$18,103.09	\$31,028.21	\$16,284.00	\$15,824.00	\$17,097.85	\$22,187.33	\$18,936.19	\$24,580.05
Annual Payment in \$	\$66,621.04	\$47,537.24	\$49,707.42	\$58,863.51	\$65,036.46	\$71,099.18	\$33,289.85	\$49,845.21	\$30,251.60	\$52,766.34
Electricity Cost for Operating LS in \$/yr	\$429.92	\$238.85	\$262.73	\$181.52	\$382.15	\$429.92	\$186.30	\$214.96	\$152.86	\$205.41
Monthly Payment/ Lot at full development	\$62.08	\$79.63	\$75.71	\$129.48	\$68.14	\$66.23	\$71.53	\$92.70	\$79.18	\$102.66
City Sewer Fee per Lot per month	\$61.43	\$61.43	\$61.43	\$61.43	\$61.43	\$61.43	\$61.43	\$61.43	\$61.43	\$61.43
Total Monthly Payment per lot	\$123.51	\$141.05	\$137.14	\$190.91	\$129.57	\$127.66	\$132.96	\$154.13	\$140.60	\$164.08

Option 2 - Each Subdivision of Concern Gets it's Own WWTP

	Double D	Matson	Meadow Brook	Royal Estate	Shoreline Acres	Six Mile	Hackberry Junct	Bay Meadows	Bowman	Shady Acres
Lots	90	50	55	38	80	90	39	45	32	43
Plant Capacity (MGD)	0.02	0.01	0.01	0.01	0.02	0.02	0.01	0.01	0.01	0.01
Treatment Cost in \$	\$540,000.00	\$312,500.00	\$343,750.00	\$237,500.00	\$480,000.00	\$540,000.00	\$243,750.00	\$281,250.00	\$200,000.00	\$268,750.00
Collection Cost in \$	\$567,000.00	\$315,000.00	\$346,500.00	\$239,400.00	\$504,000.00	\$567,000.00	\$245,700.00	\$283,500.00	\$201,600.00	\$270,900.00
Subtotal	\$1,107,000.00	\$627,500.00	\$690,250.00	\$476,900.00	\$984,000.00	\$1,107,000.00	\$489,450.00	\$564,750.00	\$401,600.00	\$539,650.00
Contingencies (15%)	\$166,050.00	\$94,125.00	\$103,537.50	\$71,535.00	\$147,600.00	\$166,050.00	\$73,417.50	\$84,712.50	\$60,240.00	\$80,947.50
Subtotal	\$1,273,050.00	\$721,625.00	\$793,787.50	\$548,435.00	\$1,131,600.00	\$1,273,050.00	\$562,867.50	\$649,462.50	\$461,840.00	\$620,597.50
Professional Services (20%)	\$254,610.00	\$144,325.00	\$158,757.50	\$109,687.00	\$226,320.00	\$254,610.00	\$112,573.50	\$129,892.50	\$92,368.00	\$124,119.50
Subtotal	\$1,527,660.00	\$865,950.00	\$952,545.00	\$658,122.00	\$1,357,920.00	\$1,527,660.00	\$675,441.00	\$779,355.00	\$554,208.00	\$744,717.00
Total Capital Cost	\$1,527,660.00	\$865,950.00	\$952,545.00	\$658,122.00	\$1,357,920.00	\$1,527,660.00	\$675,441.00	\$779,355.00	\$554,208.00	\$744,717.00
Capital Cost/Lot	\$16,974.00	\$17,319.00	\$17,319.00	\$17,319.00	\$16,974.00	\$16,974.00	\$17,319.00	\$17,319.00	\$17,319.00	\$17,319.00
Annual Payment in \$	\$76,266.28	\$43,231.34	\$47,554.47	\$32,855.81	\$67,792.24	\$76,266.28	\$33,720.44	\$38,908.20	\$27,668.05	\$37,178.95
O & M Cost in \$	\$114,975.00	\$68,437.50	\$75,281.25	\$52,012.50	\$102,200.00	\$114,975.00	\$53,381.25	\$61,593.75	\$43,800.00	\$58,856.25
Monthly Payment/ Lot at full development	\$177.08	\$186.11	\$186.11	\$186.11	\$177.08	\$177.08	\$186.11	\$186.11	\$186.11	\$186.11

1 - Collection system is assumed to Pressure Sewer System

Option 3 - Regionalized WWTPs for the Subdivisions of Concern

	Double D	Matson	Meadow Brook	Bowman	Hackberry Junct	Shady Acres	Bay Meadows	Royal Estate	Shoreline Acres	Six Mile
Lots	90	50	55	32	39	43	45	38	80	90
Plant Capacity (MGD)	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.02
Regional Plant Capacity	0.05			0.03			0.06			
Treatment Cost in \$	\$1,072,500.00			\$641,250.00			\$1,328,250.00			
Tretment Cost in \$/subdivision	\$495,000.00	\$275,000.00	\$302,500.00	\$180,000.00	\$219,375.00	\$241,875.00	\$236,250.00	\$199,500.00	\$420,000.00	\$472,500.00
Forcemain/Lift Station cost in \$	\$450,000.00	\$250,000.00	\$250,000.00	\$225,000.00	\$225,000.00	\$350,000.00	\$450,000.00	\$450,000.00	\$450,000.00	\$375,000.00
Collection Cost in \$	\$567,000.00	\$315,000.00	\$346,500.00	\$201,600.00	\$245,700.00	\$270,900.00	\$283,500.00	\$239,400.00	\$504,000.00	\$567,000.00
Subtotal	\$1,512,000.00	\$840,000.00	\$899,000.00	\$606,600.00	\$690,075.00	\$862,775.00	\$969,750.00	\$888,900.00	\$1,374,000.00	\$1,414,500.00
Contingencies (15%)	\$226,800.00	\$126,000.00	\$134,850.00	\$90,990.00	\$103,511.25	\$129,416.25	\$145,462.50	\$133,335.00	\$206,100.00	\$212,175.00
Subtotal	\$1,738,800.00	\$966,000.00	\$1,033,850.00	\$697,590.00	\$793,586.25	\$992,191.25	\$1,115,212.50	\$1,022,235.00	\$1,580,100.00	\$1,626,675.00
Professional Services (20%)	\$347,760.00	\$193,200.00	\$206,770.00	\$139,518.00	\$158,717.25	\$198,438.25	\$223,042.50	\$204,447.00	\$316,020.00	\$325,335.00
Subtotal	\$2,086,560.00	\$1,159,200.00	\$1,240,620.00	\$837,108.00	\$952,303.50	\$1,190,629.50	\$1,338,255.00	\$1,226,682.00	\$1,896,120.00	\$1,952,010.00
Total Capital Cost	\$2,086,560.00	\$1,159,200.00	\$1,240,620.00	\$837,108.00	\$952,303.50	\$1,190,629.50	\$1,338,255.00	\$1,226,682.00	\$1,896,120.00	\$1,952,010.00
Capital Cost/Lot	\$23,184.00	\$23,184.00	\$22,556.73	\$26,159.63	\$24,418.04	\$27,689.06	\$29,739.00	\$32,281.11	\$23,701.50	\$21,689.00
Annual Payment in \$	\$104,168.57	\$57,871.43	\$61,936.21	\$41,791.44	\$47,542.41	\$59,440.50	\$66,810.50	\$61,240.37	\$94,661.12	\$97,451.35
Electricity Cost for Operating Lsin \$/yr	\$429.92	\$238.85	\$262.73	\$152.86	\$186.30	\$205.41	\$214.96	\$181.52	\$382.15	\$429.92
O & M Cost in \$	\$65,700.00	\$36,500.00	\$40,150.00	\$24,820.00	\$30,249.38	\$33,351.88	\$26,690.63	\$22,538.75	\$47,450.00	\$53,381.25
Monthly Payment/ Lot at full development	\$157.35	\$157.40	\$154.78	\$173.64	\$166.36	\$179.96	\$173.27	\$183.87	\$148.10	\$139.72

Option 4 - Matson/Meadow Brook/Hackberry and Bowman to Crestview WWTP

	Matson	Meadow Brook	Hackberry Junct	Bowman
Lots	50	55	39	32
Flow (MGD)	0.01	0.01	0.01	0.01
Total Flow to Crestview WWTP (MGD)	0.04			
Forcemain/Lift Station cost in \$	\$312,500.00	\$312,500.00	\$312,500.00	\$312,500.00
Collection Cost in \$	\$315,000.00	\$346,500.00	\$245,700.00	\$201,600.00
Subtotal	\$627,500.00	\$659,000.00	\$558,200.00	\$514,100.00
Contingencies (15%)	\$94,125.00	\$98,850.00	\$83,730.00	\$77,115.00
Subtotal	\$721,625.00	\$757,850.00	\$562,867.50	\$461,840.00
Professional Services (20%)	\$144,325.00	\$151,570.00	\$112,573.50	\$92,368.00
Subtotal	\$865,950.00	\$909,420.00	\$675,441.00	\$554,208.00
Total Capital Cost	\$865,950.00	\$909,420.00	\$675,441.00	\$554,208.00
Capital Cost/Lot	\$17,319.00	\$16,534.91	\$17,319.00	\$17,319.00
Annual Payment in \$	\$43,231.34	\$45,401.51	\$33,720.44	\$27,668.05
Electricity Cost for Operating Lsin \$/yr	\$238.85	\$262.73	\$186.30	\$152.86
O & M Cost in \$/yr	\$25,093.75	\$27,603.13	\$19,573.13	\$16,060.00
Monthly Payment/ Lot at full development*	\$134.05	\$130.79	\$134.05	\$134.05

* includes \$62 flat fee for service and the annual payment

Option 1 - Convey WW to Point Comfort WWTP

	Port Alto South	Port Alto North	Olivia
Lots	118	140	68
Flow (MGD)	0.03	0.04	0.02
Collection System \$	\$743,400.00	\$882,000.00	\$428,400.00
Force Main (4")	\$700,000.00	\$700,000.00	\$725,000.00
Lift Station (<0.50 MGD)	\$250,000.00	\$250,000.00	\$250,000.00
Subtotal	\$1,693,400.00	\$1,832,000.00	\$1,403,400.00
Contingencies (15%)	\$254,010.00	\$274,800.00	\$210,510.00
Subtotal	\$1,947,410.00	\$2,106,800.00	\$1,613,910.00
Professional Services (20%)	\$389,482.00	\$421,360.00	\$322,782.00
Subtotal	\$2,336,892.00	\$2,528,160.00	\$1,936,692.00
Total Capital Cost	\$2,336,892.00	\$2,528,160.00	\$1,936,692.00
Capital Cost/Lot	\$19,804.17	\$18,058.29	\$28,480.76
Annual Payment in \$	\$116,666.04	\$126,214.83	\$96,686.62
Electricity Cost for operating LS in \$/yr	\$563.68	\$668.77	\$324.83
Monthly Payment/ Lot at full development	\$82.79	\$75.53	\$118.89
City Sewer Fee Per Lot	\$17.35	\$17.35	\$17.35
Total Monthly Fee	\$100.14	\$92.88	\$136.24

Option 2 - Each Subdivision Gets it's Own WWTP

	Port Alto South	Port Alto North	Olivia
Lots	118	140	68
Plant Capacity (MGD)	0.03	0.04	0.02
Treatment Cost in \$	\$678,500.00	\$787,500.00	\$408,000.00
Collection Cost in \$	\$743,400.00	\$882,000.00	\$428,400.00
Subtotal	\$1,421,900.00	\$1,669,500.00	\$836,400.00
Contingencies (15%)	\$213,285.00	\$250,425.00	\$125,460.00
Subtotal	\$1,635,185.00	\$1,919,925.00	\$961,860.00
Professional Services (20%)	\$327,037.00	\$383,985.00	\$192,372.00
Subtotal	\$1,962,222.00	\$2,303,910.00	\$1,154,232.00
Total Capital Cost	\$1,962,222.00	\$2,303,910.00	\$1,154,232.00
Capital Cost/Lot	\$16,629.00	\$16,456.50	\$16,974.00
Annual Payment in \$	\$97,961.17	\$115,019.46	\$57,623.41
O & M Cost in \$	\$107,675.00	\$123,917.50	\$86,870.00
Monthly Payment/ Lot at full development	\$145.22	\$142.22	\$177.08

Option 3 - Regionalized WWTP for Subdivisions

	Port Alto South	Port Alto North	Olivia
Lots	118	140	68
Plant Capacity (MGD)	0.03	0.04	0.02
Regional Plant Capacity	0.08		
Treatment Cost in \$	\$1,630,000.00		
Treatment Cost in \$/Subdivision	\$590,000.00	\$700,000.00	\$340,000.00
Forcemain/Lift Station cost in \$	\$275,000.00	\$275,000.00	\$550,000.00
Collection Cost in \$	\$743,400.00	\$882,000.00	\$428,400.00
Subtotal	\$1,608,400.00	\$1,857,000.00	\$1,318,400.00
Contingencies (15%)	\$241,260.00	\$278,550.00	\$197,760.00
Subtotal	\$1,849,660.00	\$2,135,550.00	\$1,516,160.00
Professional Services (20%)	\$369,932.00	\$427,110.00	\$303,232.00
Subtotal	\$2,219,592.00	\$2,562,660.00	\$1,819,392.00
Total Capital Cost	\$2,219,592.00	\$2,562,660.00	\$1,819,392.00
Capital Cost/Lot	\$18,810.10	\$18,304.71	\$26,755.76
Annual Payment in \$	\$110,810.01	\$127,937.19	\$90,830.59
Electricity Cost for operating LS in \$/yr	\$563.68	\$668.77	\$324.83
O & M Cost in \$	\$43,070.00	\$51,100.00	\$24,820.00
Monthly Payment/ Lot at full development	\$109.07	\$106.97	\$142.13

Option 1 - Convey WW to Port O'Connor MUD WWTP/ Seadrift WWTP

	Harbor Mist	Bindewald	Fisher	Swan Point Landing	Falcon Point	Seaport Lakes	Lane Road	Costa Grande	Powderhorn
Lots	112.5	150	150	44.5	804	28	187.5	3250	250
Flow (MGD)	0.03	0.04	0.04	0.01	0.20	0.01	0.05	0.81	0.06
Collection Cost in \$	\$708,750.00	\$945,000.00	\$945,000.00	\$280,350.00	\$5,065,200.00	\$176,400.00	\$1,181,250.00	\$20,475,000.00	\$1,575,000.00
Lift Station/Forcemain Cost in \$	\$362,500.00	\$342,500.00	\$407,500.00	\$565,000.00	\$390,000.00	\$475,000.00	\$350,000.00	\$250,000.00	\$250,000.00
Subtotal	\$1,071,250.00	\$1,287,500.00	\$1,352,500.00	\$845,350.00	\$5,455,200.00	\$651,400.00	\$1,531,250.00	\$20,725,000.00	\$1,825,000.00
Contingencies (15%)	\$160,687.50	\$193,125.00	\$202,875.00	\$126,802.50	\$818,280.00	\$97,710.00	\$229,687.50	\$3,108,750.00	\$273,750.00
Subtotal	\$1,231,937.50	\$1,480,625.00	\$1,555,375.00	\$972,152.50	\$6,273,480.00	\$749,110.00	\$1,760,937.50	\$23,833,750.00	\$2,098,750.00
Professional Services (20%)	\$246,387.50	\$296,125.00	\$311,075.00	\$194,430.50	\$1,254,696.00	\$149,822.00	\$352,187.50	\$4,766,750.00	\$419,750.00
Subtotal	\$1,478,325.00	\$1,776,750.00	\$1,866,450.00	\$1,166,583.00	\$7,528,176.00	\$898,932.00	\$2,113,125.00	\$28,600,500.00	\$2,518,500.00
Total Capital Cost	\$1,478,325.00	\$1,776,750.00	\$1,866,450.00	\$1,166,583.00	\$7,528,176.00	\$898,932.00	\$2,113,125.00	\$28,600,500.00	\$2,518,500.00
Capital Cost/Lot	\$13,140.67	\$11,845.00	\$12,443.00	\$26,215.35	\$9,363.40	\$32,104.71	\$11,270.00	\$8,800.15	\$10,074.00
Annual Payment in \$	\$117,484.31	\$141,200.51	\$148,329.08	\$92,709.79	\$598,273.42	\$71,439.23	\$167,932.65	\$2,272,916.97	\$200,148.30
Electricity Cost for operating LS in \$/yr	\$537.40	\$716.54	\$716.54	\$212.57	\$3,840.63	\$133.75	\$895.67	\$15,524.95	\$1,194.23
Monthly Payment/ Lot at full development	\$87.42	\$78.84	\$82.80	\$174.01	\$62.41	\$213.01	\$75.03	\$58.68	\$67.11
City Sewer Fee/Lot	\$26.75	\$26.75	\$26.75	\$26.75	\$26.75	\$26.75	\$26.75	\$26.75	\$26.75
Total Monthly Payment per Lot	\$114.17	\$105.59	\$109.55	\$200.76	\$89.16	\$239.76	\$101.78	\$85.43	\$93.86

Option 2 - Each Subdivision gets it's own WWTP

	Harbor Mist	Bindewald	Fisher	Swan Point Landin	Falcon Point	Seaport Lakes	Lane Road	Costa Grande	Powderhorn
Lots	112.5	150	150	44.5	804	28	187.5	3250	250
Plant Capacity (MGD)	0.03	0.04	0.04	0.01	0.20	0.01	0.05	0.81	0.06
Treatment Cost in \$	\$675,000.00	\$862,500.00	\$862,500.00	\$278,125.00	\$2,814,000.00	\$175,000.00	\$1,007,812.50	\$5,687,500.00	\$1,250,000.00
Collection Cost in \$	\$708,750.00	\$945,000.00	\$945,000.00	\$280,350.00	\$5,065,200.00	\$176,400.00	\$1,181,250.00	\$20,475,000.00	\$1,575,000.00
Subtotal	\$1,383,750.00	\$1,807,500.00	\$1,807,500.00	\$558,475.00	\$7,879,200.00	\$351,400.00	\$2,189,062.50	\$26,162,500.00	\$2,825,000.00
Contingencies (15%)	\$207,562.50	\$271,125.00	\$271,125.00	\$83,771.25	\$1,181,880.00	\$52,710.00	\$328,359.38	\$3,924,375.00	\$423,750.00
Subtotal	\$1,591,312.50	\$2,078,625.00	\$2,078,625.00	\$642,246.25	\$9,061,080.00	\$404,110.00	\$2,517,421.88	\$30,086,875.00	\$3,248,750.00
Professional Services (20%)	\$318,262.50	\$415,725.00	\$415,725.00	\$128,449.25	\$1,812,216.00	\$80,822.00	\$503,484.38	\$6,017,375.00	\$649,750.00
Subtotal	\$1,909,575.00	\$2,494,350.00	\$2,494,350.00	\$770,695.50	\$10,873,296.00	\$484,932.00	\$3,020,906.25	\$36,104,250.00	\$3,898,500.00
Total Capital Cost	\$1,909,575.00	\$2,494,350.00	\$2,494,350.00	\$770,695.50	\$10,873,296.00	\$484,932.00	\$3,020,906.25	\$36,104,250.00	\$3,898,500.00
Capital Cost/Lot	\$16,974.00	\$16,629.00	\$16,629.00	\$17,319.00	\$13,524.00	\$17,319.00	\$16,111.50	\$11,109.00	\$15,594.00
Annual Payment in \$	\$151,756.28	\$198,229.07	\$198,229.07	\$61,248.12	\$864,114.23	\$38,538.14	\$240,075.14	\$2,869,249.23	\$309,818.60
O & M Cost in \$	\$92,390.63	\$109,500.00	\$109,500.00	\$58,879.06	\$146,730.00	\$37,047.50	\$119,765.63	\$296,562.50	\$114,062.50
Monthly Payment/ Lot at full development	\$180.85	\$170.96	\$170.96	\$224.96	\$104.77	\$224.96	\$159.93	\$81.17	\$141.29

Option 3 - Regional WWTPs for subdivisions

	Harbor Mist	Bindewald	Fisher	Swan Point Landin	Falcon Point	Seaport Lakes	Lane Road	Costa Grande	Powderhorn
Lots	112.5	150	150	44.5	804	28	187.5	3250	250
Plant Capacity (MGD)	0.03	0.04	0.04	0.01	0.20	0.01	0.05	0.81	0.06
Total Plant Capacity (MGD)	1.24								
Total Treatment Cost in \$	\$8,086,812.50								
Treatment Cost in \$	\$182,812.50	\$243,750.00	\$243,750.00	\$72,312.50	\$1,306,500.00	\$45,500.00	\$304,687.50	\$5,281,250.00	\$406,250.00
Collection Cost in \$	\$708,750.00	\$945,000.00	\$945,000.00	\$280,350.00	\$5,065,200.00	\$176,400.00	\$1,181,250.00	\$20,475,000.00	\$1,575,000.00
Lift Station/Forcemain Cost in \$	\$475,000.00	\$450,000.00	\$515,000.00	\$515,000.00	\$795,000.00	\$350,000.00	\$325,000.00	\$375,000.00	\$1,000,000.00
Subtotal	\$1,366,562.50	\$1,638,750.00	\$1,703,750.00	\$867,662.50	\$7,166,700.00	\$571,900.00	\$1,810,937.50	\$26,131,250.00	\$2,981,250.00
Contingencies (15%)	\$204,984.38	\$245,812.50	\$255,562.50	\$130,149.38	\$1,075,005.00	\$85,785.00	\$271,640.63	\$3,919,687.50	\$447,187.50
Subtotal	\$1,571,546.88	\$1,884,562.50	\$1,959,312.50	\$997,811.88	\$8,241,705.00	\$657,685.00	\$2,082,578.13	\$30,050,937.50	\$3,428,437.50
Professional Services (20%)	\$314,309.38	\$376,912.50	\$391,862.50	\$199,562.38	\$1,648,341.00	\$131,537.00	\$416,515.63	\$6,010,187.50	\$685,687.50
Subtotal	\$1,885,856.25	\$2,261,475.00	\$2,351,175.00	\$1,197,374.25	\$9,890,046.00	\$789,222.00	\$2,499,093.75	\$36,061,125.00	\$4,114,125.00
Total Capital Cost	\$1,885,856.25	\$2,261,475.00	\$2,351,175.00	\$1,197,374.25	\$9,890,046.00	\$789,222.00	\$2,499,093.75	\$36,061,125.00	\$4,114,125.00
Capital Cost/Lot	\$16,763.17	\$15,076.50	\$15,674.50	\$26,907.29	\$12,301.05	\$28,186.50	\$13,328.50	\$11,095.73	\$16,456.50
Annual Payment in \$	\$149,871.32	\$179,722.20	\$186,850.77	\$95,156.81	\$785,974.14	\$62,720.44	\$198,606.06	\$2,865,822.03	\$326,954.58
Electricity Cost for operating LS in \$	\$537.40	\$716.54	\$716.54	\$212.57	\$3,840.63	\$133.75	\$895.67	\$15,524.95	\$1,194.23
O & M Cost in \$	\$10,265.63	\$13,687.50	\$13,687.50	\$4,060.63	\$73,365.00	\$2,555.00	\$17,109.38	\$296,562.50	\$22,812.50
Monthly Payment/ Lot at full development	\$119.02	\$107.85	\$111.81	\$186.20	\$89.47	\$194.67	\$96.27	\$81.48	\$116.99

Option 4 - Some Subdivisions go to City of Seadrift

	Harbor Mist	Bindewald	Fisher	Swan Point Landing	Falcon Point
Lots	112.5	150	150	44.5	804
Plant Capacity (MGD)	0.03	0.04	0.04	0.01	0.20
Collection Cost in \$	\$708,750.00	\$945,000.00	\$945,000.00	\$280,350.00	\$5,065,200.00
Lift Station/Forcemain Cost in \$	\$362,500.00	\$342,500.00	\$407,500.00	\$565,000.00	\$390,000.00
Subtotal	\$1,071,250.00	\$1,287,500.00	\$1,352,500.00	\$845,350.00	\$5,455,200.00
Contingencies (15%)	\$160,687.50	\$193,125.00	\$202,875.00	\$126,802.50	\$818,280.00
Subtotal	\$1,231,937.50	\$1,480,625.00	\$1,555,375.00	\$972,152.50	\$6,273,480.00
Professional Services (20%)	\$246,387.50	\$296,125.00	\$311,075.00	\$194,430.50	\$1,254,696.00
Subtotal	\$1,478,325.00	\$1,776,750.00	\$1,866,450.00	\$1,166,583.00	\$7,528,176.00
Total Capital Cost	\$1,478,325.00	\$1,776,750.00	\$1,866,450.00	\$1,166,583.00	\$7,528,176.00
Capital Cost/Lot	\$13,140.67	\$11,845.00	\$12,443.00	\$26,215.35	\$9,363.40
Annual Payment in \$	\$117,484.31	\$141,200.51	\$148,329.08	\$92,709.79	\$598,273.42
Electricity Cost for operating LS in \$/yr	\$537.40	\$716.54	\$716.54	\$212.57	\$3,840.63
Monthly Payment/ Lot at full development	\$87.42	\$78.84	\$82.80	\$174.01	\$119.33
City Sewer Fee/Lot	\$26.75	\$26.75	\$26.75	\$26.75	\$26.75
Total Monthly Payment per Lot	\$114.17	\$105.59	\$109.55	\$200.76	\$146.08

Regional Plant for the Rest

	Seaport Lakes	Lane Road	Costa Grande	Powderhorn
Lots	28	187.5	3250	250
Plant Capacity (MGD)	0.01	0.05	0.81	0.06
Total Plant Capacity (MGD)	0.93			
Total Treatment Cost in \$	\$6,037,687.50			
Treatment Cost in \$	\$45,500.00	\$304,687.50	\$5,281,250.00	\$406,250.00
Collection Cost in \$	\$176,400.00	\$1,181,250.00	\$20,475,000.00	\$1,575,000.00
Lift Station/Forcemain Cost in \$	\$350,000.00	\$325,000.00	\$375,000.00	\$1,000,000.00
Subtotal	\$571,900.00	\$1,810,937.50	\$26,131,250.00	\$2,981,250.00
Contingencies (15%)	\$85,785.00	\$271,640.63	\$3,919,687.50	\$447,187.50
Subtotal	\$657,685.00	\$2,082,578.13	\$30,050,937.50	\$3,428,437.50
Professional Services (20%)	\$131,537.00	\$416,515.63	\$6,010,187.50	\$685,687.50
Subtotal	\$789,222.00	\$2,499,093.75	\$36,061,125.00	\$4,114,125.00
Total Capital Cost	\$789,222.00	\$2,499,093.75	\$36,061,125.00	\$4,114,125.00
Capital Cost/Lot	\$28,186.50	\$13,328.50	\$11,095.73	\$16,456.50
Annual Payment in \$	\$62,720.44	\$198,606.06	\$2,865,822.03	\$326,954.58
Electricity Cost for operating LS in \$	\$133.75	\$895.67	\$15,524.95	\$1,194.23
O & M Cost in \$	\$5,110.00	\$34,218.75	\$593,125.00	\$45,625.00
Monthly Payment/ Lot at full development	\$202.27	\$103.88	\$89.09	\$124.59

Option 1 - Convey WW to S. Calhoun WCID #1 WWTP

	Indianola	Alamo Beach	Bay Point
Lots	133	85	100
Flow (MGD)	0.03	0.02	0.03
Collection System \$	\$837,900.00	\$535,500.00	\$630,000.00
Force Main (4")	\$750,000.00	\$187,500.00	\$187,500.00
Lift Station (<0.50 MGD)	\$250,000.00	\$250,000.00	\$250,000.00
Subtotal	\$1,837,900.00	\$973,000.00	\$1,067,500.00
Contingencies (15%)	\$275,685.00	\$145,950.00	\$160,125.00
Subtotal	\$2,113,585.00	\$1,118,950.00	\$1,227,625.00
Professional Services (20%)	\$422,717.00	\$223,790.00	\$245,525.00
Subtotal	\$2,536,302.00	\$1,342,740.00	\$1,473,150.00
Total Capital Cost	\$2,536,302.00	\$1,342,740.00	\$1,473,150.00
Capital Cost/Lot	\$19,069.94	\$15,796.94	\$14,731.50
Annual Payment in \$	\$126,621.31	\$67,034.40	\$73,544.94
Electricity Cost for operating LS in \$/yr	\$635.33	\$406.04	\$477.69
Monthly Payment/ Lot at full development	\$79.73	\$66.12	\$61.69
City Sewer Fee Per Lot	\$17.35	\$17.35	\$17.35
Total Monthly Fee	\$97.08	\$83.47	\$79.04

Option 2 - Each Subdivision Gets it's Own WWTP

	Indianola	Alamo Beach	Bay Point
Lots	133	85	100
Plant Capacity (MGD)	0.03	0.02	0.03
Treatment Cost in \$	\$748,125.00	\$510,000.00	\$600,000.00
Collection Cost in \$	\$837,900.00	\$535,500.00	\$630,000.00
Subtotal	\$1,586,025.00	\$1,045,500.00	\$1,230,000.00
Contingencies (15%)	\$237,903.75	\$156,825.00	\$184,500.00
Subtotal	\$1,823,928.75	\$1,202,325.00	\$1,414,500.00
Professional Services (20%)	\$364,785.75	\$240,465.00	\$282,900.00
Subtotal	\$2,188,714.50	\$1,442,790.00	\$1,697,400.00
Total Capital Cost	\$2,188,714.50	\$1,442,790.00	\$1,697,400.00
Capital Cost/Lot	\$16,456.50	\$16,974.00	\$16,974.00
Annual Payment in \$	\$109,268.49	\$72,029.26	\$84,740.31
O & M Cost in \$	\$97,090.00	\$69,806.25	\$82,125.00
Monthly Payment/ Lot at full development	\$129.30	\$139.05	\$139.05

Option 3 - Regionalized WWTP for Subdivisions

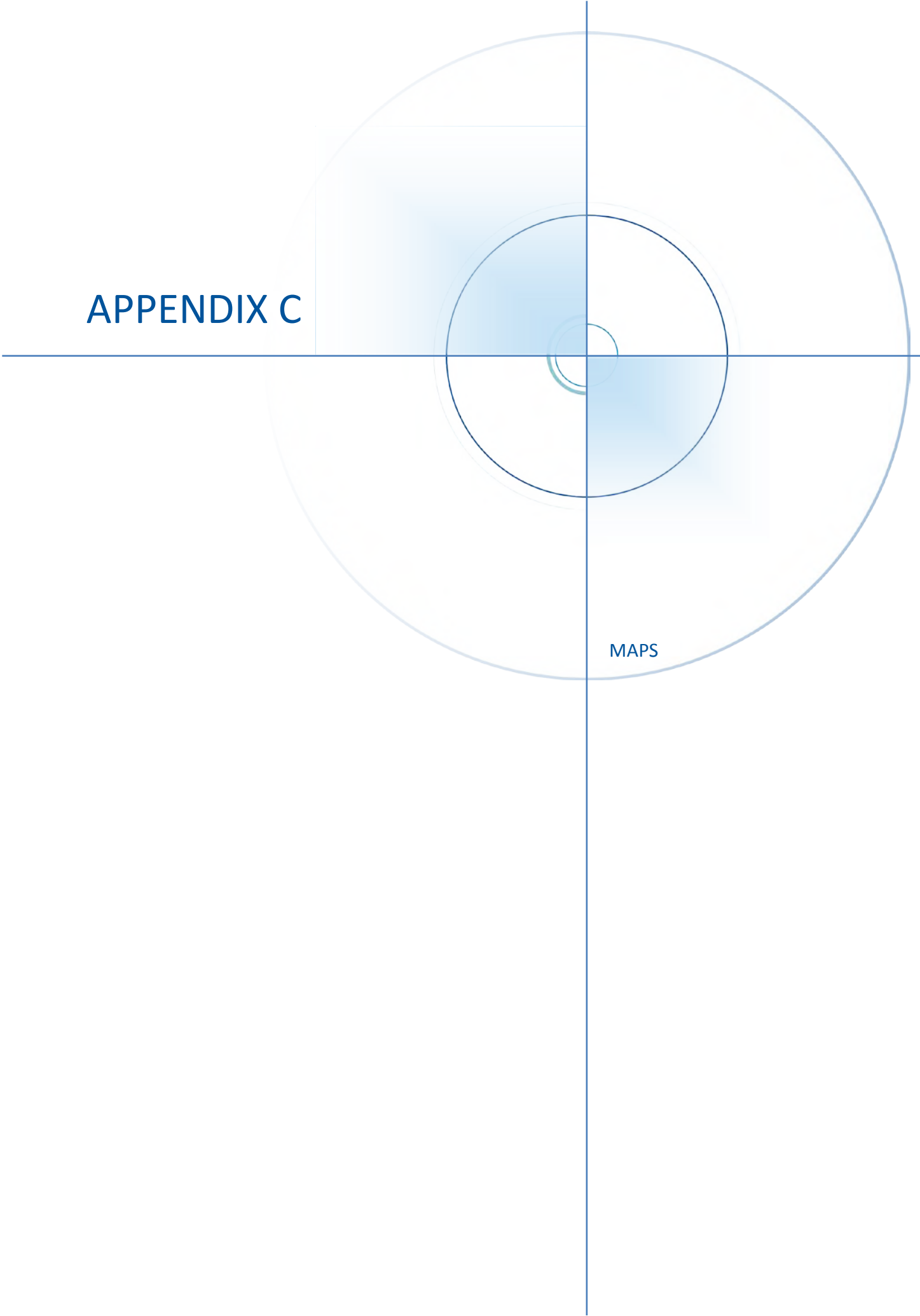
	Indianola	Alamo Beach	Bay Point
Lots	133	85	100
Plant Capacity (MGD)	0.03	0.02	0.03
Regional Plant Capacity	0.08		
Treatment Cost in \$	\$1,590,000.00		
Treatment Cost in \$/Subdivision	\$665,000.00	\$425,000.00	\$500,000.00
Forcemain/Lift Station cost in \$	\$1,000,000.00	\$437,500.00	\$437,500.00
Collection Cost in \$	\$837,900.00	\$535,500.00	\$630,000.00
Subtotal	\$2,502,900.00	\$1,398,000.00	\$1,567,500.00
Contingencies (15%)	\$375,435.00	\$209,700.00	\$235,125.00
Subtotal	\$2,878,335.00	\$1,607,700.00	\$1,802,625.00
Professional Services (20%)	\$575,667.00	\$321,540.00	\$360,525.00
Subtotal	\$3,454,002.00	\$1,929,240.00	\$2,163,150.00
Total Capital Cost	\$3,454,002.00	\$1,929,240.00	\$2,163,150.00
Capital Cost/Lot	\$25,969.94	\$22,696.94	\$21,631.50
Annual Payment in \$	\$172,436.19	\$96,314.59	\$107,992.22
Electricity Cost for operating LS in \$/yr	\$635.33	\$406.04	\$477.69
O & M Cost in \$	\$60,681.25	\$38,781.25	\$45,625.00
Monthly Payment/ Lot at full development	\$146.46	\$132.84	\$128.41

Reclaimed Water Options - Area 4

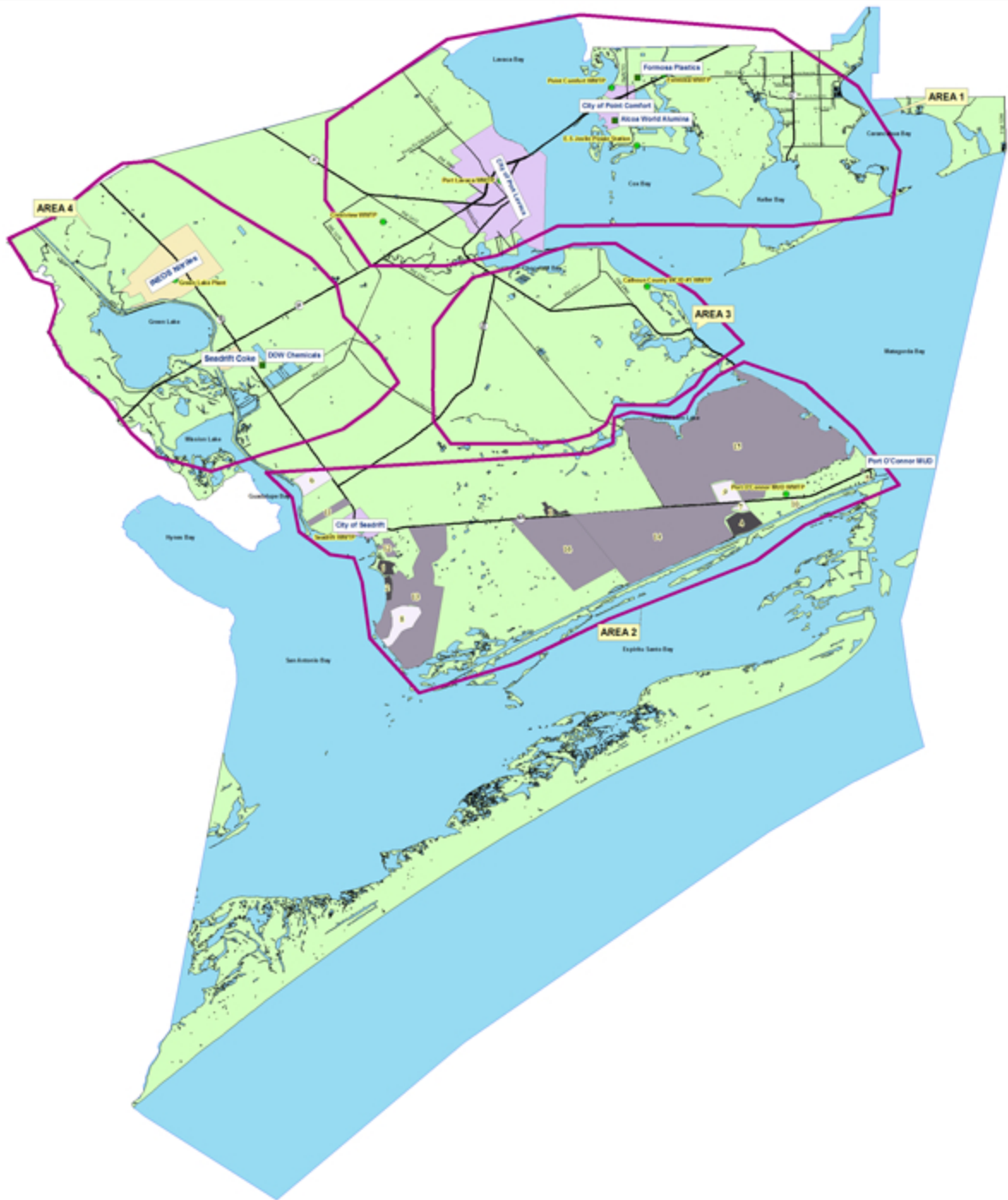
	Pump to Formosa/ALCOA	Pump to DOW/ Ineos Nitrile/Seadrift Coke
Pipeline Cost in \$	\$8,368,750.00	\$5,695,000.00
Lift Station Cost in \$	\$450,000.00	\$450,000.00
Subtotal	\$8,818,750.00	\$6,145,000.00
Contingencies (15%)	\$1,322,812.50	\$921,750.00
Subtotal	\$10,141,562.50	\$7,066,750.00
Professional Services (20%)	\$2,028,312.50	\$1,413,350.00
Subtotal	\$12,169,875.00	\$8,480,100.00
Total Capital Cost in \$	\$12,170,000.00	\$8,481,000.00
Annual Payment in \$	\$967,164.89	\$673,995.52
Annual Electrical Cost \$	\$17,200.00	\$34,250.00
Total Annual Cost \$	\$984,364.89	\$708,245.52
Annual Cost per Acre foot \$	\$878.90	\$632.36

APPENDIX C

MAPS



Calhoun County Regional Wastewater Facility Study - Overview Map



SUBDIVISIONS

CURRENT

- 1 Swan Point Landing
- 2 The Bay Club at Falcon Point Ranch
- 3 Seaport Lakes
- 4 The Sanctuary at Costa Grande
- 5 Canalot

PLANNED

- 6 Harbor Mist
- 7 The Sanctuary - Phase III at Costa Grande
- 8 Development at Falcon Point Ranch
- 9 Development at Powderhorn Ranch
- 10 Tulelands

POTENTIAL

- 11 Blindswald Tract
- 12 Fisher Tract
- 13 Falcon Point Ranch
- 14 Costa Grande
- 15 Powderhorn Ranch
- 16 Lane Road

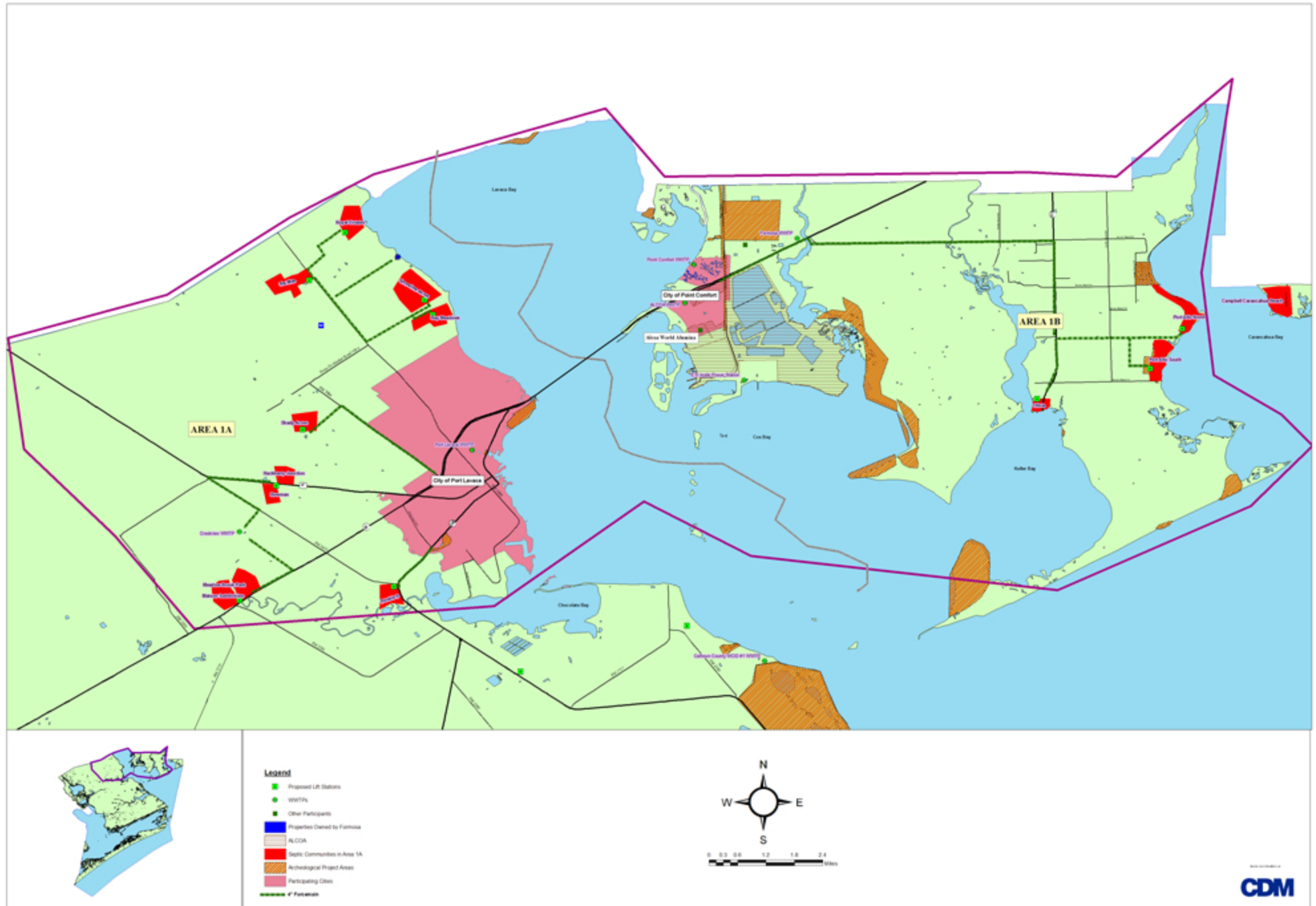


Legend

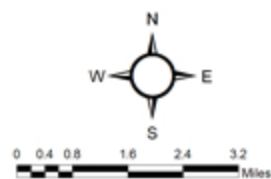
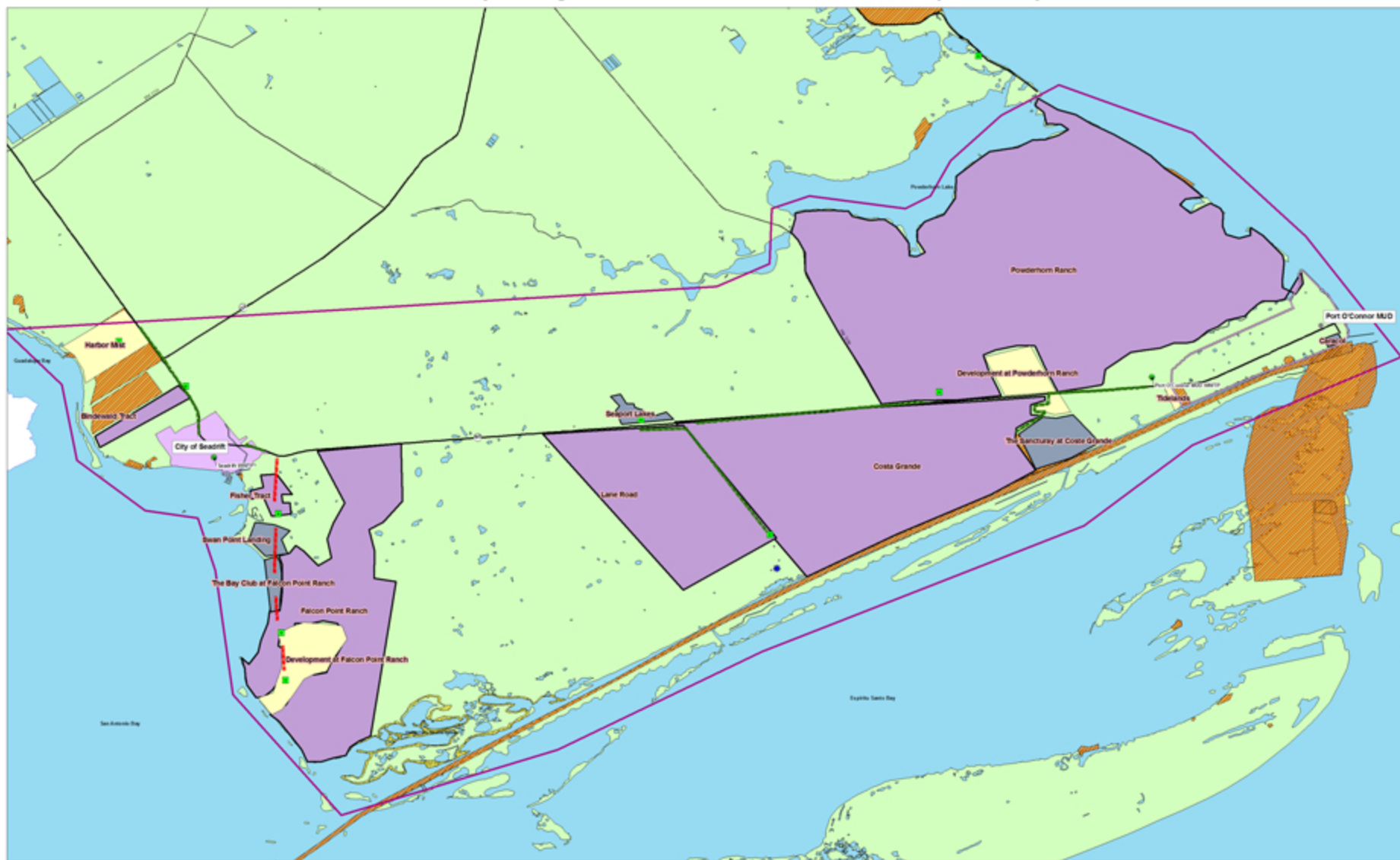
- WWTPs
- Subdivisions**
- Current
- Planned
- Potential
- Other Participants
- Non Participating Cities
- Participating Cities



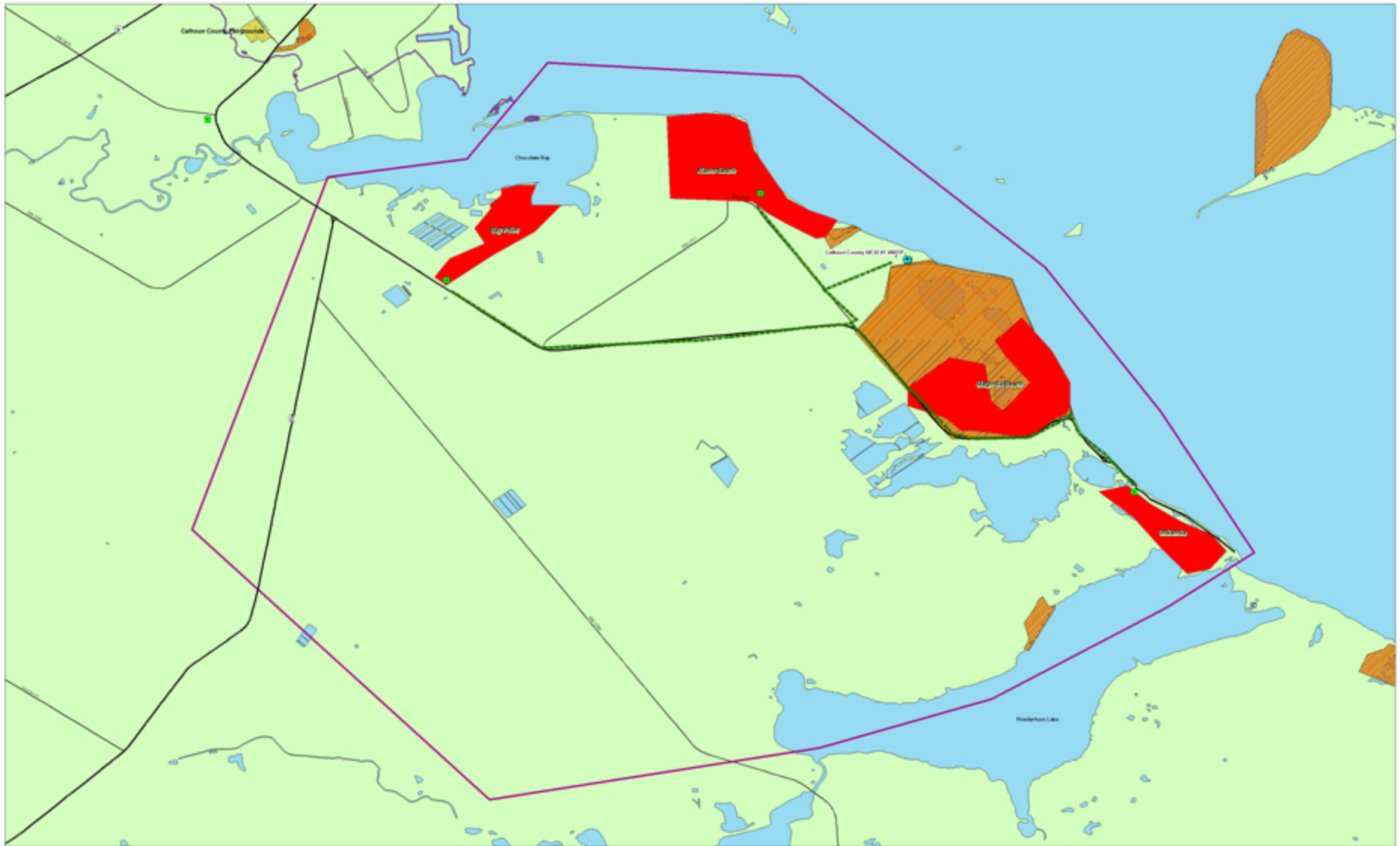
Calhoun County Regional Wastewater Facility Study - Area 1



Calhoun County Regional Wastewater Facility Study - Area No.2



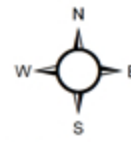
Calhoun County Regional Wastewater Facility Study - Area No. 3



Legend

- Proposed LR Stations
- WWTPs
- Subdivisions in Area 3
- Archaeological Project Areas
- Future

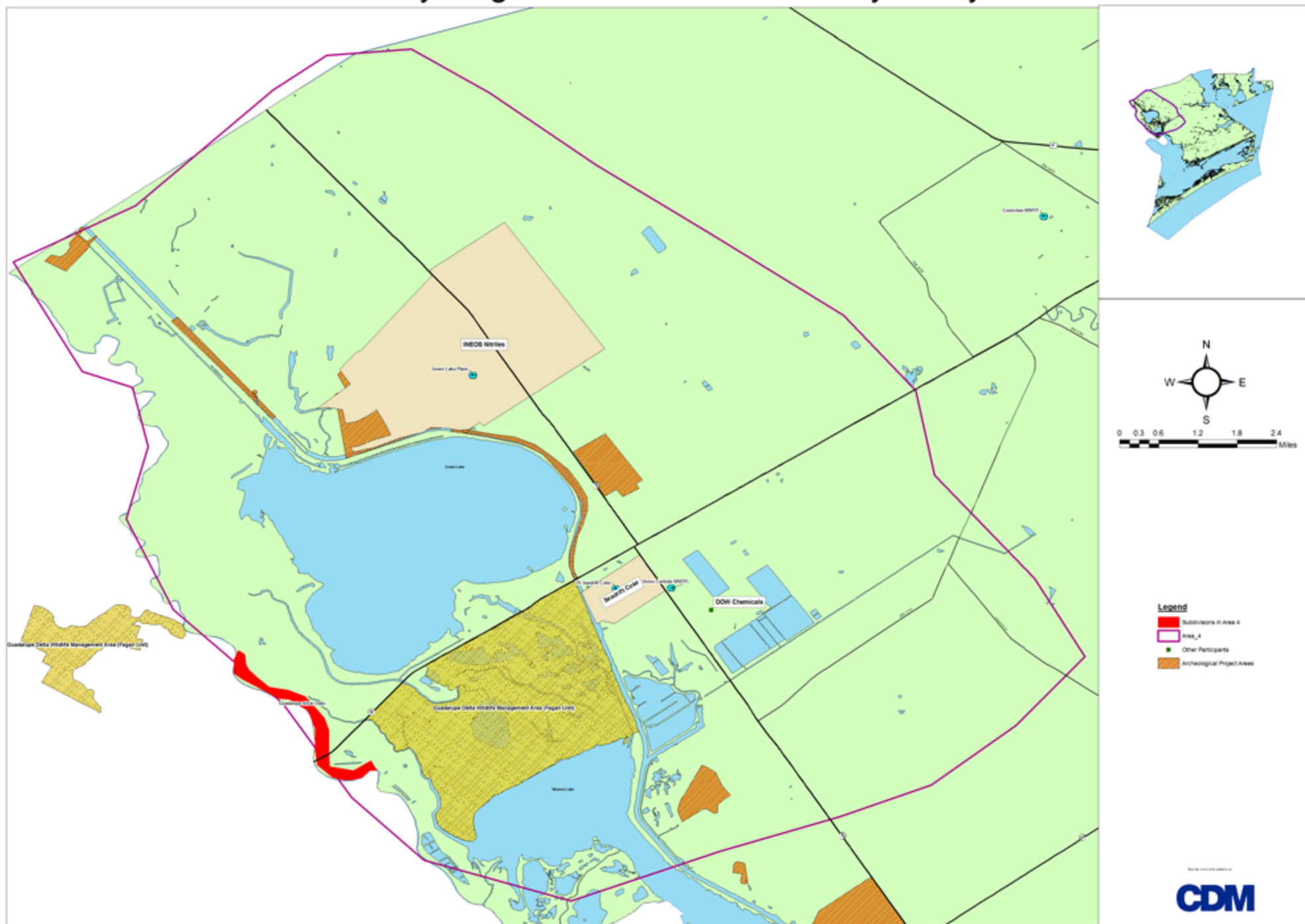
CDM



0 0.25 0.5 1 1.5 2 Miles

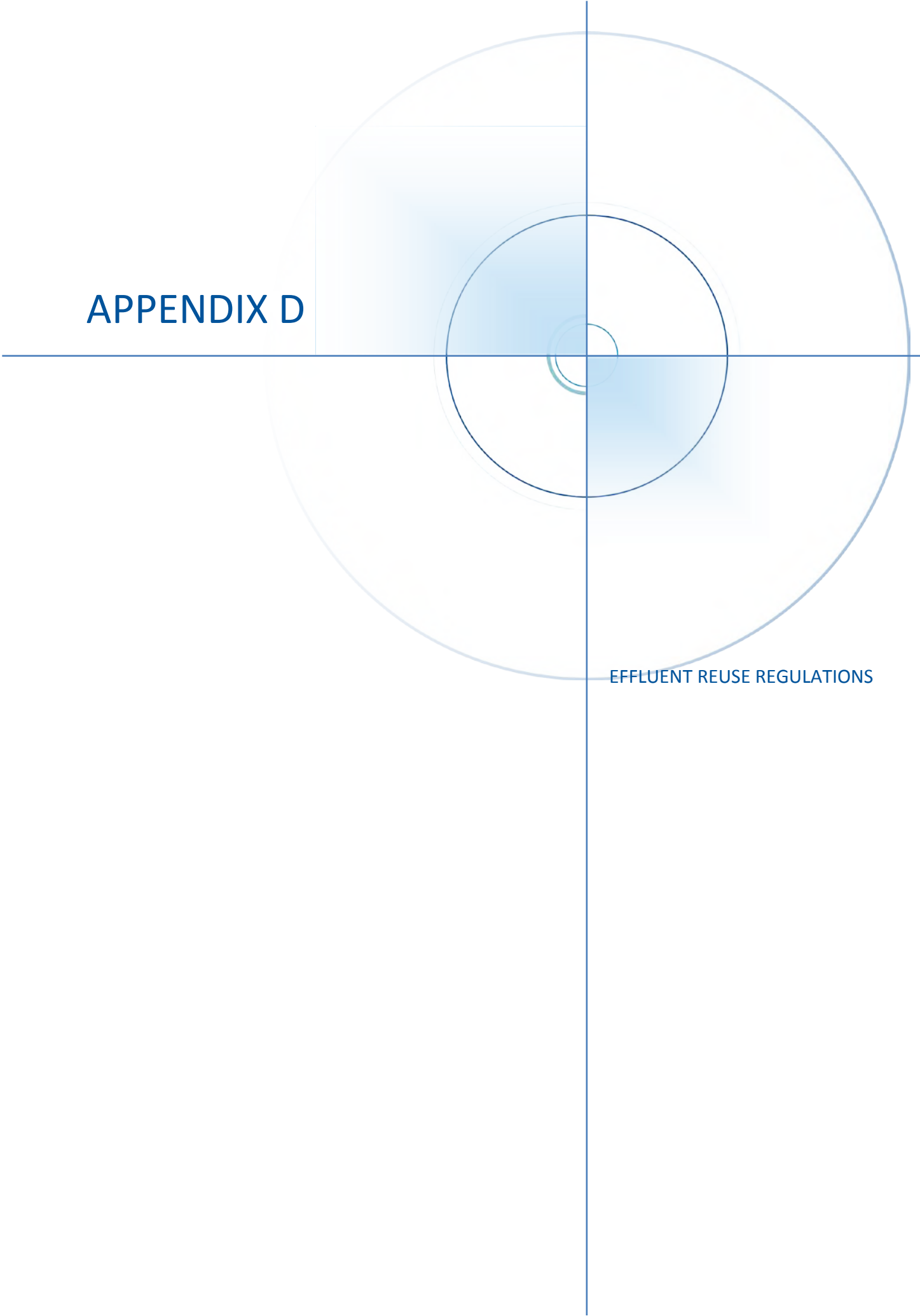


Calhoun County Regional Wastewater Facility Study - Area 4



APPENDIX D

EFFLUENT REUSE REGULATIONS



- (3) the proposed end use of industrial reclaimed water is not on-site;
- (4) the proposed end use is not listed in §210.56(b)(2) of this title; or
- (5) the disposal method proposed as an alternative to reuse is not listed in §210.56(b)(1) of this title.

§210.54. Wastes Not Eligible for Coverage.

(a) The following wastes are not eligible for authorization under this subchapter regardless of effluent quality or end use:

- (1) wastewater containing radioactive material regulated under Texas Health and Safety Code, Chapter 401;
- (2) wastewater containing dioxin and furans;
- (3) wastewater containing pesticides;
- (4) wastewater classified as or which is characteristically hazardous as defined by 40 Code of Federal Regulations (CFR) Part 261;
- (5) process wastewater regulated under 40 CFR Parts 400 - 471 with the following exceptions:
 - (A) Part 405 - dairy products processing;
 - (B) Part 406 - grain mills;
 - (C) Part 407 - canned and preserved fruits and vegetables;
 - (D) Part 408 - canned and preserved seafood processing;
 - (E) Part 409 - sugar processing;
 - (F) Part 411 - cement manufacturing;
 - (G) Part 417 - soap and detergent manufacturing;
 - (H) Part 423 - steam electric power generating;
 - (I) Part 434 - coal mining;
 - (J) Part 436 - mineral mining and processing;
 - (K) Part 454 - gum and wood chemicals manufacturing; and

(L) Part 460 - hospital;

(6) septic tank waste, chemical toilet waste, grit trap waste, or grease trap waste;

(7) barge cleaning washwater;

(8) air scrubber wastewater;

(9) any wastewater where a permit by rule authorized under Chapter 321 of this title (relating to Control of Certain Activities by Rule) or commission-issued general permit for land application is available; or

(10) remediated/contaminated groundwater generated from facilities where process wastewater is prohibited for use as listed in paragraph (5) of this subsection.

(b) Producers who could otherwise be eligible to obtain authorization under this chapter, but who do not implement all required applicable conditions of this authorization must apply for and obtain permit coverage.

(c) Discharges into or adjacent to water in the state shall not be authorized under this chapter where prohibited by applicable rules including, but not limited to, Chapter 213 of this title (relating to Edwards Aquifer); Chapter 311 of this title (relating to Watershed Protection); and Chapter 335 of this title (relating to Industrial Solid Waste and Municipal Hazardous Waste).

(d) Any user proposing to irrigate or store wastewater within the boundaries of a playa lake may not obtain authorization under this subchapter and must obtain a Texas Pollutant Discharge Elimination System discharge permit for authorization to discharge into a playa lake.

§210.55. Application Requirements for Authorization.

(a) Level I authorization. Producers eligible for Level I authorization under this subchapter are authorized to use industrial reclaimed water without any notification or approval by the executive director. Effluent sampling is not required for wastes listed in §210.53(a)(1) - (8) of this title (relating to Wastes Eligible for Coverage) with the exception of cooling tower blowdown which must meet the 2,000 milligrams per liter threshold level for total dissolved solids.

(b) Level II authorization. Producers requesting Level II authorization for industrial reclaimed water activities under this subchapter must submit a complete application to the executive director on a form approved by the executive director to request authorization. The use of industrial reclaimed water shall not begin until written authorization is received from the executive director. The application shall include, at a minimum, the following information:

(1) the legal names and addresses of the user, provider, and producer;

(2) contact representative for the applicant and telephone number;

APPENDIX E

CALHOUN COUNTY MEETING
PRESENTATIONS AND SIGN IN SHEETS

Calhoun County Regional Wastewater Facility Study



Project Kick-off Meeting

**Calhoun County Courthouse
October 21, 2010**

SUSAN K. ROTH, P.E., PMP

WATER AND WASTEWATER CONSULTING

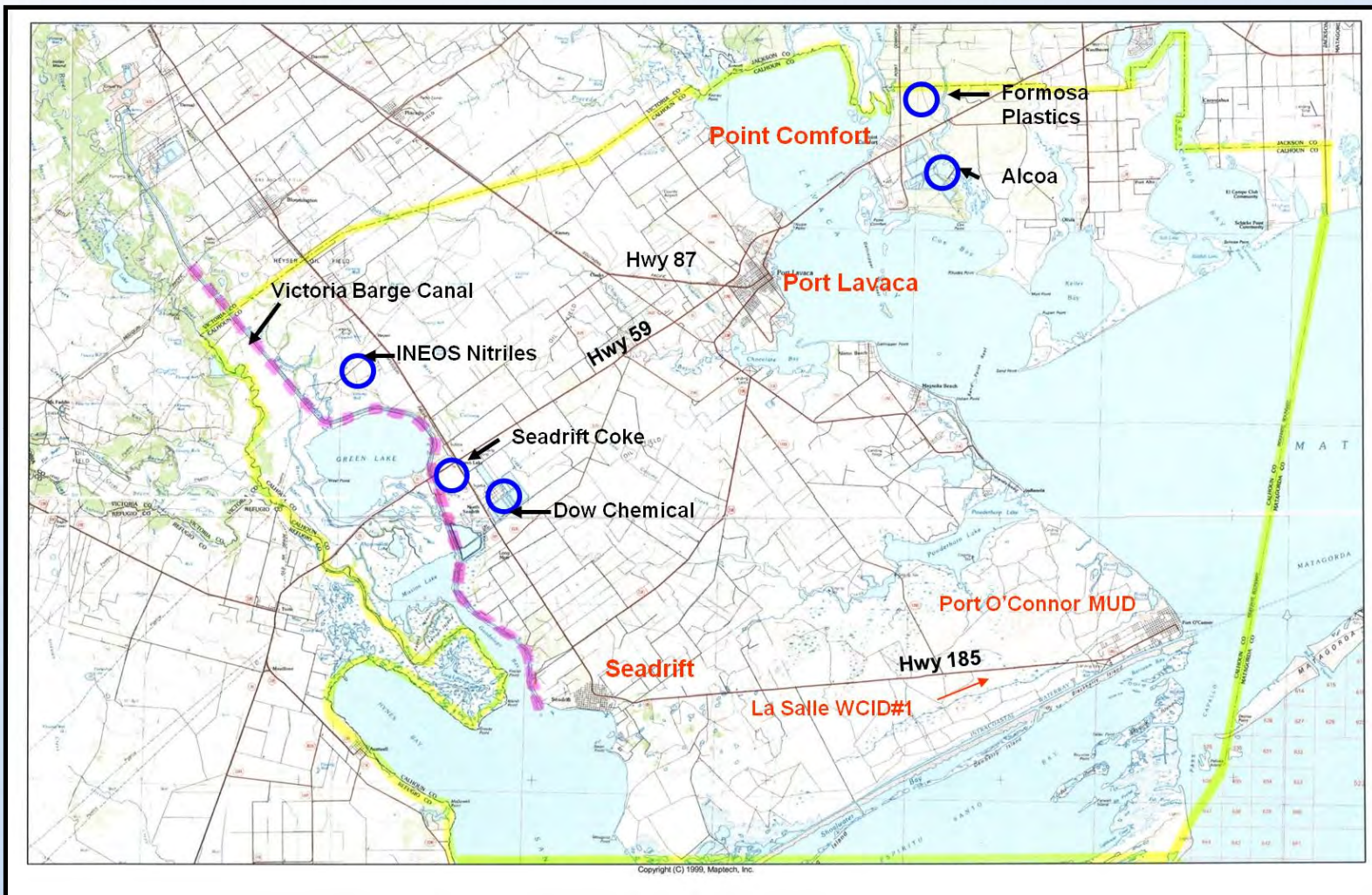
Presentation Outline

- ◆ **TWDB Program Overview**
- ◆ **Study Area**
- ◆ **Project Participants**
- ◆ **Scope of Work**
- ◆ **Project Schedule**
- ◆ **In-kind Service Contributions**
- ◆ **Project Data Request**
- ◆ **Roundtable Discussion**

TWDB Program Overview

- ◆ **Background**
- ◆ **History**
- ◆ **Purpose of Regional Facility Program**
- ◆ **Financing Options**

Calhoun County



Project Participants

- ◆ **Texas Water Development Board**
- ◆ **GBRA (primary applicant)**
- ◆ **Calhoun County**
- ◆ **Calhoun County Economic Development Corporation**
- ◆ **City of Seadrift**
- ◆ **City of Point Comfort**
- ◆ **City of Port Lavaca**
- ◆ **Alcoa**
- ◆ **Dow Chemical**
- ◆ **Formosa Plastics**
- ◆ **INEOS Nitriles**
- ◆ **Seadrift Coke**

Scope of Work

- ◆ **Service Area Description – Data Collection**
- ◆ **Wastewater System Flows**
- ◆ **Collection System Alternatives**
- ◆ **Treatment System Alternatives**
- ◆ **Operation and Reuse Alternatives**
- ◆ **Environmental Assessment**
- ◆ **Implementation Schedule**
- ◆ **Cost Estimates for Scenarios**
- ◆ **Funding Options**
- ◆ **Water Conservation/Drought Management Plans**

Project Timeline

- ◆ **Project Kick-off Meeting (October 21, 2010)**
- ◆ **Second Meeting (January 2011)**
 - Discuss population/wastewater flow data and various regional collection, treatment and reuse alternatives
- ◆ **Third Meeting (April 2011)**
 - Discuss detailed analysis and evaluation of final alternatives for regional collection, treatment and reuse
- ◆ **Fourth Meeting (July 2011)**
 - Discuss comments on Draft Report
- ◆ **Submit Draft Final Report to TWDB
(no later than August 31, 2011)**

In-kind Service Contributions

Project Data Request

Roundtable Discussion: Project Expectations

Q&A Discussion

Project Contacts:

Susan K. Roth, P.E., PMP
Susan Roth Consulting, LLC
(512) 796-6692
susan@srothconsulting.com

Bryan Serold
GBRA, Lower Basin Manager
(361) 575-6366
bserold@gbra.org

MEETING SIGN-IN SHEET

Regional Wastewater Facility Study Group

Meeting Date: October 21, 2010

Place/Room: Courthouse

Name	Title	Agency	Phone	Fax	E-Mail
BRYAN SEROLD	OPERATIONS MANAGER	GBRA	361/575-6366	575-2267	bserold@gbra.org
Mike Pfeifer	CalHoun County Judge	CalHoun (Dist)	361 553-4140	553-4444	Mike.Pfeifer@CalHoun CoTX.org
DAVID Meecey	PROGRAM SPECIALIST	TWDB	512) 936- 0852		david.meecey@TWR.STATE.TX.US
STEPHANIE SHELLY	CHIEF OPERATOR	GBRA	361 552-9751	361 552-6524	sshelly@gbra.org
Herb Wittliff	Manager	"	"	"	hwittliff@gbra.org
CHRISTINE A. HOOD	McSeadrift JUDGE	Seadrift Municipal Ct.	361 785-2218 (2208)		seadriftjudge@tisd.net
RANDY KIM	SVP	CDM	713-423-7300		rkim@CDM.COM
Arlene Marshall	Director Calhoun County	GBRA			
James Lee Murphy	Executive mgr water resources	GBRA	830-379-5822		smurphy@gbra.org
Chris GUSZOS		City of Point Comfort	987-2661		
Charlotte Felkins	City Secretary	City of Point Comfort	(361) 987-2661	361- 987-2798	pcomfort@tisd.net
Bruce Gertner	environmental manager	Seadrift C&LP	361 676-2508		bgertner@seadriftcoke.com
Bob WALLACE	FPC		987-7440		

MEETING SIGN-IN SHEET

Regional Wastewater Facility Study Group

Meeting Date: October 21, 2010

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Name	Title	Agency	Phone	Fax	E-Mail
BOB TURNER	CITY MANAGER	PORT LAUACA	745-2551		bturner@portlauaca.org
Jim Schon		Alco3	987-6505		jim.schon@alco3.com
John Weitz	Env. S. Dow		553-2802		weitzj@dow.com
Susan Roth	President				
Tom Schmitt		Urban Eng	578-983L 361-579	576-483L	tschmitt@urbanvictoria.com
Allen Woelke	VP	CDM	512-346-1100	512-345-1483	woelkead@cdm.com
DAVID ROBERTS	ATTORNEY	ROBERTS, ROBERTS O'REILLY & WITTE	361-552-2971	361-552-5368	david@PORTLAUACALAW.COM
NEIL E. FRITZCH	COUNTY COMMISSIONER	CALHOUN CO	361-893-5346	361-893-5309	neil.fritzsch@calhouncounty.org
Parren Gurley	D. of P.W.	PORT LAUACA	361-552-3347	552-1481	dgurley@PORTLAUACA.org

Calhoun County Regional Wastewater Facility Study



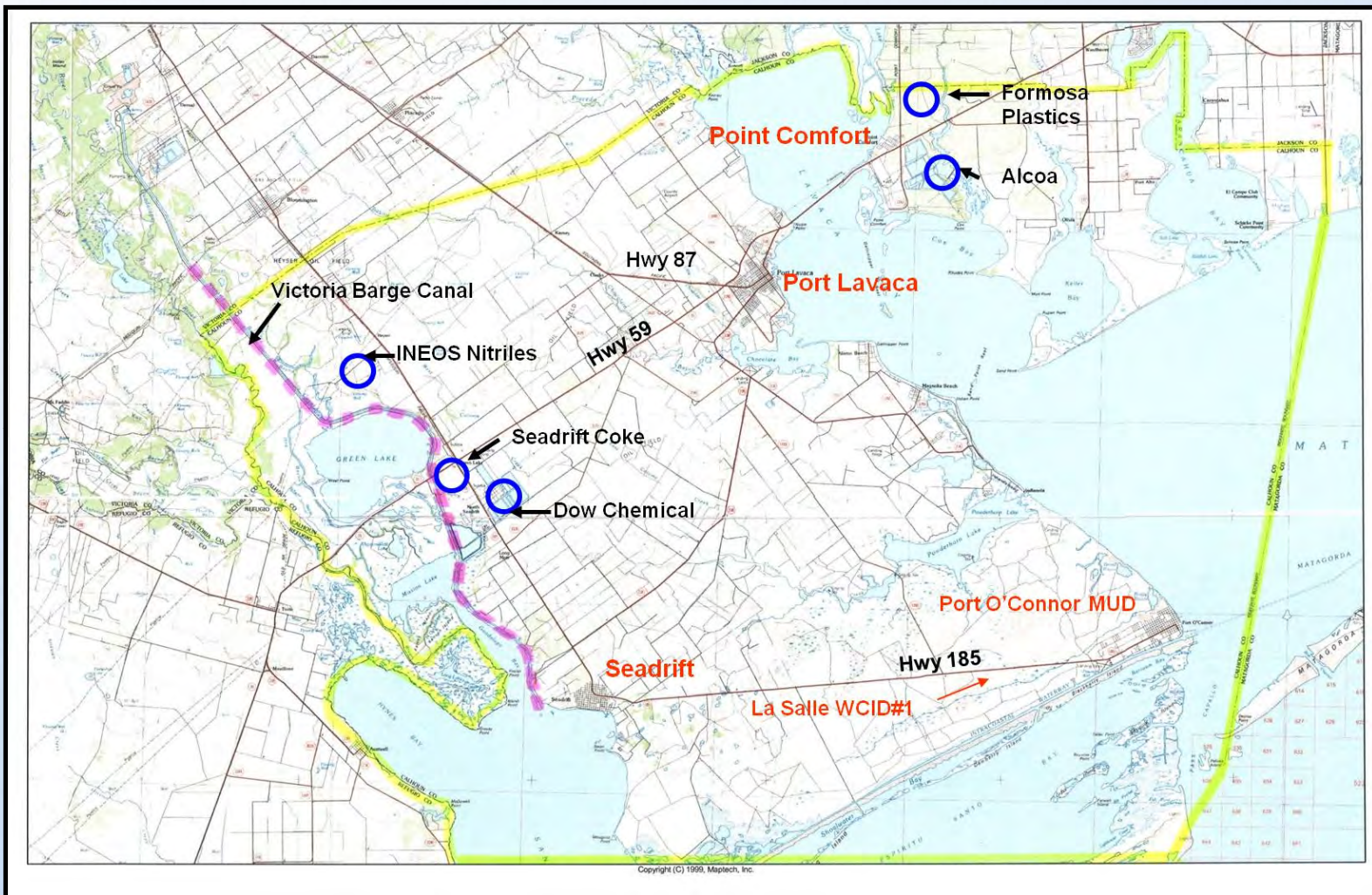
Project Meeting

**Alcoa World Alumina – Point Comfort
February 10, 2011**

Presentation Outline

- ◆ **Project Overview**
- ◆ **Project Schedule**
- ◆ **Data Collection Activities**
- ◆ **General Observations – Study Area**
- ◆ **Preliminary Regional Alternatives**
- ◆ **Breakout Session**
- ◆ **Small Group Reports**

Calhoun County



Project Participants

- ◆ **Texas Water Development Board**
- ◆ **GBRA (primary applicant)**
- ◆ **Calhoun County**
- ◆ **Calhoun County Economic Development Corporation**
- ◆ **City of Seadrift**
- ◆ **City of Point Comfort**
- ◆ **City of Port Lavaca**
- ◆ **Alcoa**
- ◆ **Dow Chemical**
- ◆ **Formosa Plastics**
- ◆ **INEOS Nitriles**
- ◆ **Seadrift Coke**

Scope of Work

- ◆ **Service Area Description – Data Collection**
- ◆ **Wastewater System Flows**
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- ◆ **Operation and Reuse Alternatives**
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- ◆ **Funding Options**
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Project Timeline

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Data Collection Activities

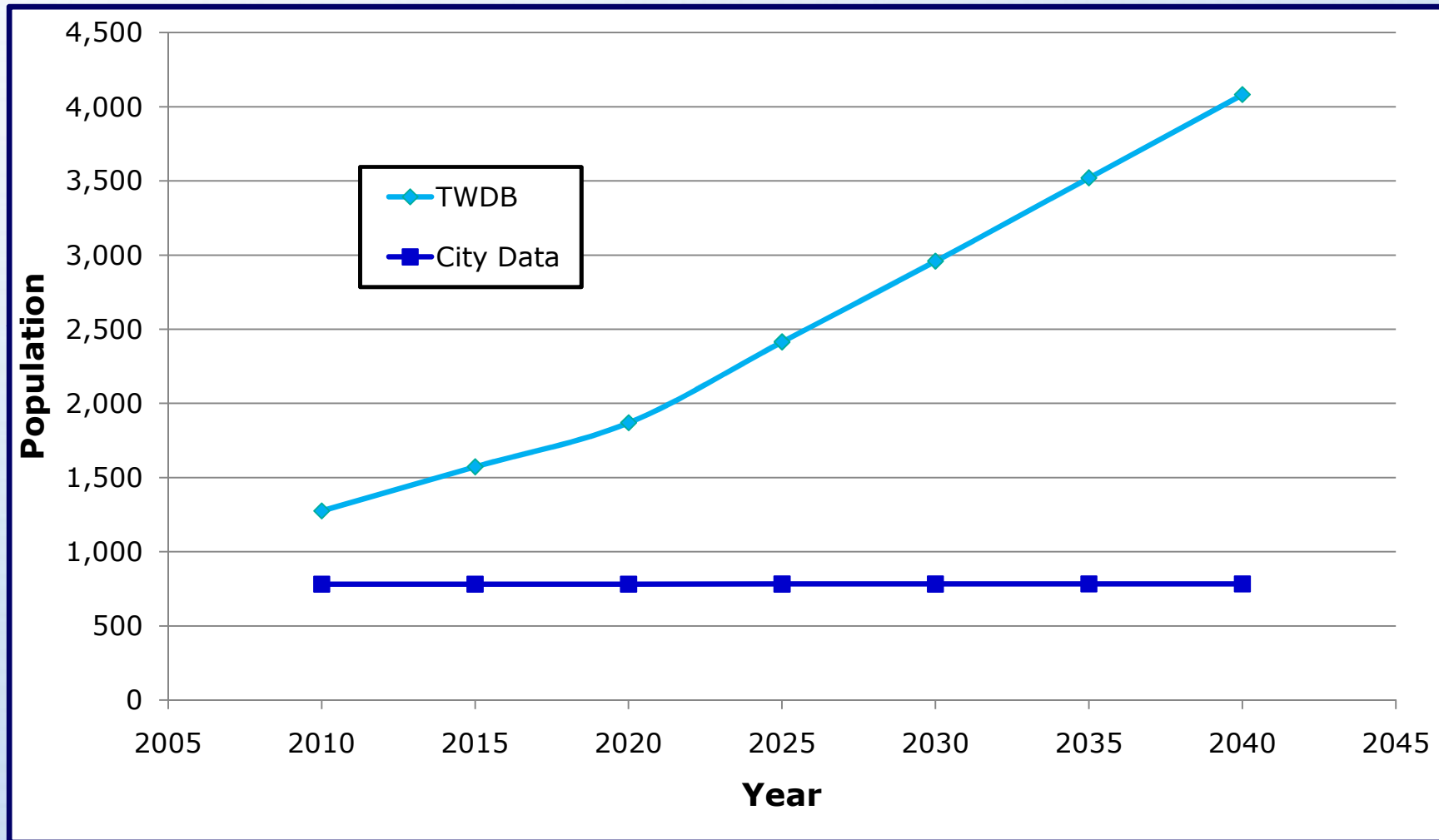
- ◆ **Summaries of system information**
- ◆ **Maps of existing wastewater infrastructure (i.e. treatment plants, lift stations, etc.)**
- ◆ **Current population and growth projections**
- ◆ **Monthly flow data from WWTPs**
- ◆ **Utility development agreements**
- ◆ **Build-out schedules and conceptual plans of future developments**

Population & Projection Data

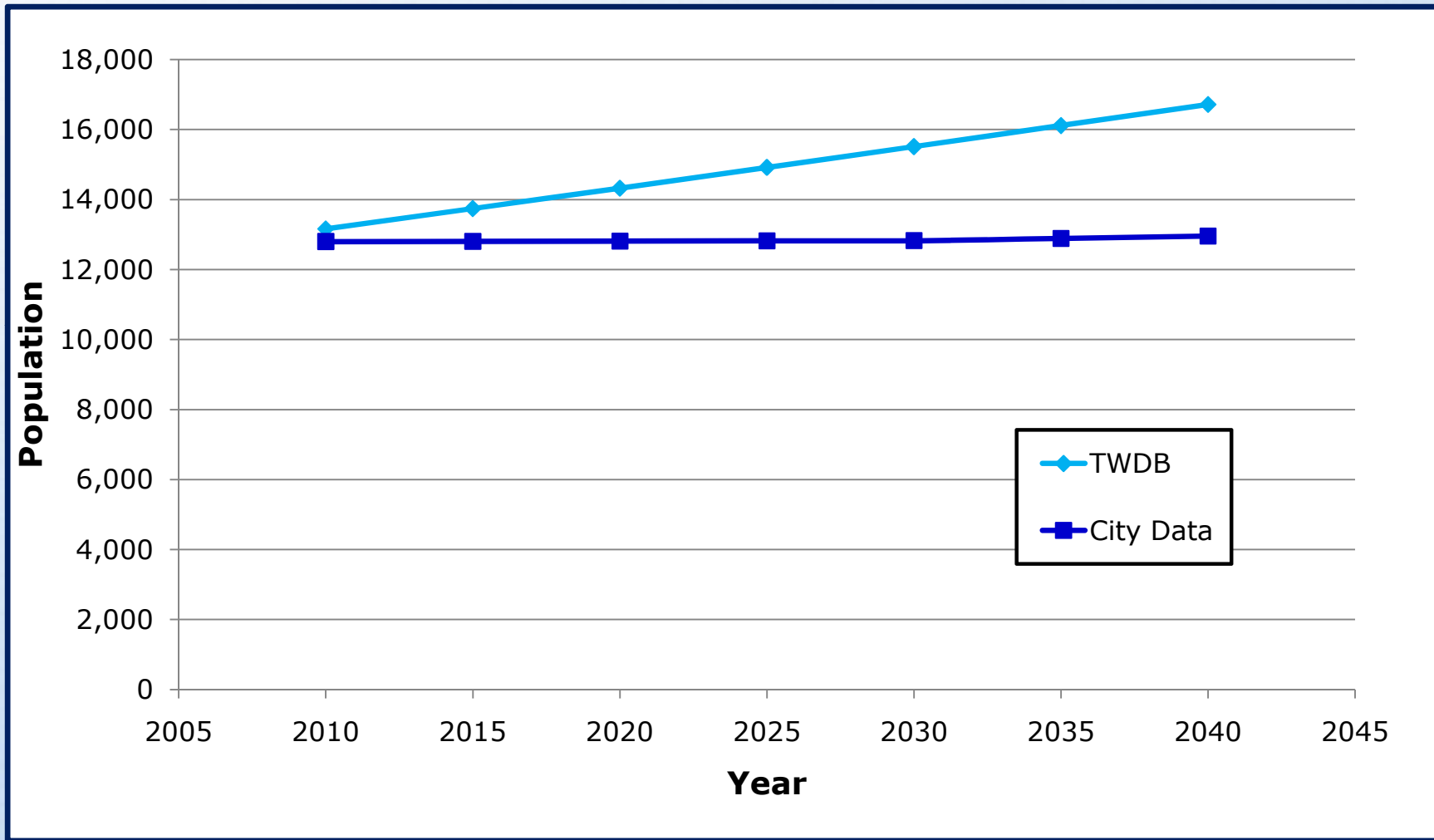
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* Data provided by the Entity

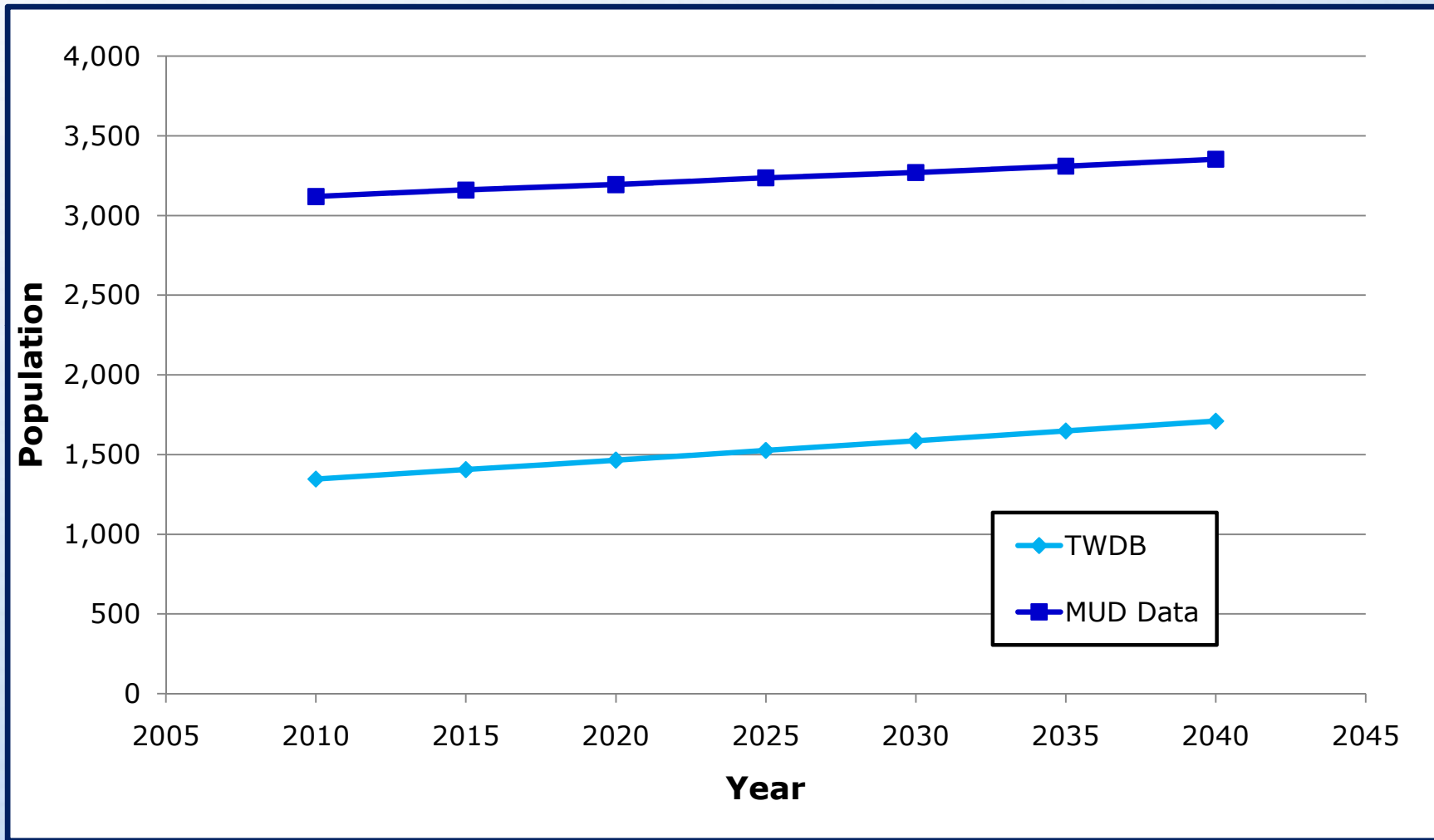
Point Comfort Population Projections: Comparison of TWDB & City Data



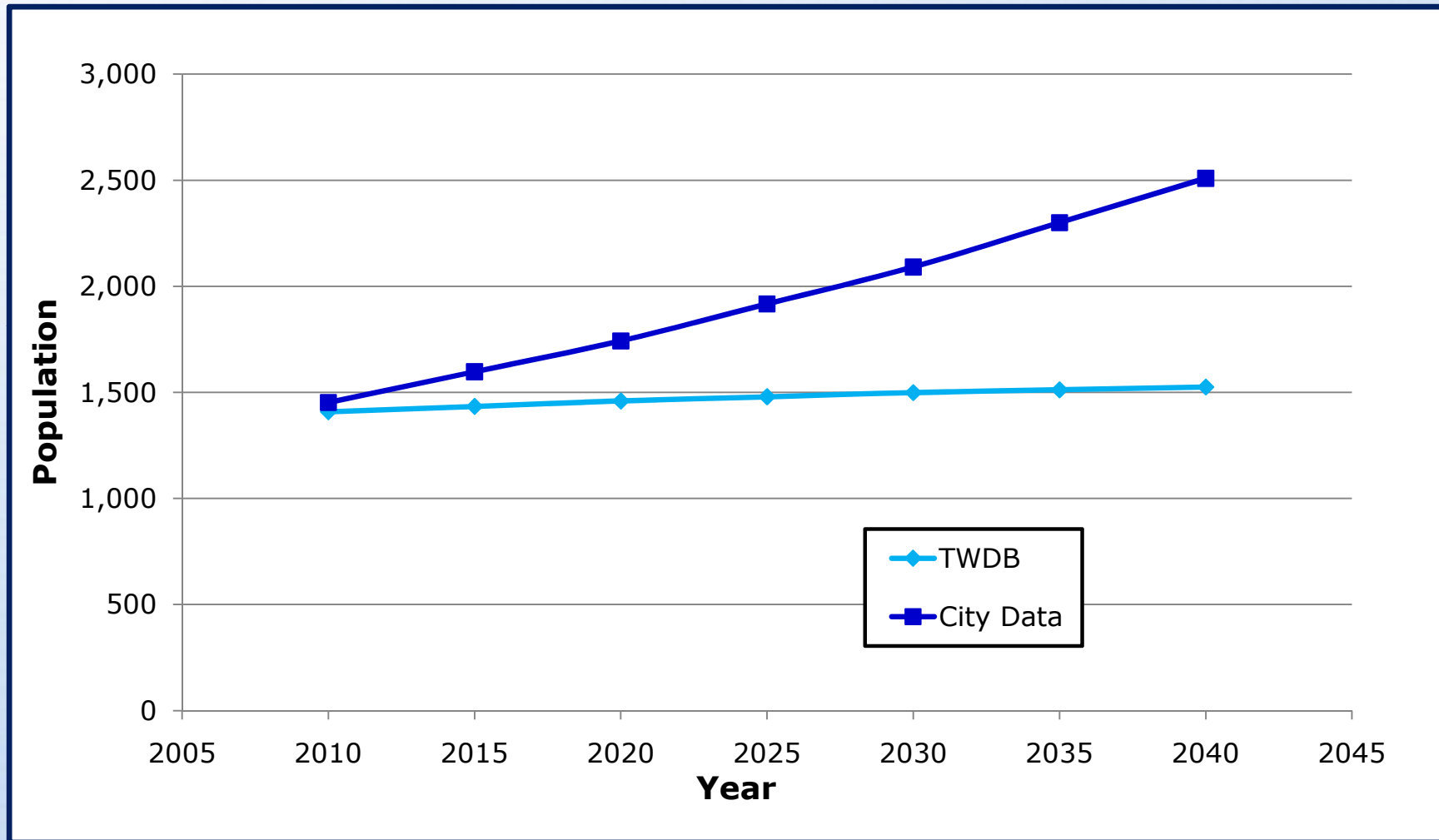
Port Lavaca Population Projections: Comparison of TWDB & City Data



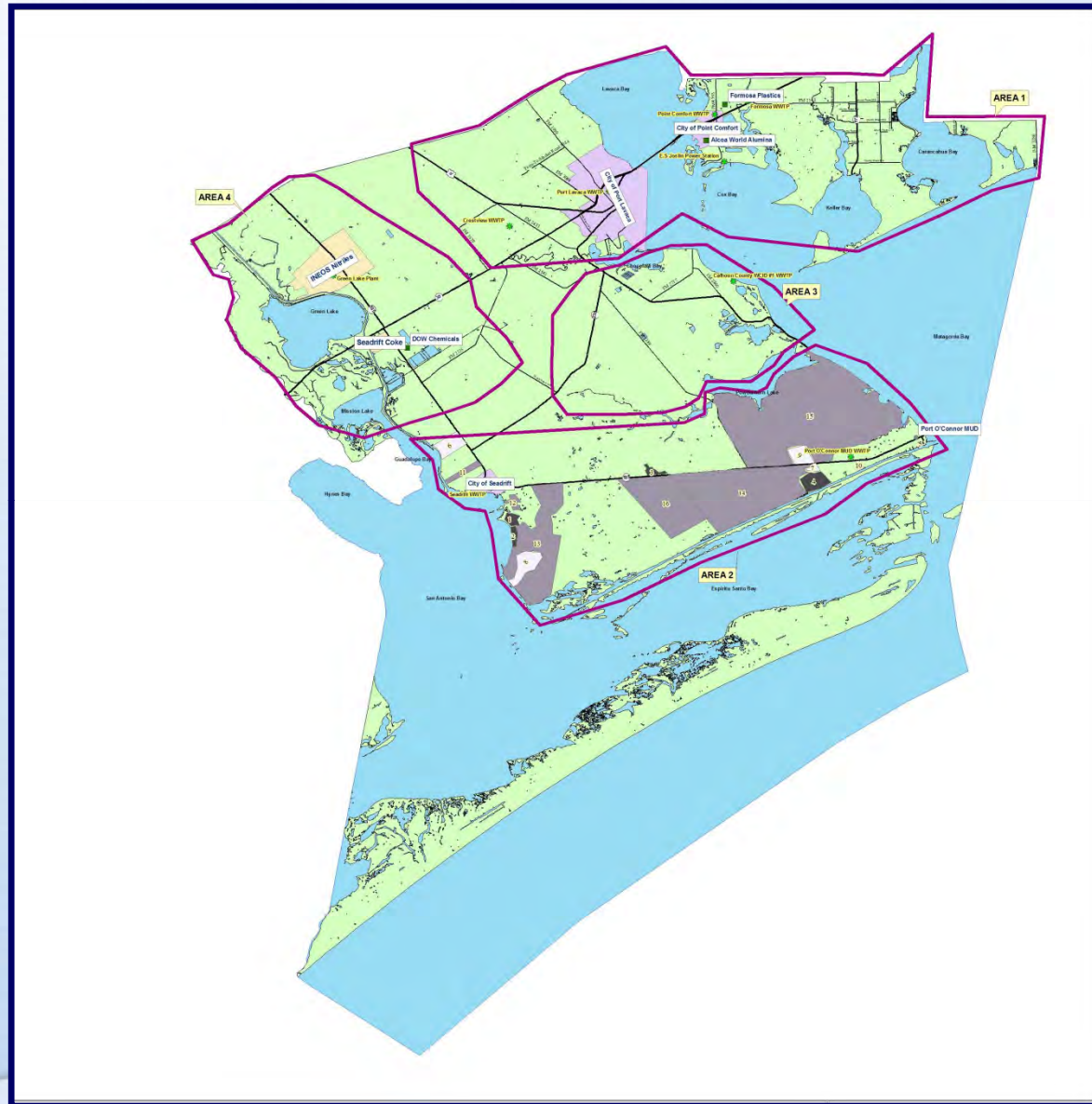
Port O'Connor Population Projections: Comparison of TWDB & MUD Data



Seadrift Population Projections: Comparison of TWDB & City Data



Study Area – Regional Concept



Study Area Overview

AREA 1A

- ◆ City of Port Lavaca
- ◆ Crestview Subdivision
- ◆ Meadow Brook Park
- ◆ Shady Acres
- ◆ Hackberry Junction
- ◆ Bowman Development
- ◆ Matson Subdivision
- ◆ Bay Meadows
- ◆ Shoreline Acres
- ◆ Royal Estates
- ◆ Double Subdivision
- ◆ Six Mile Subdivision

AREA 1B

- ◆ City of Point Comfort
- ◆ Alcoa
- ◆ Formosa Plastics
- ◆ Olivia
- ◆ Port Alto WSC
(North & South)
- ◆ Campbell Carancahua
Beach Subdivision
- ◆ El Campo Club
Community
- ◆ Schicke Point Community

Study Area Overview

AREA 2

- ◆ City of Seadrift
- ◆ Port O'Connor MUD
- ◆ Swan Point Landing
- ◆ Falcon Point
- ◆ Costa Grande Development (I-V)
- ◆ Powder Horn Ranch
- ◆ Lane Road Development
- ◆ The Sanctuary

AREA 3

- ◆ Magnolia Beach
- ◆ Indianola
- ◆ Baypoint Subdivision
- ◆ Alamo Beach

AREA 4

- ◆ Dow Chemical
- ◆ Seadrift Coke
- ◆ INEOS Nitriles

Study Area Observations

AREA 1

- ◆ **Area 1A and 1B divided by Lavaca Bay;**
- ◆ **Declining population growth in Cities of Point Comfort and Port Lavaca;**
- ◆ **Industrial Companies in Area 1B interested in using treated effluent to supplement their water supply;**
- ◆ **Number of small subdivisions with failing septic systems;**
- ◆ **Developments to date have been low density;**

Study Area Observations (Cont.)

AREA 2

- ◆ **Infrastructure needed along Highway 185 to provide wastewater service to future developments;**

AREA 3

- ◆ **Area separated from Area 1 by Chocolate Bay and Area 2 by Powderhorn Lake;**
- ◆ **Number of small subdivisions with failing septic systems;**
- ◆ **Developments to date have been low density;**

Study Area Observations (Cont.)

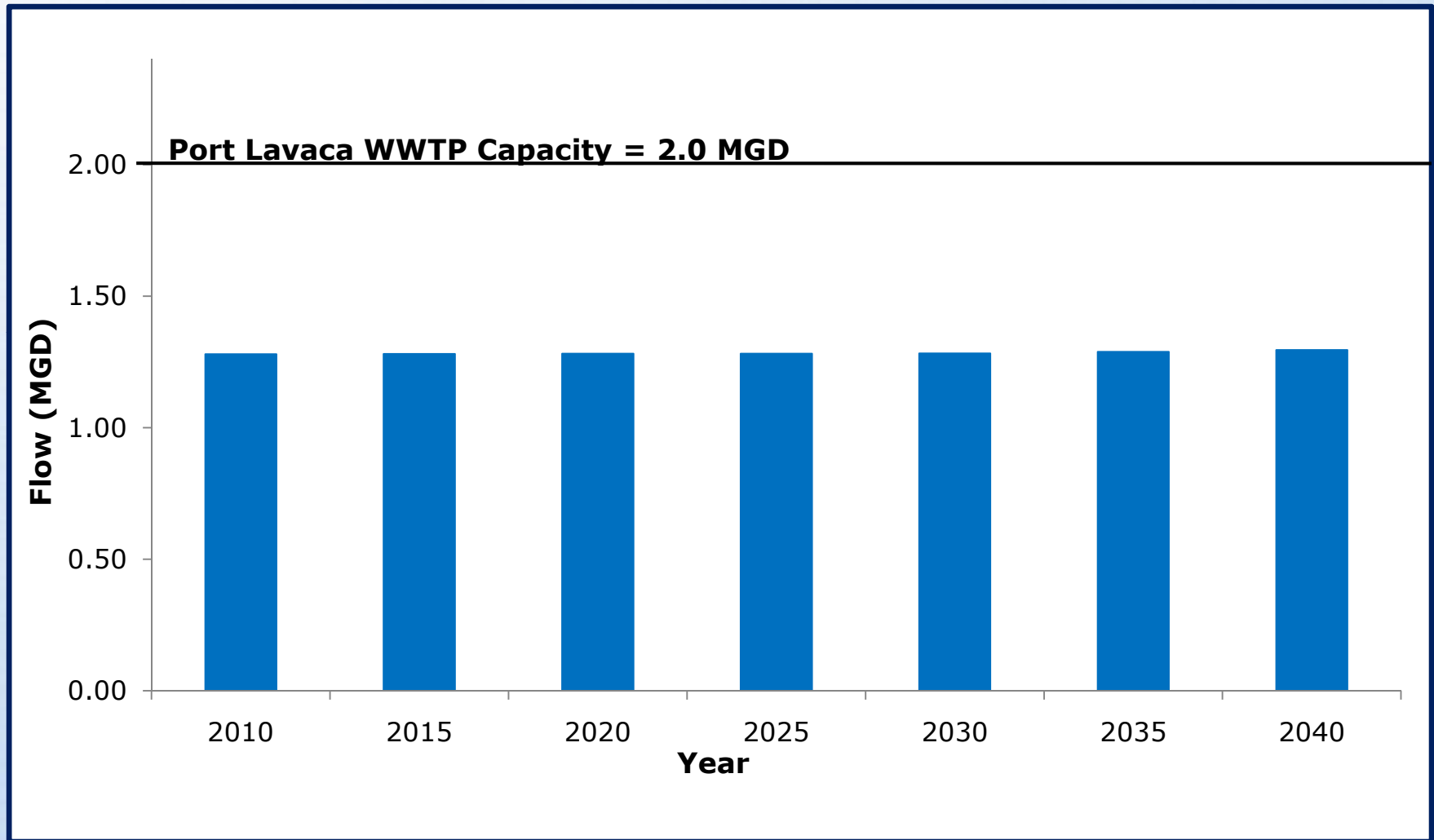
AREA 4

- ◆ **Industrial Companies interested in exploring treated effluent for additional water supply;**
- ◆ **Large tract of land (4,000 acres) located adjacent to INEOS Nitriles and without centralized wastewater utilities;**
- ◆ **Few subdivisions developed in area;**

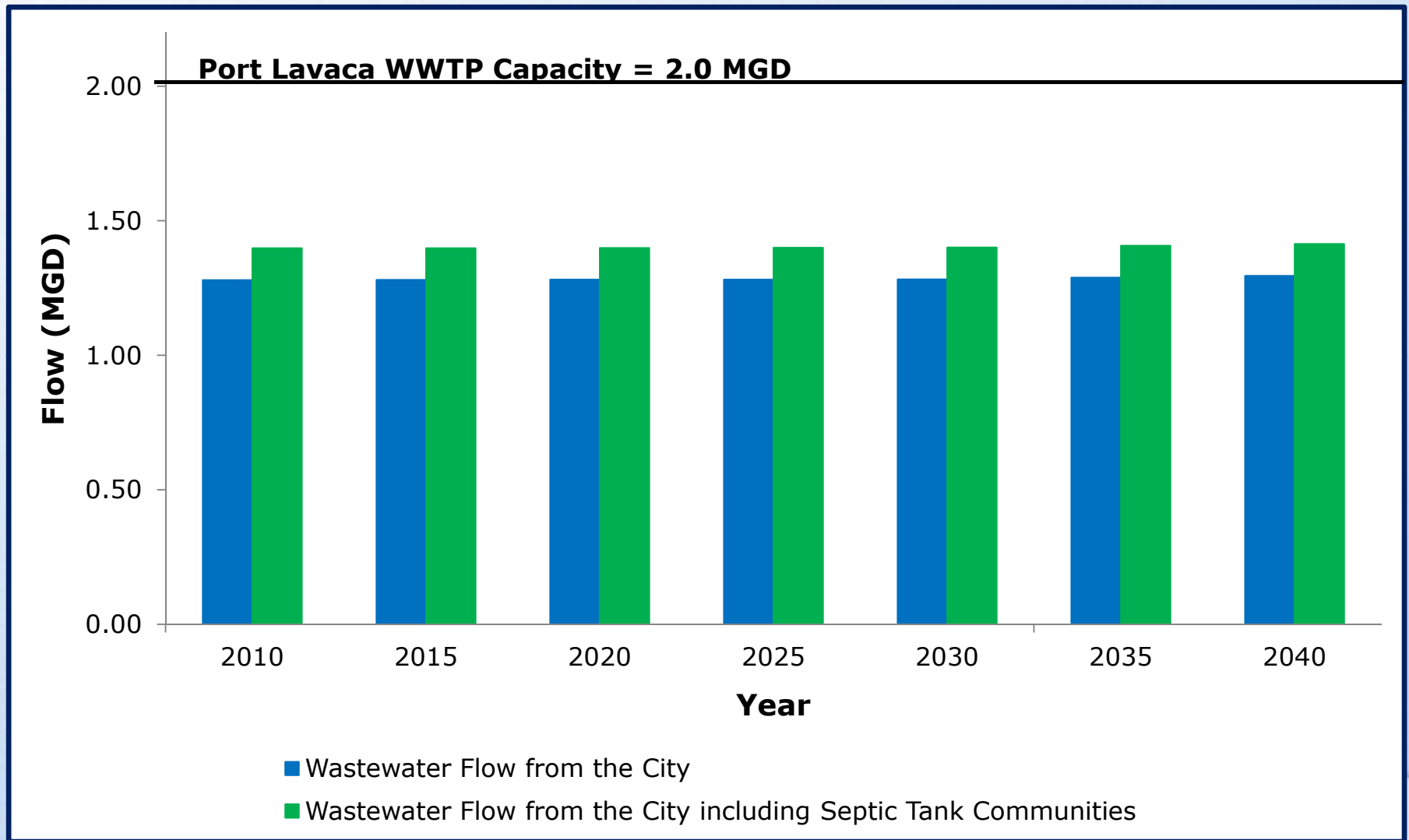
Study Area Overview - Potential Regional Assets

- ◆ **Excess wastewater treatment plant capacity at the Cities of Point Comfort and Port Lavaca**
- ◆ **Magnolia Beach WWTP/collection system**
- ◆ **Excess wastewater treatment plant capacity at the City of Seadrift and Port O'Connor MUD; WWTPs located on the west and east ends of Highway 185**

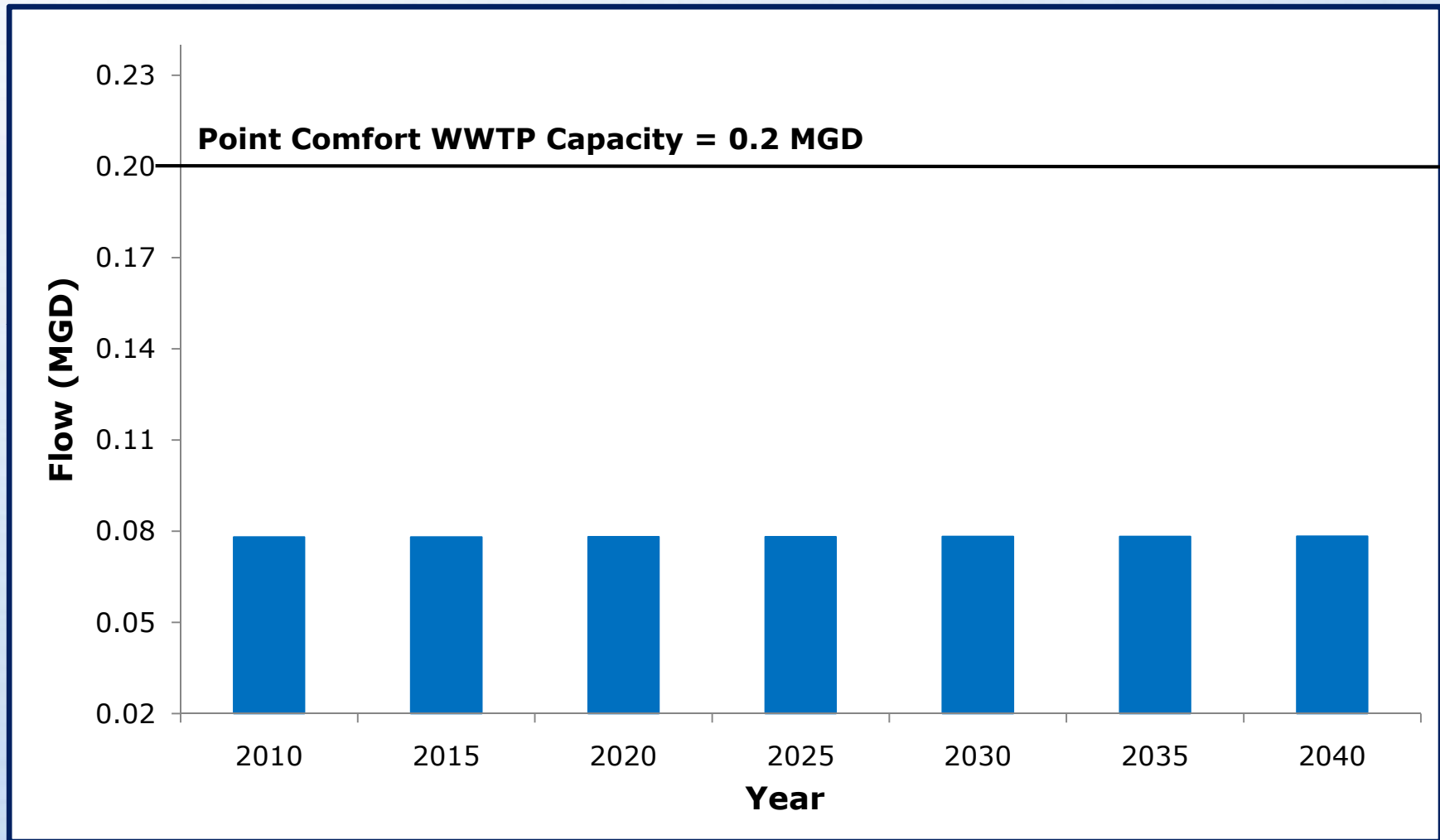
City of Port Lavaca: Wastewater Flow Projections



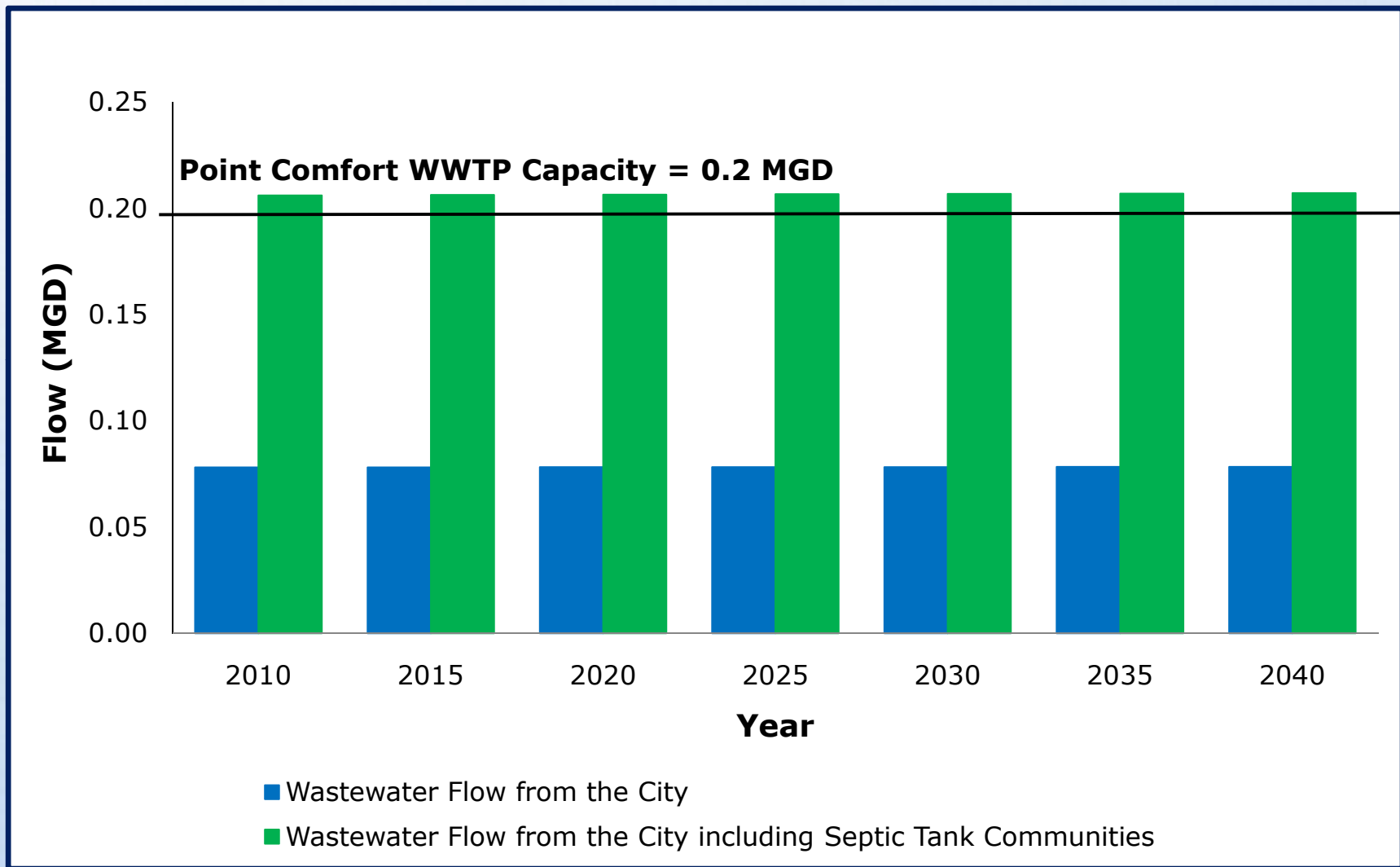
Wastewater Flow Projections: Area 1A



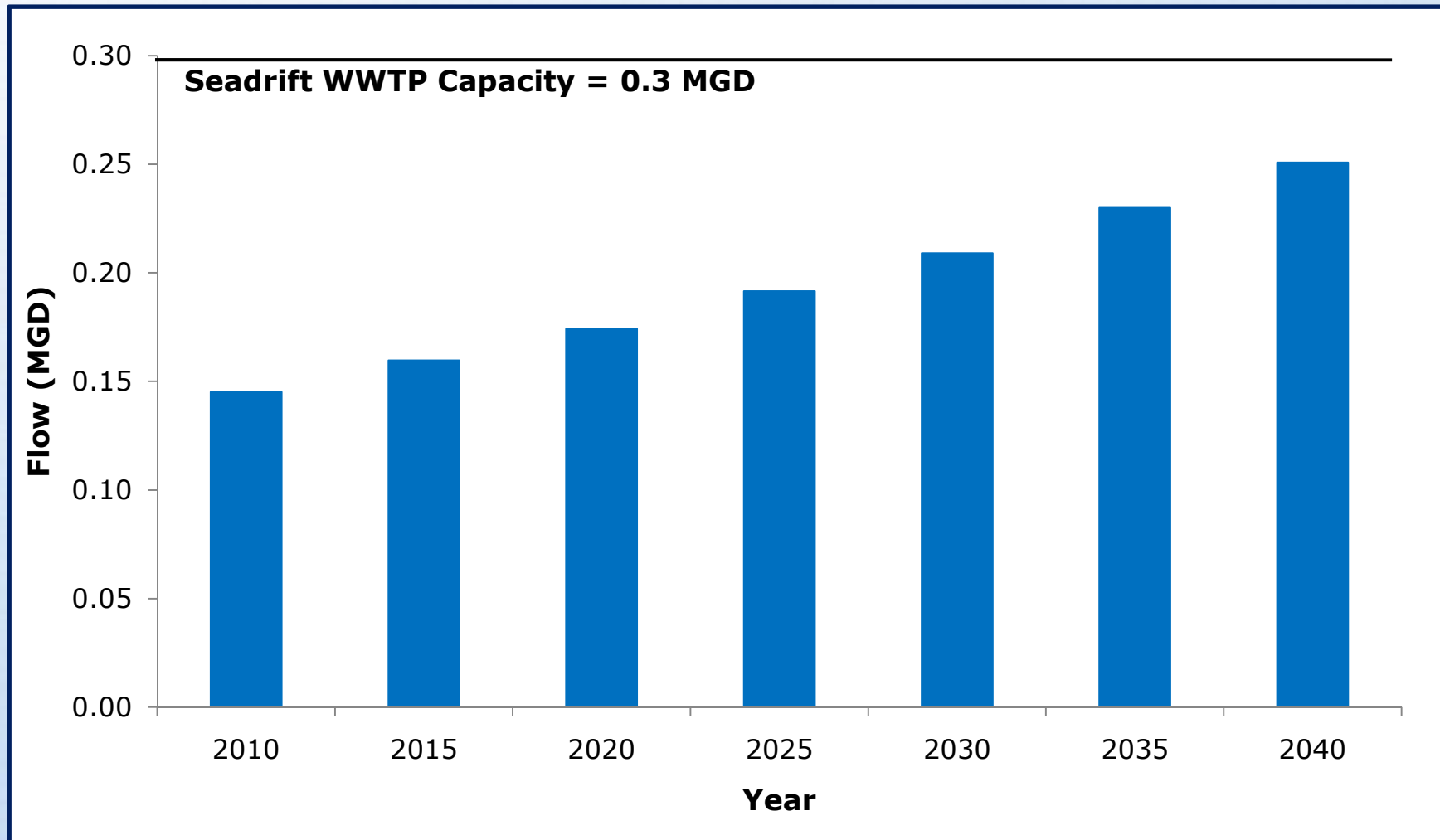
City of Point Comfort: Wastewater Flow Projections



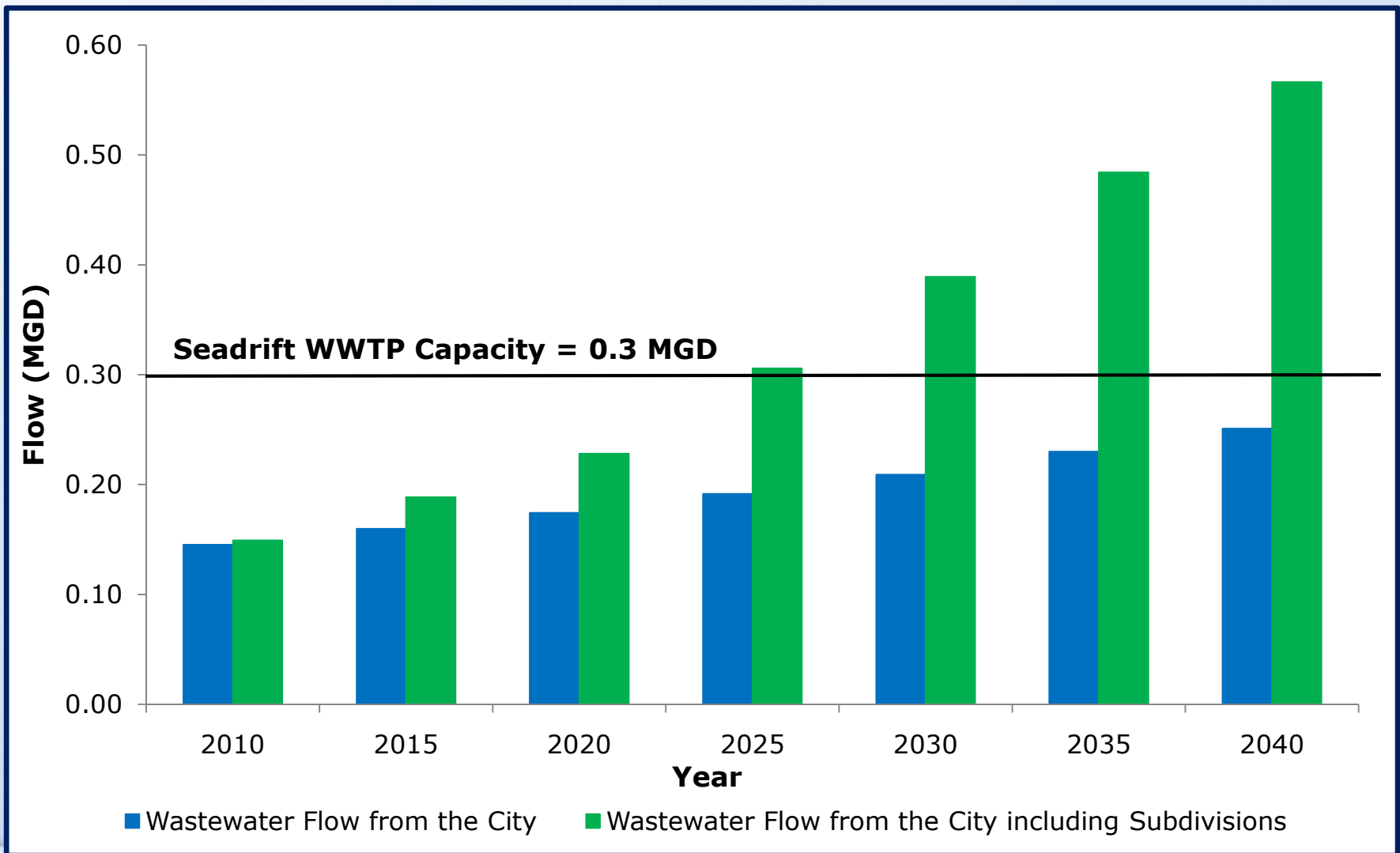
Wastewater Flow Projections: Area 1B



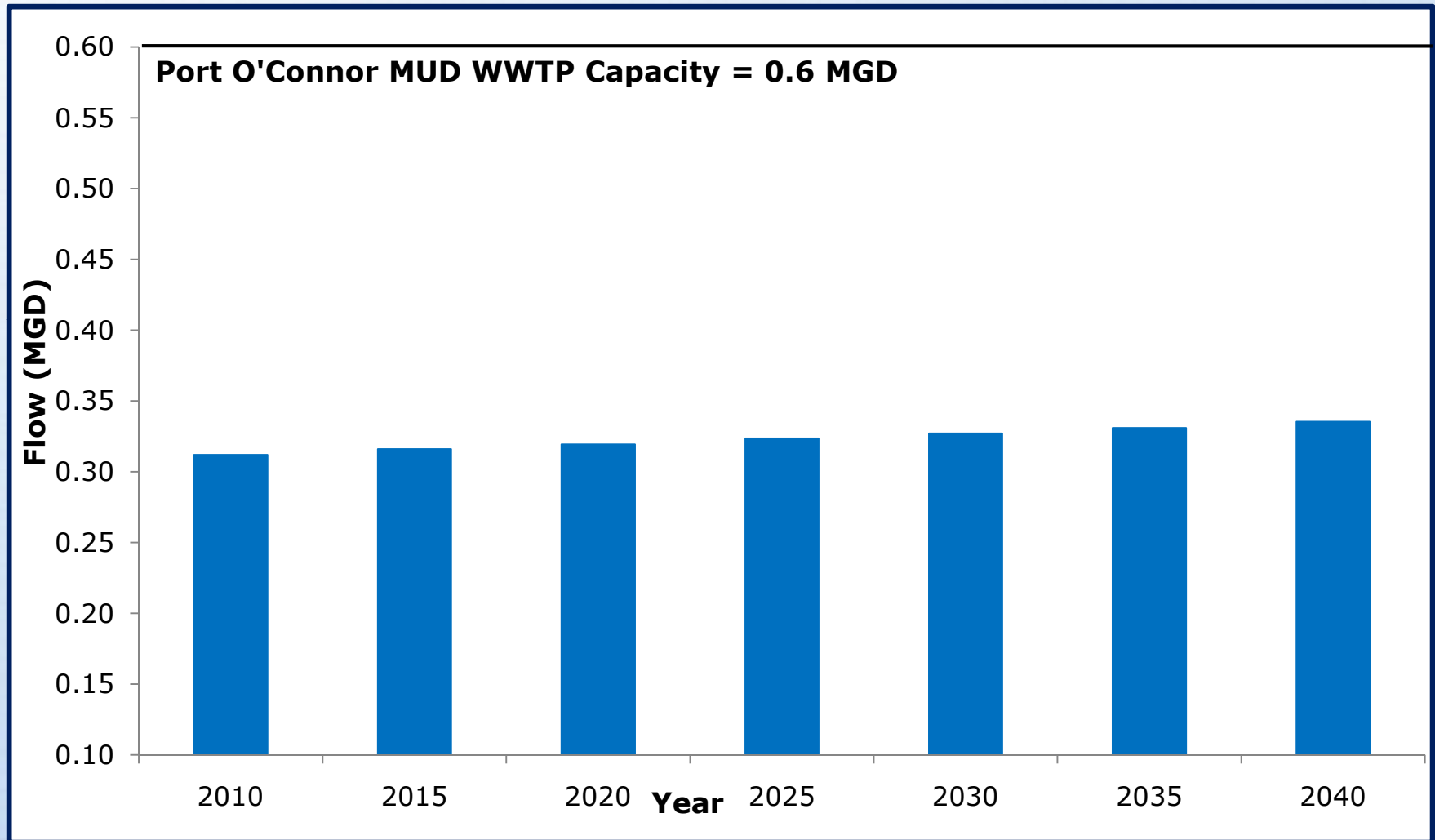
City of Seadrift: Wastewater Flow Projections



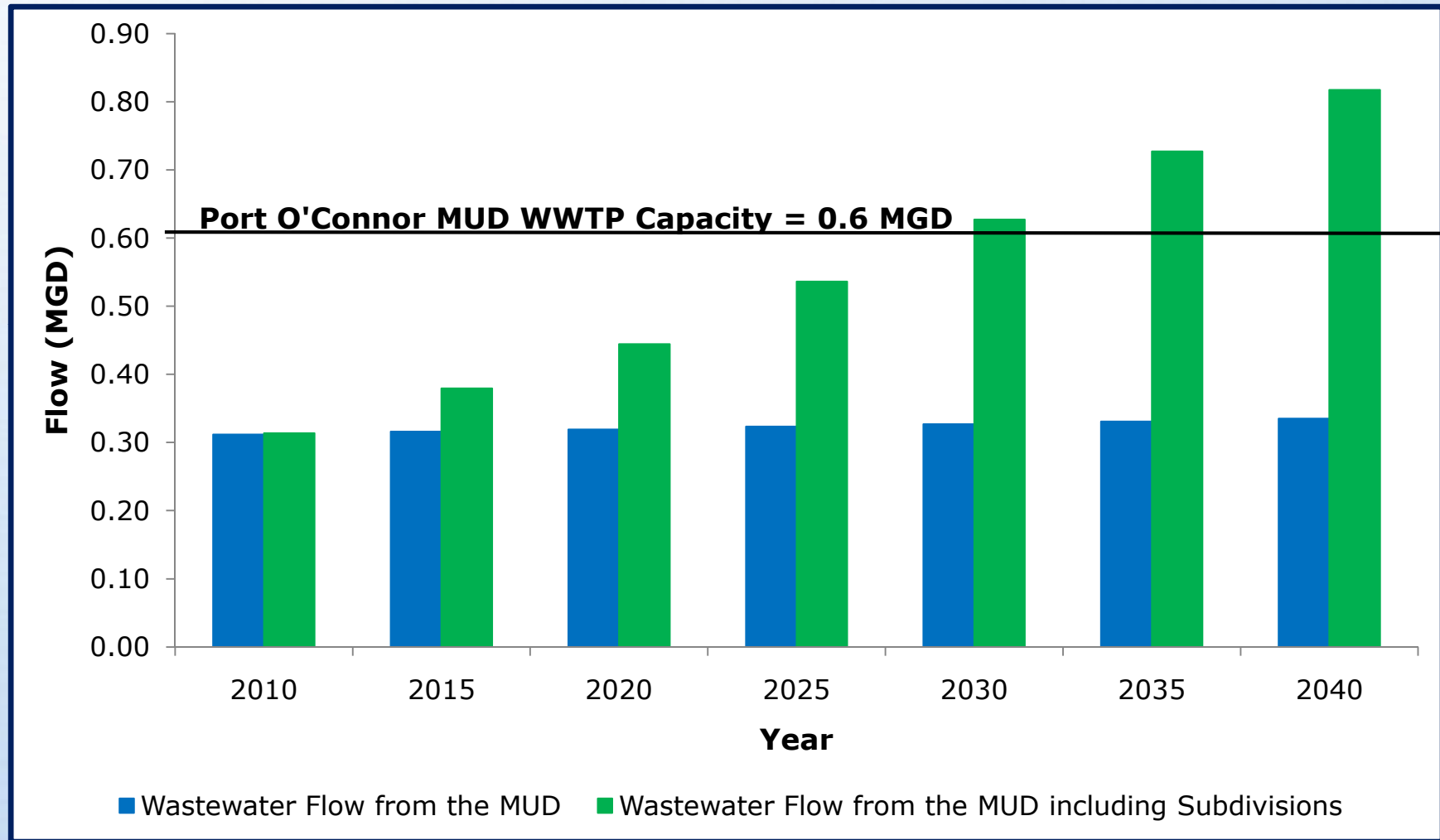
Wastewater Flow Projections: City of Seadrift - Area 2



Port O'Connor MUD: Wastewater Flow Projections



Wastewater Flow Projections: Port O'Connor MUD - Area 2



Study Area Overview - Potential Regional Assets

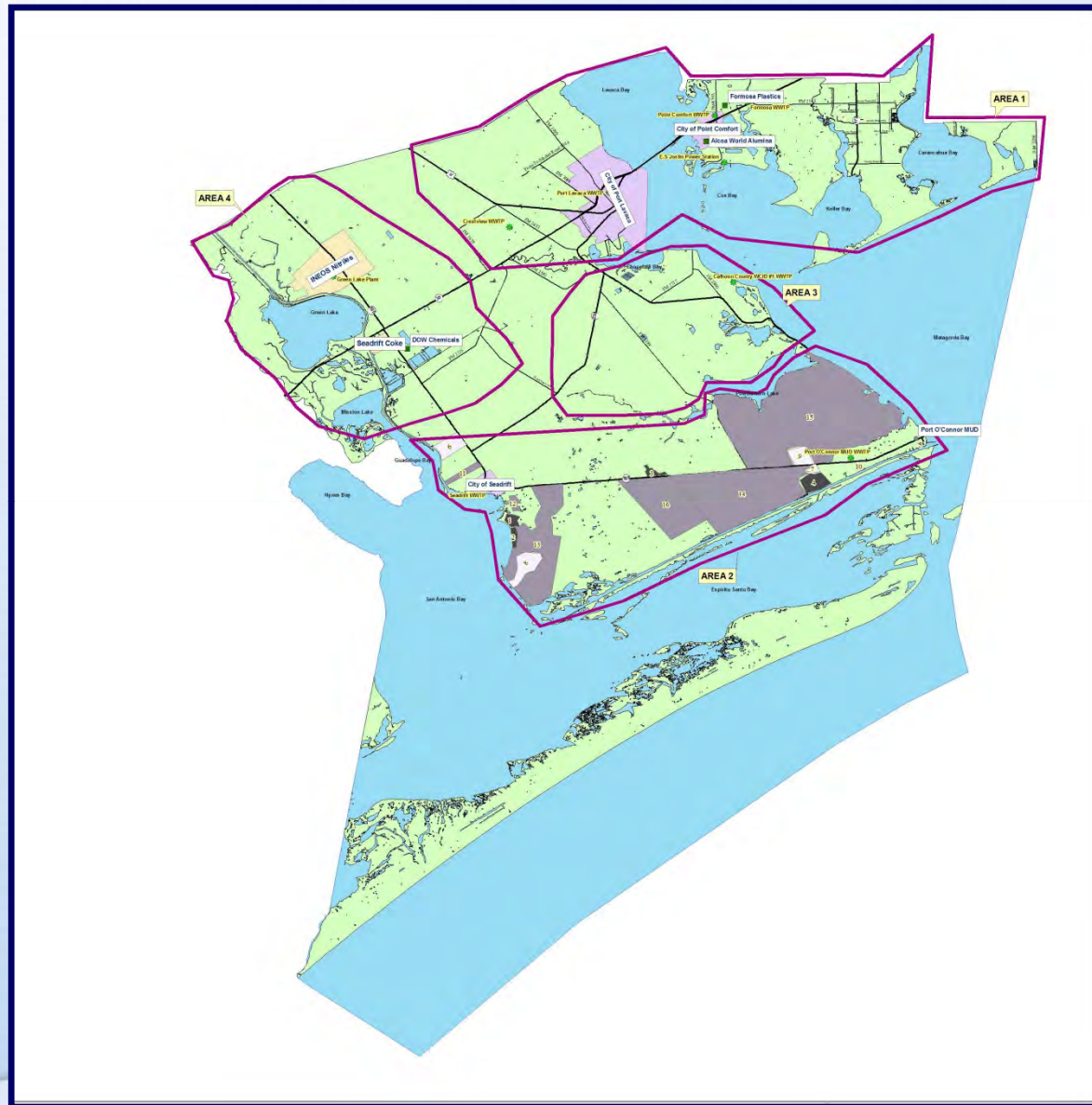
- ◆ **Excess wastewater treatment plant capacity at the Cities of Point Comfort and Port Lavaca**
- ◆ **Magnolia Beach WWTP/collection system**
- ◆ **Excess wastewater treatment plant capacity at the City of Seadrift and Port O'Connor MUD; WWTPs located on the west and east ends of Highway 185**
- ◆ **Wastewater main from Port O'Connor MUD WWTP along Highway 185 to The Sanctuary Development**

Study Area Overview - Potential Regional Assets (Cont.)

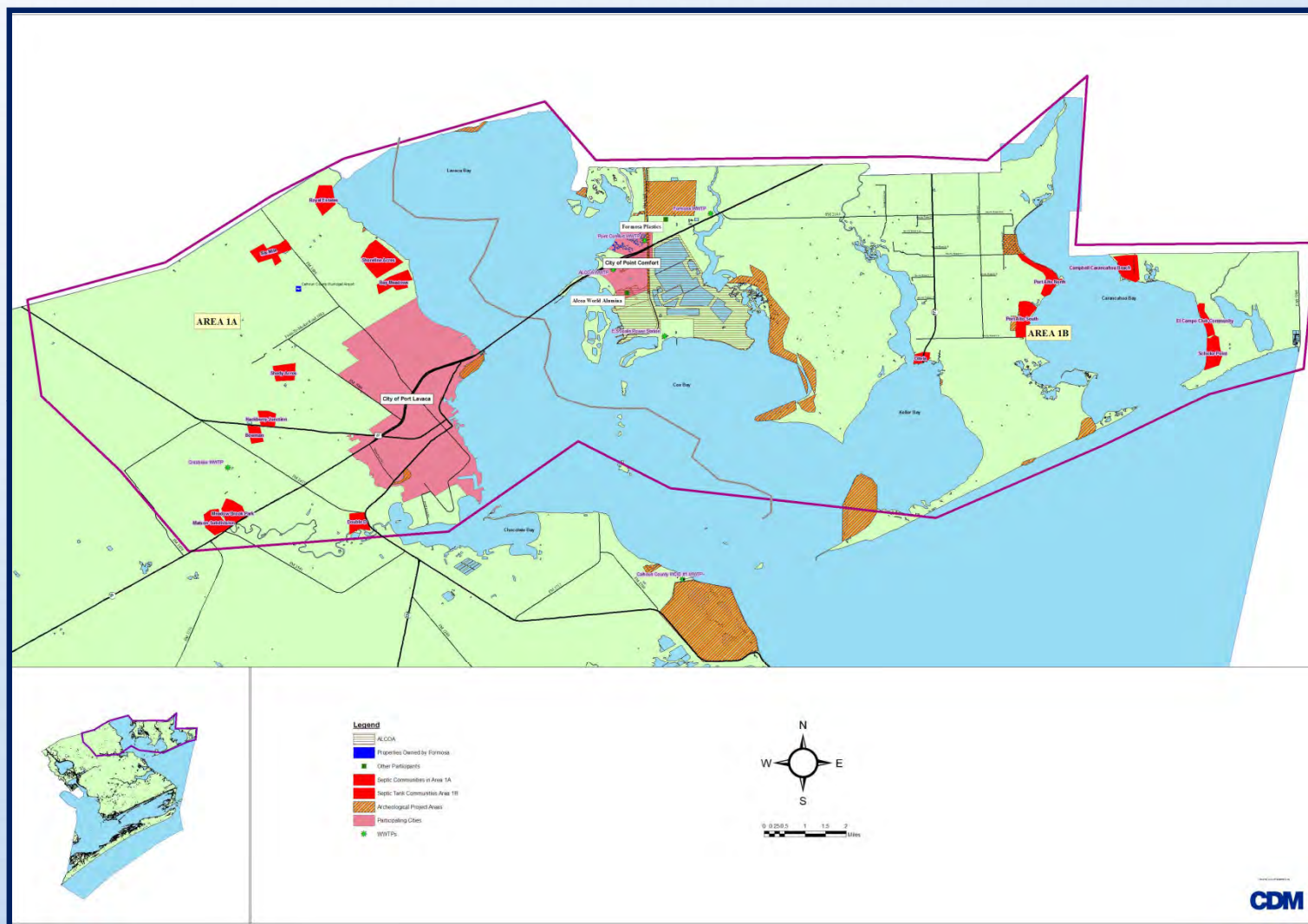
- ◆ **Large developments planned in the southern end of Calhoun County (stimulus for regional systems)**
- ◆ **Crestview WWTP and collection system located near City of Port Lavaca**
- ◆ **Numerous small developments located near City of Port Lavaca (regional opportunities)**
- ◆ **Large tract of land (4,000 acres) located adjacent to INEOS Nitriles that needs centralized wastewater service**

Preliminary Regional Alternatives

Study Area Overview



Area No. 1 Regional Options



Area No. 1A & 1B Regional Options

Wastewater Service

- 1) City of Port Lavaca provide wastewater service to Royal Estates, Shoreline Acres, Bay Meadows, Double D, Shady Acres, Meadow Brook Park, Bowman, Hackberry Junction, Matson Subdivision & Six Mile Area**
- 2) Install small package plant to serve Royal Estates, Shoreline Acres, Bay Meadows & Six Mile Area**
- 3) Crestview WWTP extend service to Meadow Brook Park, Bowman, Hackberry Junction & Matson Subdivision**
- 4) Install small package plant to serve Olivia and Port Alto WSC**

Area No. 1A & 1B Regional Options

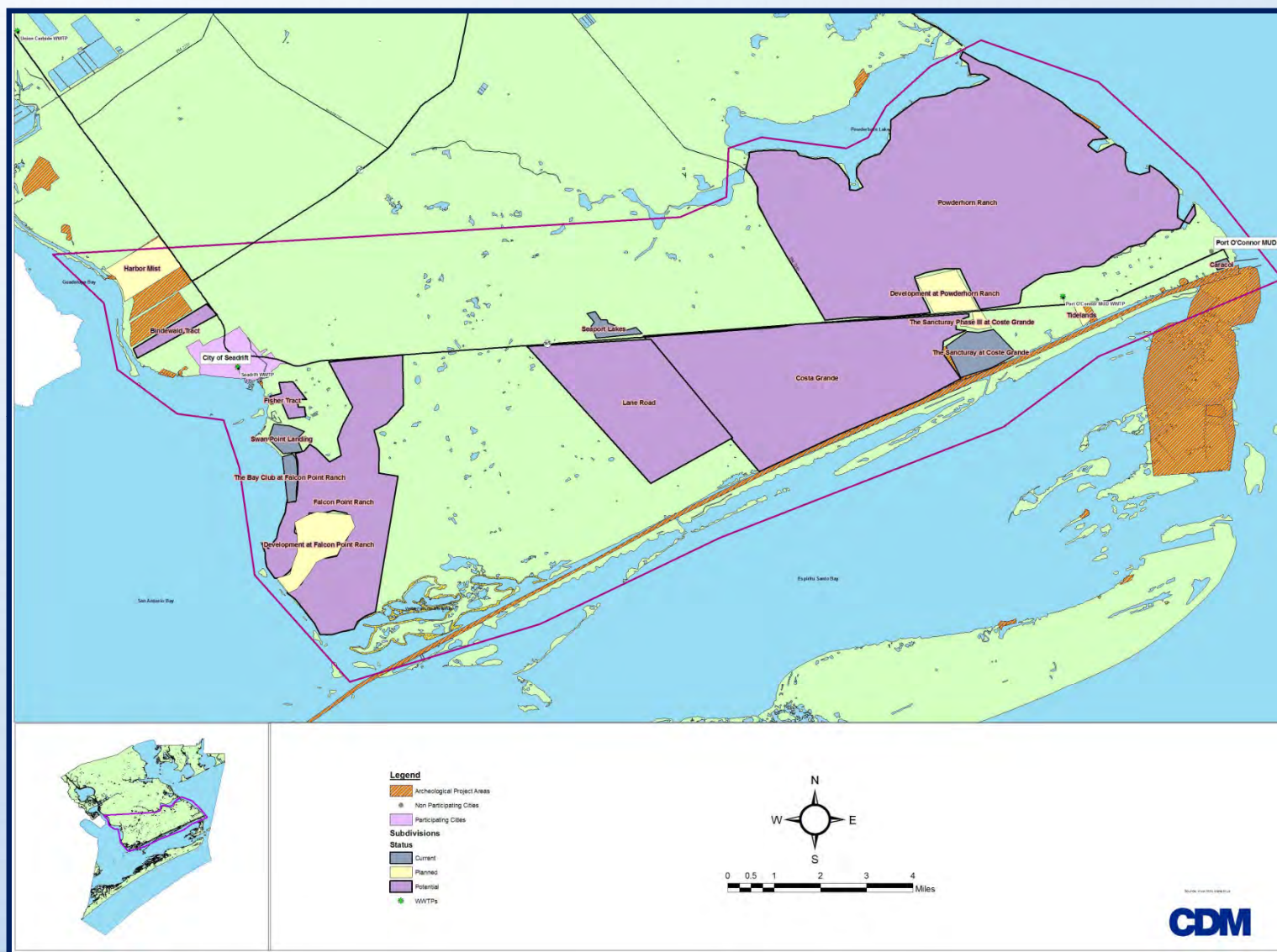
Wastewater Service (Cont.)

- 5) City of Point Comfort provide centralized wastewater service to Port Alto WSC, Olivia, and other developments in the area**
- 6) Install small package plant to serve Campbell Carancahua Beach Subdivision, El Campo Club Community & Schicke Point Community**

Reclaimed Water

- 1) Stand-alone alternative**
- 2) Formosa Plastics and Alcoa receive treated effluent/reuse from Cities of Point Comfort and Port Lavaca**

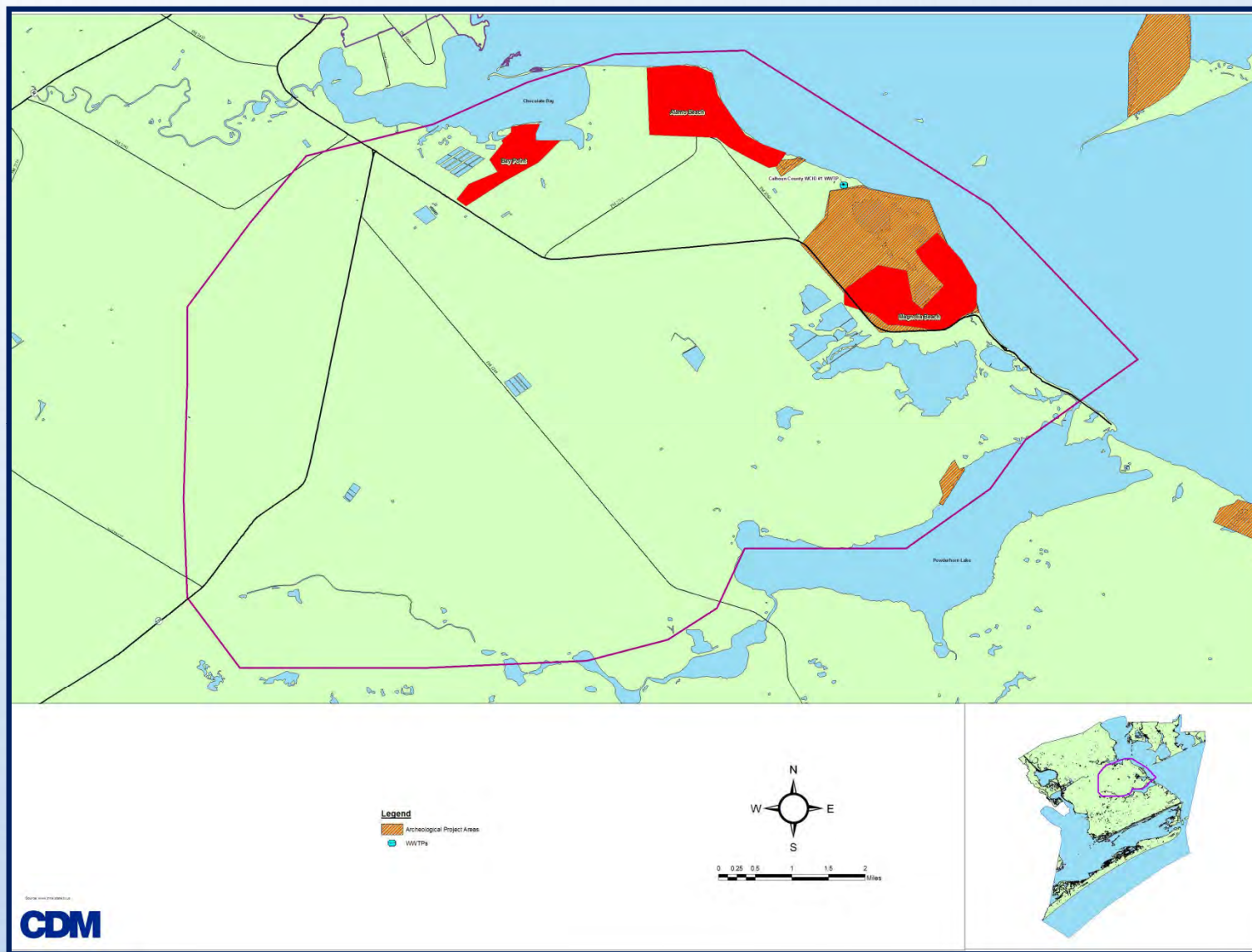
Area No. 2 Regional Options



Area No. 2 Regional Options

- 1) a. City of Seadrift serve Swan Point Landing, Falcon Point and others located in close proximity**
b. Port O'Connor MUD extend wastewater service west along Highway 185 to Lane Road Development, The Sanctuary, Powder Horn Ranch & Costa Grande
- 2) City of Seadrift and Port O'Connor MUD provide wastewater service to their existing areas; install package plant near Lane Road Development to serve developments along Highway 185**

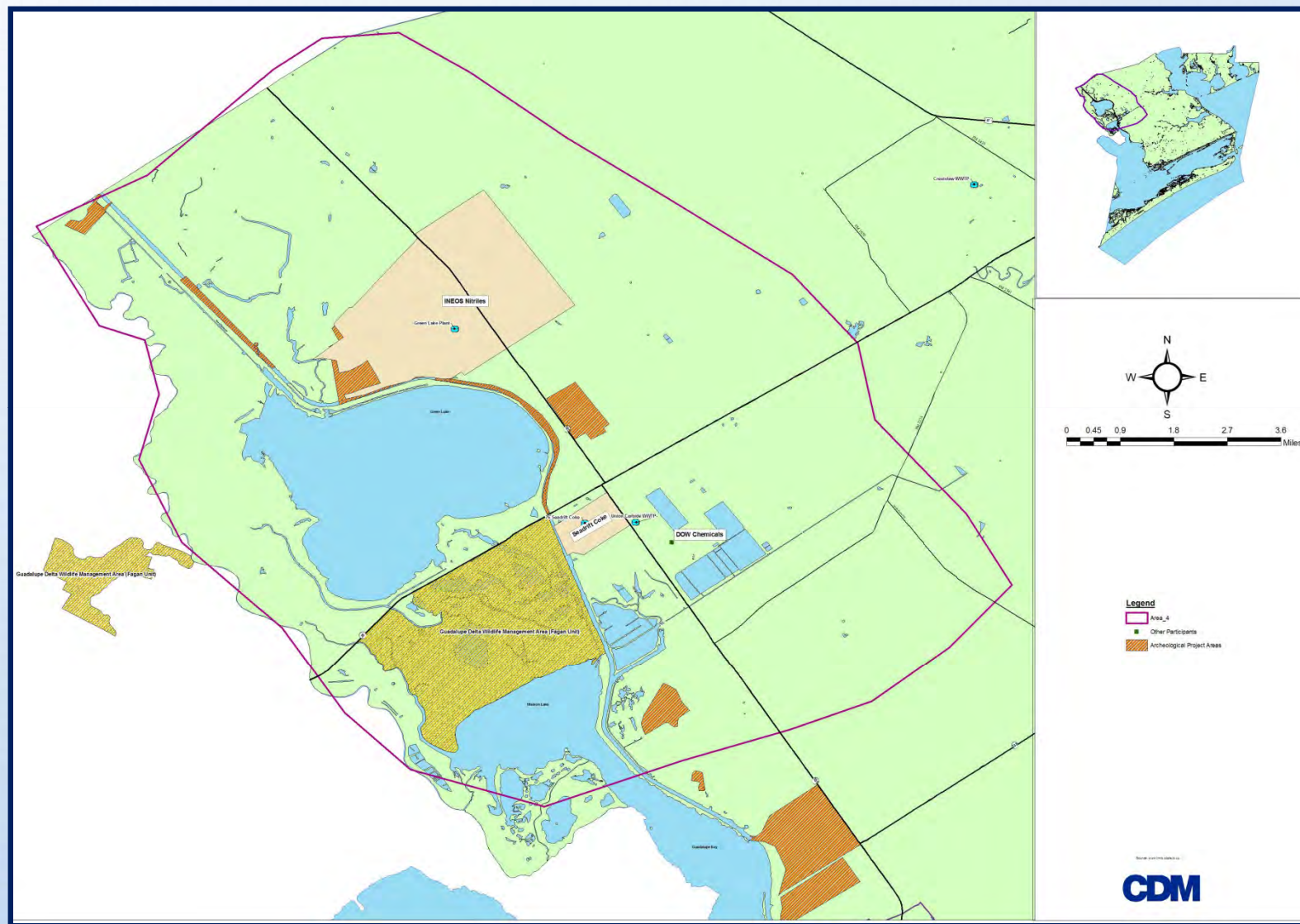
Area No. 3 Regional Options



Area No. 3 Regional Options

- 1) Magnolia Beach WWTP expand its system to serve Indianola, Alamo Beach, Baypoint Subdivision and other areas on septic systems**

Area No. 4 Regional Options



Area No. 4 Regional Options

- 1) Construct small package plant to provide centralized wastewater service to 4,000 acre site adjacent to INEOS Nitriles**
- 2) Seadrift Coke and Dow Chemical receive treated effluent/reuse from City of Seadrift and new INEOS Nitriles package plant**

Breakout Session by Areas

FACILITATORS

- ❖ **Area No. 1 & 1A (Allen Woelke)**
- ❖ **Area No. 2 (Tom Schmidt)**
- ❖ **Area No. 3 (Matt Glaze)**
- ❖ **Area No. 4 (Susan Roth)**

Study Area Overview

AREA 1A

- ◆ City of Port Lavaca
- ◆ Crestview Subdivision
- ◆ Meadow Brook Park
- ◆ Shady Acres
- ◆ Hackberry Junction
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- ◆ Royal Estates
- ◆ Double Subdivision
- ◆ Six Mile Subdivision

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- ◆ Alcoa
- ◆ Formosa Plastics
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Beach Subdivision
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Community
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Study Area Overview

AREA 2

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- ◆ Baypoint Subdivision
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AREA 4

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- ◆ Seadrift Coke
- ◆ INEOS Nitriles

Project Contacts

Project Contacts:

**Susan K. Roth, P.E.
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**Bryan Serold
GBRA, Lower Basin Manager
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Calhoun County Regional Wastewater Facility Study

Project Meeting
February 10, 2011

Name	Title	City/Entity	Phone Number	Email Address
Matt Glaze		Urban Engineering	361-578-9836	mglaze@urbanvictoria.com
Tom Engelgau		Alcoa	361-987-6954	tom.engelgau@alcoa.com
DAVID MEESEY		TDSB	512-936-0852	
Vern Lissy		Calhoun County	361-212-9656	Vern.Lissy@calhouncounty.org
Oscar Perea		Port Lavaca	361-552-3347	operea@portlavaca.org
Jonny Atkins		Port Lavaca	361-552-6130	
Mike Pfeiffer		Calhoun County	361-553-4600	Mike.Pfeiffer@calhouncounty.org
CHRISTINE A. HOOP		Seadrift	361-785-2218	seadriftjudge@twi.net
TERRELL JONES		Seadrift	4	
Nelda Benavides		Don Chemical Co	361-652-2500	benavinf2@don.com
Bruce Gertner	Technical Manager	Seadrift Coke LA	361-551-4580	bgertner@seadriftcoke.com
Allen Woelke		CDM	512-346-1100	woelkead@cdm.com
Tom Schmidt		Urban Eng	361-578-9836	tschmidt@urbanvictoria.com
DAVID ROBERTS	ATTY	CCFDC	361-552-2971	david@portlavaca.org
NEIL FRITSCH	Commissioner	Calhoun County	361-593-5346	neil.fritsch@calhouncounty.org
Bob WALLACE	Dis. Mgr. of	Port JSA	361-987-7440	
BRYAN SEROLD	OPERATIONS MGR.	GBRA	361-575-6366	bserold@gbra.org
STEPHANIE SHELLEY	Chief Operator	GBRA	361-552-9751	sshelly@gbra.org
Chris Coughlin	operator	City of Point Comfort	361-987-2661	
Herb Wittliff	Manager	GBRA	361-552-9751	hwittliff@gbra.org
Alex Marshall	President	Cal. Co. EDC / GBRA	361-553-7600	ammarshall@calhouncounty.org
Susan Roth		Susan Roth Consulting	512-796-6692	susan@srrothconsulting.com

Calhoun County Regional Wastewater Facility Study



Project Meeting

**Dow Chemical – Port Lavaca Site
May 19, 2011**

Presentation Outline

- ◆ **Project Timeline & Recap**
- ◆ **Population Projections**
- ◆ **Analysis of Final Alternatives**
- ◆ **Wastewater Reuse Findings**
- ◆ **Capital and O&M Cost Estimates**
- ◆ **Preliminary Conclusions & Summary**
- ◆ **Q&A Discussion**
- ◆ **Next Steps**

Scope of Work

- ◆ **Service Area Description – Data Collection**
- ◆ **Wastewater System Flows**
- ◆ **Collection System Alternatives**
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Project Timeline

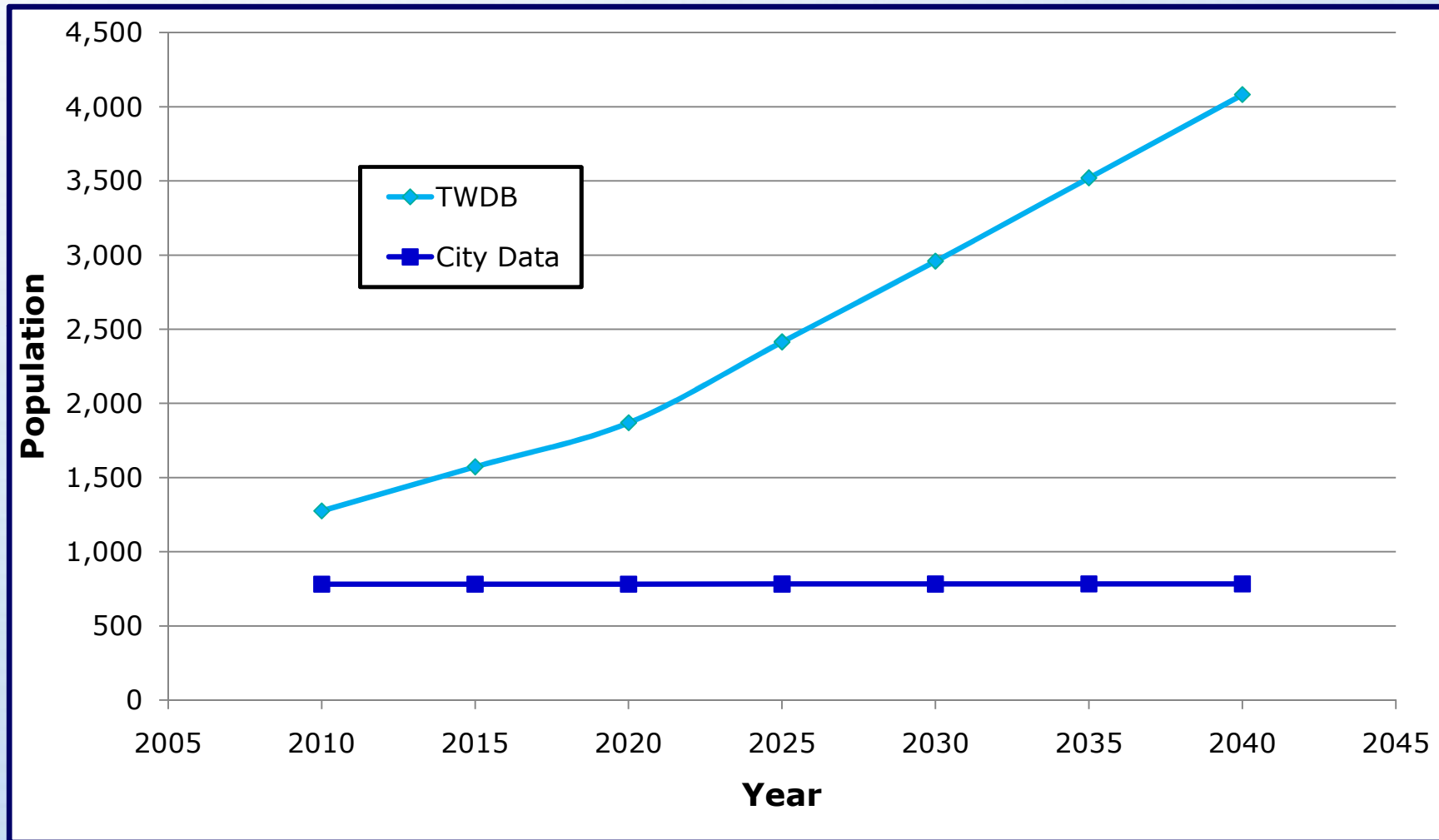
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Population & Projection Data

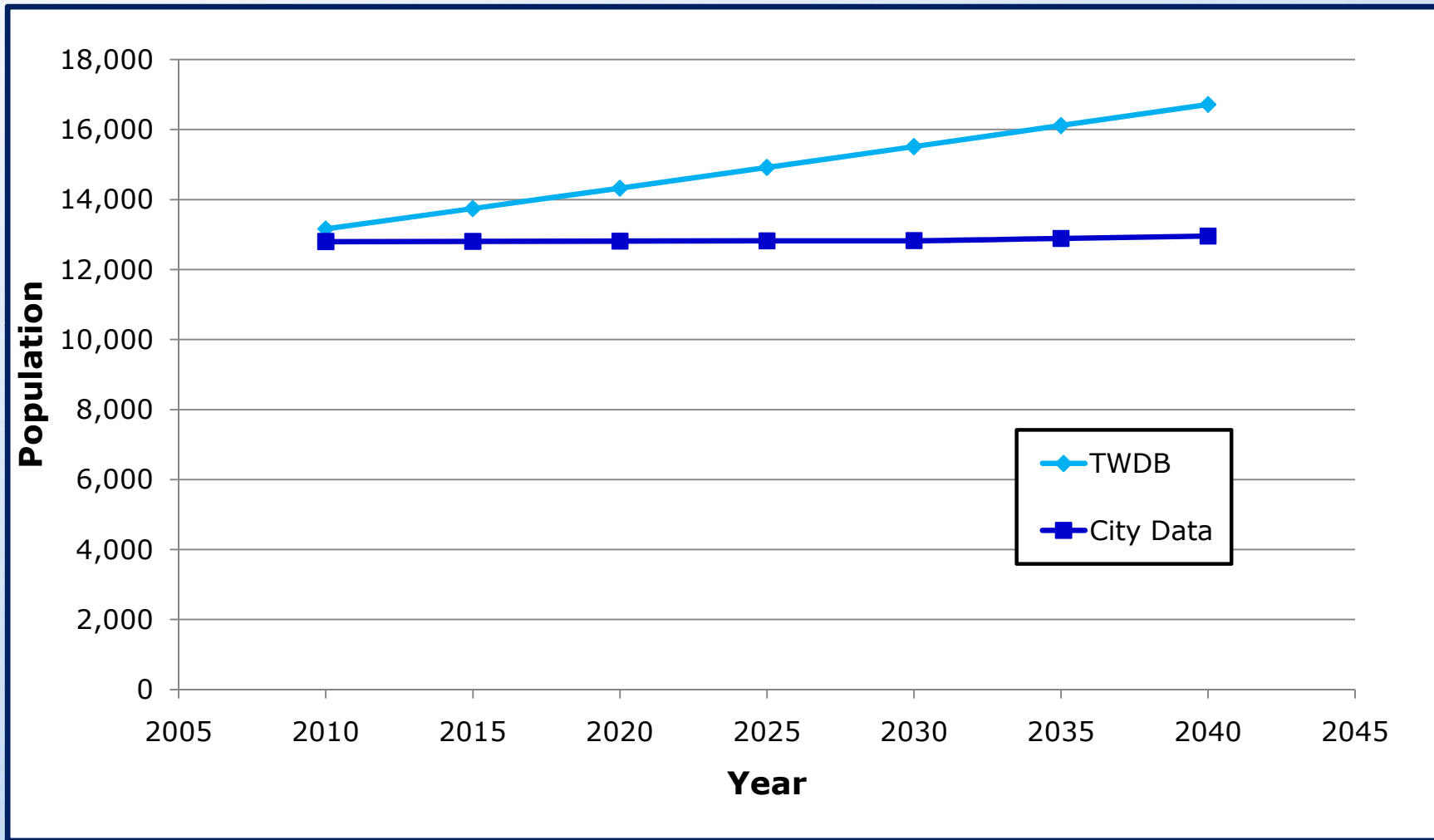
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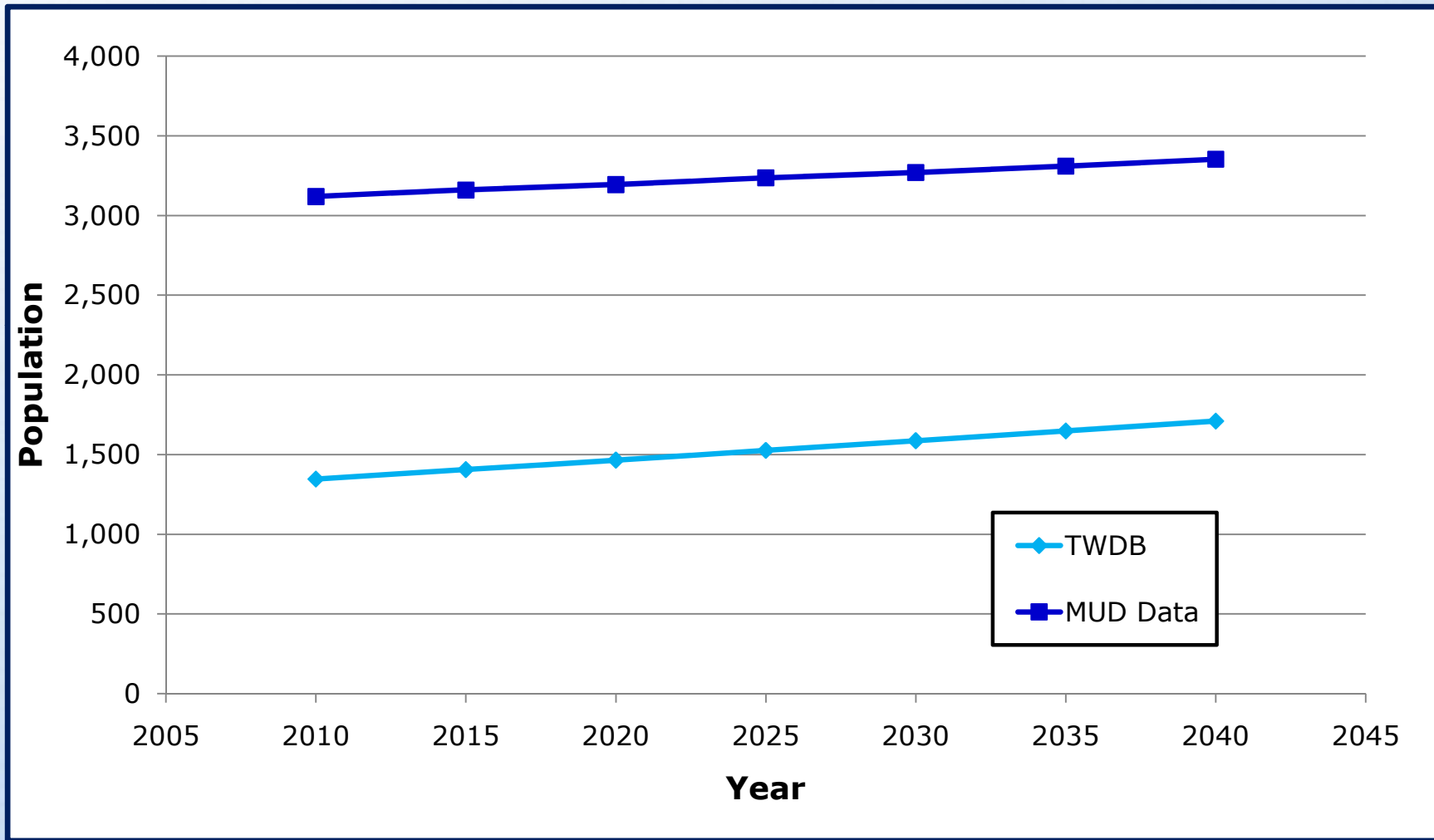
Point Comfort Population Projections: Comparison of TWDB & City Data



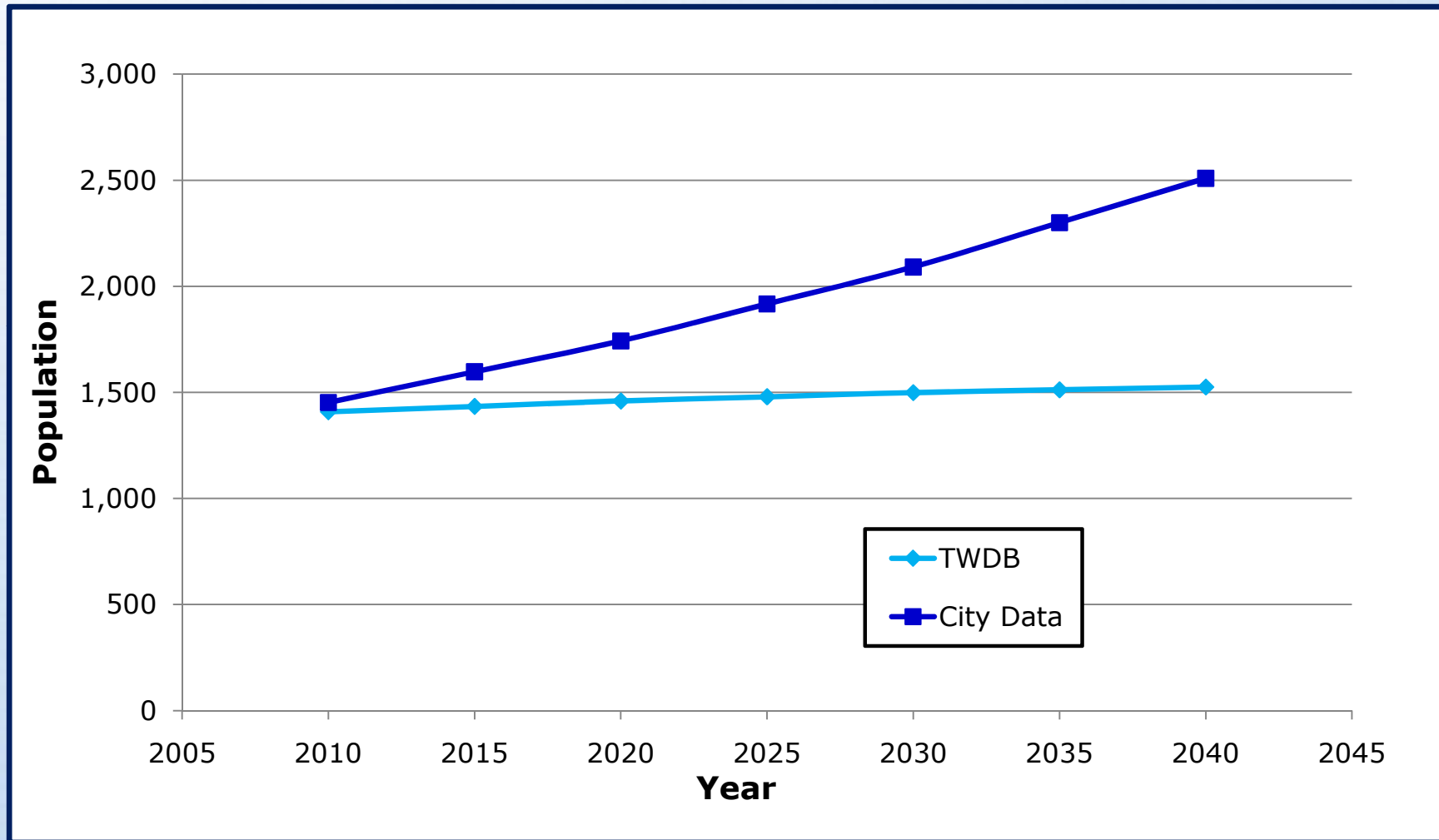
Port Lavaca Population Projections: Comparison of TWDB & City Data



Port O'Connor Population Projections: Comparison of TWDB & MUD Data



Seadrift Population Projections: Comparison of TWDB & City Data



[illegible]

Study Area Overview

AREA 1A

- ◆ City of Port Lavaca
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- ◆ Matson Subdivision
- ◆ Bay Meadows
- ◆ Shoreline Acres
- ◆ Royal Estates
- ◆ Double Subdivision
- ◆ Six Mile Subdivision

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- ◆ Formosa Plastics
- ◆ Olivia
- ◆ Port Alto WSC
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Community
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Study Area Overview

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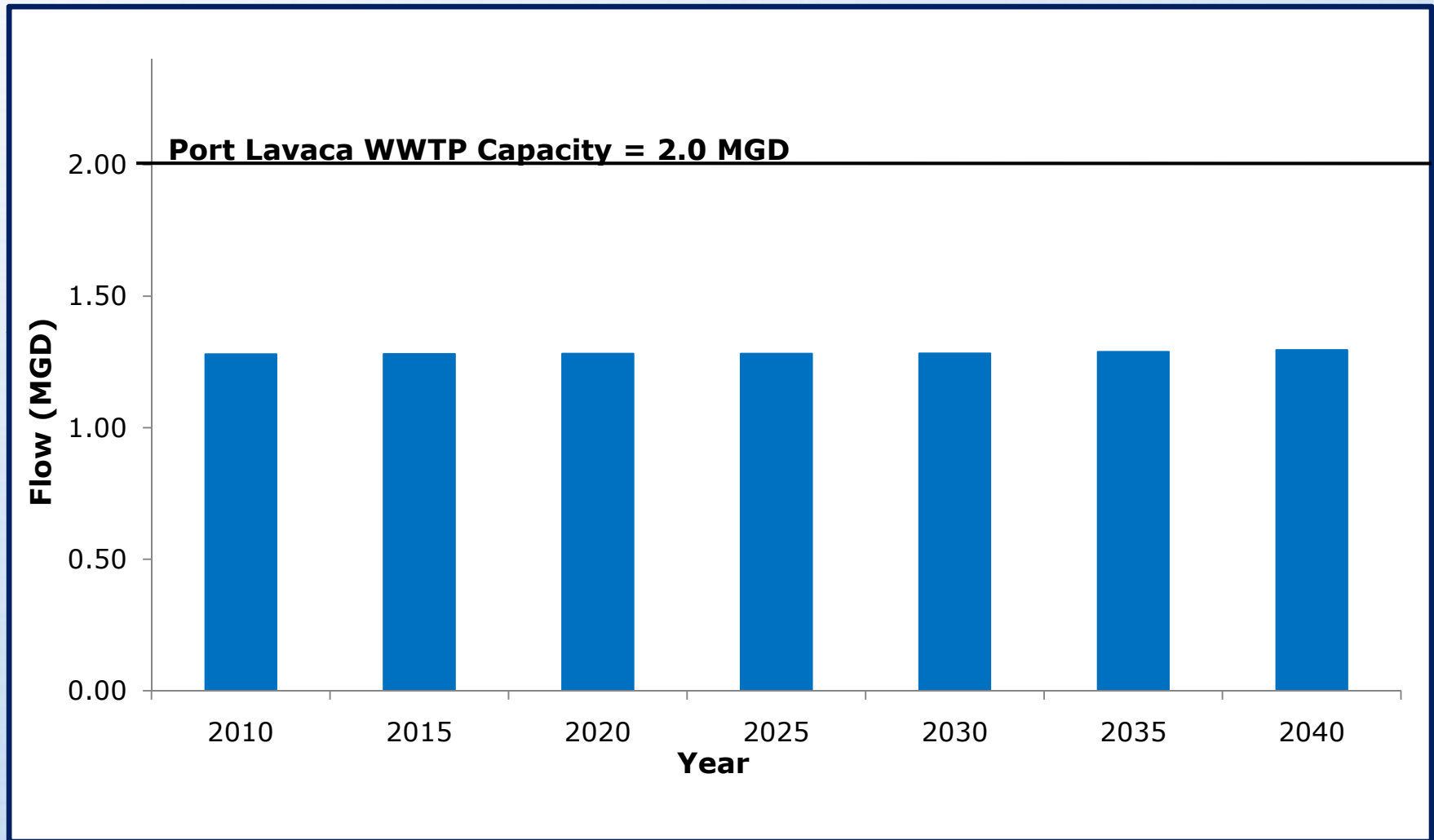
AREA 3

- ◆ Magnolia Beach
- ◆ Indianola
- ◆ Baypoint Subdivision
- ◆ Alamo Beach

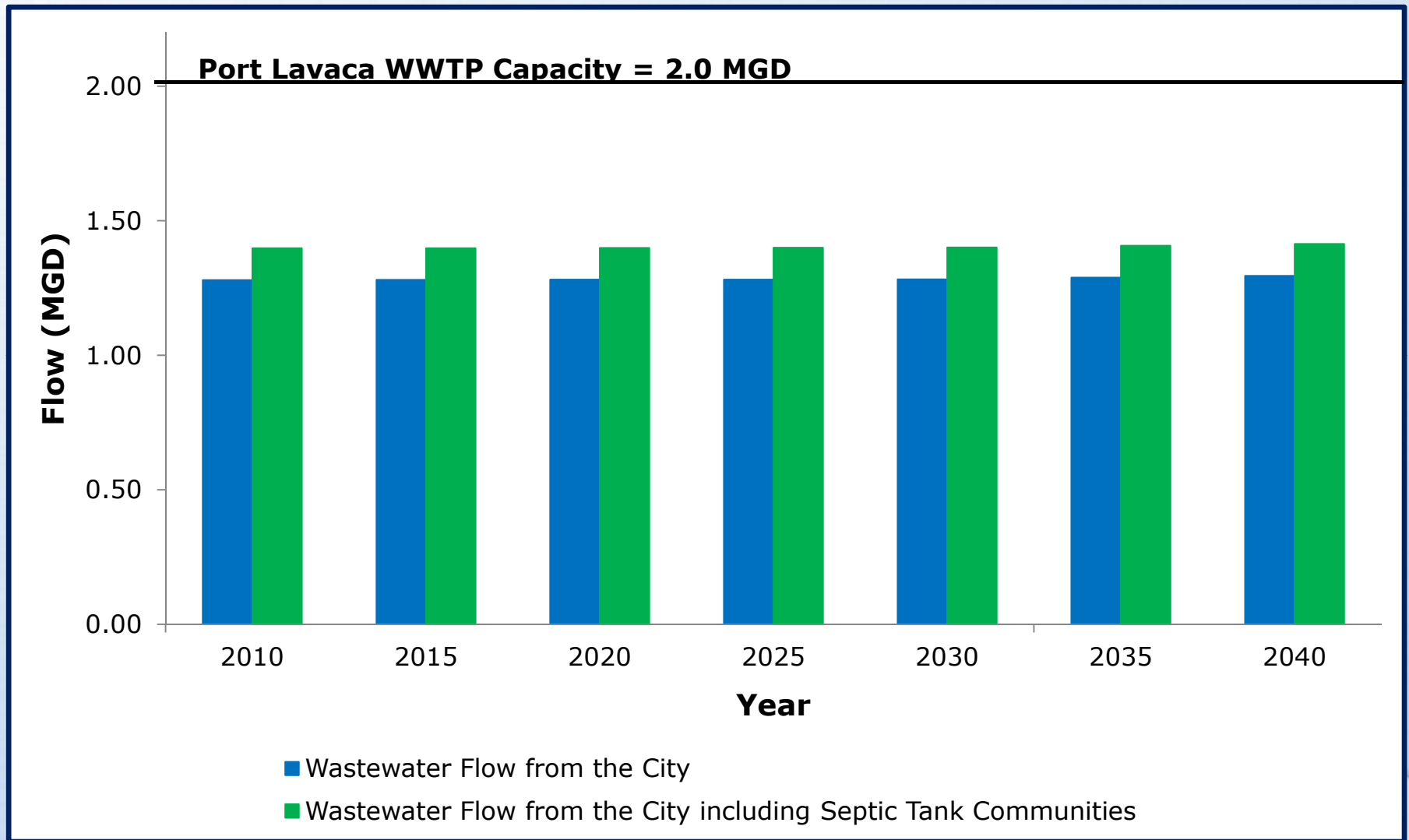
AREA 4

- ◆ Dow Chemical
- ◆ Seadrift Coke
- ◆ INEOS Nitriles

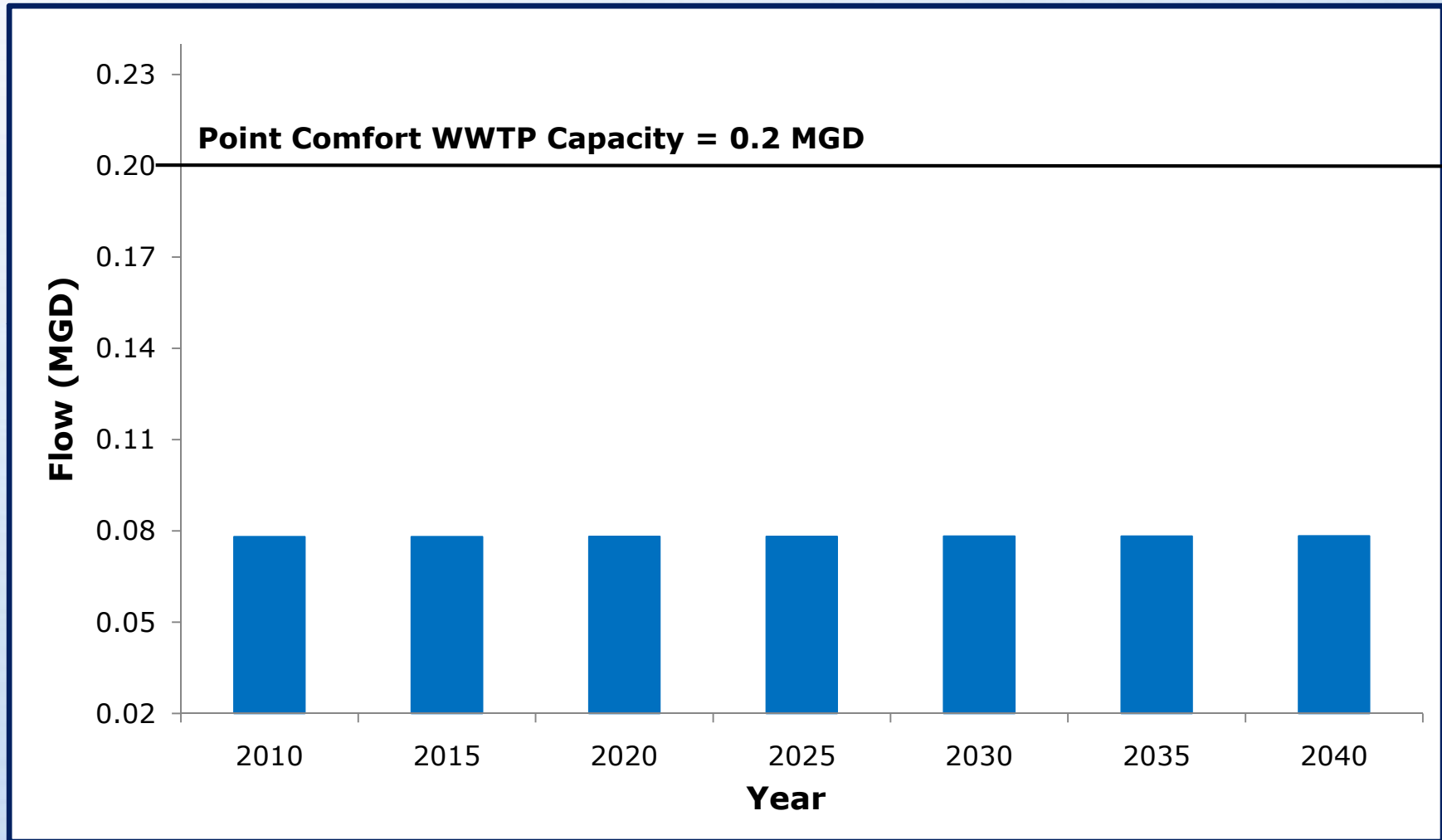
City of Port Lavaca: Wastewater Flow Projections



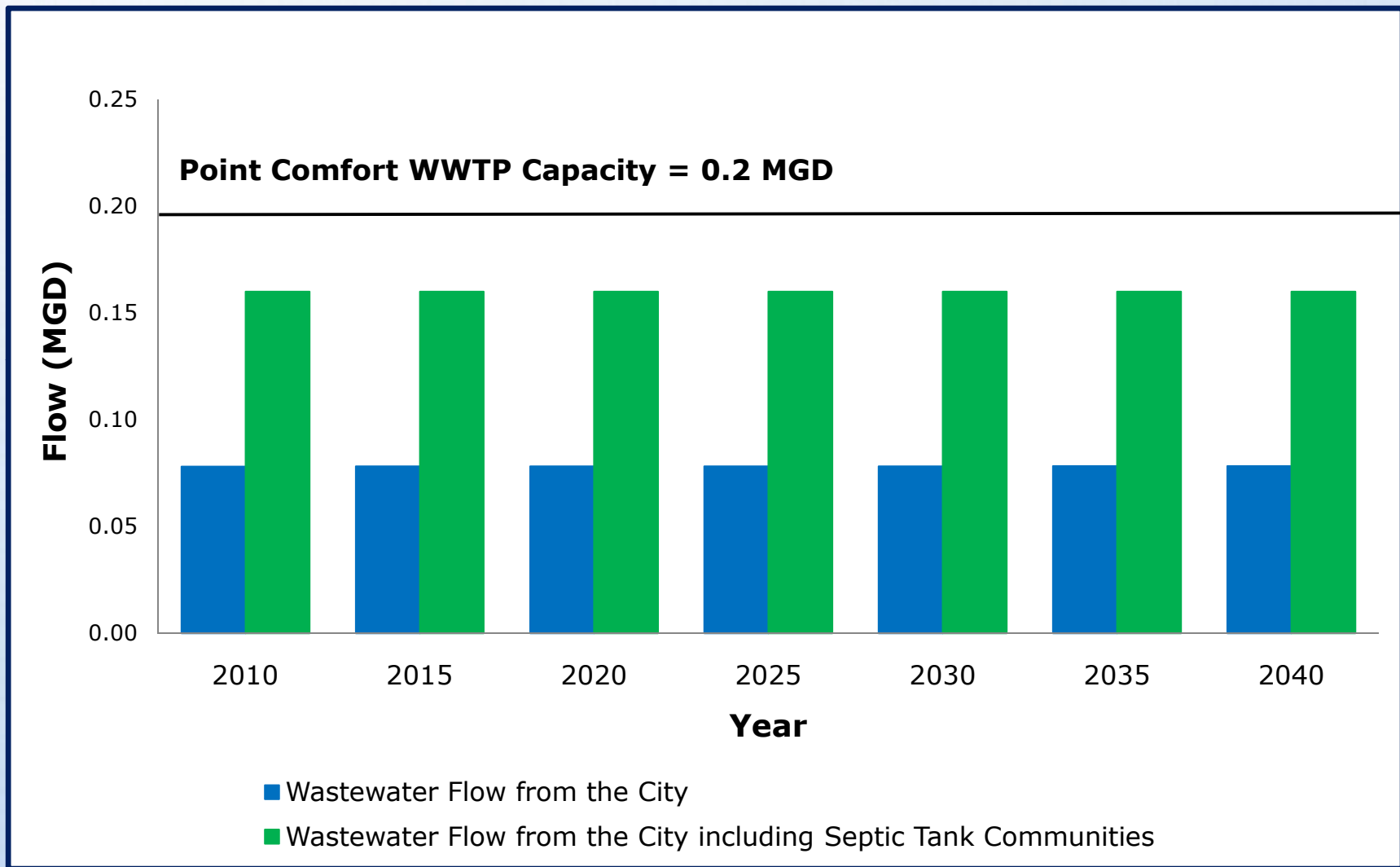
Wastewater Flow Projections: Area 1A



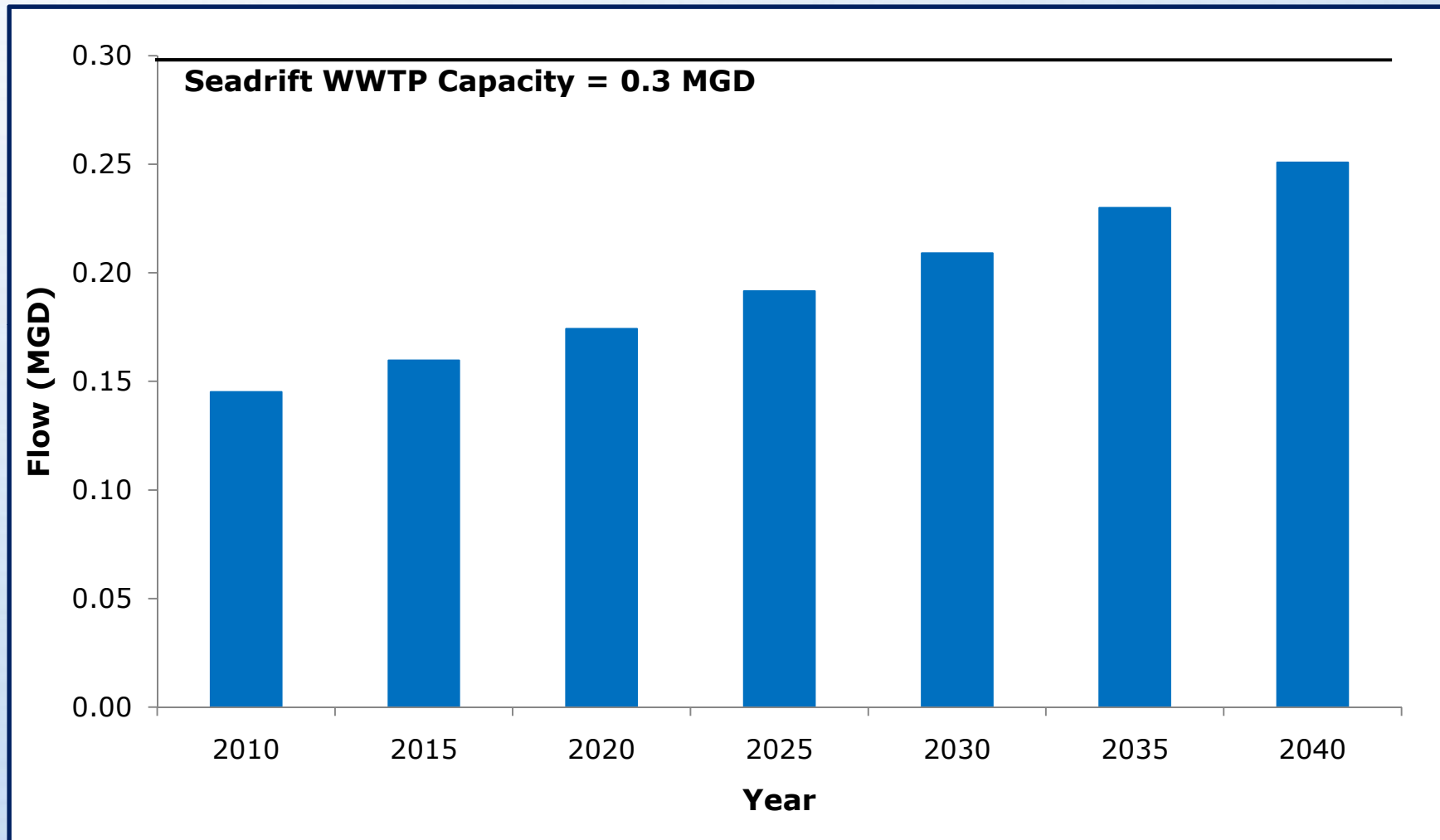
City of Point Comfort: Wastewater Flow Projections



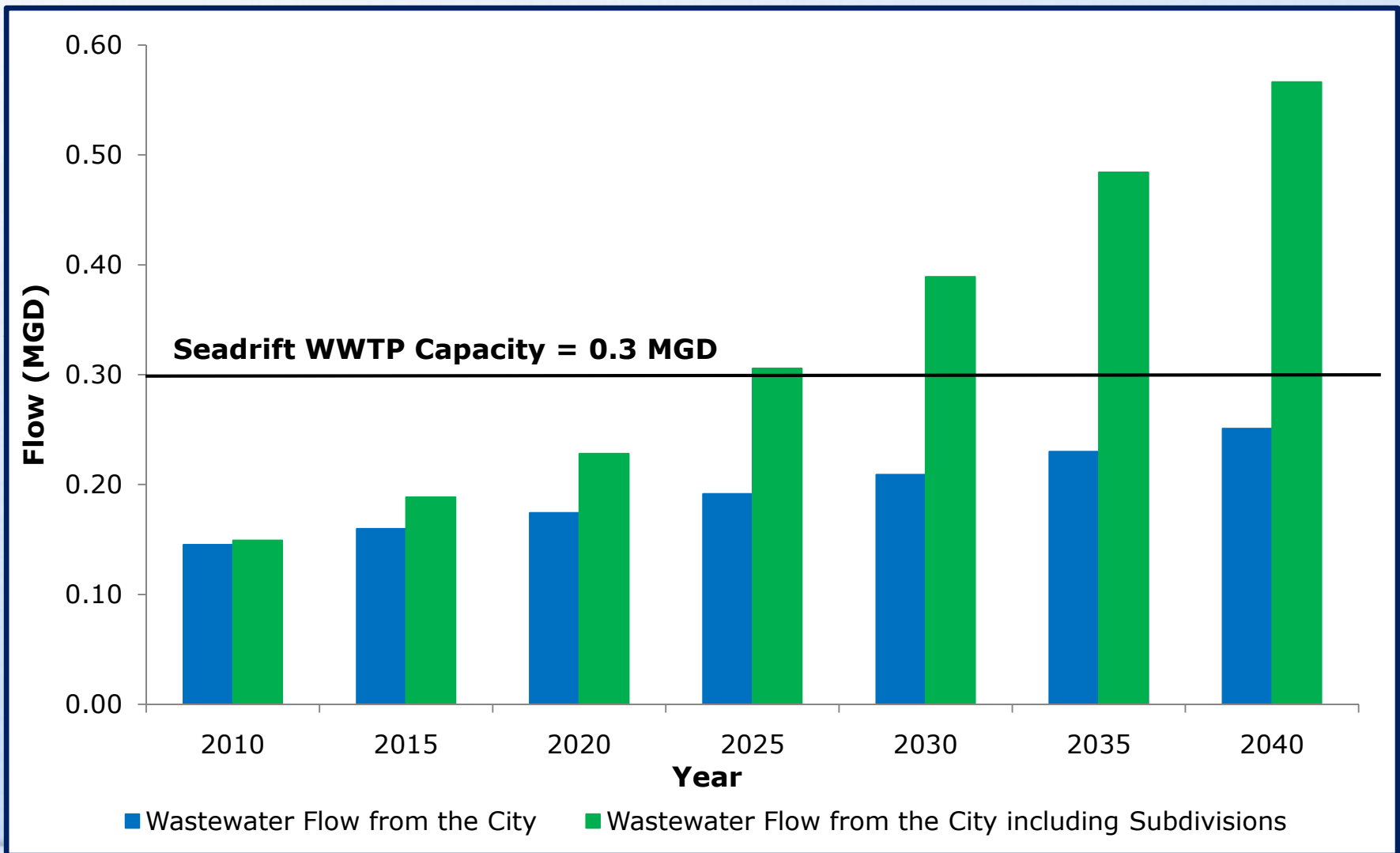
Wastewater Flow Projections: Area 1B



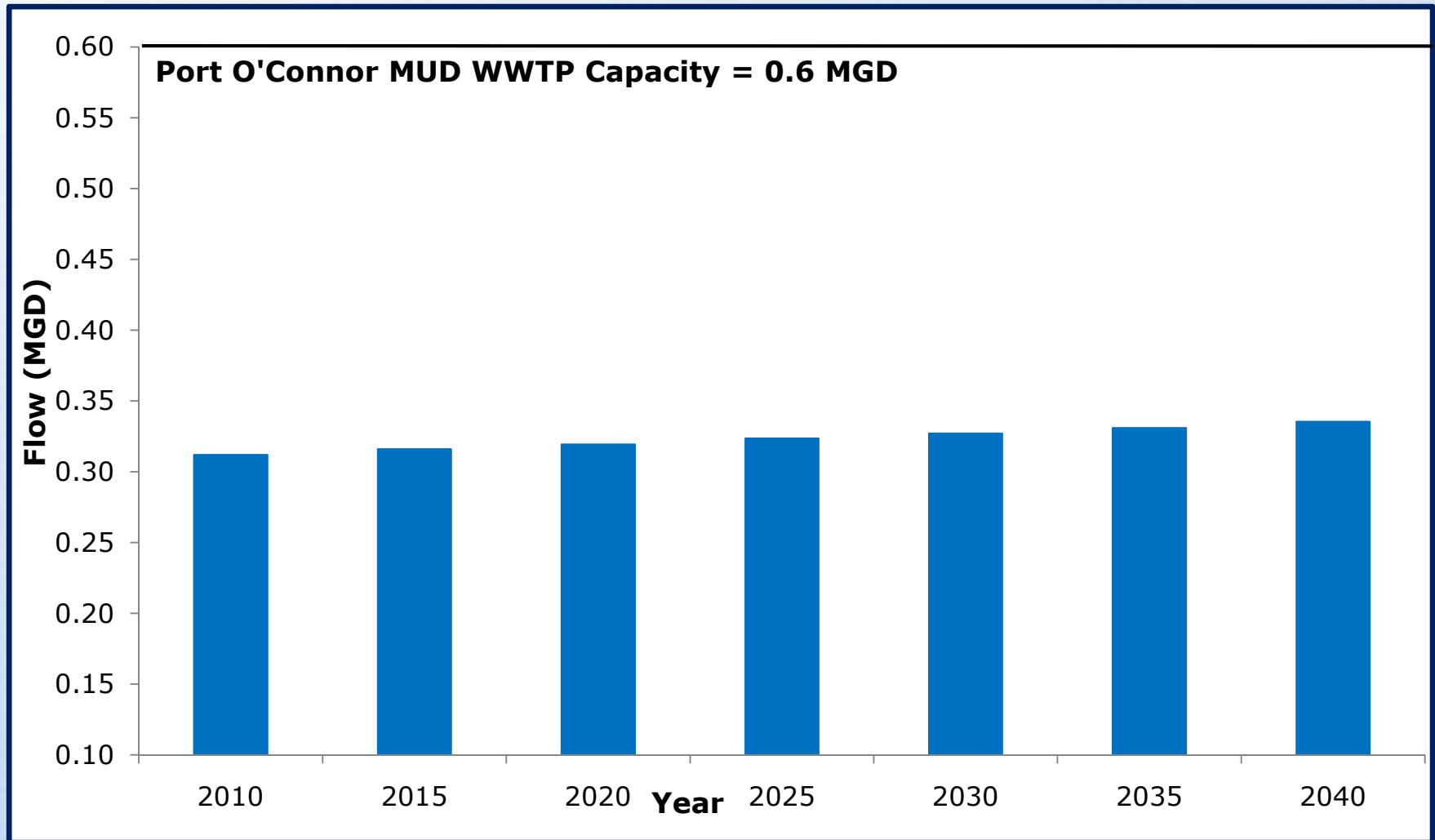
City of Seadrift: Wastewater Flow Projections



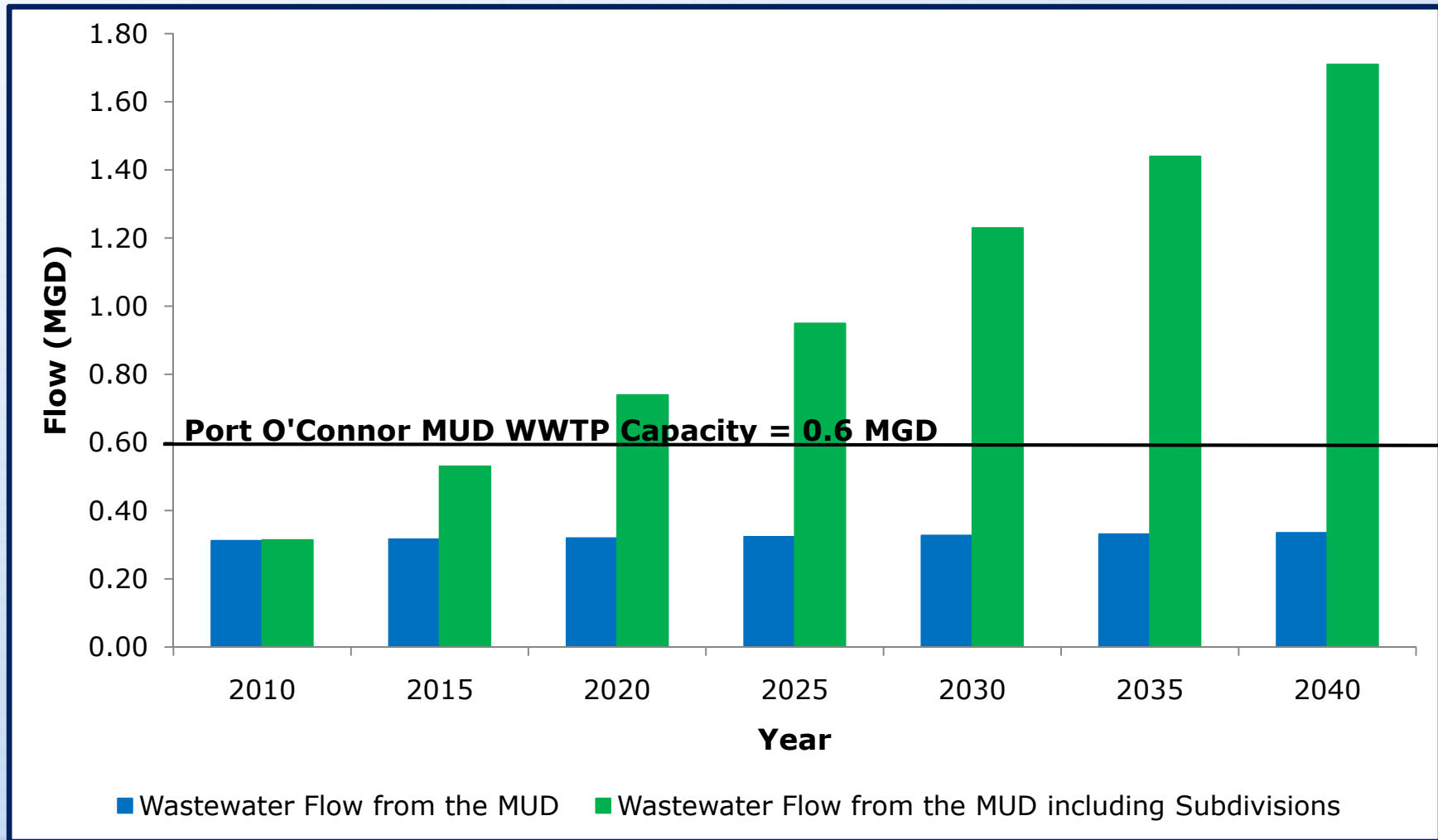
Wastewater Flow Projections: City of Seadrift - Area 2



Port O'Connor MUD: Wastewater Flow Projections

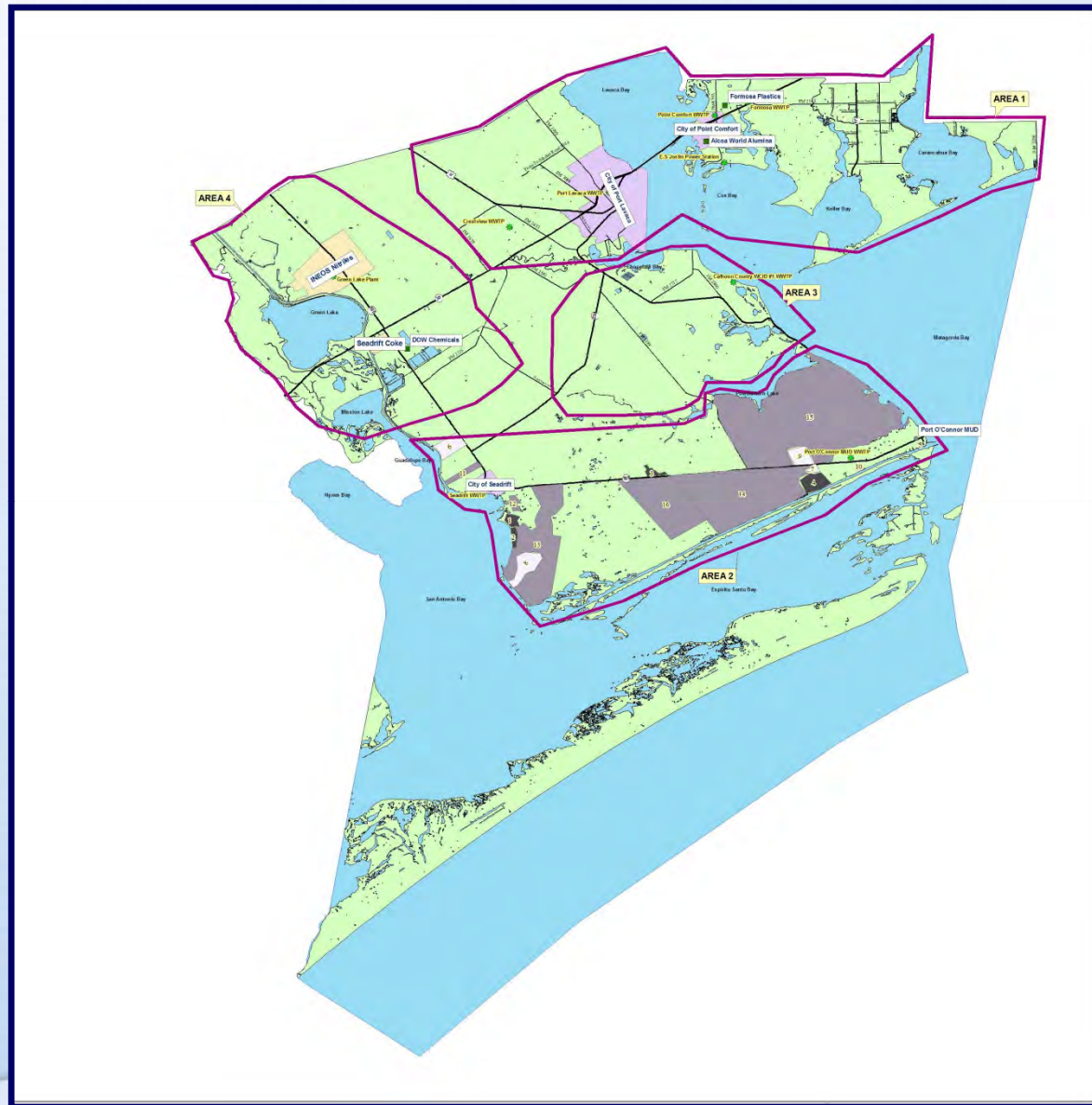


Wastewater Flow Projections: Port O'Connor MUD - Area 2

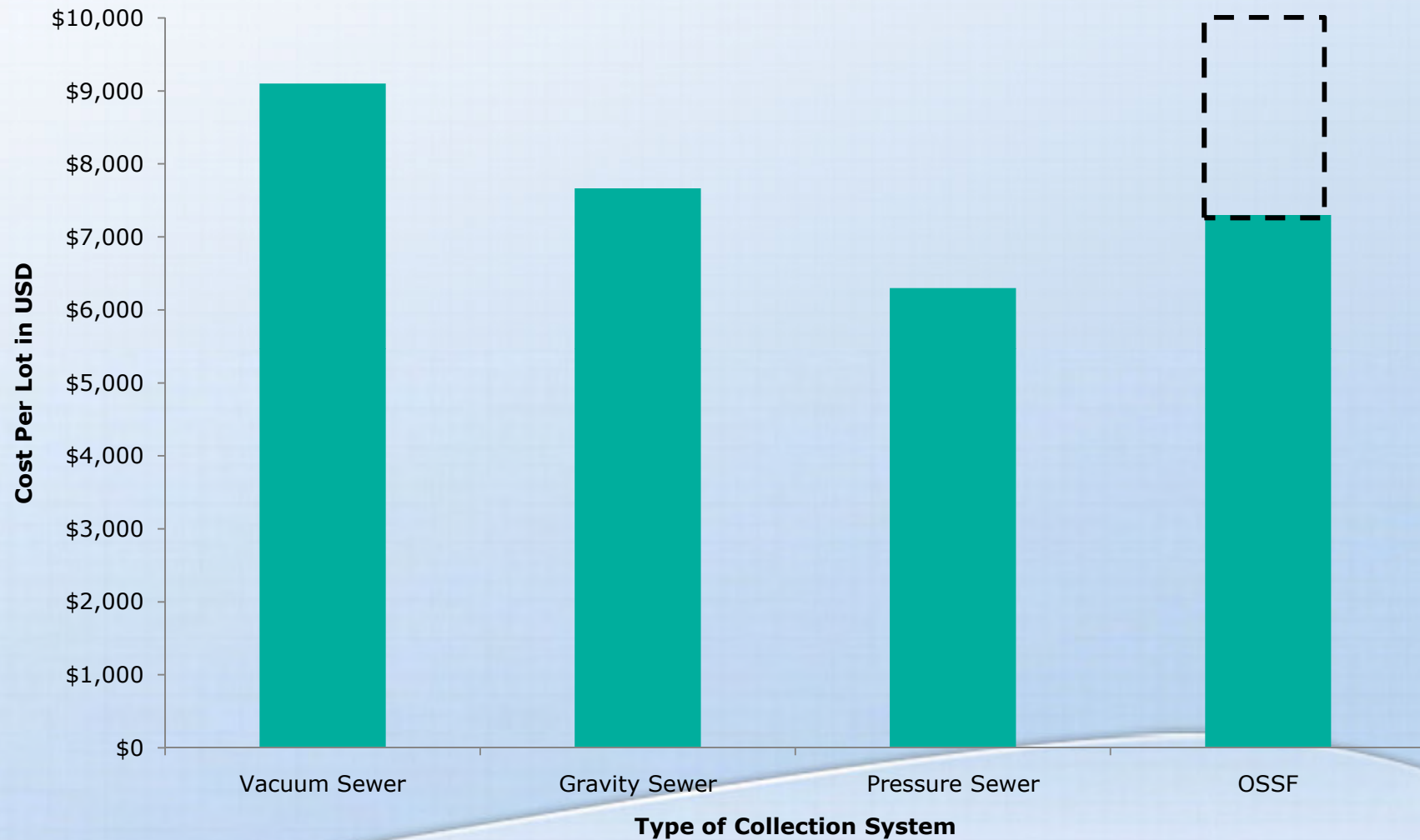


Analysis of Final Regional Alternatives

Study Area Overview



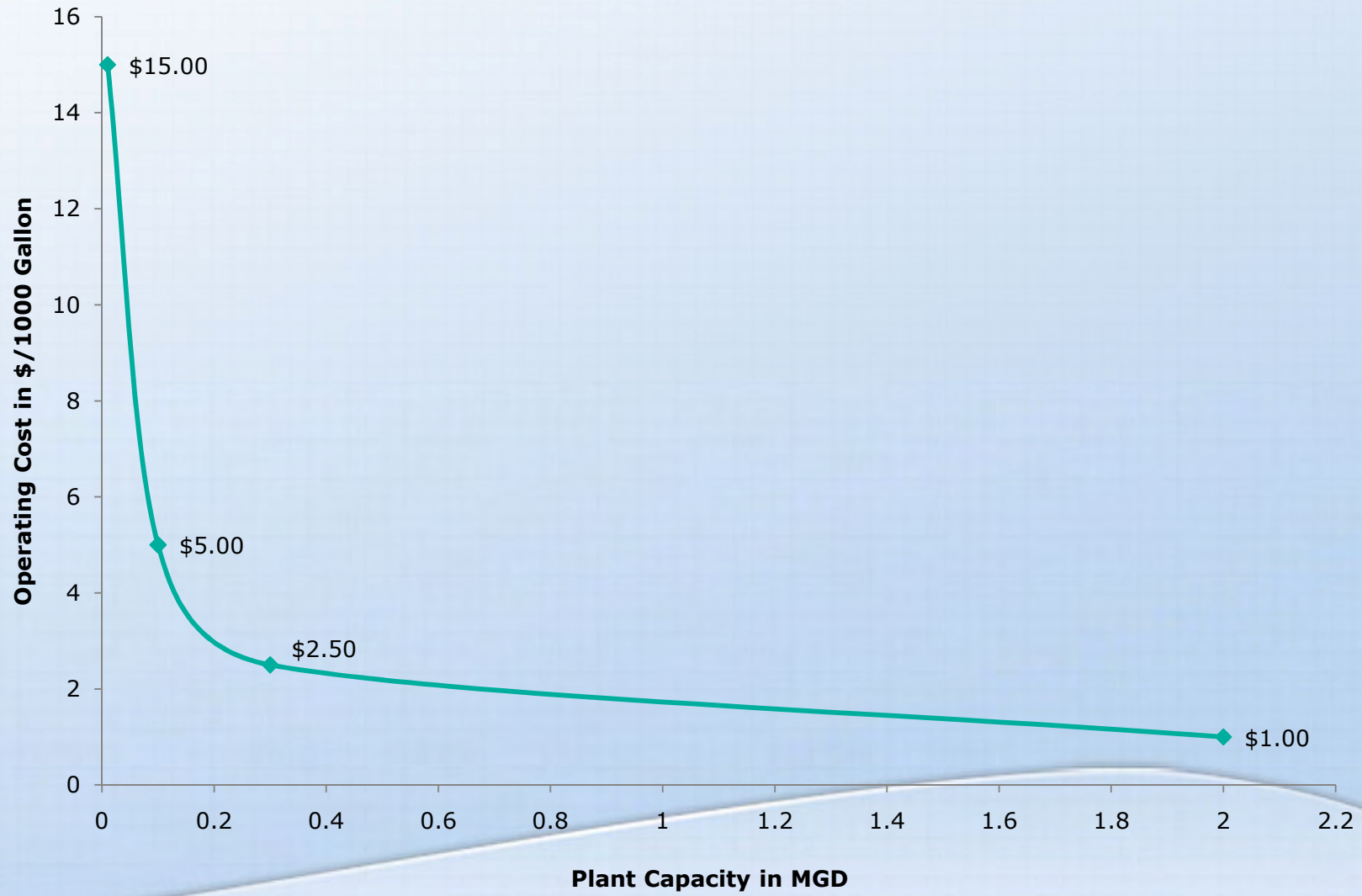
Collection System Alternatives



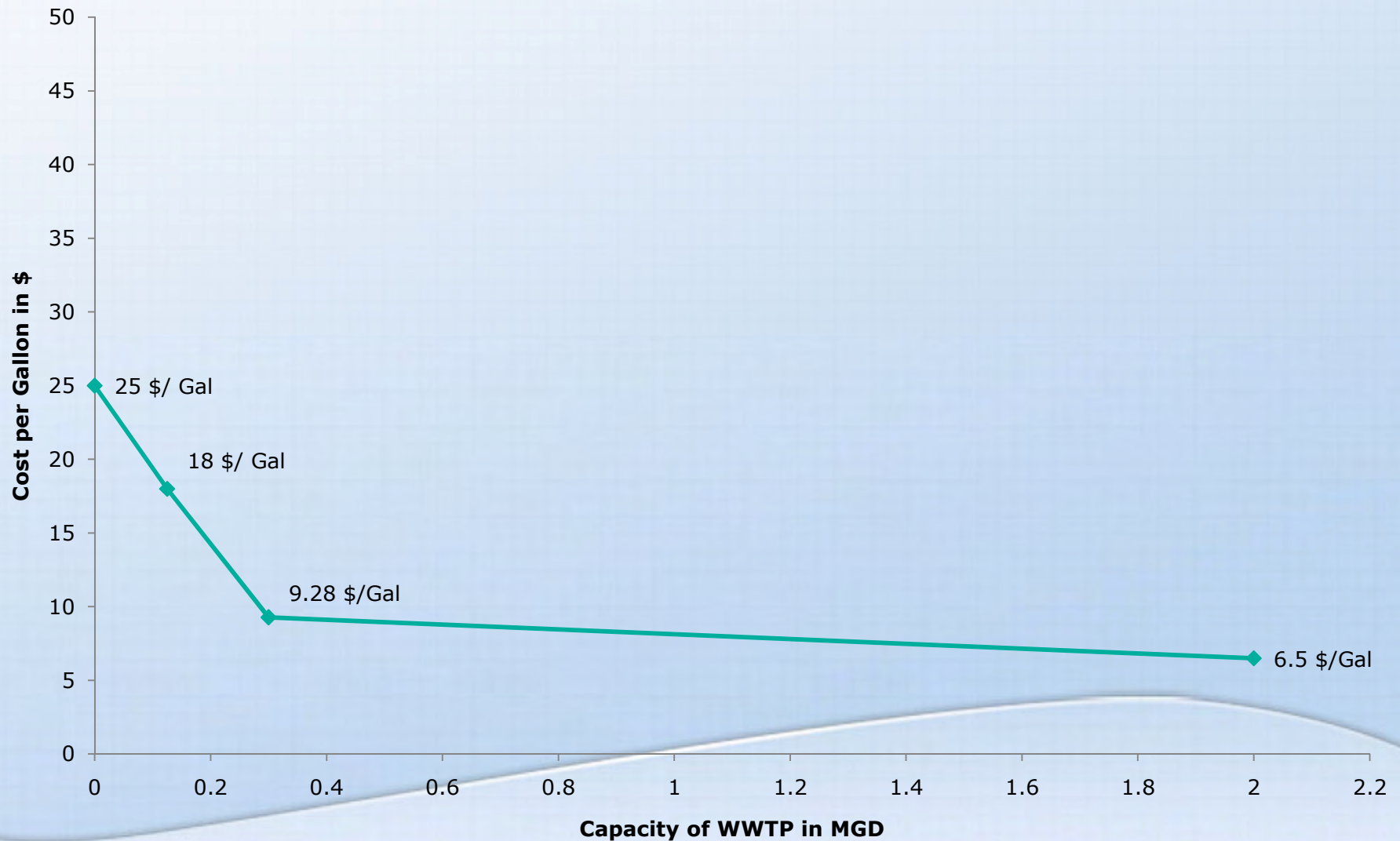
Assumptions for Cost Estimate

- ◆ **Pressure Sewer System**
- ◆ **Areas 1A, 1B & 3 assumed to qualify for Rural TWDB Loan (40 years, 3.92% interest)**
- ◆ **Contingency 15%**
- ◆ **Professional Services 20%**
- ◆ **City of Port Lavaca Sewer Fee: \$14 for first 2000 Gallons and \$4.90/1000 gallon after that**
- ◆ **For users outside city limits, wastewater rate is 1.5 times that of user within city limit**
- ◆ **O&M Cost: Graph in Next Slide**
- ◆ **Treatment Cost: See Graph**

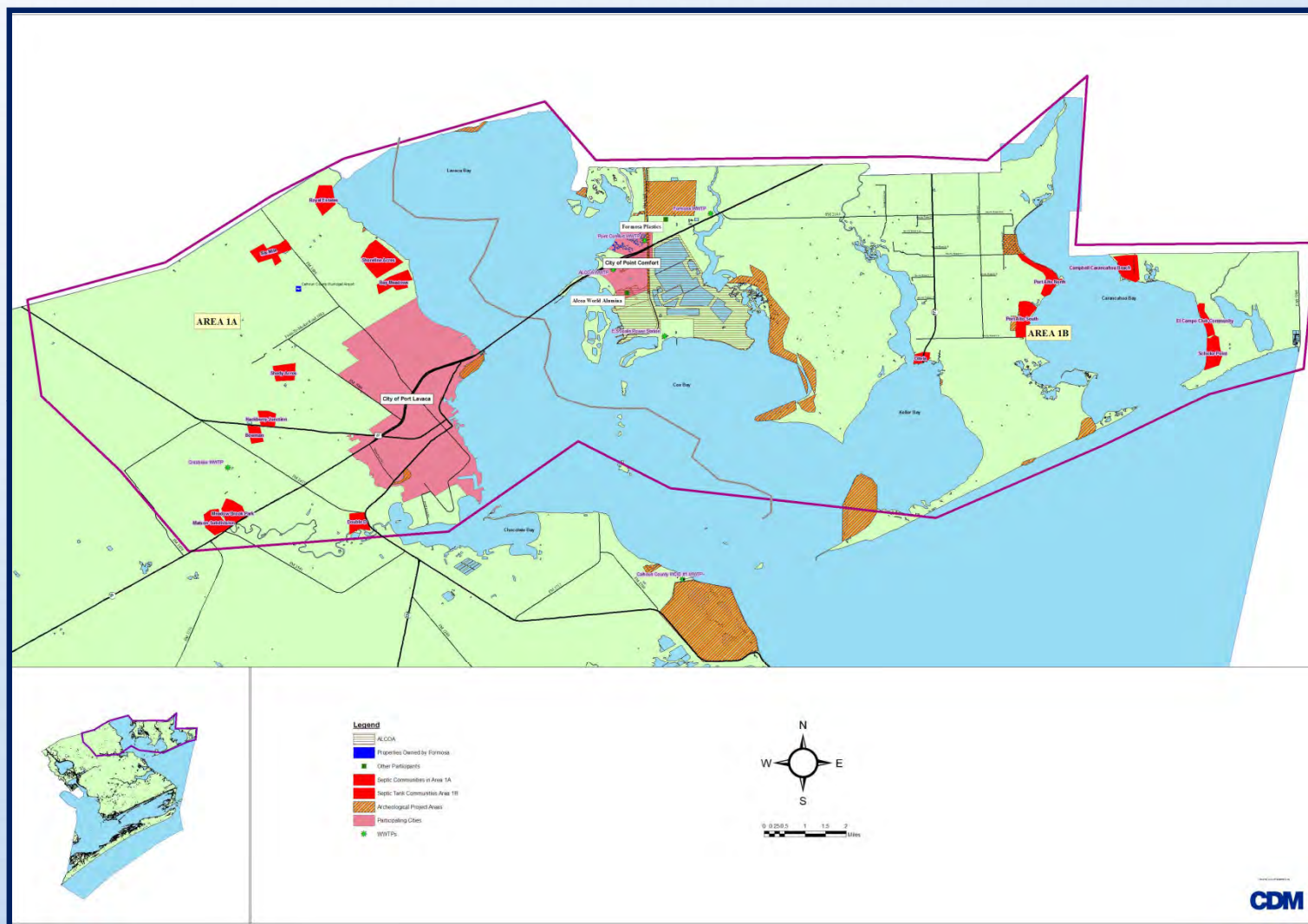
O&M Cost for WWTP Operation



Capacity of WWTP vs. Cost per Gallon



Area No. 1 Regional Options



Area No. 1A & 1B Regional Options

Wastewater Service

- 1) City of Port Lavaca provide wastewater service to Royal Estates, Shoreline Acres, Bay Meadows, Double D, Shady Acres, Meadow Brook Park, Bowman, Hackberry Junction, Matson Subdivision & Six Mile Area**
- 2) Install small package plant to serve Royal Estates, Shoreline Acres, Bay Meadows & Six Mile Area**
- 3) Crestview WWTP extend service to Meadow Brook Park, Bowman, Hackberry Junction & Matson Subdivision**
- 4) Install small package plant to serve Olivia and Port Alto WSC**

Area No. 1A & 1B Regional Options

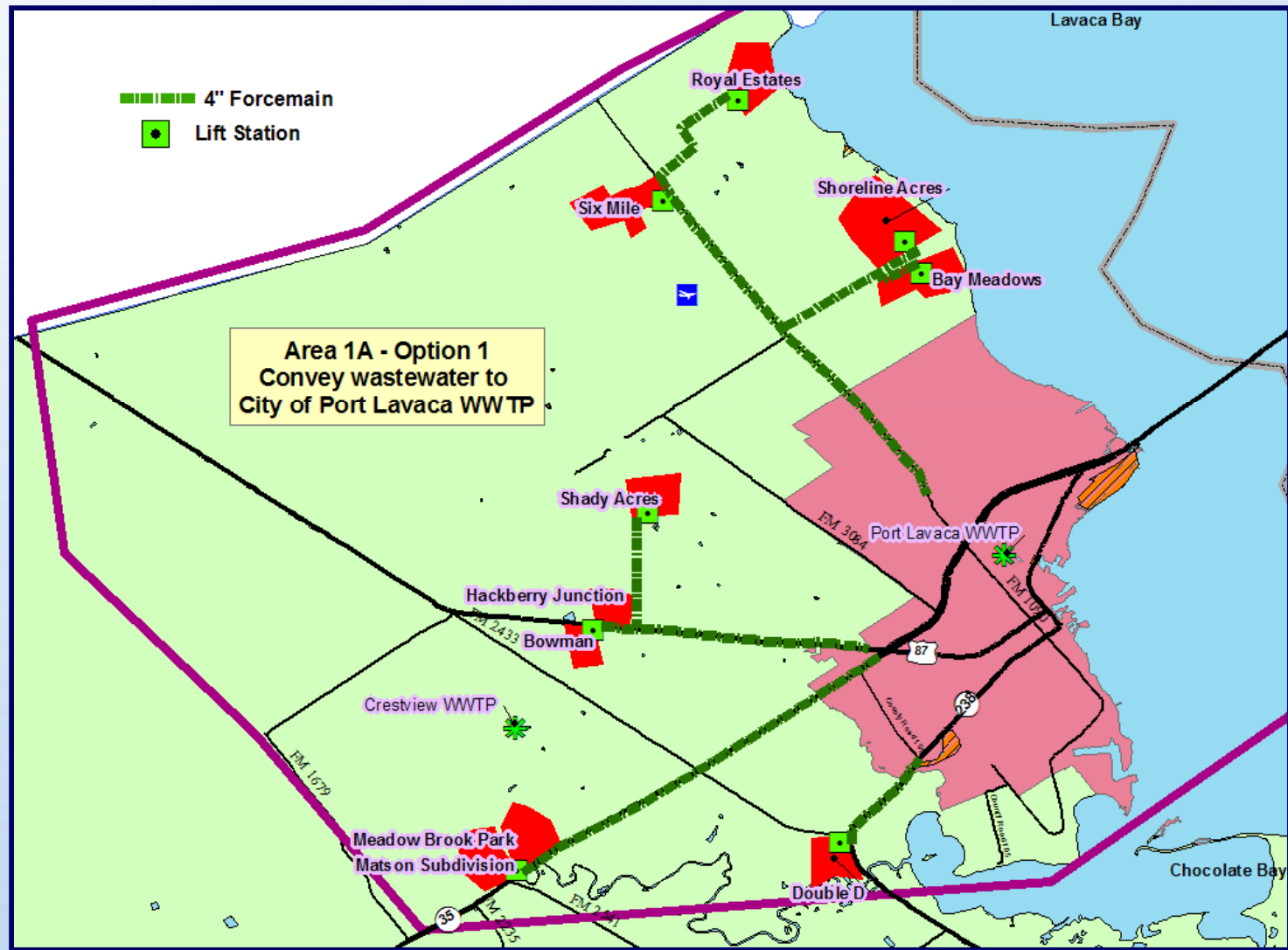
Wastewater Service (Cont.)

- 5) City of Point Comfort provide centralized wastewater service to Port Alto WSC, Olivia, and other developments in the area**
- 6) Install small package plant to serve Campbell Carancahua Beach Subdivision, El Campo Club Community & Schicke Point Community**

Reclaimed Water

- 1) Stand-alone alternative**
- 2) Formosa Plastics and Alcoa receive treated effluent/reuse from Cities of Point Comfort and Port Lavaca**

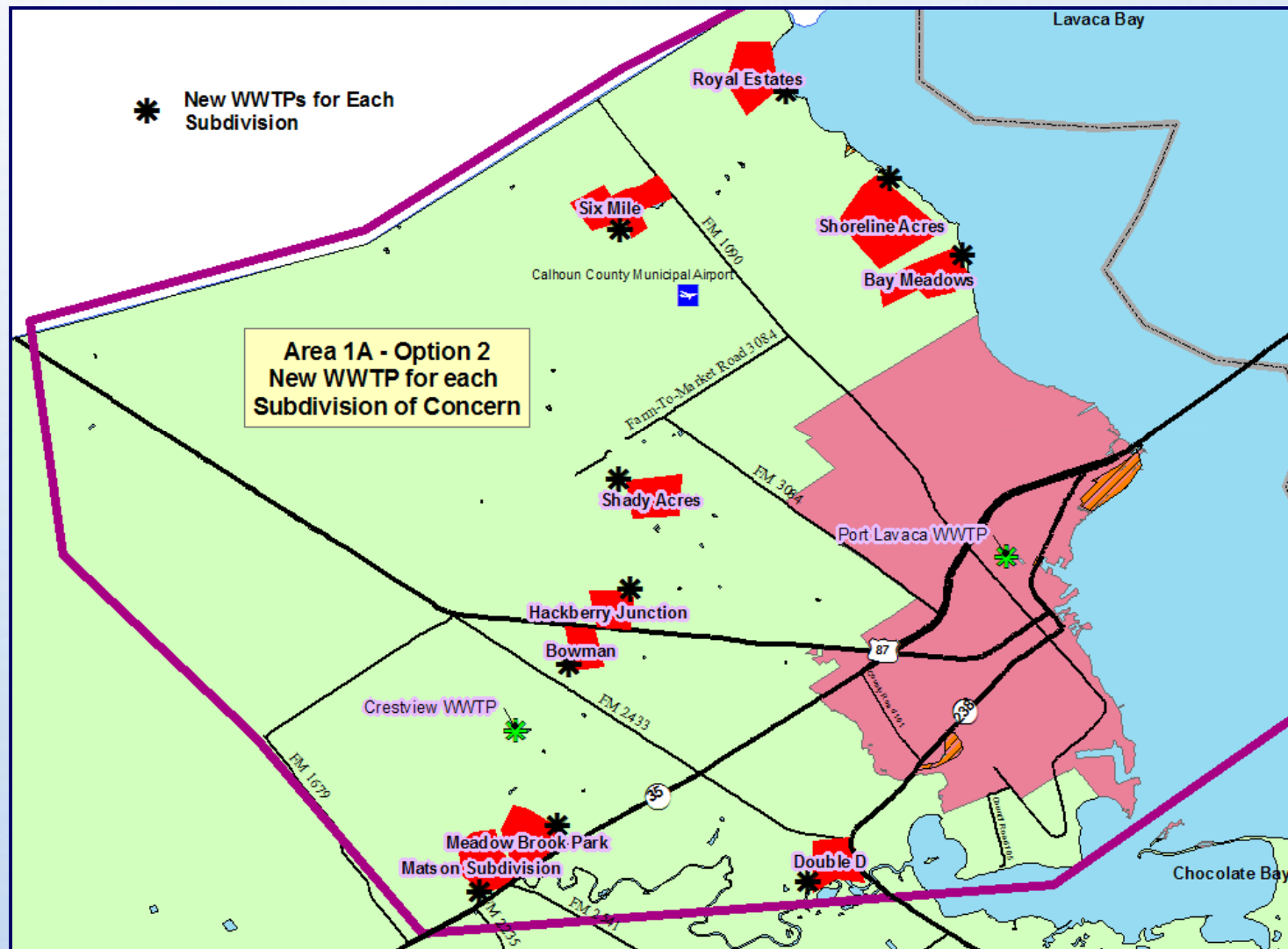
Area 1A – Option 1



Cost Estimate for Option 1

	Double D	Matson	Meadow Brook	Royal Estate	Shoreline Acres	Six Mile	Hackberry Junction	Bay Meadows	Bowman	Shady Acres
Lots	90	50	55	38	80	90	39	45	32	43
Flow (MGD)	0.02	0.01	0.01	0.01	0.02	0.02	0.01	0.01	0.01	0.01
Collection System \$	\$567,000.00	\$315,000.00	\$346,500.00	\$239,400.00	\$504,000.00	\$567,000.00	\$245,700.00	\$283,500.00	\$201,600.00	\$270,900.00
Force Main (4")	\$150,000.00	\$250,000.00	\$250,000.00	\$275,000.00	\$100,000.00	\$125,000.00	\$112,500.00	\$100,000.00	\$112,500.00	\$245,000.00
Force Main (6")	\$0.00	\$0.00	\$0.00	\$90,000.00	\$90,000.00	\$90,000.00	\$0.00	\$90,000.00	\$0.00	\$0.00
Lift Station (<0.50 MGD)	\$250,000.00	\$125,000.00	\$125,000.00	\$250,000.00	\$250,000.00	\$250,000.00	\$125,000.00	\$250,000.00	\$125,000.00	\$250,000.00
Subtotal	\$967,000.00	\$690,000.00	\$721,500.00	\$854,400.00	\$944,000.00	\$1,032,000.00	\$483,200.00	\$723,500.00	\$439,100.00	\$765,900.00
Contingencies (15%)	\$145,050.00	\$103,500.00	\$108,225.00	\$128,160.00	\$141,600.00	\$154,800.00	\$72,480.00	\$108,525.00	\$65,865.00	\$114,885.00
Subtotal	\$1,112,050.00	\$793,500.00	\$829,725.00	\$982,560.00	\$1,085,600.00	\$1,186,800.00	\$555,680.00	\$832,025.00	\$504,965.00	\$880,785.00
Professional Services (20%)	\$222,410.00	\$158,700.00	\$165,945.00	\$196,512.00	\$217,120.00	\$237,360.00	\$111,136.00	\$166,405.00	\$100,993.00	\$176,157.00
Subtotal	\$1,334,460.00	\$952,200.00	\$995,670.00	\$1,179,072.00	\$1,302,720.00	\$1,424,160.00	\$666,816.00	\$998,430.00	\$605,958.00	\$1,056,942.00
Total Capital Cost	\$1,334,460.00	\$952,200.00	\$995,670.00	\$1,179,072.00	\$1,302,720.00	\$1,424,160.00	\$666,816.00	\$998,430.00	\$605,958.00	\$1,056,942.00
Capital Cost/Lot	\$14,827.33	\$19,044.00	\$18,103.09	\$31,028.21	\$16,284.00	\$15,824.00	\$17,097.85	\$22,187.33	\$18,936.19	\$24,580.05
Annual Payment in \$	\$66,621.04	\$47,537.24	\$49,707.42	\$58,863.51	\$65,036.46	\$71,099.18	\$33,289.85	\$49,845.21	\$30,251.60	\$52,766.34
Electricity Cost for Operating LS in \$/yr	\$429.92	\$238.85	\$262.73	\$181.52	\$382.15	\$429.92	\$186.30	\$214.96	\$152.86	\$205.41
Monthly Payment/ Lot at full development	\$62.08	\$79.63	\$75.71	\$129.48	\$68.14	\$66.23	\$71.53	\$92.70	\$79.18	\$102.66
City Sewer Fee per Lot per month	\$61.43	\$61.43	\$61.43	\$61.43	\$61.43	\$61.43	\$61.43	\$61.43	\$61.43	\$61.43
Total Monthly Payment per lot	\$123.51	\$141.05	\$137.14	\$190.91	\$129.57	\$127.66	\$132.96	\$154.13	\$140.60	\$164.08

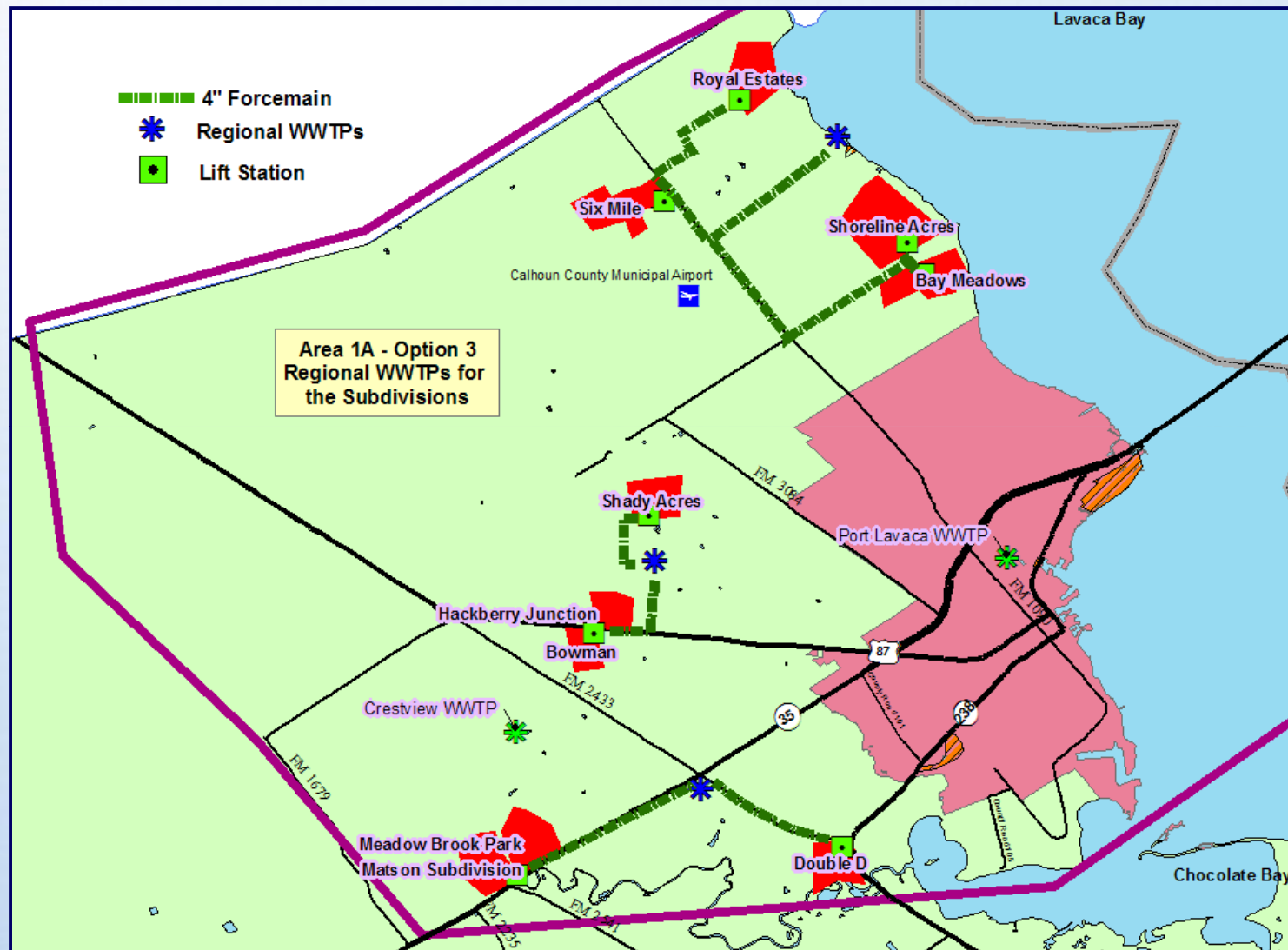
Area 1A – Option 2



Cost Estimate for Option 2

	Double D	Matson	Meadow Brook	Royal Estate	Shoreline Acres	Six Mile	Hackberry Junction	Bay Meadows	Bowman	Shady Acres
Lots	90	50	55	38	80	90	39	45	32	43
Plant Capacity (MGD)	0.02	0.01	0.01	0.01	0.02	0.02	0.01	0.01	0.01	0.01
Treatment Cost in \$	\$540,000.00	\$312,500.00	\$343,750.00	\$237,500.00	\$480,000.00	\$540,000.00	\$243,750.00	\$281,250.00	\$200,000.00	\$268,750.00
Collection Cost in \$	\$567,000.00	\$315,000.00	\$346,500.00	\$239,400.00	\$504,000.00	\$567,000.00	\$245,700.00	\$283,500.00	\$201,600.00	\$270,900.00
Subtotal	\$1,107,000.00	\$627,500.00	\$690,250.00	\$476,900.00	\$984,000.00	\$1,107,000.00	\$489,450.00	\$564,750.00	\$401,600.00	\$539,650.00
Contingencies (15%)	\$166,050.00	\$94,125.00	\$103,537.50	\$71,535.00	\$147,600.00	\$166,050.00	\$73,417.50	\$84,712.50	\$60,240.00	\$80,947.50
Subtotal	\$1,273,050.00	\$721,625.00	\$793,787.50	\$548,435.00	\$1,131,600.00	\$1,273,050.00	\$562,867.50	\$649,462.50	\$461,840.00	\$620,597.50
Professional Services (20%)	\$254,610.00	\$144,325.00	\$158,757.50	\$109,687.00	\$226,320.00	\$254,610.00	\$112,573.50	\$129,892.50	\$92,368.00	\$124,119.50
Subtotal	\$1,527,660.00	\$865,950.00	\$952,545.00	\$658,122.00	\$1,357,920.00	\$1,527,660.00	\$675,441.00	\$779,355.00	\$554,208.00	\$744,717.00
Total Capital Cost	\$1,527,660.00	\$865,950.00	\$952,545.00	\$658,122.00	\$1,357,920.00	\$1,527,660.00	\$675,441.00	\$779,355.00	\$554,208.00	\$744,717.00
Capital Cost/Lot	\$16,974.00	\$17,319.00	\$17,319.00	\$17,319.00	\$16,974.00	\$16,974.00	\$17,319.00	\$17,319.00	\$17,319.00	\$17,319.00
Annual Payment in \$	\$76,266.28	\$43,231.34	\$47,554.47	\$32,855.81	\$67,792.24	\$76,266.28	\$33,720.44	\$38,908.20	\$27,668.05	\$37,178.95
O & M Cost in \$	\$114,975.00	\$68,437.50	\$75,281.25	\$52,012.50	\$102,200.00	\$114,975.00	\$53,381.25	\$61,593.75	\$43,800.00	\$58,856.25
Monthly Payment/ Lot at full development	\$177.08	\$186.11	\$186.11	\$186.11	\$177.08	\$177.08	\$186.11	\$186.11	\$186.11	\$186.11

Area 1A – Option 3



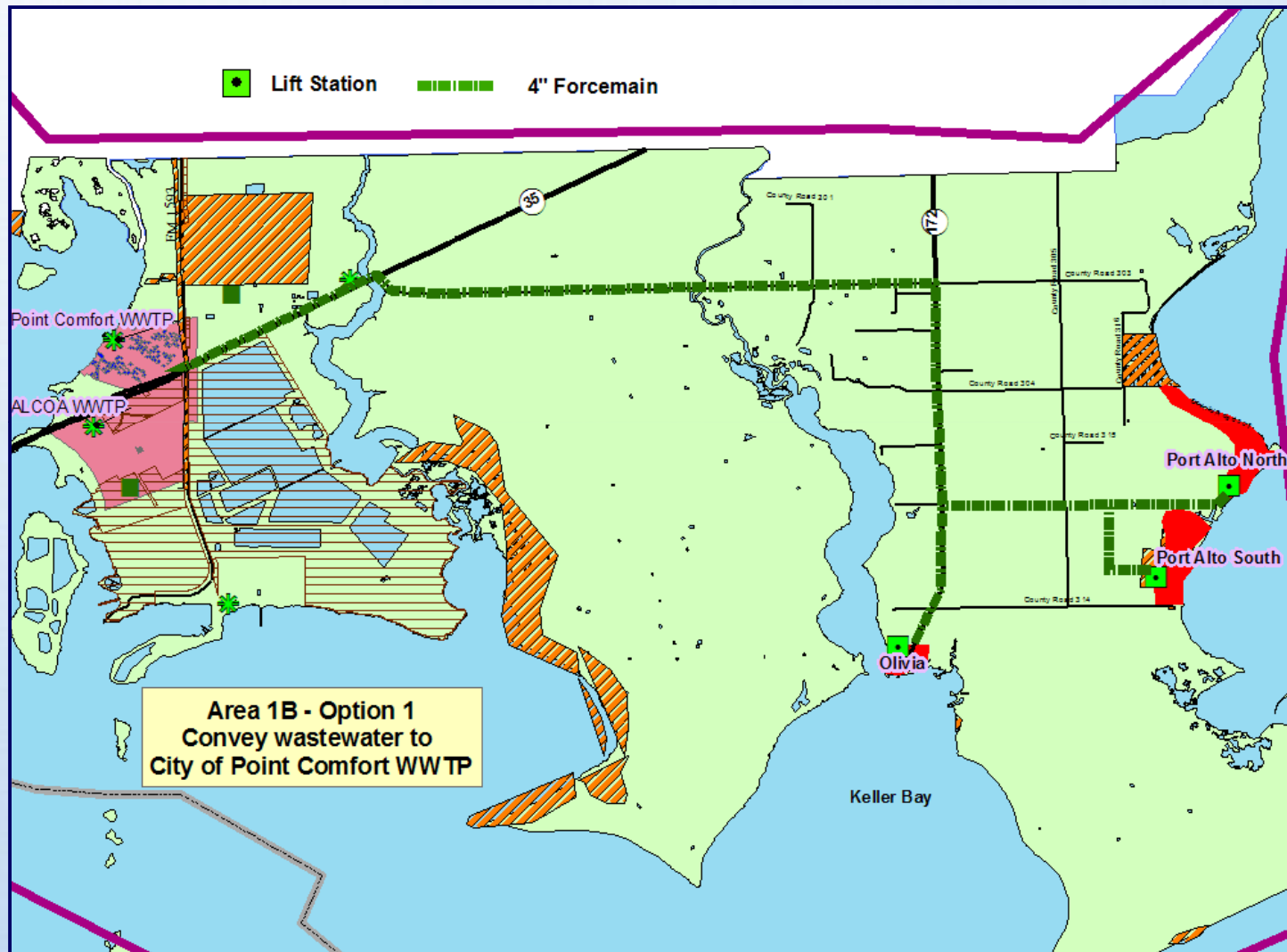
Cost Estimate for Option 3

	Double D	Matson	Meadow Brook	Bowman	Hackberry Junction	Shady Acres	Bay Meadows	Royal Estate	Shoreline Acres	Six Mile
Lots	90	50	55	32	39	43	45	38	80	90
Plant Capacity (MGD)	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.02
Regional Plant Capacity	0.05			0.03			0.06			
Treatment Cost in \$	\$1,072,500.00			\$641,250.00			\$1,328,250.00			
Treatment Cost in \$/subdivision	\$495,000.00	\$275,000.00	\$302,500.00	\$180,000.00	\$219,375.00	\$241,875.00	\$236,250.00	\$199,500.00	\$420,000.00	\$472,500.00
Forcemain/Lift Station cost in \$	\$450,000.00	\$250,000.00	\$250,000.00	\$225,000.00	\$225,000.00	\$350,000.00	\$450,000.00	\$450,000.00	\$450,000.00	\$375,000.00
Collection Cost in \$	\$567,000.00	\$315,000.00	\$346,500.00	\$201,600.00	\$245,700.00	\$270,900.00	\$283,500.00	\$239,400.00	\$504,000.00	\$567,000.00
Subtotal	\$1,512,000.00	\$840,000.00	\$899,000.00	\$606,600.00	\$690,075.00	\$862,775.00	\$969,750.00	\$888,900.00	\$1,374,000.00	\$1,414,500.00
Contingencies (15%)	\$226,800.00	\$126,000.00	\$134,850.00	\$90,990.00	\$103,511.25	\$129,416.25	\$145,462.50	\$133,335.00	\$206,100.00	\$212,175.00
Subtotal	\$1,738,800.00	\$966,000.00	\$1,033,850.00	\$697,590.00	\$793,586.25	\$992,191.25	\$1,115,212.50	\$1,022,235.00	\$1,580,100.00	\$1,626,675.00
Professional Services (20%)	\$347,760.00	\$193,200.00	\$206,770.00	\$139,518.00	\$158,717.25	\$198,438.25	\$223,042.50	\$204,447.00	\$316,020.00	\$325,335.00
Subtotal	\$2,086,560.00	\$1,159,200.00	\$1,240,620.00	\$837,108.00	\$952,303.50	\$1,190,629.50	\$1,338,255.00	\$1,226,682.00	\$1,896,120.00	\$1,952,010.00
Total Capital Cost	\$2,086,560.00	\$1,159,200.00	\$1,240,620.00	\$837,108.00	\$952,303.50	\$1,190,629.50	\$1,338,255.00	\$1,226,682.00	\$1,896,120.00	\$1,952,010.00
Capital Cost/Lot	\$23,184.00	\$23,184.00	\$22,556.73	\$26,159.63	\$24,418.04	\$27,689.06	\$29,739.00	\$32,281.11	\$23,701.50	\$21,689.00
Annual Payment in \$	\$104,168.57	\$57,871.43	\$61,936.21	\$41,791.44	\$47,542.41	\$59,440.50	\$66,810.50	\$61,240.37	\$94,661.12	\$97,451.35
Electricity Cost for Operating Lsin \$/yr	\$429.92	\$238.85	\$262.73	\$152.86	\$186.30	\$205.41	\$214.96	\$181.52	\$382.15	\$429.92
O & M Cost in \$	\$65,700.00	\$36,500.00	\$40,150.00	\$24,820.00	\$30,249.38	\$33,351.88	\$26,690.63	\$22,538.75	\$47,450.00	\$53,381.25
Monthly Payment/ Lot at full developemnt	\$157.35	\$157.40	\$154.78	\$173.64	\$166.36	\$179.96	\$173.27	\$183.87	\$148.10	\$139.72

Assumptions

- ◆ **City of Port Lavaca Sewer Fee was adopted for Area 1B**

Area 1B –Option 1

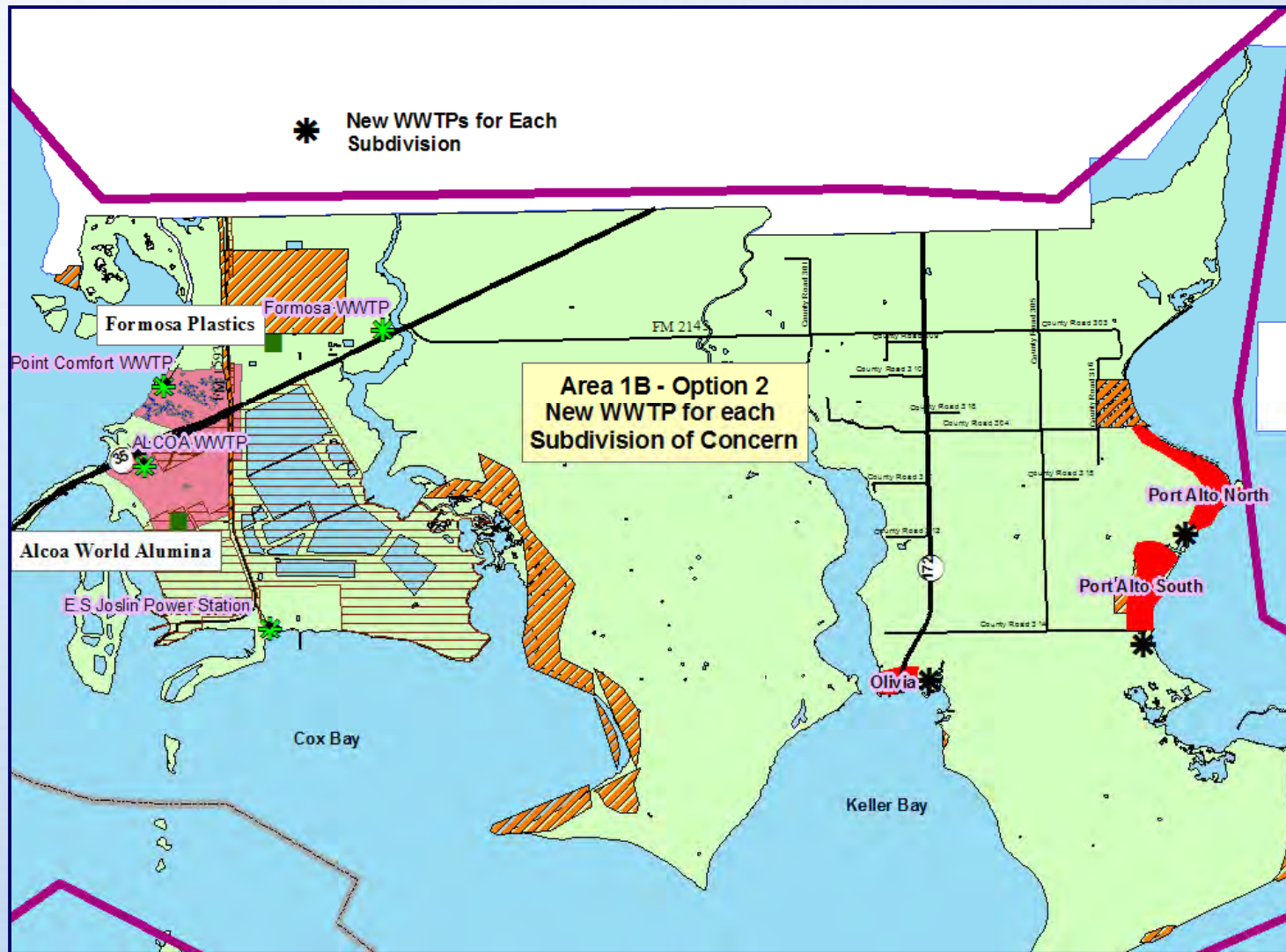


Cost Estimate for Option 1

	Port Alto South	Port Alto North	Olivia
Lots	118	140	68
Flow (MGD)	0.03	0.04	0.02
Collection System \$	\$743,400.00	\$882,000.00	\$428,400.00
Force Main (4")	\$700,000.00	\$700,000.00	\$725,000.00
Lift Station (<0.50 MGD)	\$250,000.00	\$250,000.00	\$250,000.00
Subtotal	\$1,693,400.00	\$1,832,000.00	\$1,403,400.00
Contingencies (15%)	\$254,010.00	\$274,800.00	\$210,510.00
Subtotal	\$1,947,410.00	\$2,106,800.00	\$1,613,910.00
Professional Services (20%)	\$389,482.00	\$421,360.00	\$322,782.00
Subtotal	\$2,336,892.00	\$2,528,160.00	\$1,936,692.00
Total Capital Cost	\$2,336,892.00	\$2,528,160.00	\$1,936,692.00
Capital Cost/Lot	\$19,804.17	\$18,058.29	\$28,480.76
Annual Payment in \$	\$116,666.04	\$126,214.83	\$96,686.62
Electricity Cost for operating LS in \$/yr	\$563.68	\$668.77	\$324.83
Monthly Payment/ Lot at full development	\$82.79	\$75.53	\$118.89
City Sewer Fee Per Lot	\$61.43	\$61.43	\$61.43
Total Monthly Fee	\$144.21	\$136.95	\$180.31

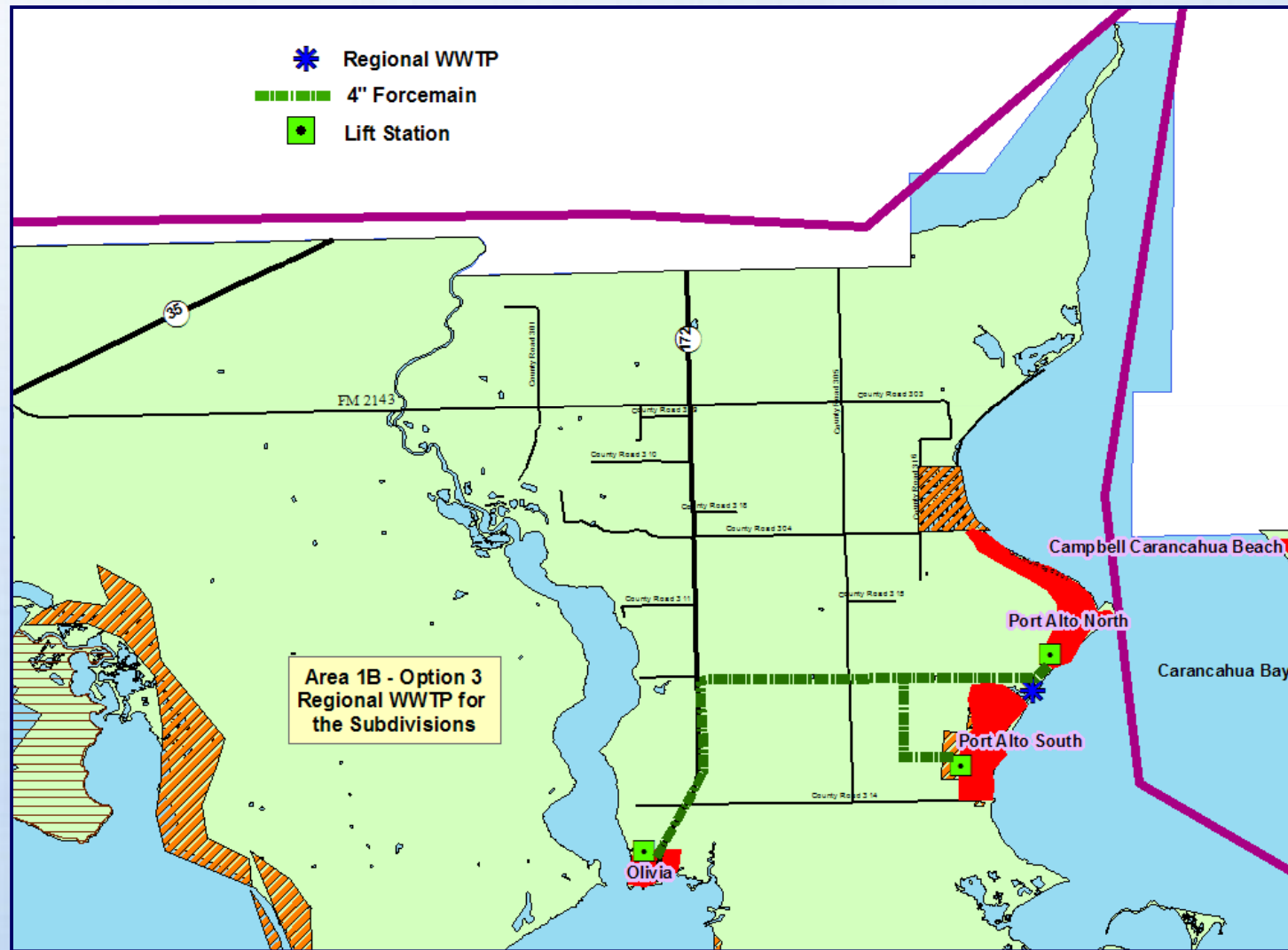
Area 1B – Option 2

The map displays the geographical area of concern, bounded by a thick purple line. A legend at the top indicates that black asterisks represent "New WWTPs for Each Subdivision". The map includes several labeled locations: Formosa Plastics, Point Comfort WWTP, ALCOA WWTP, Alcoa World Alumina, E.S. Joslin Power Station, Cox Bay, Keller Bay, Olivia, Port Alto North, and Port Alto South. A central yellow box contains the text "Area 1B - Option 2 New WWTP for each Subdivision of Concern". Various roads are shown, including FM 2145, County Road 210, County Road 212, County Road 214, County Road 216, County Road 218, County Road 220, County Road 222, County Road 224, County Road 226, County Road 228, County Road 230, County Road 232, County Road 234, County Road 236, County Road 238, County Road 240, County Road 242, County Road 244, County Road 246, County Road 248, County Road 250, County Road 252, County Road 254, County Road 256, County Road 258, County Road 260, County Road 262, County Road 264, County Road 266, County Road 268, County Road 270, County Road 272, County Road 274, County Road 276, County Road 278, County Road 280, County Road 282, County Road 284, County Road 286, County Road 288, County Road 290, County Road 292, County Road 294, County Road 296, County Road 298, County Road 300, County Road 302, County Road 304, County Road 306, County Road 308, County Road 310, County Road 312, County Road 314, County Road 316, County Road 318, County Road 320, 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County Road 674, County Road 676, County Road 678, County Road 680, County Road 682, County Road 684, County Road 686, County Road 688, County Road 690, County Road 692, County Road 694, County Road 696, County Road 698, County Road 700, County Road 702, County Road 704, County Road 706, County Road 708, County Road 710, County Road 712, County Road 714, County Road 716, County Road 718, County Road 720, County Road 722, County Road 724, County Road 726, County Road 728, County Road 730, County Road 732, County Road 734, County Road 736, County Road 738, County Road 740, County Road 742, County Road 744, County Road 746, County Road 748, County Road 750, County Road 752, County Road 754, County Road 756, County Road 758, County Road 760, County Road 762, County Road 764, County Road 766, County Road 768, County Road 770, County Road 772, County Road 774, County Road 776, County Road 778, County Road 780, County Road 782, County Road 784, County Road 786, County Road 788, County Road 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Road 908, County Road 910, County Road 912, County Road 914, County Road 916, County Road 918, County Road 920, County Road 922, County Road 924, County Road 926, County Road 928, County Road 930, County Road 932, County Road 934, County Road 936, County Road 938, County Road 940, County Road 942, County Road 944, County Road 946, County Road 948, County Road 950, County Road 952, County Road 954, County Road 956, County Road 958, County Road 960, County Road 962, County Road 964, County Road 966, County Road 968, County Road 970, County Road 972, County Road 974, County Road 976, County Road 978, County Road 980, County Road 982, County Road 984, County Road 986, County Road 988, County Road 990, County Road 992, County Road 994, County Road 996, County Road 998, County Road 1000.



Cost Estimate for Option 2

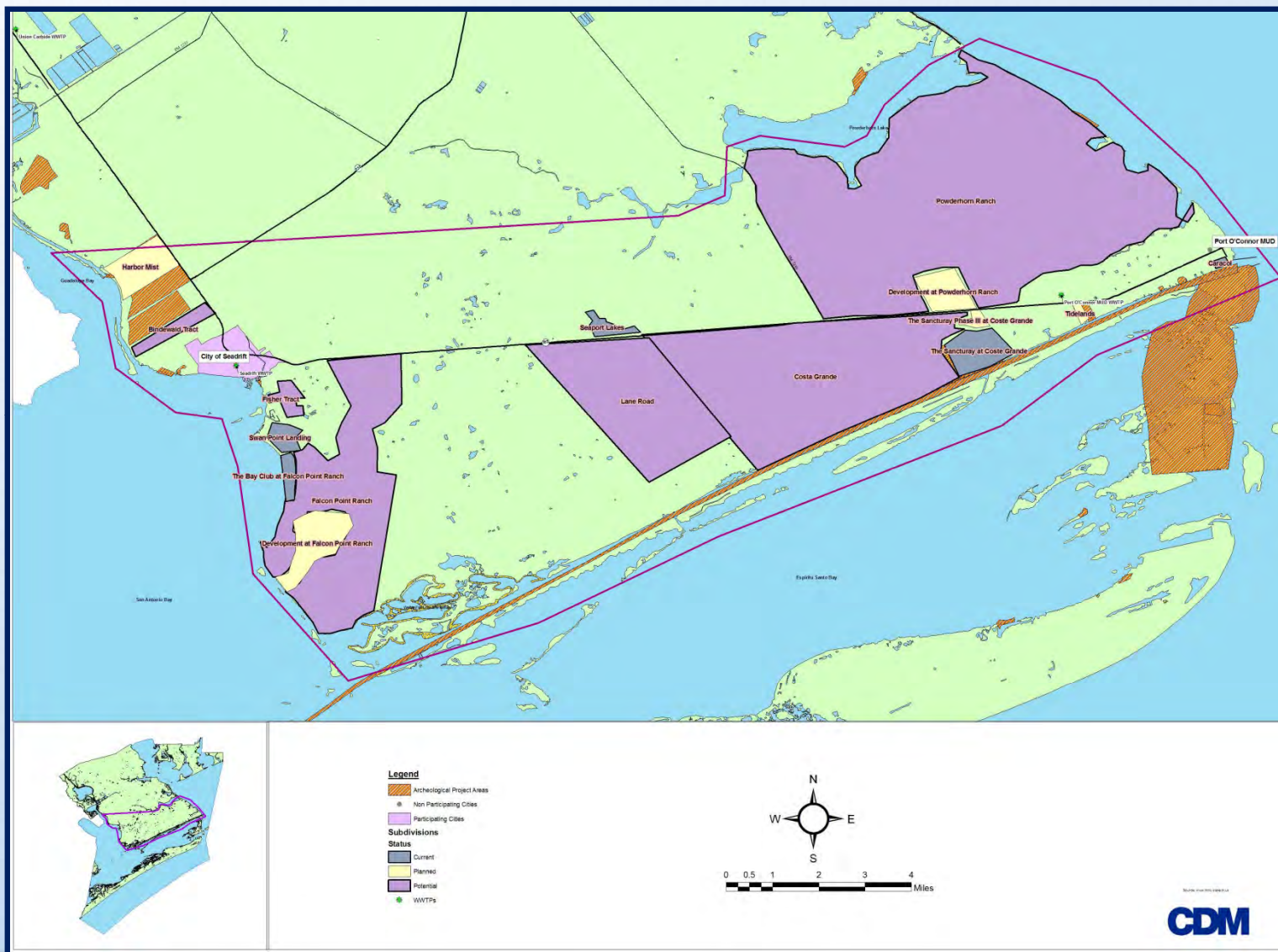
	Port Alto South	Port Alto North	Olivia
Lots	118	140	68
Plant Capacity (MGD)	0.03	0.04	0.02
Treatment Cost in \$	\$678,500.00	\$787,500.00	\$408,000.00
Collection Cost in \$	\$743,400.00	\$882,000.00	\$428,400.00
Subtotal	\$1,421,900.00	\$1,669,500.00	\$836,400.00
Contingencies (15%)	\$213,285.00	\$250,425.00	\$125,460.00
Subtotal	\$1,635,185.00	\$1,919,925.00	\$961,860.00
Professional Services (20%)	\$327,037.00	\$383,985.00	\$192,372.00
Subtotal	\$1,962,222.00	\$2,303,910.00	\$1,154,232.00
Total Capital Cost	\$1,962,222.00	\$2,303,910.00	\$1,154,232.00
Capital Cost/Lot	\$16,629.00	\$16,456.50	\$16,974.00
Annual Payment in \$	\$97,961.17	\$115,019.46	\$57,623.41
O & M Cost in \$	\$107,675.00	\$123,917.50	\$86,870.00
Monthly Payment/ Lot at full development	\$145.22	\$142.22	\$177.08

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Cost Estimate for Option 3

	Port Alto South	Port Alto North	Olivia
Lots	118	140	68
Plant Capacity (MGD)	0.03	0.04	0.02
Regional Plant Capacity	0.08		
Treatment Cost in \$	\$1,630,000.00		
Treatment Cost in \$/Subdivision	\$590,000.00	\$700,000.00	\$340,000.00
Forcemain/Lift Station cost in \$	\$275,000.00	\$275,000.00	\$550,000.00
Collection Cost in \$	\$743,400.00	\$882,000.00	\$428,400.00
Subtotal	\$1,608,400.00	\$1,857,000.00	\$1,318,400.00
Contingencies (15%)	\$241,260.00	\$278,550.00	\$197,760.00
Subtotal	\$1,849,660.00	\$2,135,550.00	\$1,516,160.00
Professional Services (20%)	\$369,932.00	\$427,110.00	\$303,232.00
Subtotal	\$2,219,592.00	\$2,562,660.00	\$1,819,392.00
Total Capital Cost	\$2,219,592.00	\$2,562,660.00	\$1,819,392.00
Capital Cost/Lot	\$18,810.10	\$18,304.71	\$26,755.76
Annual Payment in \$	\$110,810.01	\$127,937.19	\$90,830.59
Electricity Cost for operating LS in \$/yr	\$563.68	\$668.77	\$324.83
O & M Cost in \$	\$43,070.00	\$51,100.00	\$24,820.00
Monthly Payment/ Lot at full development	\$109.07	\$106.97	\$142.13

Area No. 2 Regional Options



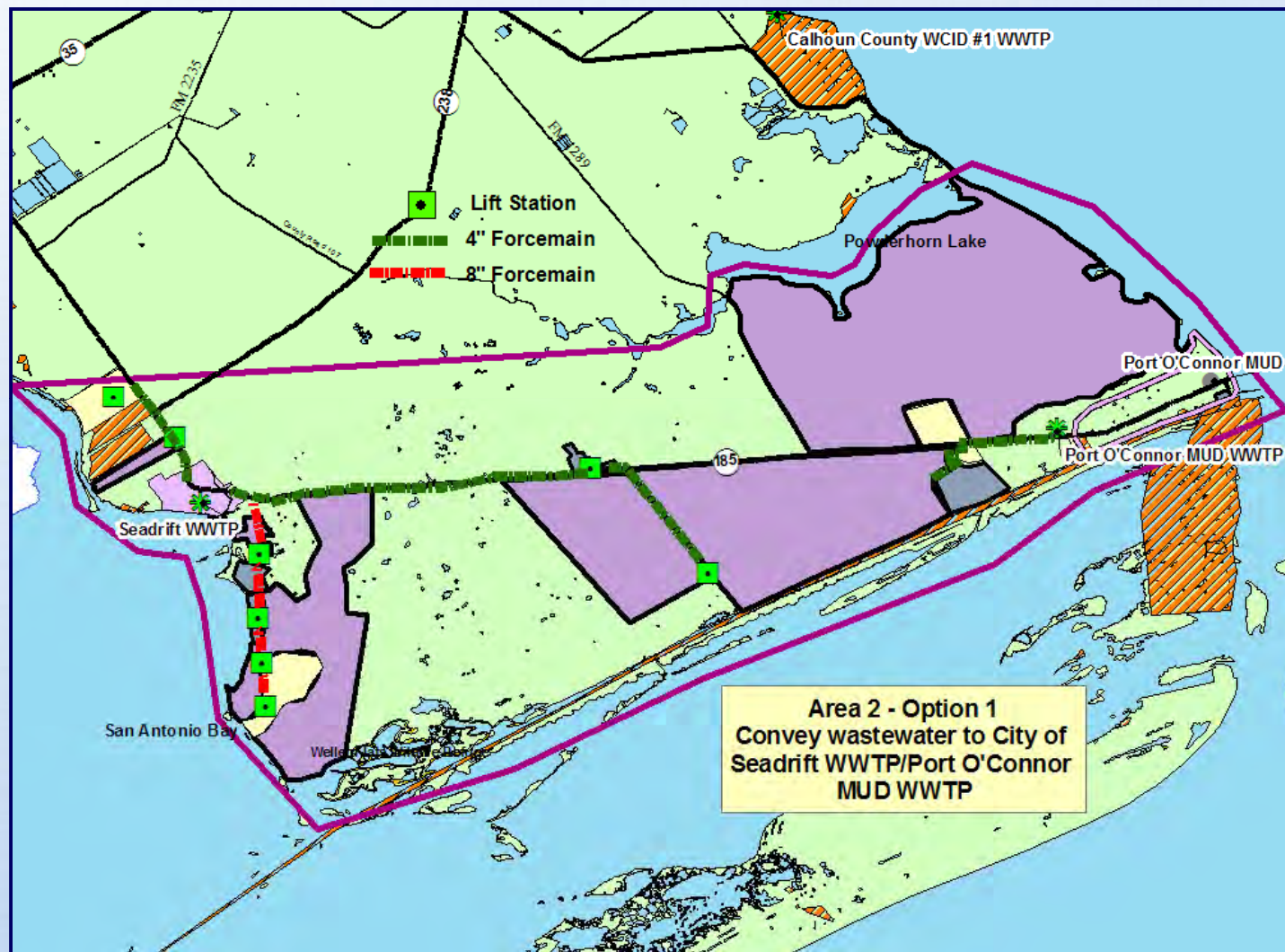
Assumptions

- ◆ **TWDB Funding option of 22 years and 5.5% interest rate was used to calculate Cost**
- ◆ **All cost have been calculated for subdivisions at full development**

Area No. 2 Regional Options

- 1) a. City of Seadrift serve Swan Point Landing, Falcon Point and others located in close proximity**
b. Port O'Connor MUD extend wastewater service west along Highway 185 to Lane Road Development, The Sanctuary, Powder Horn Ranch & Costa Grande
- 2) City of Seadrift and Port O'Connor MUD provide wastewater service to their existing areas; install package plant near Lane Road Development to serve developments along Highway 185**

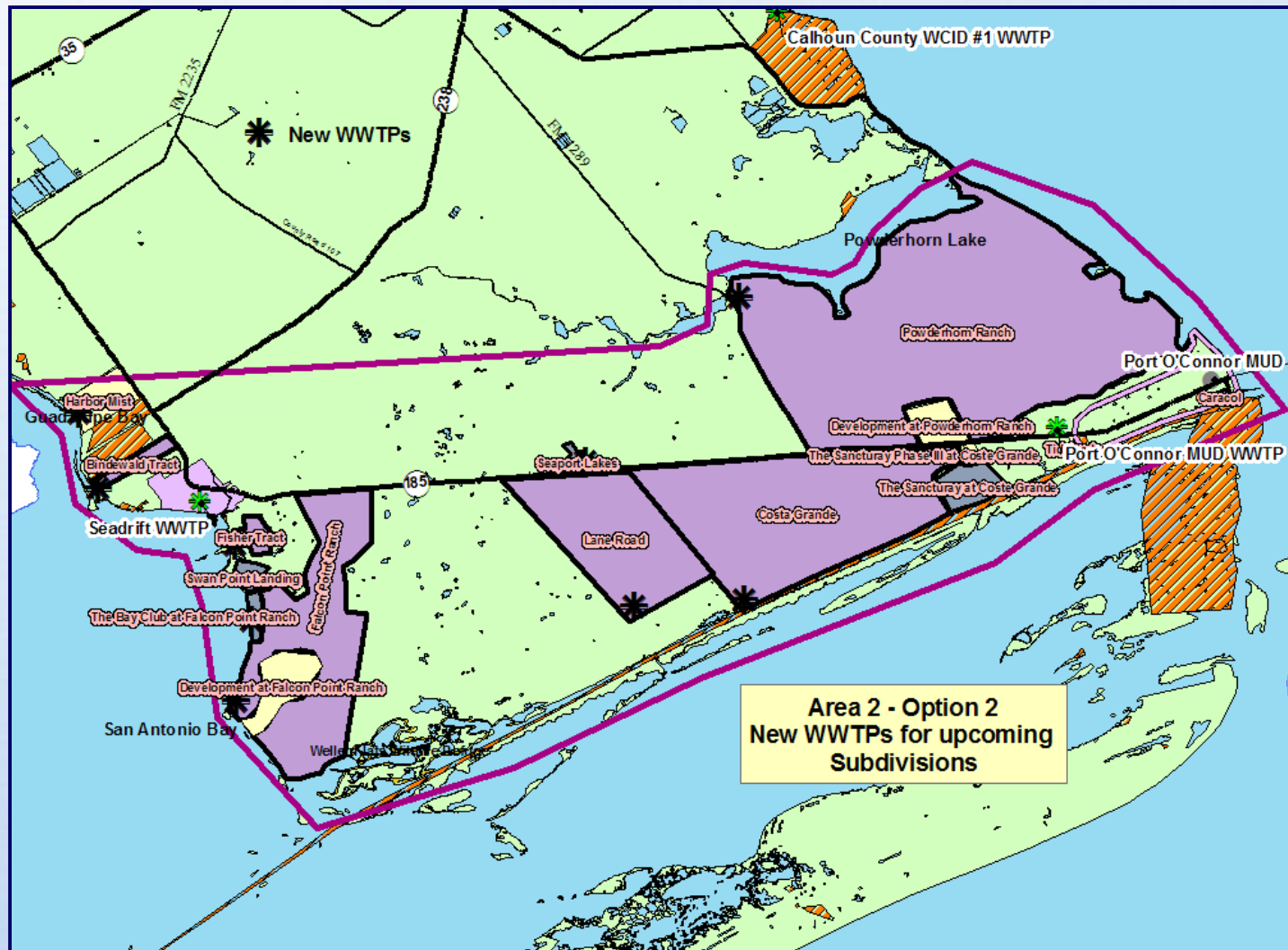
Area 2 – Option 1



Cost Estimate for Option 1

	Harbor Mist	Bindewald	Fisher	Swan Point Landing	Falcon Point	Seaport Lakes	Lane Road	Costa Grande	Powderhorn
Lots	225	300	300	89	1608	56	375	8900	500
Plant Capacity (MGD)	0.06	0.08	0.08	0.02	0.40	0.01	0.09	2.23	0.13
Collection Cost in \$	\$1,417,500.00	\$1,890,000.00	\$1,890,000.00	\$560,700.00	\$10,130,400.00	\$352,800.00	\$2,362,500.00	\$56,070,000.00	\$3,150,000.00
Lift Station/Forcemain Cost in \$	\$362,500.00	\$342,500.00	\$407,500.00	\$565,000.00	\$390,000.00	\$475,000.00	\$350,000.00	\$250,000.00	\$250,000.00
Subtotal	\$1,780,000.00	\$2,232,500.00	\$2,297,500.00	\$1,125,700.00	\$10,520,400.00	\$827,800.00	\$2,712,500.00	\$56,320,000.00	\$3,400,000.00
Contingencies (15%)	\$267,000.00	\$334,875.00	\$344,625.00	\$168,855.00	\$1,578,060.00	\$124,170.00	\$406,875.00	\$8,448,000.00	\$510,000.00
Subtotal	\$2,047,000.00	\$2,567,375.00	\$2,642,125.00	\$1,294,555.00	\$12,098,460.00	\$951,970.00	\$3,119,375.00	\$64,768,000.00	\$3,910,000.00
Professional Services (20%)	\$409,400.00	\$513,475.00	\$528,425.00	\$258,911.00	\$2,419,692.00	\$190,394.00	\$623,875.00	\$12,953,600.00	\$782,000.00
Subtotal	\$2,456,400.00	\$3,080,850.00	\$3,170,550.00	\$1,553,466.00	\$14,518,152.00	\$1,142,364.00	\$3,743,250.00	\$77,721,600.00	\$4,692,000.00
Total Capital Cost	\$2,456,400.00	\$3,080,850.00	\$3,170,550.00	\$1,553,466.00	\$14,518,152.00	\$1,142,364.00	\$3,743,250.00	\$77,721,600.00	\$4,692,000.00
Capital Cost/Lot	\$10,917.33	\$10,269.50	\$10,568.50	\$17,454.67	\$9,028.70	\$20,399.36	\$9,982.00	\$8,732.76	\$9,384.00
Annual Payment in \$	\$195,213.13	\$244,838.94	\$251,967.51	\$123,455.86	\$1,153,775.43	\$90,785.07	\$297,480.69	\$6,176,631.30	\$372,879.02
Electricity Cost for operating LS in \$/yr	\$1,074.80	\$1,433.07	\$1,433.07	\$425.14	\$7,681.27	\$267.51	\$1,791.34	\$42,514.48	\$2,388.45
Monthly Payment/ Lot at full development	\$129.62	\$125.33	\$127.31	\$172.92	\$117.12	\$192.42	\$123.43	\$115.16	\$119.47
City Sewer Fee/Lot	\$26.75	\$26.75	\$26.75	\$26.75	\$26.75	\$26.75	\$26.75	\$26.75	\$26.75
Total Monthly Payment per Lot	\$156.37	\$152.08	\$154.06	\$199.67	\$143.87	\$219.17	\$150.18	\$141.91	\$146.22

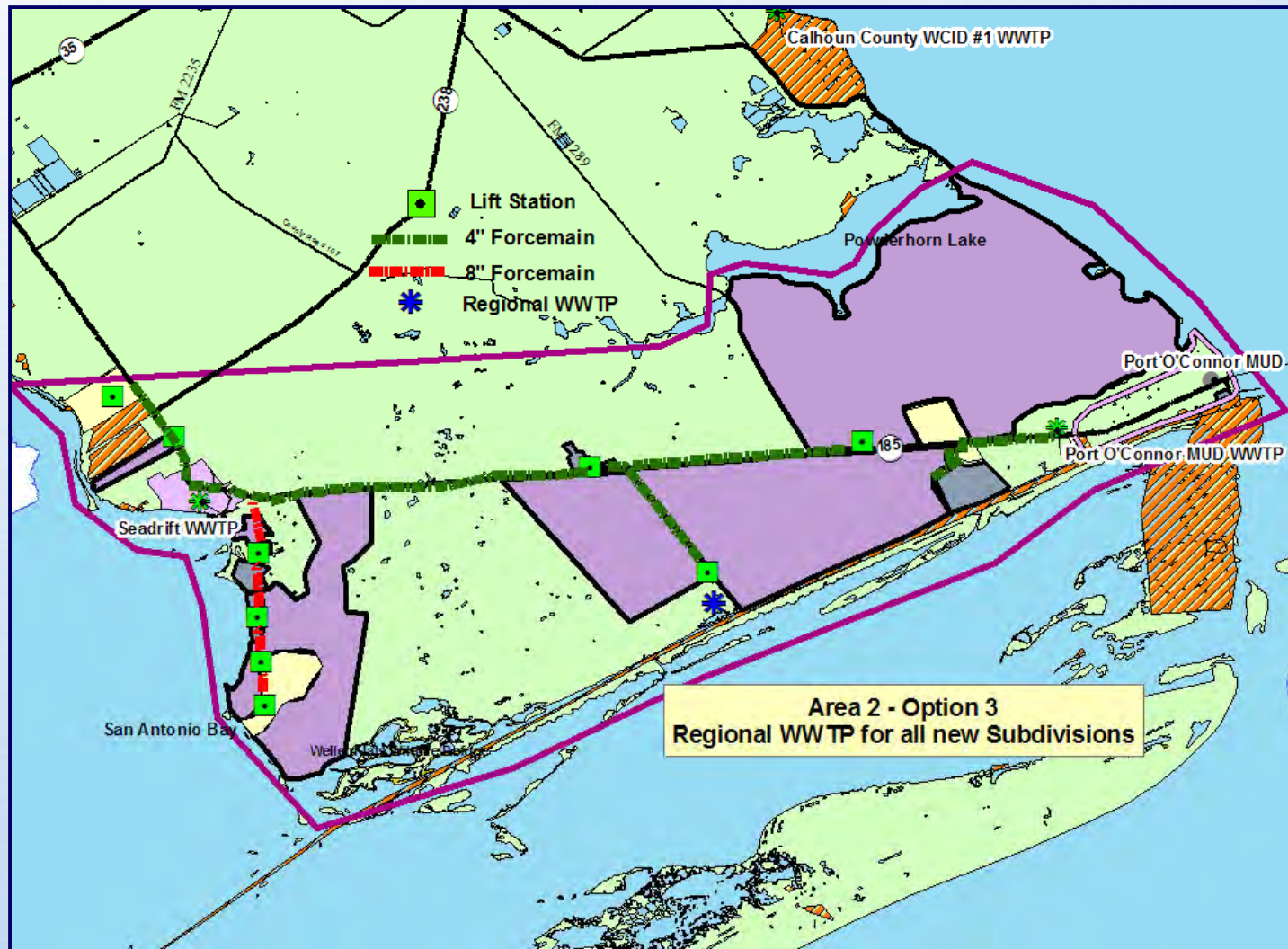
Area 2 – Option 2



Cost Estimate for Option 2

	Harbor Mist	Bindewald	Fisher	Swan Point Landing	Falcon Point	Seaport Lakes	Lane Road	Costa Grande	Powderhorn
Lots	225	300	300	89	1608	56	375	8900	500
Plant Capacity (MGD)	0.06	0.08	0.08	0.02	0.40	0.01	0.09	2.23	0.13
Treatment Cost in \$	\$1,237,500.00	\$1,500,000.00	\$1,500,000.00	\$534,000.00	\$3,618,000.00	\$350,000.00	\$2,015,625.00	\$13,350,000.00	\$2,250,000.00
Collection Cost in \$	\$1,417,500.00	\$1,890,000.00	\$1,890,000.00	\$560,700.00	\$10,130,400.00	\$352,800.00	\$2,362,500.00	\$56,070,000.00	\$3,150,000.00
Subtotal	\$2,655,000.00	\$3,390,000.00	\$3,390,000.00	\$1,094,700.00	\$13,748,400.00	\$702,800.00	\$4,378,125.00	\$69,420,000.00	\$5,400,000.00
Contingencies (15%)	\$398,250.00	\$508,500.00	\$508,500.00	\$164,205.00	\$2,062,260.00	\$105,420.00	\$656,718.75	\$10,413,000.00	\$810,000.00
Subtotal	\$3,053,250.00	\$3,898,500.00	\$3,898,500.00	\$1,258,905.00	\$15,810,660.00	\$808,220.00	\$5,034,843.75	\$79,833,000.00	\$6,210,000.00
Professional Services (20%)	\$610,650.00	\$779,700.00	\$779,700.00	\$251,781.00	\$3,162,132.00	\$161,644.00	\$1,006,968.75	\$15,966,600.00	\$1,242,000.00
Subtotal	\$3,663,900.00	\$4,678,200.00	\$4,678,200.00	\$1,510,686.00	\$18,972,792.00	\$969,864.00	\$6,041,812.50	\$95,799,600.00	\$7,452,000.00
Total Capital Cost	\$3,663,900.00	\$4,678,200.00	\$4,678,200.00	\$1,510,686.00	\$18,972,792.00	\$969,864.00	\$6,041,812.50	\$95,799,600.00	\$7,452,000.00
Capital Cost/Lot	\$16,284.00	\$15,594.00	\$15,594.00	\$16,974.00	\$11,799.00	\$17,319.00	\$16,111.50	\$10,764.00	\$14,904.00
Annual Payment in \$	\$291,174.65	\$371,782.32	\$371,782.32	\$120,056.08	\$1,507,791.15	\$77,076.29	\$480,150.28	\$7,613,312.23	\$592,219.62
O & M Cost in \$	\$133,453.13	\$164,250.00	\$164,250.00	\$117,758.13	\$293,460.00	\$76,650.00	\$181,359.38	\$812,125.00	\$182,500.00
Monthly Payment/ Lot at full development	\$157.27	\$148.90	\$148.90	\$222.67	\$93.35	\$228.76	\$147.00	\$78.89	\$129.12

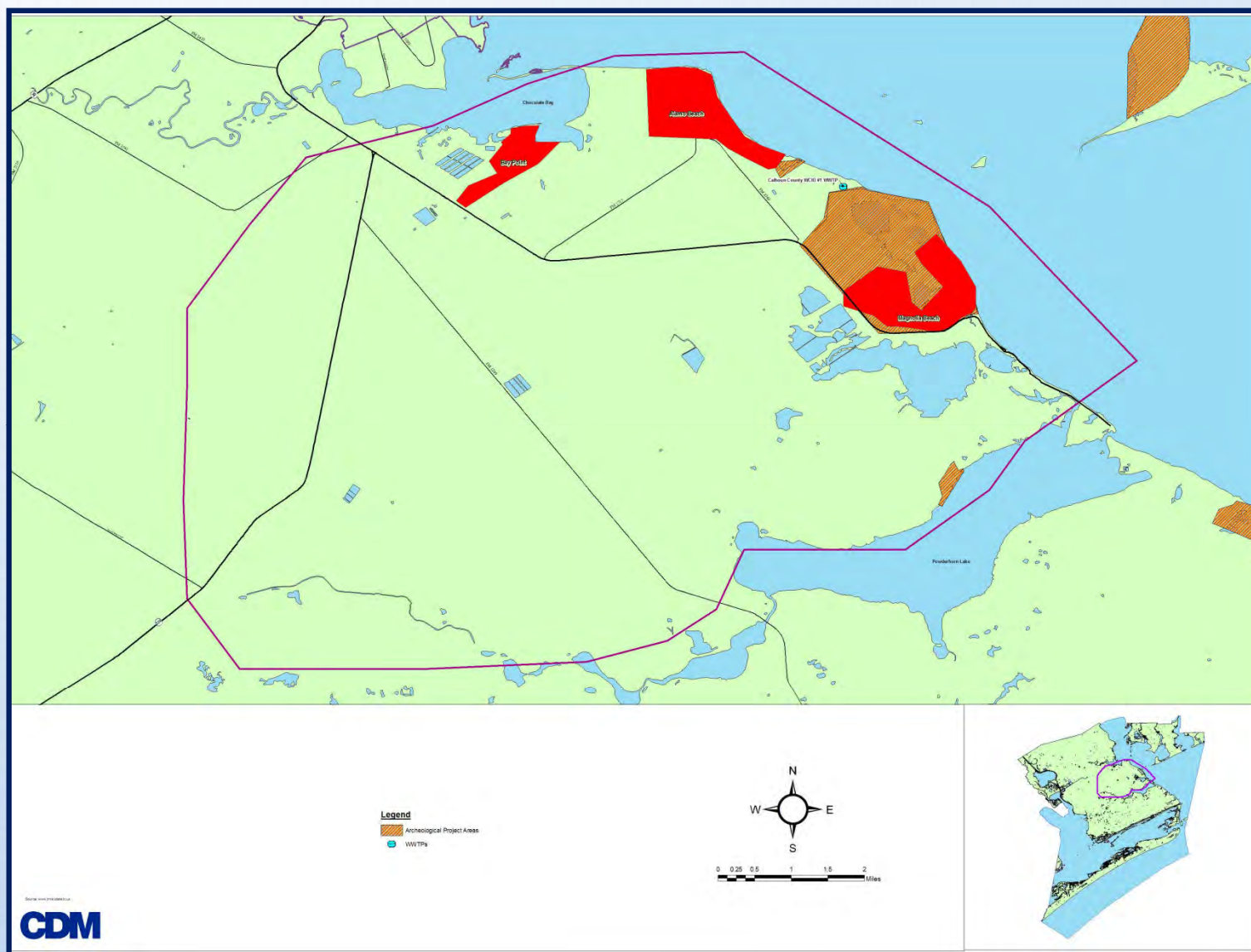
Area 2 - Option 3



Cost Estimate for Option 3

	Harbor Mist	Bindewald	Fisher	Swan Point Landing	Falcon Point	Seaport Lakes	Lane Road	Costa Grande	Powderhorn
Lots	225	300	300	89	1608	56	375	8900	500
Plant Capacity (MGD)	0.06	0.08	0.08	0.02	0.40	0.01	0.09	2.23	0.13
Total Plant Capacity (MGD)	3.09								
Total Treatment Cost in \$	\$15,441,250.00								
Treatment Cost in \$	\$281,250.00	\$375,000.00	\$375,000.00	\$111,250.00	\$2,010,000.00	\$70,000.00	\$468,750.00	\$11,125,000.00	\$625,000.00
Collection Cost in \$	\$1,417,500.00	\$1,890,000.00	\$1,890,000.00	\$560,700.00	\$10,130,400.00	\$352,800.00	\$2,362,500.00	\$56,070,000.00	\$3,150,000.00
Lift Station/Forcemain Cost in \$	\$475,000.00	\$450,000.00	\$515,000.00	\$515,000.00	\$795,000.00	\$350,000.00	\$325,000.00	\$375,000.00	\$1,000,000.00
Subtotal	\$2,173,750.00	\$2,715,000.00	\$2,780,000.00	\$1,186,950.00	\$12,935,400.00	\$772,800.00	\$3,156,250.00	\$67,570,000.00	\$4,775,000.00
Contingencies (15%)	\$326,062.50	\$407,250.00	\$417,000.00	\$178,042.50	\$1,940,310.00	\$115,920.00	\$473,437.50	\$10,135,500.00	\$716,250.00
Subtotal	\$2,499,812.50	\$3,122,250.00	\$3,197,000.00	\$1,364,992.50	\$14,875,710.00	\$888,720.00	\$3,629,687.50	\$77,705,500.00	\$5,491,250.00
Professional Services (20%)	\$499,962.50	\$624,450.00	\$639,400.00	\$272,998.50	\$2,975,142.00	\$177,744.00	\$725,937.50	\$15,541,100.00	\$1,098,250.00
Subtotal	\$2,999,775.00	\$3,746,700.00	\$3,836,400.00	\$1,637,991.00	\$17,850,852.00	\$1,066,464.00	\$4,355,625.00	\$93,246,600.00	\$6,589,500.00
Total Capital Cost	\$2,999,775.00	\$3,746,700.00	\$3,836,400.00	\$1,637,991.00	\$17,850,852.00	\$1,066,464.00	\$4,355,625.00	\$93,246,600.00	\$6,589,500.00
Capital Cost/Lot	\$13,332.33	\$12,489.00	\$12,788.00	\$18,404.39	\$11,101.28	\$19,044.00	\$11,615.00	\$10,477.15	\$13,179.00
Annual Payment in \$	\$238,395.81	\$297,754.86	\$304,883.43	\$130,173.16	\$1,418,629.20	\$84,753.21	\$346,146.88	\$7,410,422.18	\$523,675.68
Electricity Cost for operating LS in \$/yr	\$1,074.80	\$1,433.07	\$1,433.07	\$425.14	\$7,681.27	\$267.51	\$1,791.34	\$42,514.48	\$2,388.45
O & M Cost in \$	\$20,531.25	\$27,375.00	\$27,375.00	\$8,121.25	\$146,730.00	\$5,110.00	\$34,218.75	\$812,125.00	\$45,625.00
Monthly Payment/ Lot at full development	\$96.30	\$90.71	\$92.69	\$129.89	\$81.52	\$134.12	\$84.92	\$77.39	\$95.28

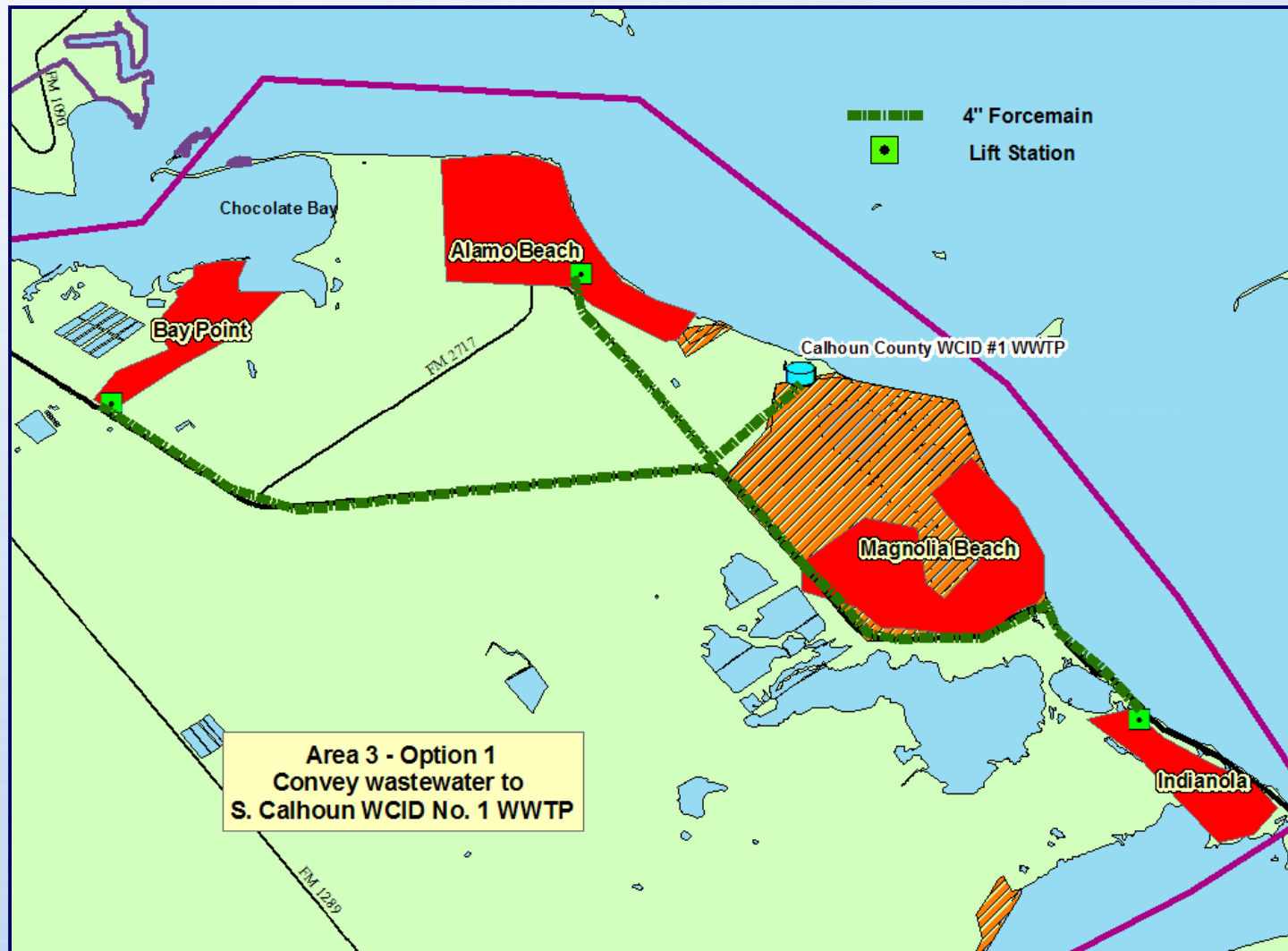
Area No. 3 Regional Options



Area No. 3 Regional Options

- 1) Magnolia Beach WWTP expand its system to serve Indianola, Alamo Beach, Baypoint Subdivision and other areas on septic systems**

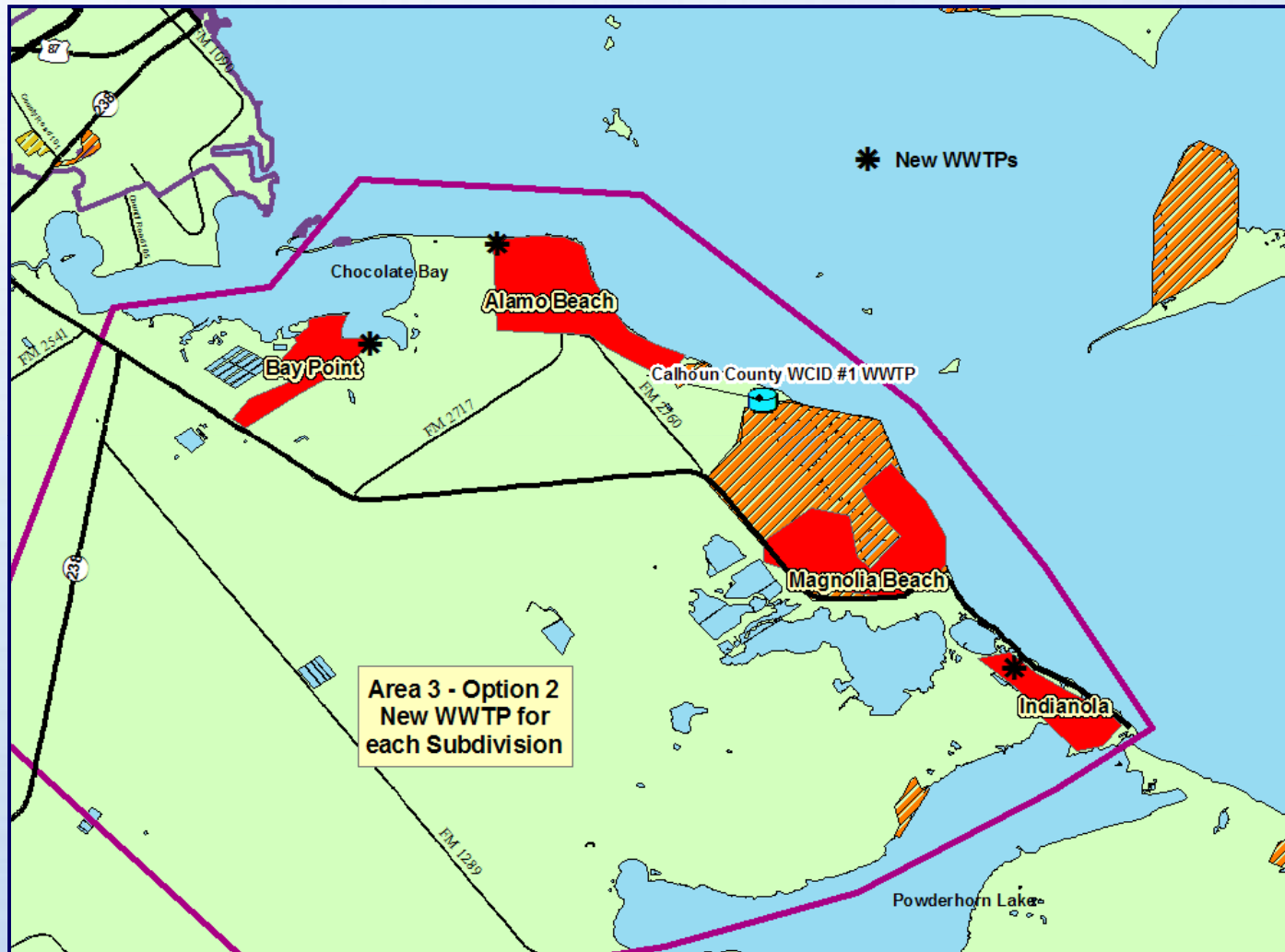
Area 3 - Option 1



Cost Estimate for Option 1

	Indianola	Alamo Beach	Bay Point
Lots	133	85	100
Flow (MGD)	0.03	0.02	0.03
Collection System \$	\$837,900.00	\$535,500.00	\$630,000.00
Force Main (4")	\$750,000.00	\$187,500.00	\$187,500.00
Lift Station (<0.50 MGD)	\$250,000.00	\$250,000.00	\$250,000.00
Subtotal	\$1,837,900.00	\$973,000.00	\$1,067,500.00
Contingencies (15%)	\$275,685.00	\$145,950.00	\$160,125.00
Subtotal	\$2,113,585.00	\$1,118,950.00	\$1,227,625.00
Professional Services (20%)	\$422,717.00	\$223,790.00	\$245,525.00
Subtotal	\$2,536,302.00	\$1,342,740.00	\$1,473,150.00
Total Capital Cost	\$2,536,302.00	\$1,342,740.00	\$1,473,150.00
Capital Cost/Lot	\$19,069.94	\$15,796.94	\$14,731.50
Annual Payment in \$	\$126,621.31	\$67,034.40	\$73,544.94
Electricity Cost for operating LS in \$/yr	\$635.33	\$406.04	\$477.69
Monthly Payment/ Lot at full development	\$79.73	\$66.12	\$61.69
City Sewer Fee Per Lot	\$61.43	\$61.43	\$61.43
Total Monthly Fee	\$141.16	\$127.54	\$123.11

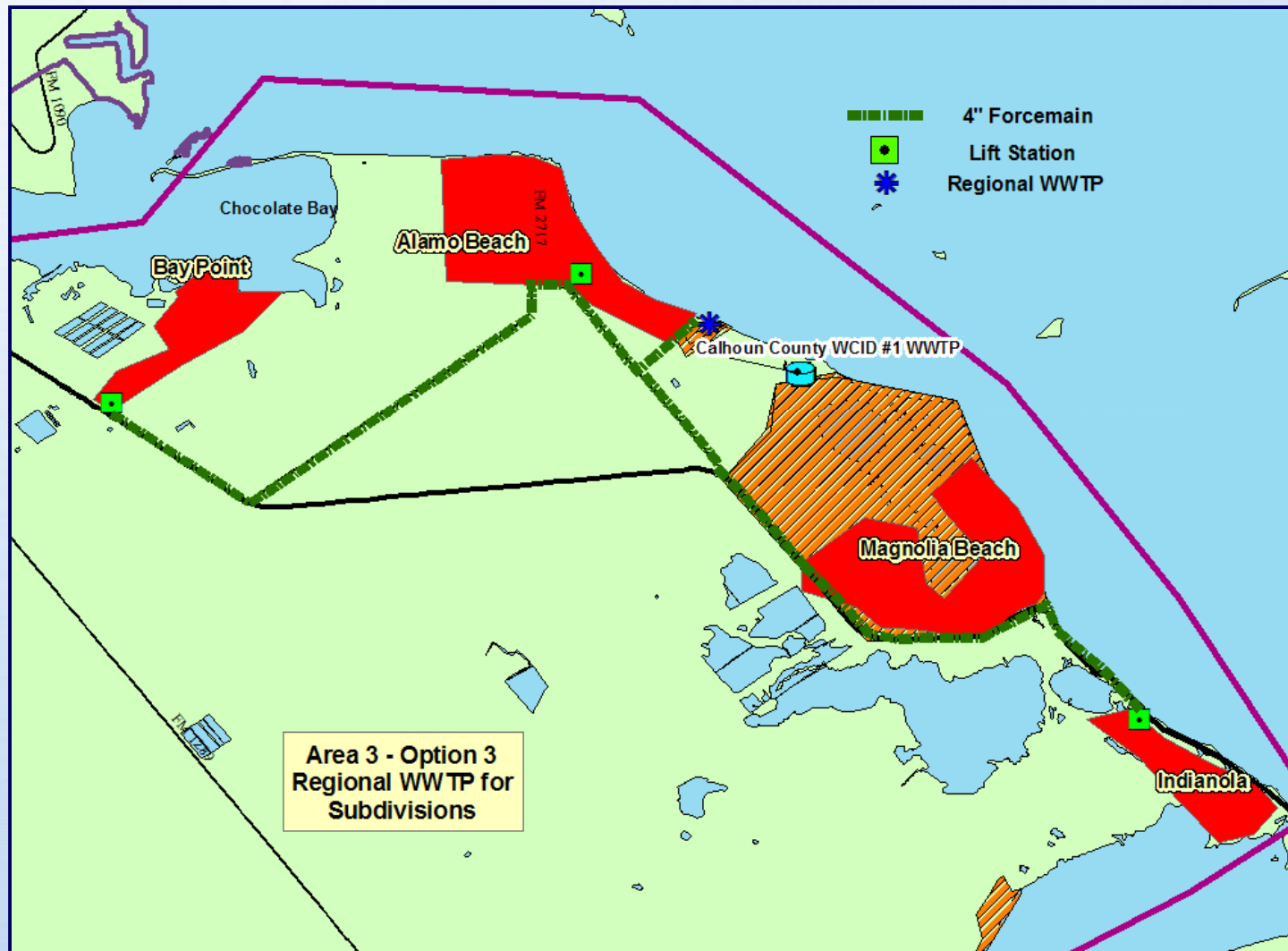
Area 3 – Option 2



Cost Estimate for Option 2

	Indianola	Alamo Beach	Bay Point
Lots	133	85	100
Plant Capacity (MGD)	0.03	0.02	0.03
Treatment Cost in \$	\$748,125.00	\$510,000.00	\$600,000.00
Collection Cost in \$	\$837,900.00	\$535,500.00	\$630,000.00
Subtotal	\$1,586,025.00	\$1,045,500.00	\$1,230,000.00
Contingencies (15%)	\$237,903.75	\$156,825.00	\$184,500.00
Subtotal	\$1,823,928.75	\$1,202,325.00	\$1,414,500.00
Professional Services (20%)	\$364,785.75	\$240,465.00	\$282,900.00
Subtotal	\$2,188,714.50	\$1,442,790.00	\$1,697,400.00
Total Capital Cost	\$2,188,714.50	\$1,442,790.00	\$1,697,400.00
Capital Cost/Lot	\$16,456.50	\$16,974.00	\$16,974.00
Annual Payment in \$	\$109,268.49	\$72,029.26	\$84,740.31
O & M Cost in \$	\$97,090.00	\$69,806.25	\$82,125.00
Monthly Payment/ Lot at full development	\$129.30	\$139.05	\$139.05

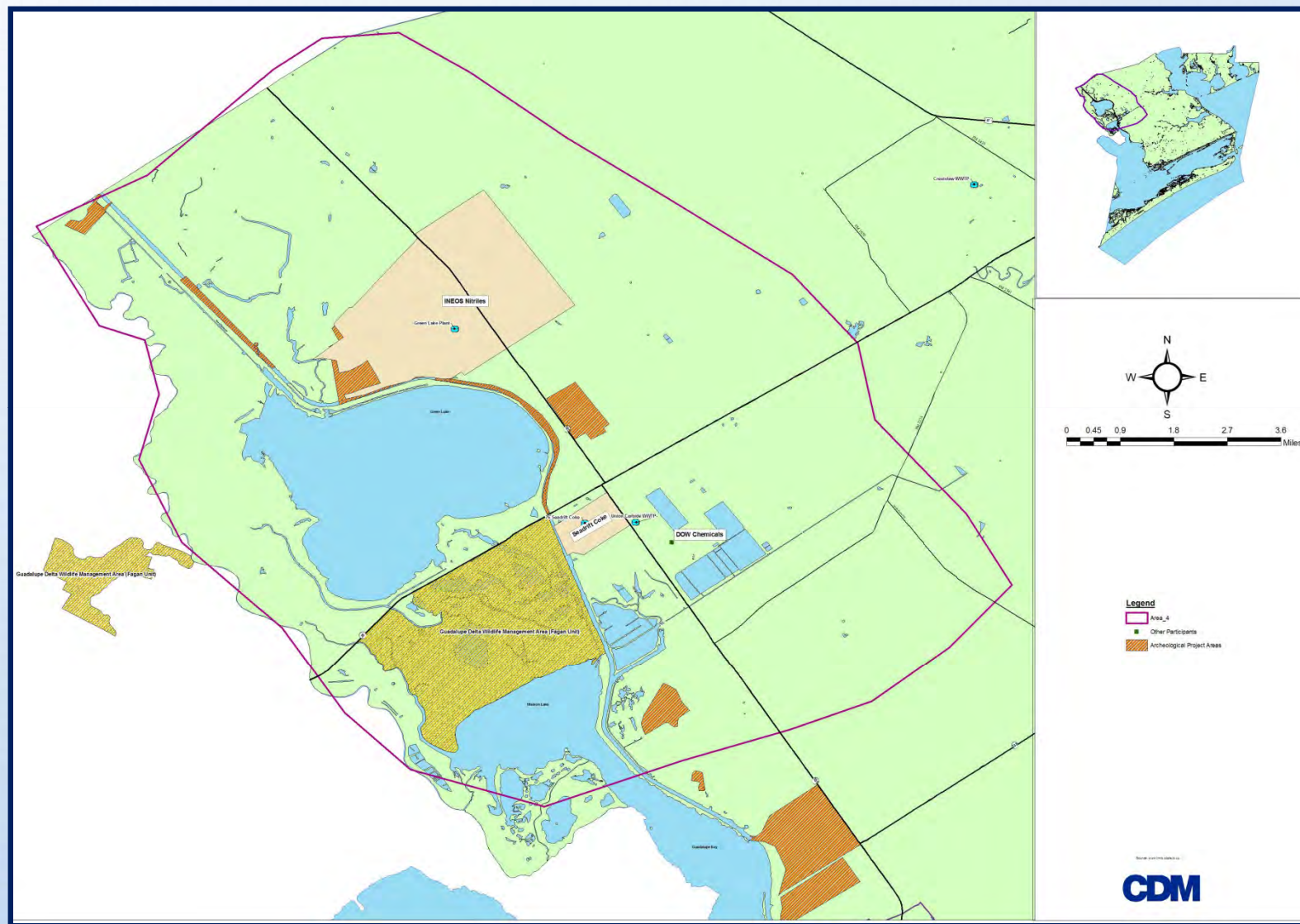
Area 3 –Option 3



Cost Estimate for Option 3

	Indianola	Alamo Beach	Bay Point
Lots	133	85	100
Plant Capacity (MGD)	0.03	0.02	0.03
Regional Plant Capacity	0.08		
Treatment Cost in \$	\$1,590,000.00		
Treatment Cost in \$/Subdivision	\$665,000.00	\$425,000.00	\$500,000.00
Forcemain/Lift Station cost in \$	\$1,000,000.00	\$437,500.00	\$437,500.00
Collection Cost in \$	\$837,900.00	\$535,500.00	\$630,000.00
Subtotal	\$2,502,900.00	\$1,398,000.00	\$1,567,500.00
Contingencies (15%)	\$375,435.00	\$209,700.00	\$235,125.00
Subtotal	\$2,878,335.00	\$1,607,700.00	\$1,802,625.00
Professional Services (20%)	\$575,667.00	\$321,540.00	\$360,525.00
Subtotal	\$3,454,002.00	\$1,929,240.00	\$2,163,150.00
Total Capital Cost	\$3,454,002.00	\$1,929,240.00	\$2,163,150.00
Capital Cost/Lot	\$25,969.94	\$22,696.94	\$21,631.50
Annual Payment in \$	\$172,436.19	\$96,314.59	\$107,992.22
Electricity Cost for operating LS in \$/yr	\$635.33	\$406.04	\$477.69
O & M Cost in \$	\$60,681.25	\$38,781.25	\$45,625.00
Monthly Payment/ Lot at full development	\$146.46	\$132.84	\$128.41

Area No. 4 Regional Options



Area No. 4 Regional Options

- 1) Construct small package plant to provide centralized wastewater service to 300 acre site adjacent to INEOS Nitriles**
- 2) Seadrift Coke, Dow Chemical and INEOS Nitriles receive treated effluent/reuse**

Preferred Options

- ◆ **Area 1A – All subdivisions of concern convey flow to City of Port Lavaca WWTP**
- ◆ **Area 1B – Regional WWTP for Olivia, Port Alto North & South Subdivisions**
- ◆ **Area 2 – Regional WWTP for all new Subdivisions between City of Seadrift and Port O' Connor**

Reclaimed Water Options

	Pump to Formosa/ALCOA	Pump to DOW/ Ineos Nitrile
Pipeline Cost in \$	\$8,368,750.00	\$5,695,000.00
Lift Station Cost in \$	\$450,000.00	\$450,000.00
Subtotal	\$8,818,750.00	\$6,145,000.00
Contingencies (15%)	\$1,322,812.50	\$921,750.00
Subtotal	\$10,141,562.50	\$7,066,750.00
Professional Services (20%)	\$2,028,312.50	\$1,413,350.00
Subtotal	\$12,169,875.00	\$8,480,100.00
Total Capital Cost in \$	\$12,170,000.00	\$8,481,000.00
Annual Payment in \$	\$967,164.89	\$673,995.52
Annual Electrical Cost \$	\$17,200.00	\$34,250.00
Total Annual Cost \$	\$984,364.89	\$708,245.52
Annual Cost per Acre foot \$	\$878.90	\$632.36

Project Contacts

Project Contacts:

**Susan K. Roth, P.E.
Susan Roth Consulting, LLC
(512) 796-6692
susan@srothconsulting.com**

**Bryan Serold
GBRA, Lower Basin Manager
(361) 575-6366
bserold@gbra.org**

Calhoun County Regional Wastewater Facility Study Project Meeting May 19, 2011

[illegible]

Calhoun County Regional Wastewater Facility Study



Project Meeting

**Dow Chemical – Port Lavaca Site
August 11, 2011**

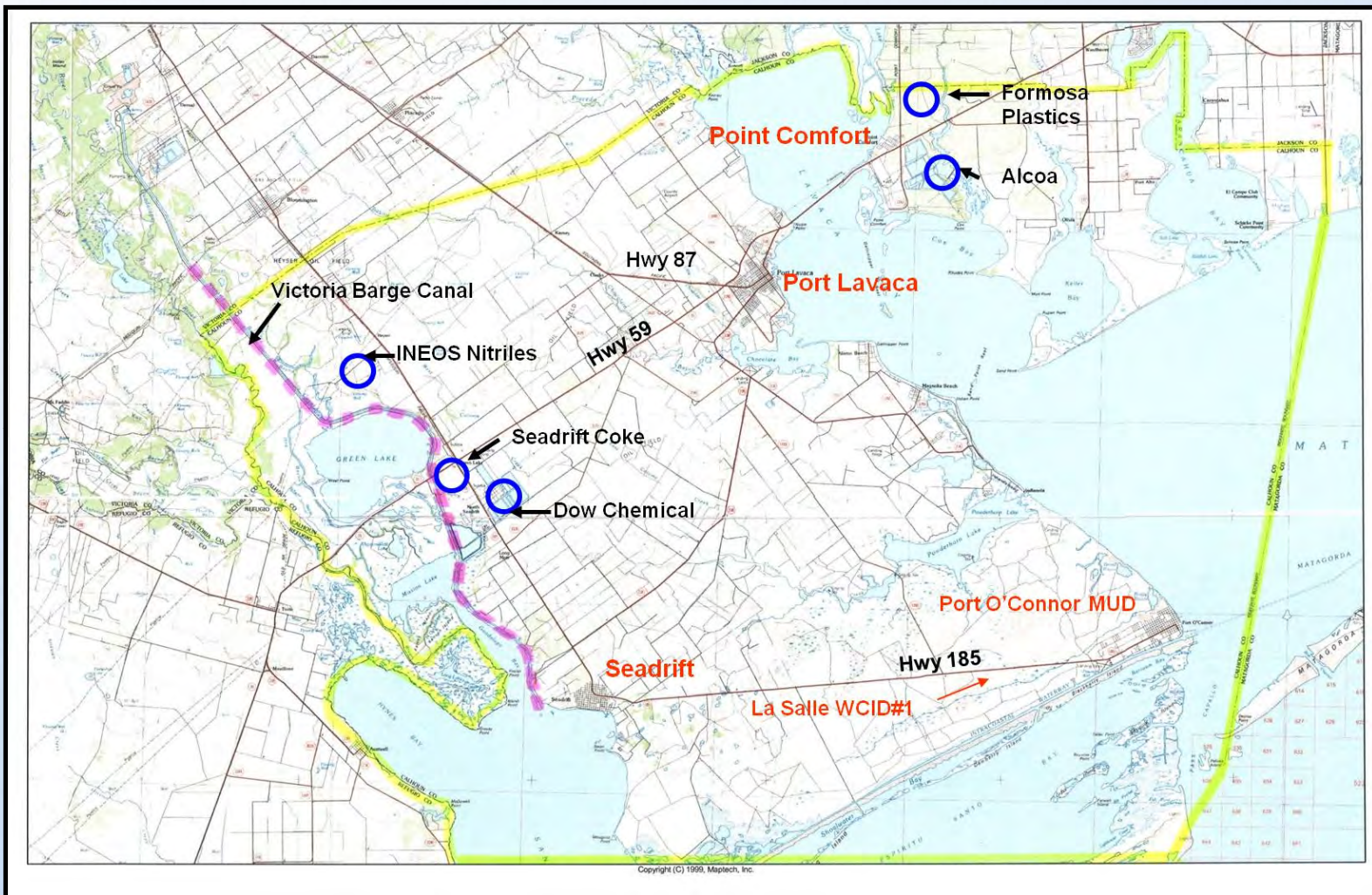
Presentation Outline

- ◆ **Project Overview & Schedule**
- ◆ **Highlights of Initial Draft Report**
- ◆ **Industrial Water & Wastewater Findings**
- ◆ **Funding Opportunities**
- ◆ **Q&A Discussion**
- ◆ **Next Steps**

Project Participants

- ◆ **Texas Water Development Board**
- ◆ **GBRA (primary applicant)**
- ◆ **Calhoun County**
- ◆ **Calhoun County Economic Development Corporation**
- ◆ **City of Seadrift**
- ◆ **City of Point Comfort**
- ◆ **City of Port Lavaca**
- ◆ **Alcoa**
- ◆ **Dow Chemical**
- ◆ **Formosa Plastics Company**
- ◆ **INEOS Nitriles**
- ◆ **Seadrift Coke, L.P.**

Calhoun County



Study Focus Areas

- ◆ **Feasibility of developing regional wastewater collection and treatment to replace and/or supplement the multiple systems currently in service;**
- ◆ **Options for smaller wastewater systems that no longer want to be in the utility business;**
- ◆ **Evaluate alternatives to decommission failing septic systems and connect to a larger wastewater system; and,**
- ◆ **Investigate wastewater reuse on a regional level to serve the study area.**

Scope of Work

- ◆ **Population and Wastewater Flow Projections**
- ◆ **Collection System Alternatives**
- ◆ **Treatment System Alternatives**
- ◆ **Operation and Reuse Alternatives**
- ◆ **Environmental Assessment**
- ◆ **Implementation Schedule**
- ◆ **Cost Estimates and Recommendations**
- ◆ **Funding Options**
- ◆ **Water Conservation/Drought Management Plans**

Project Timeline

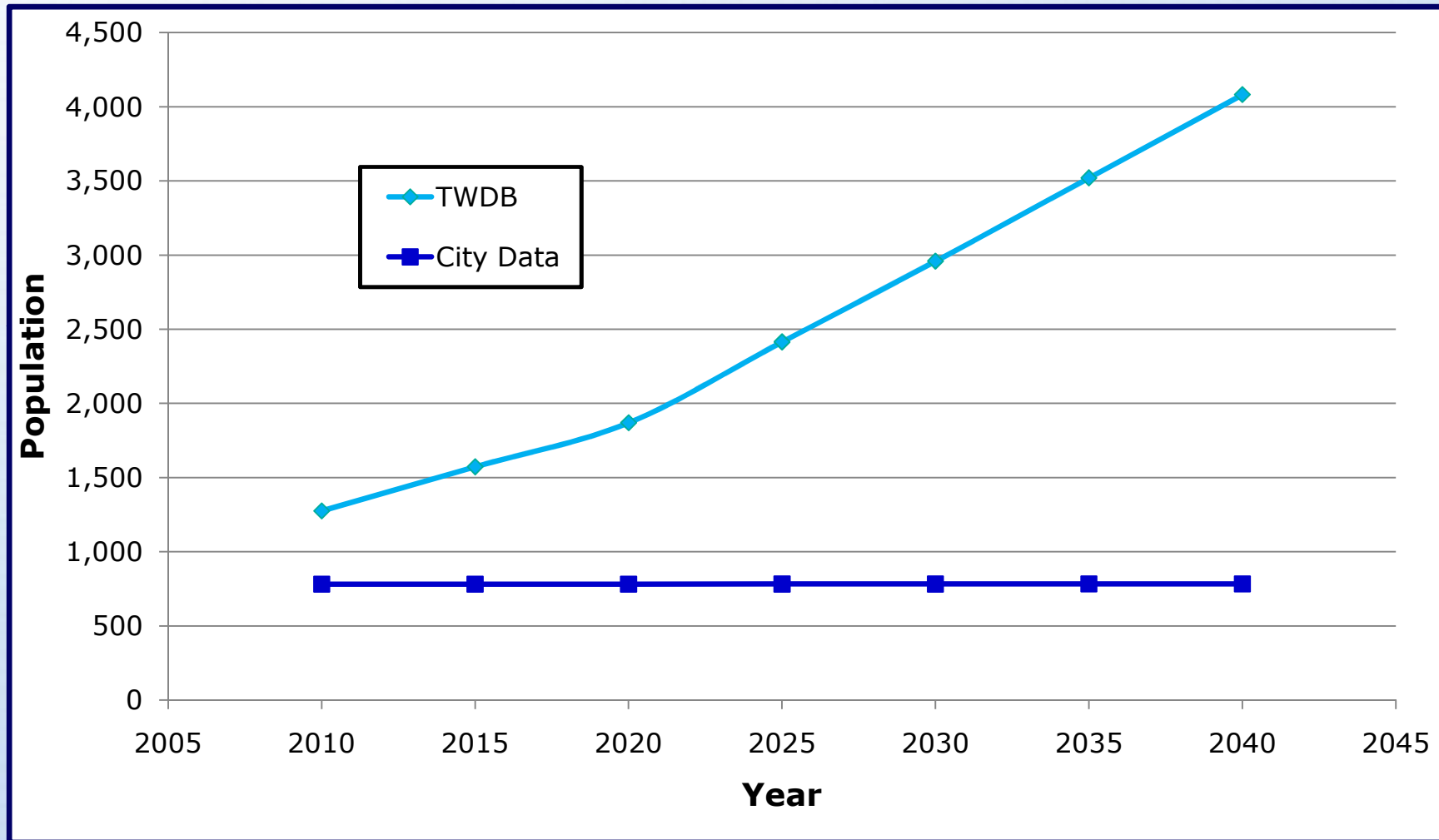
- ◆ **Project Kick-off Meeting (October 21, 2010)**
- ◆ **Second Meeting (February 10, 2011)**
 - Discuss population/wastewater flow data and various regional collection, treatment and reuse alternatives
- ◆ **Third Meeting (May 19, 2011)**
 - Discuss detailed analysis and evaluation of final alternatives for regional collection, treatment and reuse
- ◆ **Fourth Meeting (August 11, 2011)**
 - Discuss comments on Draft Report
- ◆ **Submit Draft Final Report to TWDB (no later than August 31, 2011)**

Initial Draft Report

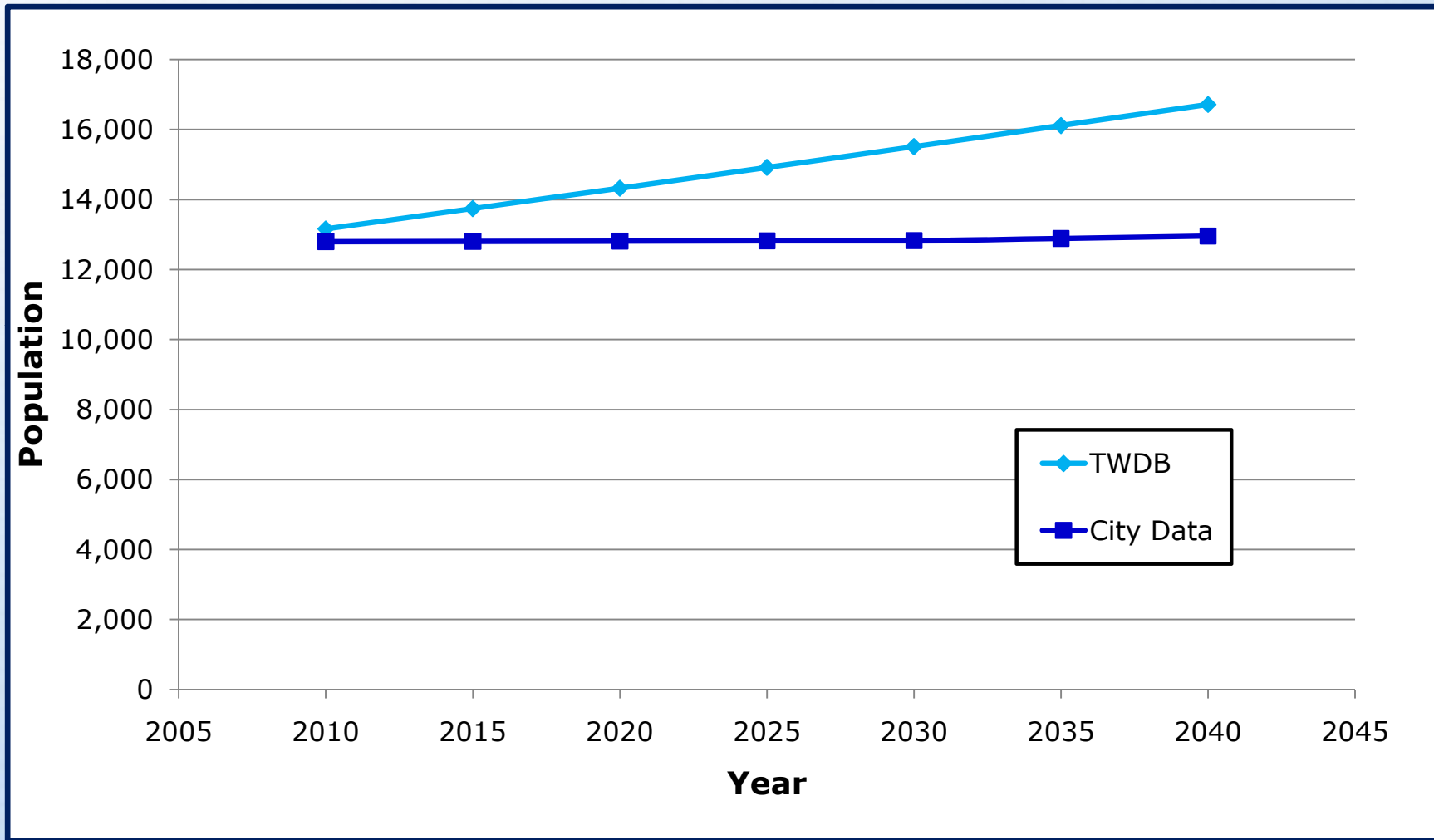
Population & Growth Projections

Entity	Growth Rate	2010	2015	2020	2025	2030	2035	2040
City of Point Comfort								
TWDB Projections	4.0%	1,276	1,573	1,870	2,415	2,959	3,520	4,081
City's Projections	0.1%	781	781	782	782	783	783	783
City of Port Lavaca								
TWDB Projections	0.8%	13,163	13,744	14,325	14,919	15,513	16,115	16,717
City's Projections	0.1%	12,800	12,806	12,813	12,819	12,826	12,890	12,954
City of Seadrift								
TWDB Projections	0.3%	1,408	1,434	1,459	1,479	1,499	1,512	1,525
City's Projections	2.0%	1,452	1,597	1,742	1,917	2,091	2,300	2,509
Port O'Connor MUD								
TWDB Projections	0.8%	1,346	1,406	1,465	1,526	1,587	1,649	1,710
MUD's Projections	1.0%	3,119	3,160	3,194	3,236	3,270	3,310	3,353

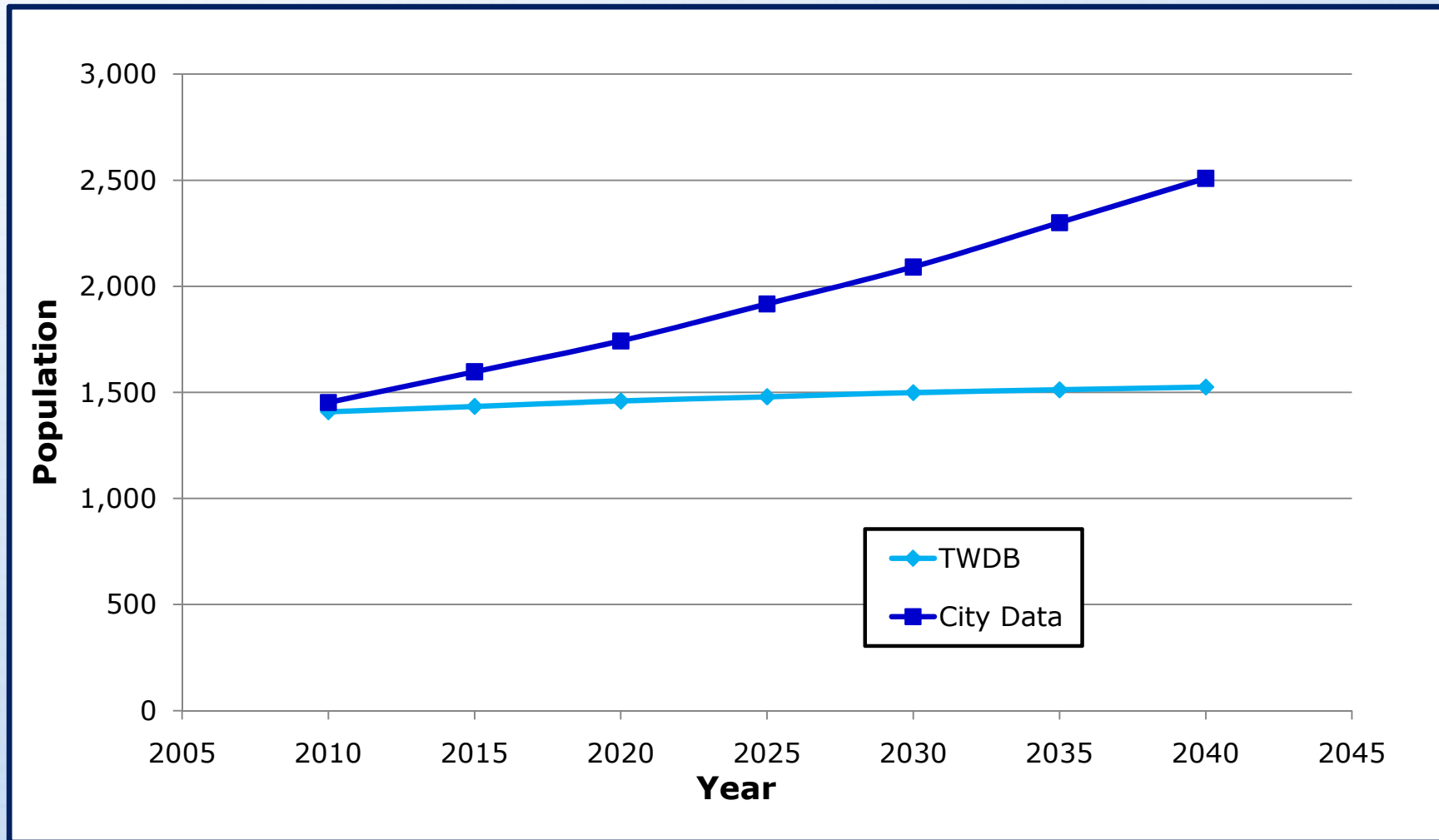
Point Comfort Population Projections: Comparison of TWDB & City Data



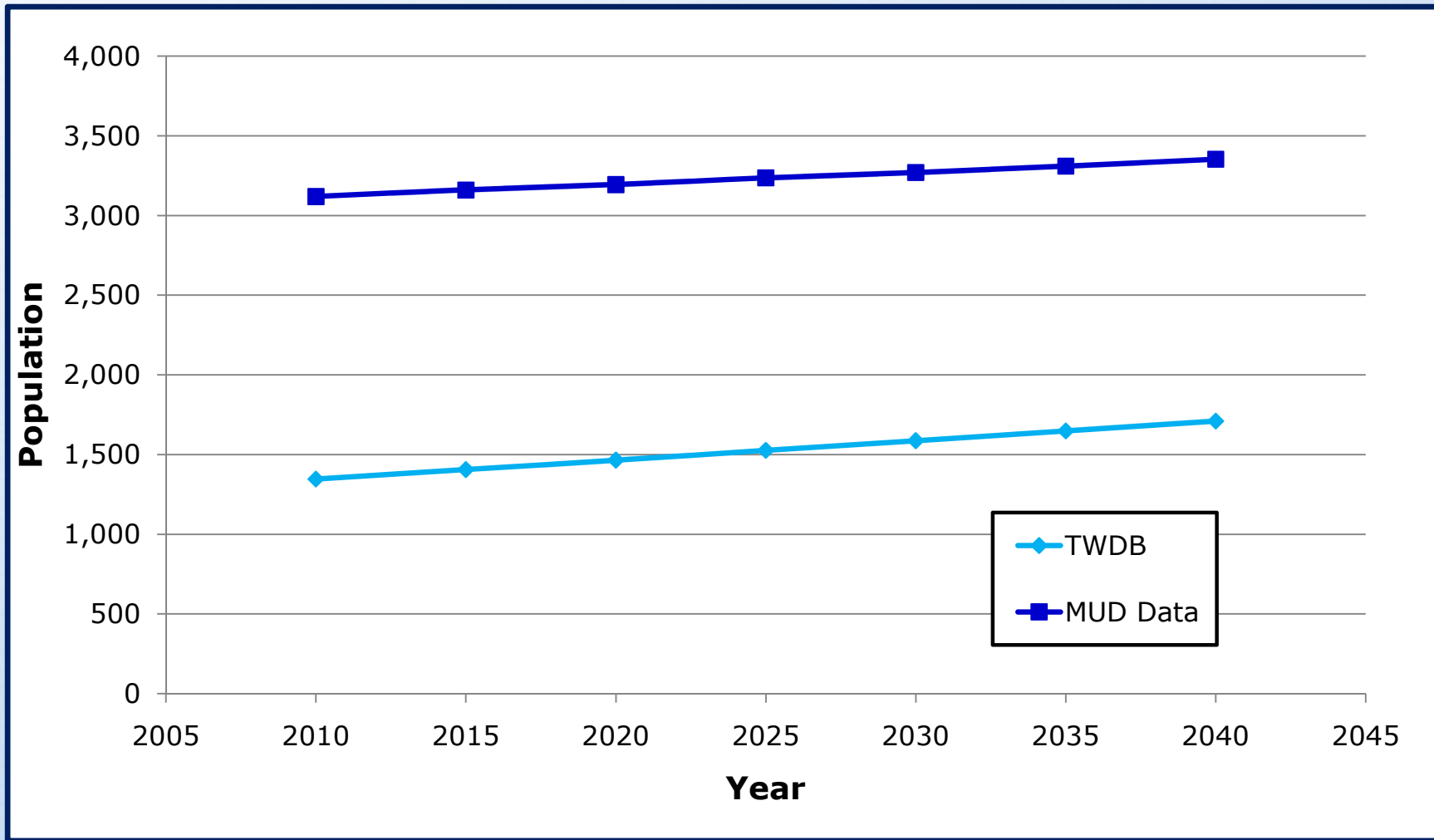
Port Lavaca Population Projections: Comparison of TWDB & City Data



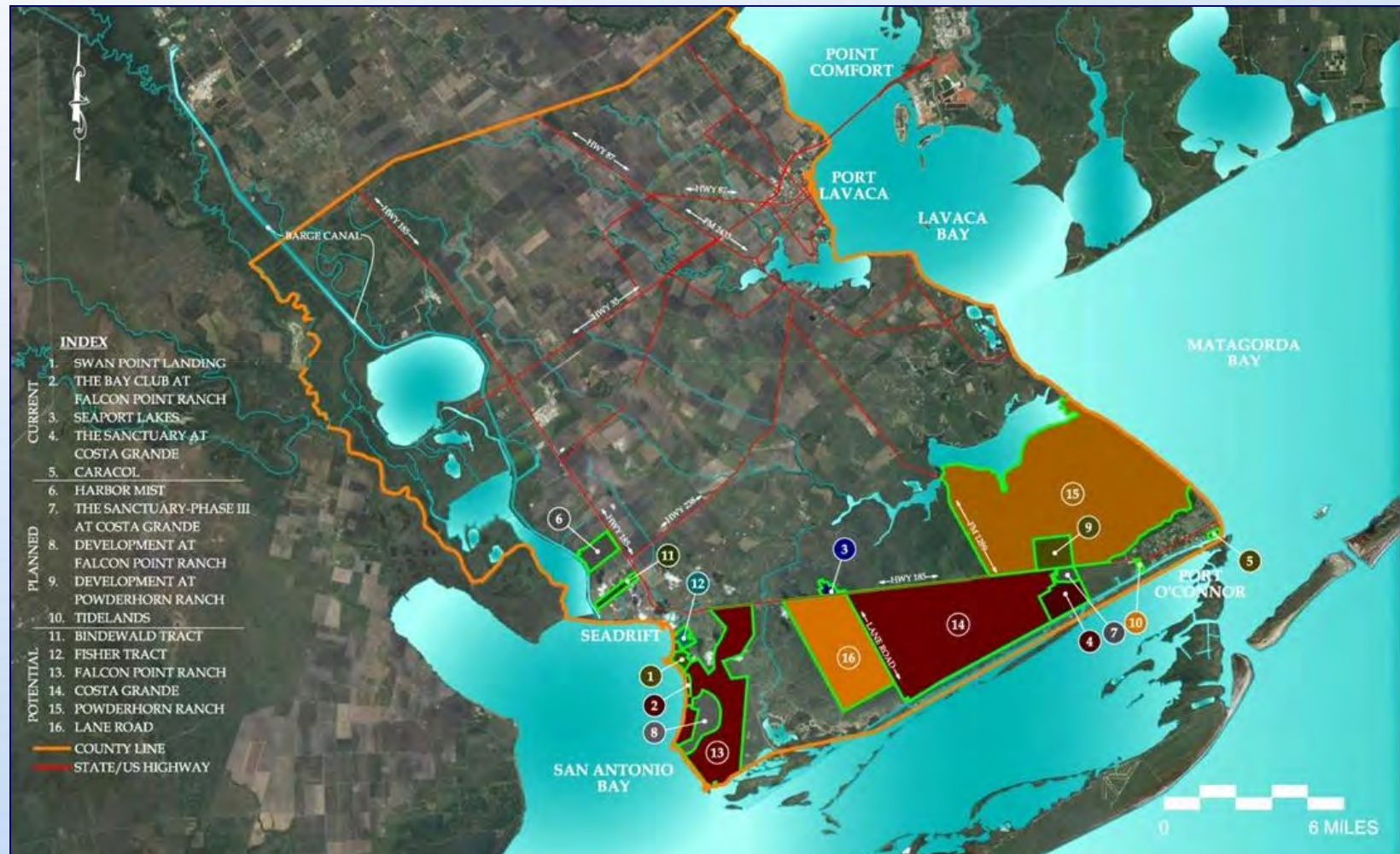
Seadrift Population Projections: Comparison of TWDB & City Data



Port O'Connor Population Projections: Comparison of TWDB & MUD Data



Current, Planned & Potential Subdivisions



Proposed Subdivision Units

Dev No.	Proposed Development	Estimated Number of Units (Full Development Assumed to be in 2060)
1	Swan Point Landing	89
2	The Bay Club @ Falcon Point	108
3	Seaport Lakes	56
4	Sanctuary at Costa Grande	767
5	Caracol	74
6	Harbor Mist	225
7	Sanctuary-Phase III at Costa Grande	300
8/13	Falcon Point Ranch Phase I	1500
10	Tidelands	82
11	Bindewald Tract	300
12	Fisher Tract	300
9/15	Powderhorn Ranch	500
14	Costa Grande	8900
16	Lane Road	300

Existing Wastewater Facilities

City of Point Comfort WWTP



WWTP Name	Permitted Average Flow in MGD	Permitted 2-hr Peak Flow in MGD	BOD/TSS in mg/L
City of Point Comfort WWTP	0.2	0.5	20/20

City of Port Lavaca WWTP



WWTP Name	Permitted Average Flow in MGD	Permitted 2-hr Peak Flow in MGD	BOD/TSS in mg/L
City of Port Lavaca WWTP	2	7.65	20/20

City of Seadrift WWTP



WWTP Name	Permitted Average Flow in MGD	Permitted 2-hr Peak Flow in MGD	BOD/TSS in mg/L
City of Seadrift WWTP	0.3	0.6	20/20

Port O'Connor MUD WWTP



WWTP Name	Permitted Average Flow in MGD	Permitted 2-hr Peak Flow in MGD	BOD/TSS/Ammonia in mg/L
Port O'Connor MUD WWTP	0.6	1.8	10/15/3

Crestview WWTP



WWTP Name	Permitted Average Flow in MGD	Permitted 2-hr Peak Flow in MGD	BOD/TSS in mg/L
Crestview WWTP	0.03	0.09	20/20

Southern Central Calhoun County WCID No. 1 WWTP



WWTP Name	Permitted Average Flow in MGD	Permitted 2-hr Peak Flow in MGD	BOD/TSS in mg/L
Southern Central Calhoun County WCID No.1 WWTP	0.075	0.262	20/20

Final Regional Alternatives

Study Area – Regional Concept



Study Area Overview

AREA 1A

- ◆ City of Port Lavaca
- ◆ Crestview Subdivision
- ◆ Meadow Brook Park
- ◆ Shady Acres
- ◆ Hackberry Junction
- ◆ Bowman Development
- ◆ Matson Subdivision
- ◆ Bay Meadows
- ◆ Shoreline Acres
- ◆ Royal Estates
- ◆ Double Subdivision
- ◆ Six Mile Subdivision

AREA 1B

- ◆ City of Point Comfort
- ◆ Alcoa
- ◆ Formosa Plastics
- ◆ Olivia
- ◆ Port Alto WSC
(North & South)
- ◆ Campbell Carancahua
Beach Subdivision
- ◆ El Campo Club
Community
- ◆ Schicke Point Community

Study Area Overview

AREA 2

- ◆ City of Seadrift
- ◆ Port O'Connor MUD
- ◆ Swan Point Landing
- ◆ Falcon Point
- ◆ Costa Grande Development (I-V)
- ◆ Powder Horn Ranch
- ◆ Lane Road Development
- ◆ The Sanctuary

AREA 3

- ◆ Magnolia Beach
- ◆ Indianola
- ◆ Baypoint Subdivision
- ◆ Alamo Beach

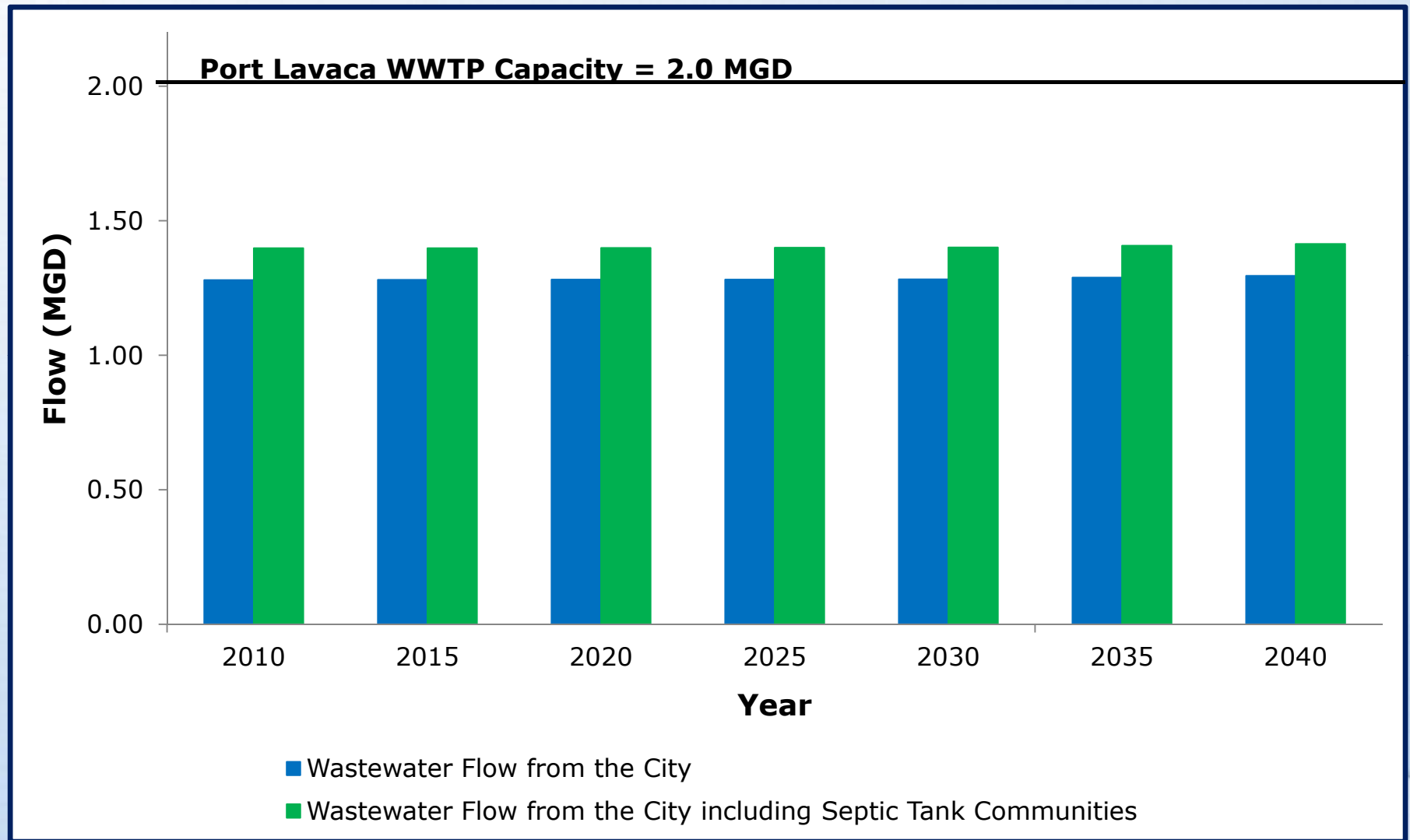
AREA 4

- ◆ Dow Chemical
- ◆ Seadrift Coke
- ◆ INEOS Nitriles

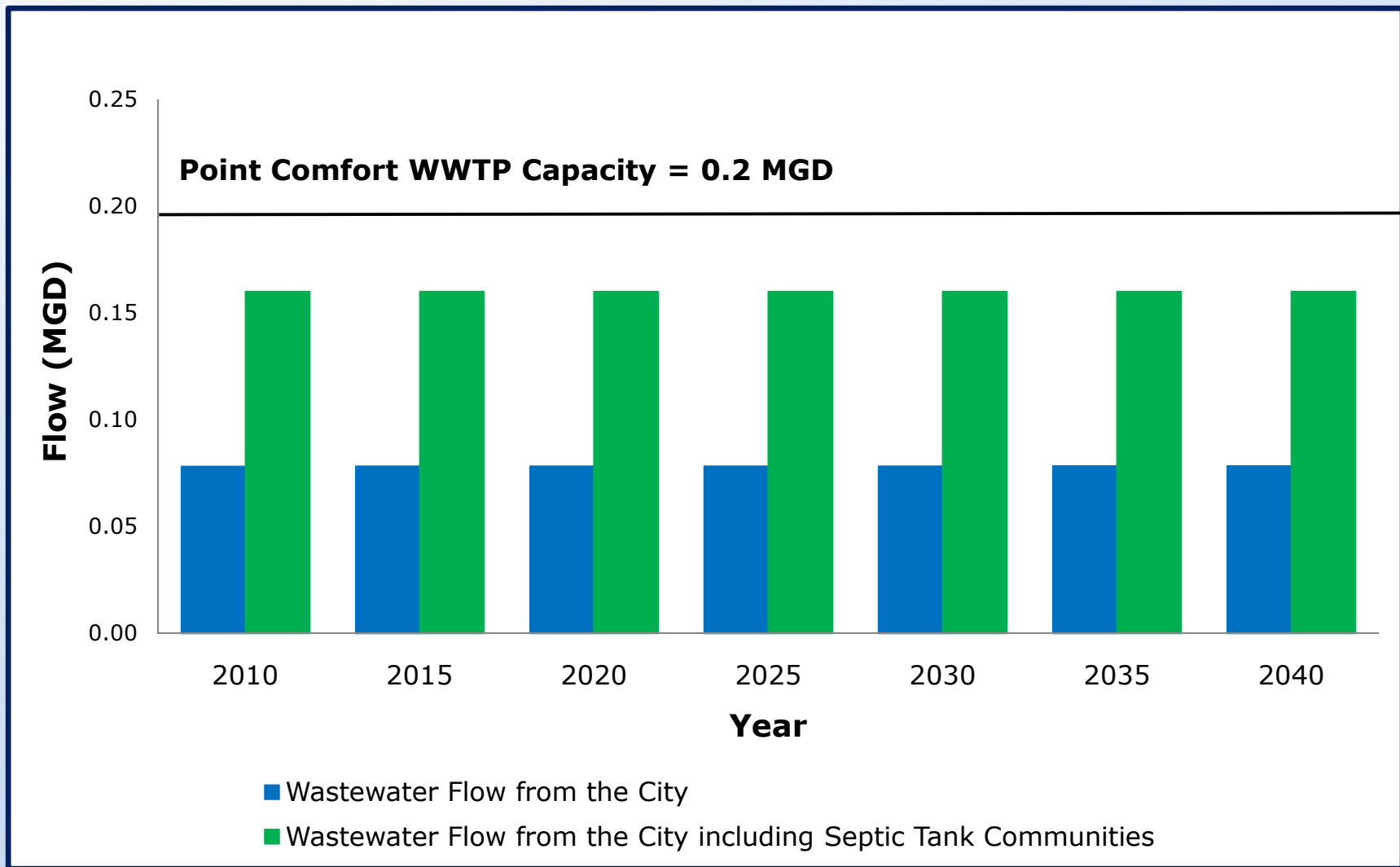
Wastewater Flow Projections: Design Criteria

- ◆ **For subdivisions, the LUE (Living Unit Equivalent) was assumed to be 2.5 persons per lot based on U.S Census Data for Calhoun County.**
- ◆ **Wastewater production rate was assumed to 100 gallon per capita per day (gpcd).**
- ◆ **For the cities, population growth and gpcd were used to calculate the future flow.**
- ◆ **For the subdivisions, number of lots, LUE's and gpcd were used to calculate the future flows.**

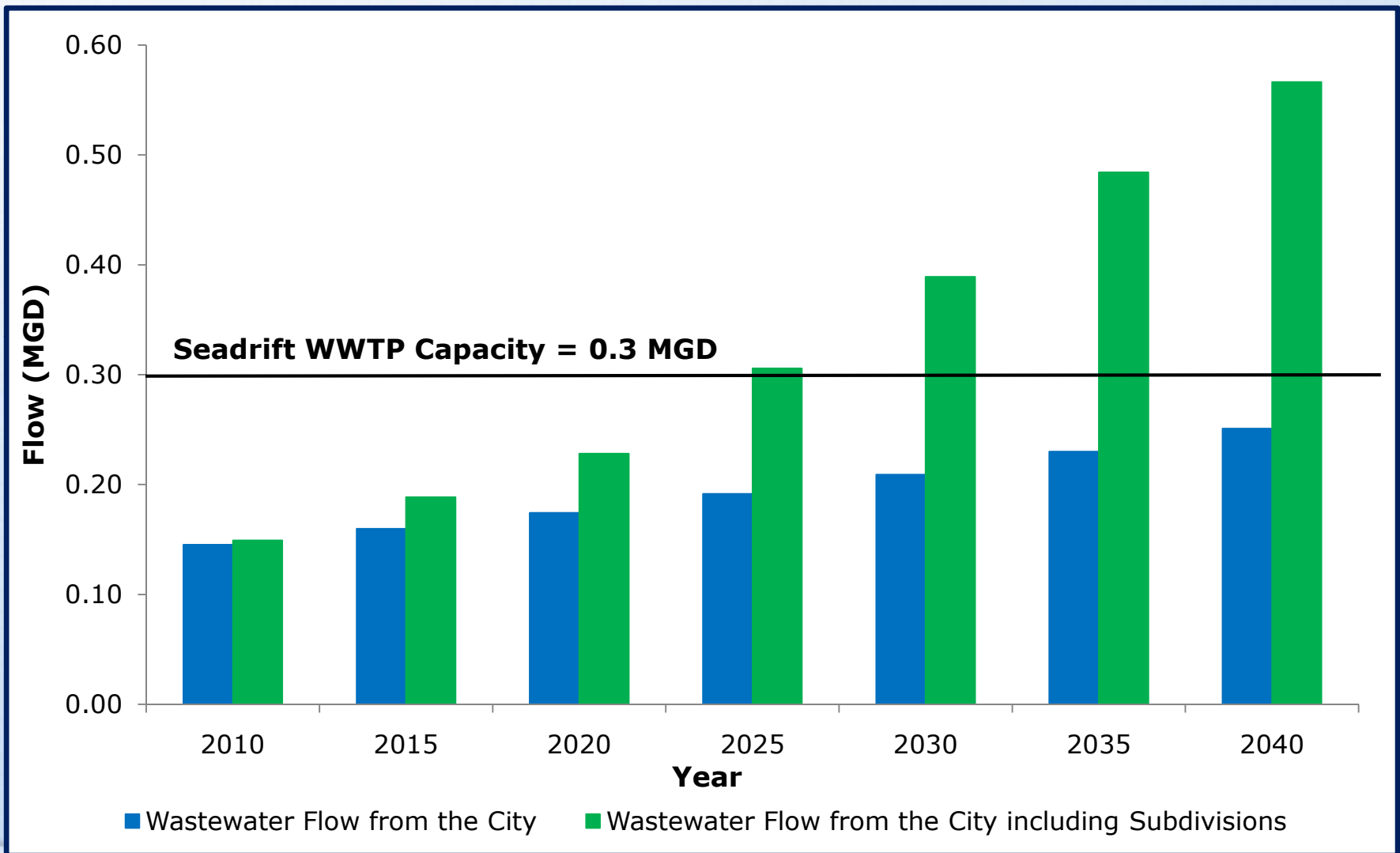
Wastewater Flow Projections: Area 1A



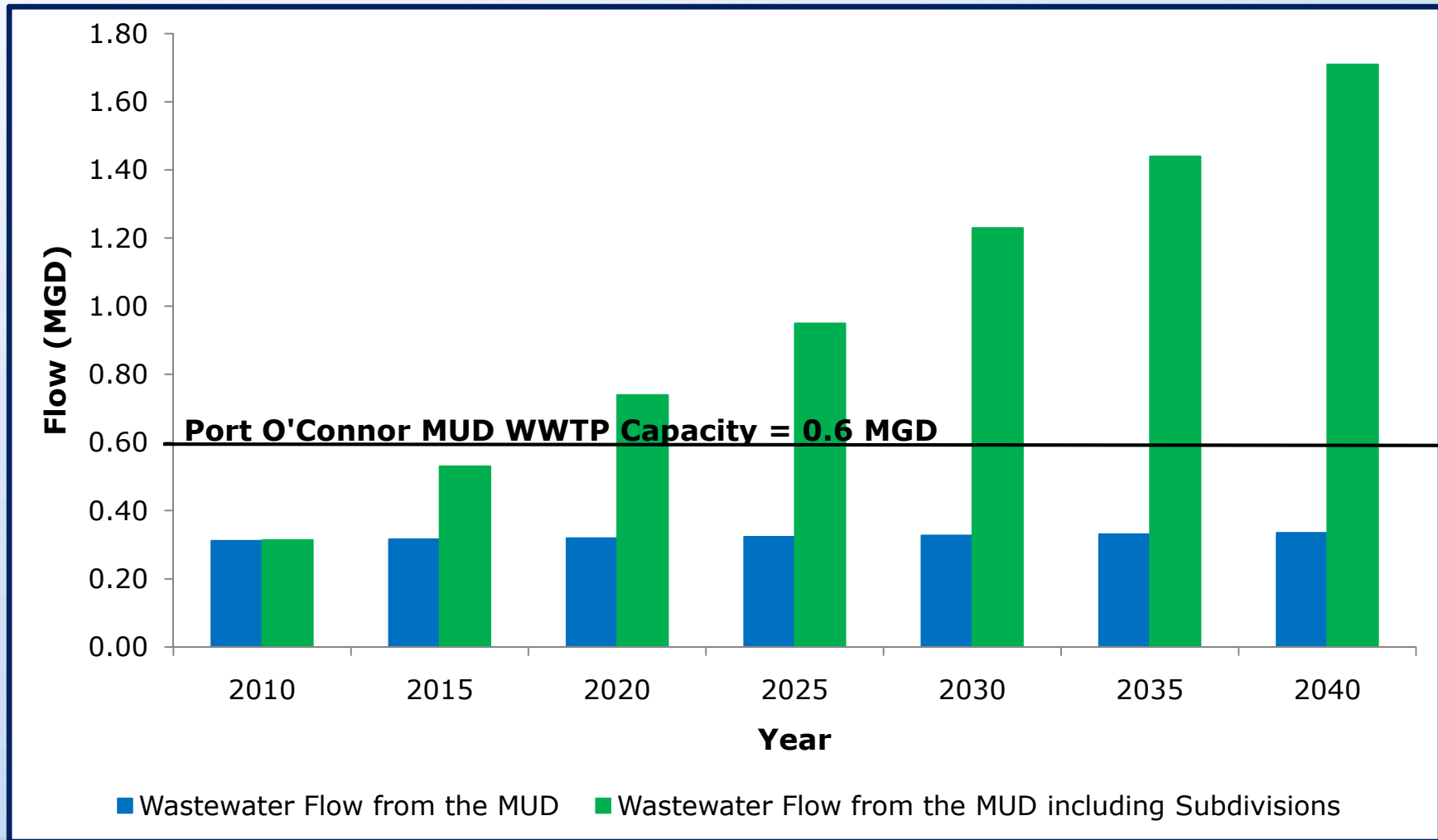
Wastewater Flow Projections: Area 1B



Wastewater Flow Projections: City of Seadrift - Area 2



Wastewater Flow Projections: Port O'Connor MUD - Area 2



Development of Final Regional Alternatives

Collection System Alternatives

- ◆ **Vacuum Sewer System**
- ◆ **Gravity Sewer System**
- ◆ **Pressure Sewer System**
- ◆ **On-Site Sewage Facility (OSSF)**

Vacuum Sewer System

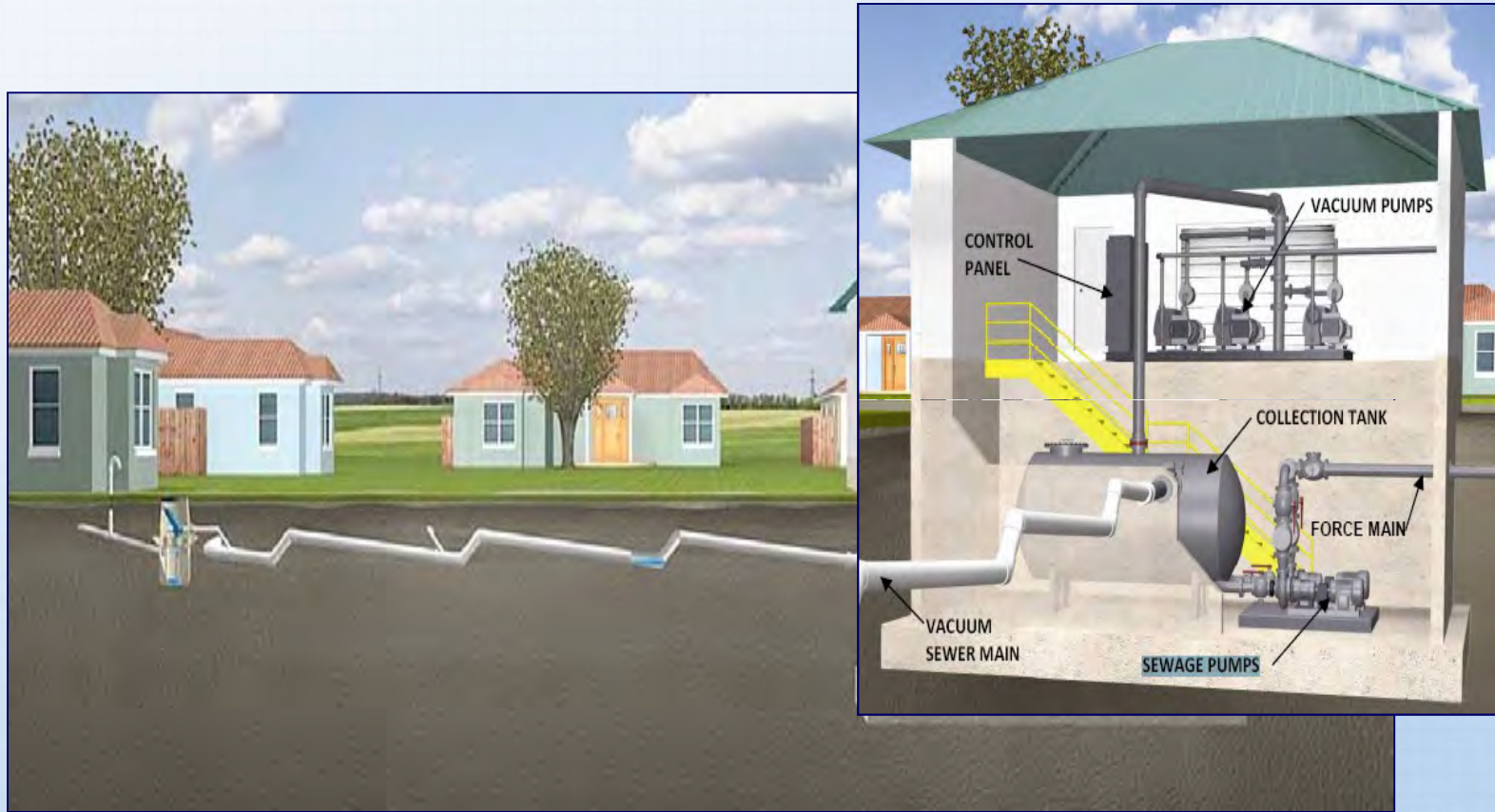
Advantages

- ◆ **Fewer I/I problems than gravity sewer**
- ◆ **Generate less odors**
- ◆ **Wastewater is completely contained**
- ◆ **The Sanctuary (future subdivision planned for Area 2) utilizes vacuum sewer system**

Disadvantages

- ◆ **Better for MUDs or Cities to operate and maintain**
- ◆ **High upfront cost**
- ◆ **Not conducive to incremental cost for construction**

Vacuum Sewer System (Cont.)



Gravity Sewer System

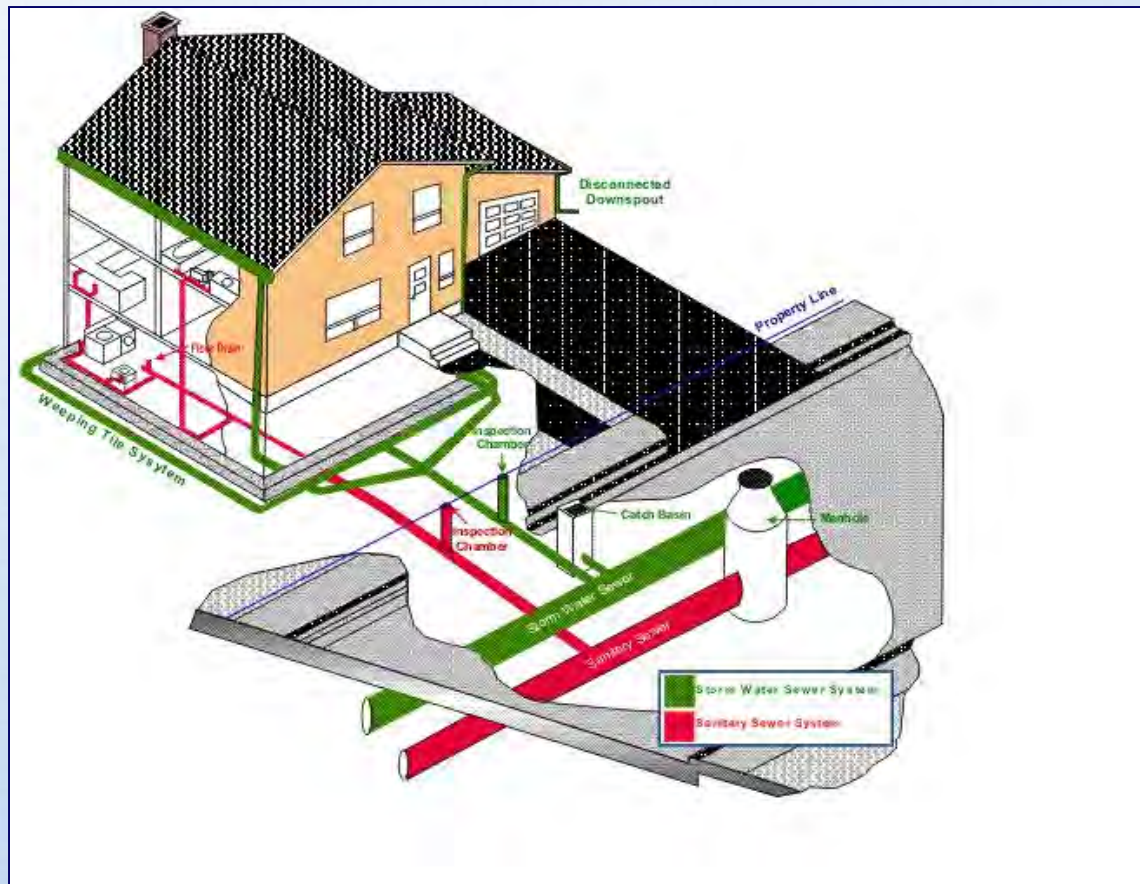
Advantages

- ◆ **Proven, effective and widely used**
- ◆ **Does not require individual household attention and maintenance**
- ◆ **Access for maintenance is relatively easy**

Disadvantages

- ◆ **High groundwater levels render high construction cost**
- ◆ **Wastewater collection systems must be installed within specified slope to provide minimum solids-carrying velocity**

Gravity Sewer System (Cont.)



Pressure Sewer System

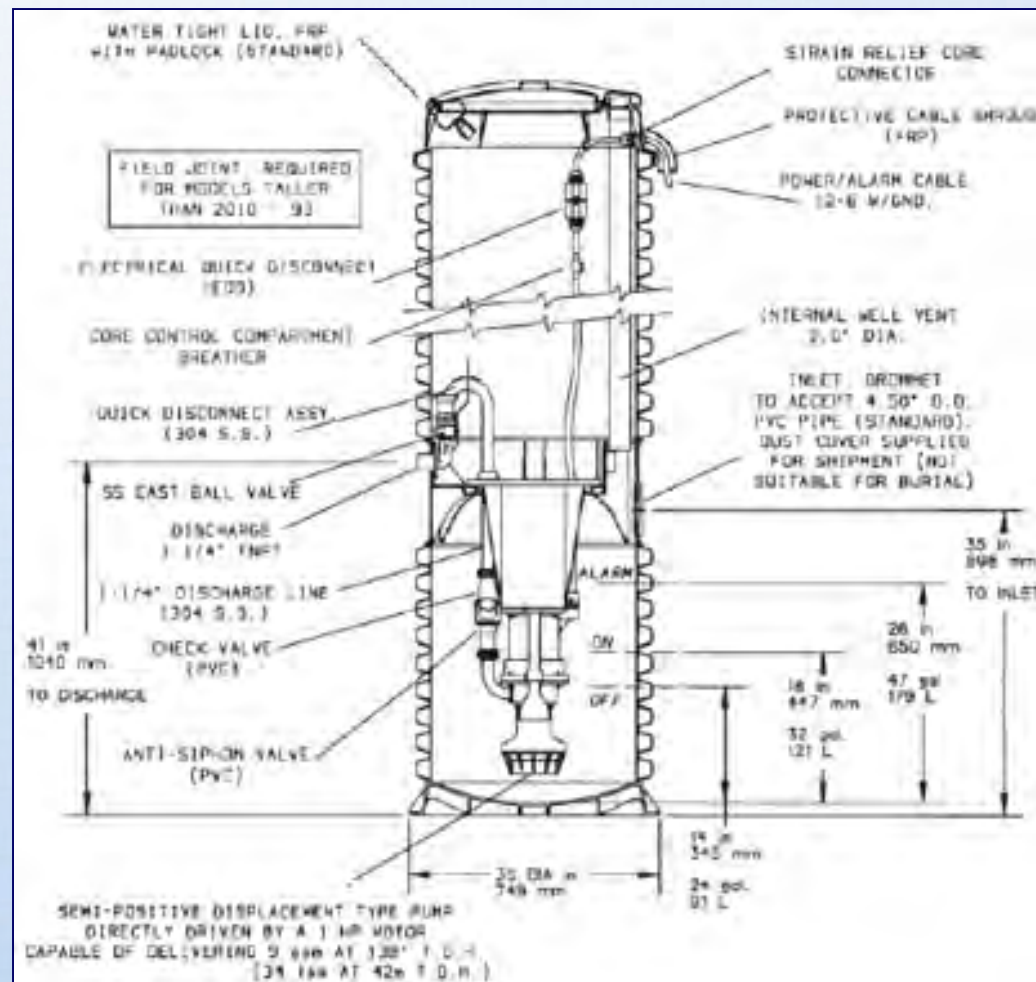
Advantages

- ◆ **Can be retrofitted**
- ◆ **Can be built incrementally**
- ◆ **Low upfront cost**
- ◆ **I/I will not be a factor**

Disadvantages

- ◆ **Odor control stations will be required**
- ◆ **Smaller pipe size is not conducive to inspection inside if damaged**
- ◆ **Air release valves throughout the system are required to avoid air traps, which could reduce system capacity**

Pressure Sewer System (Cont.)



On-Site Sewage Facilities (OSSF)

Advantages

- ◆ **Cost effective option (systems recommended for study area would be typically anaerobic)**

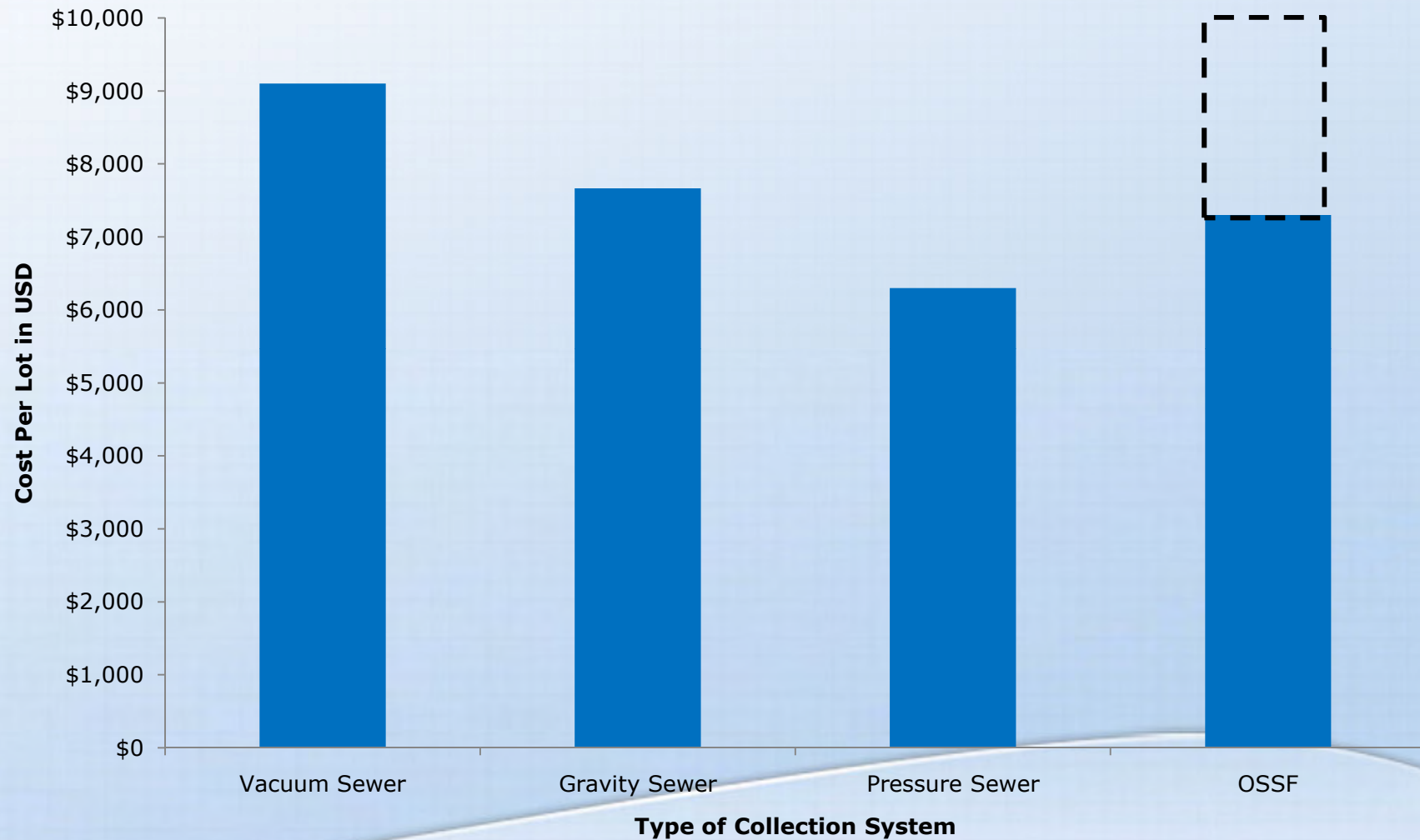
Disadvantages

- ◆ **If an OSSF fails, potential for public exposure to raw sewage is high**
- ◆ **Failing OSSFs will also potentially cause wastewater pooling**

On-Site Sewage Facilities (Cont.)



Collection System Alternatives



Treatment Alternatives

Package & Regional WWTPs

Advantages

- ◆ Will avoid pumping over long distance to local WWTP
- ◆ Will avoid construction of lift station and electrical costs
- ◆ Effluent can be recycled as needed

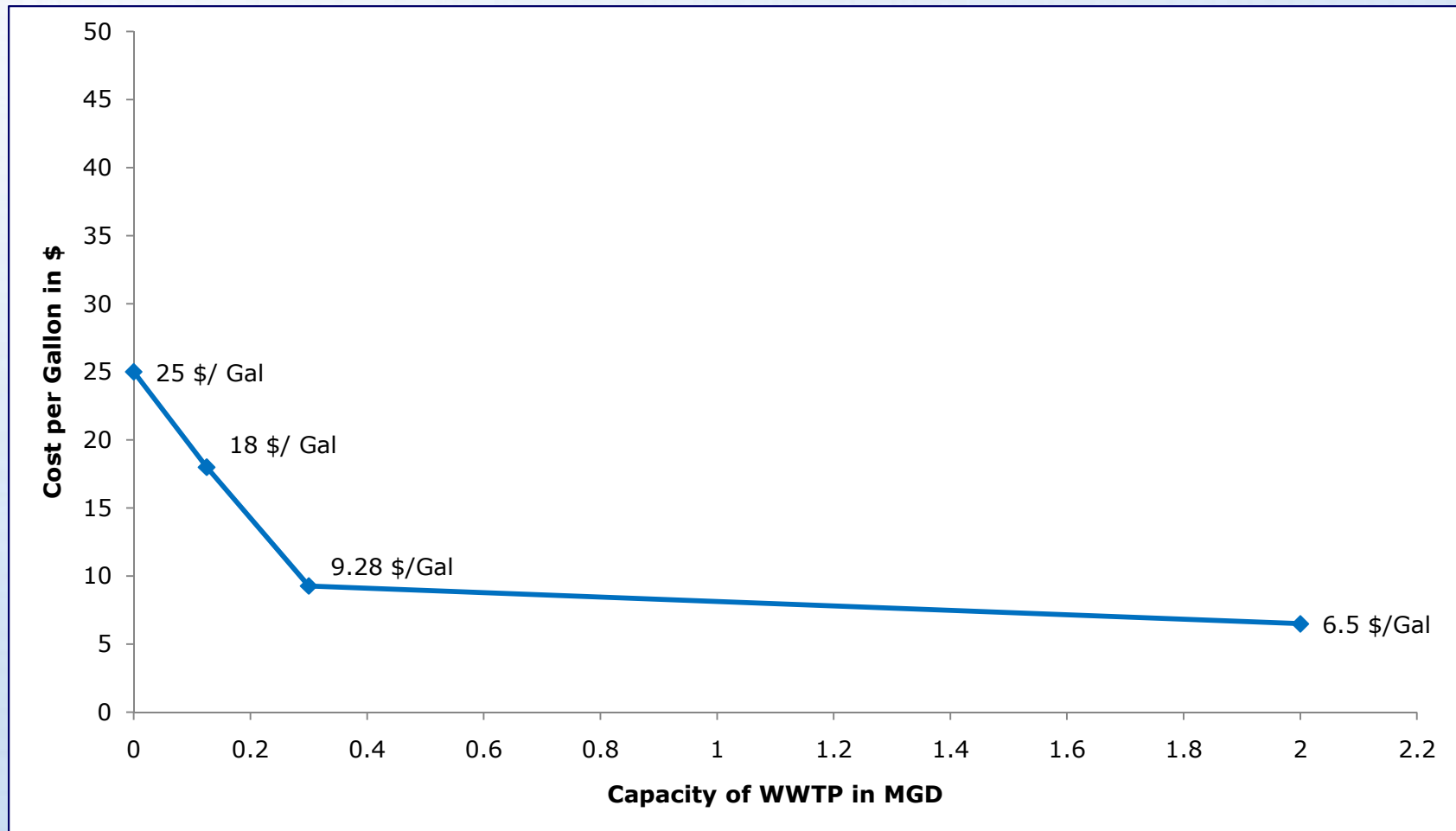
Disadvantages

- ◆ Requires constant attention for permit compliance
- ◆ Construction and treatment costs will be higher than a large capacity WWTP
- ◆ Potential discharge violation penalties

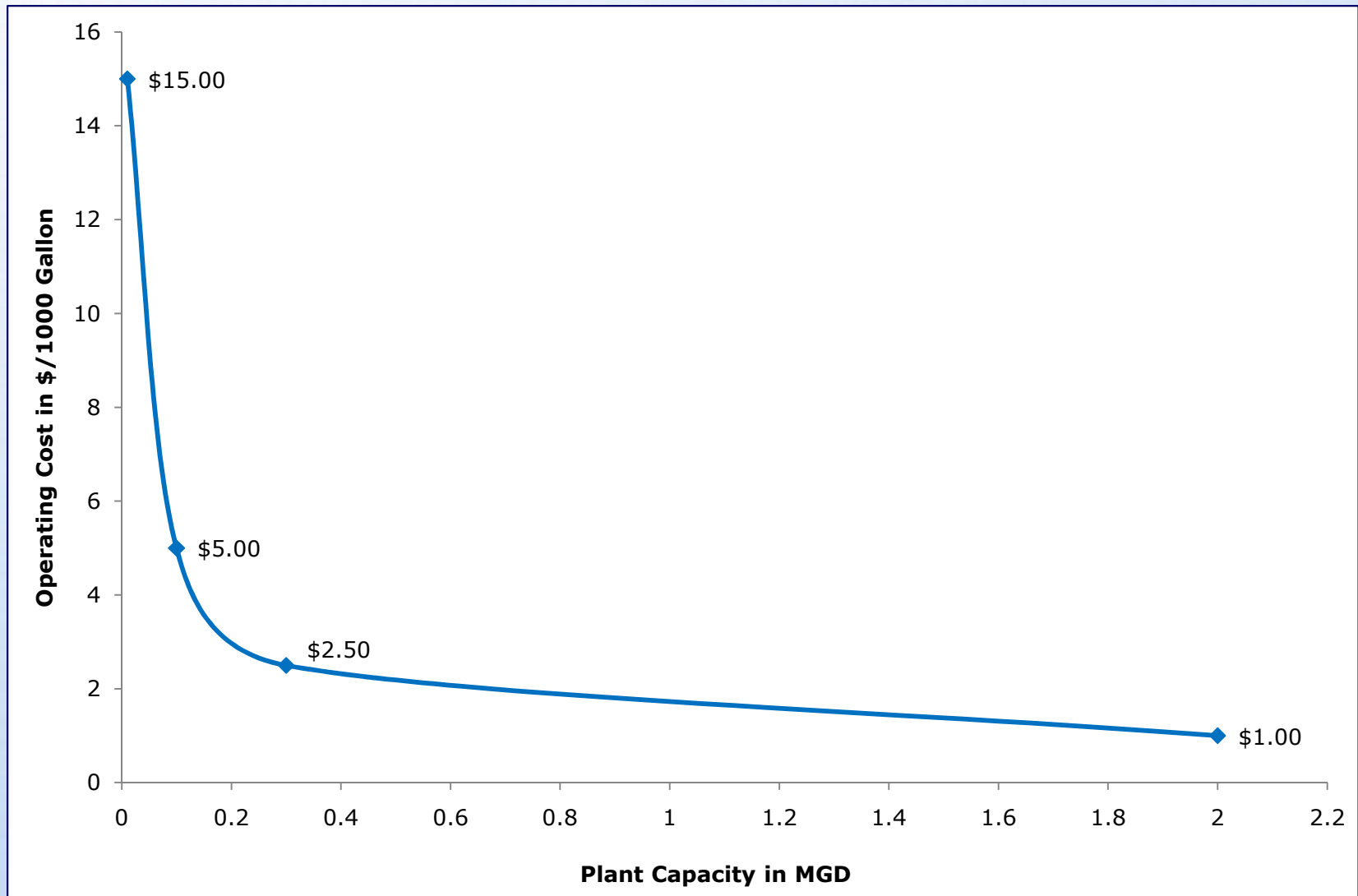
Assumptions for Cost Estimates

- ◆ **Pressure Sewer System**
- ◆ **Areas 1A, 1B & 3 assumed to qualify for Rural TWDB Loan (40 years; 3.92% interest)**
- ◆ **Contingency 15%**
- ◆ **Professional Services 20%**
- ◆ **City of Port Lavaca Sewer Fee: \$14 for first 2000 Gallons and \$4.90 per 1000 gallons afterwards**
- ◆ **For users outside city limits, wastewater rate is 1.5 times that of user within city limit**

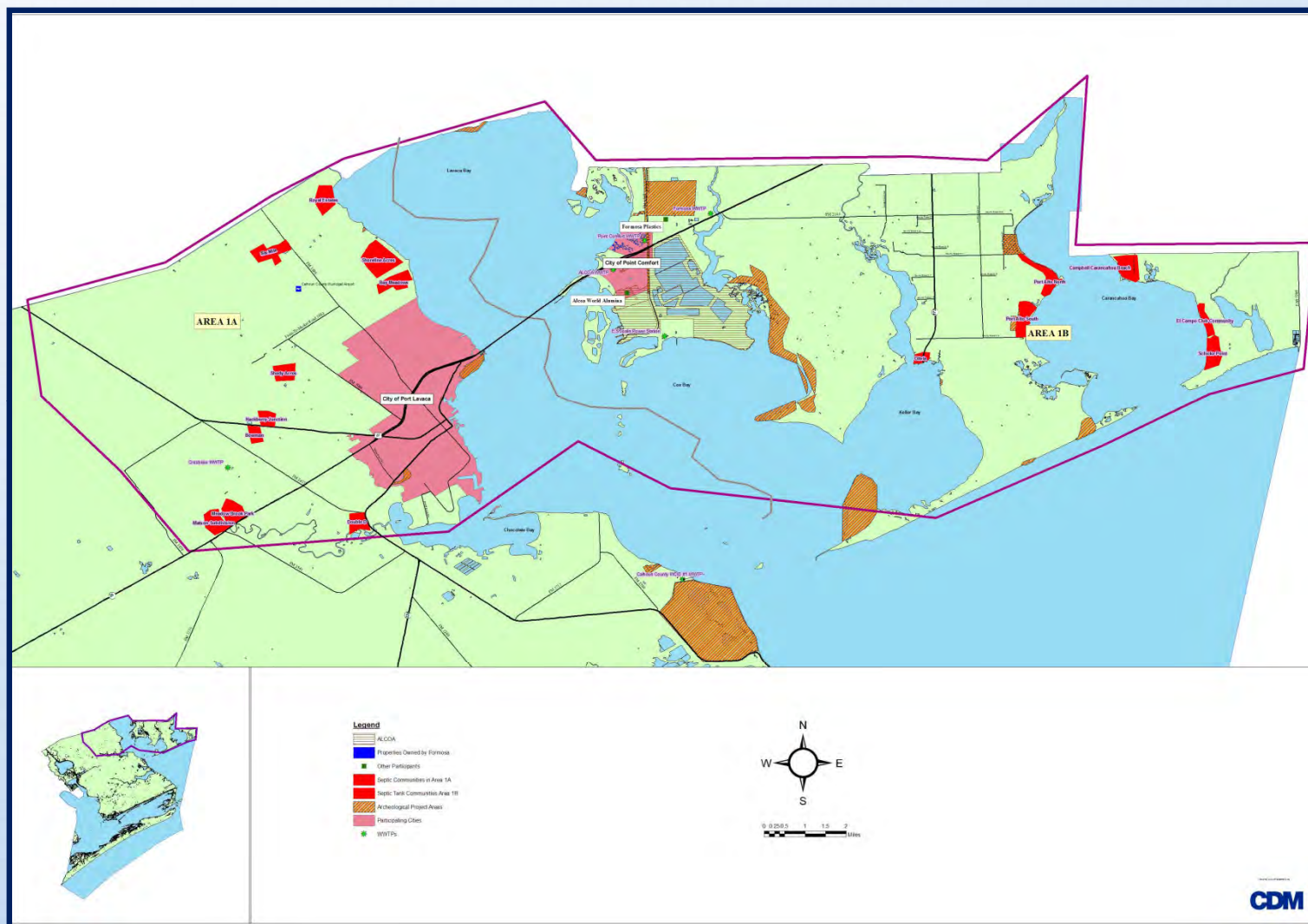
Capacity of WWTP vs. Cost per Gallon



O&M Cost for WWTP Operation



Area No. 1 Regional Options



Area No. 1A & 1B Regional Options

Wastewater Service

- 1) City of Port Lavaca provide wastewater service to Royal Estates, Shoreline Acres, Bay Meadows, Double D, Shady Acres, Meadow Brook Park, Bowman, Hackberry Junction, Matson Subdivision & Six Mile Area**
- 2) Install small package plant to serve Royal Estates, Shoreline Acres, Bay Meadows & Six Mile Area**
- 3) Crestview WWTP extend service to Meadow Brook Park, Bowman, Hackberry Junction & Matson Subdivision**
- 4) Install small package plant to serve Olivia and Port Alto WSC**

Area No. 1A & 1B Regional Options

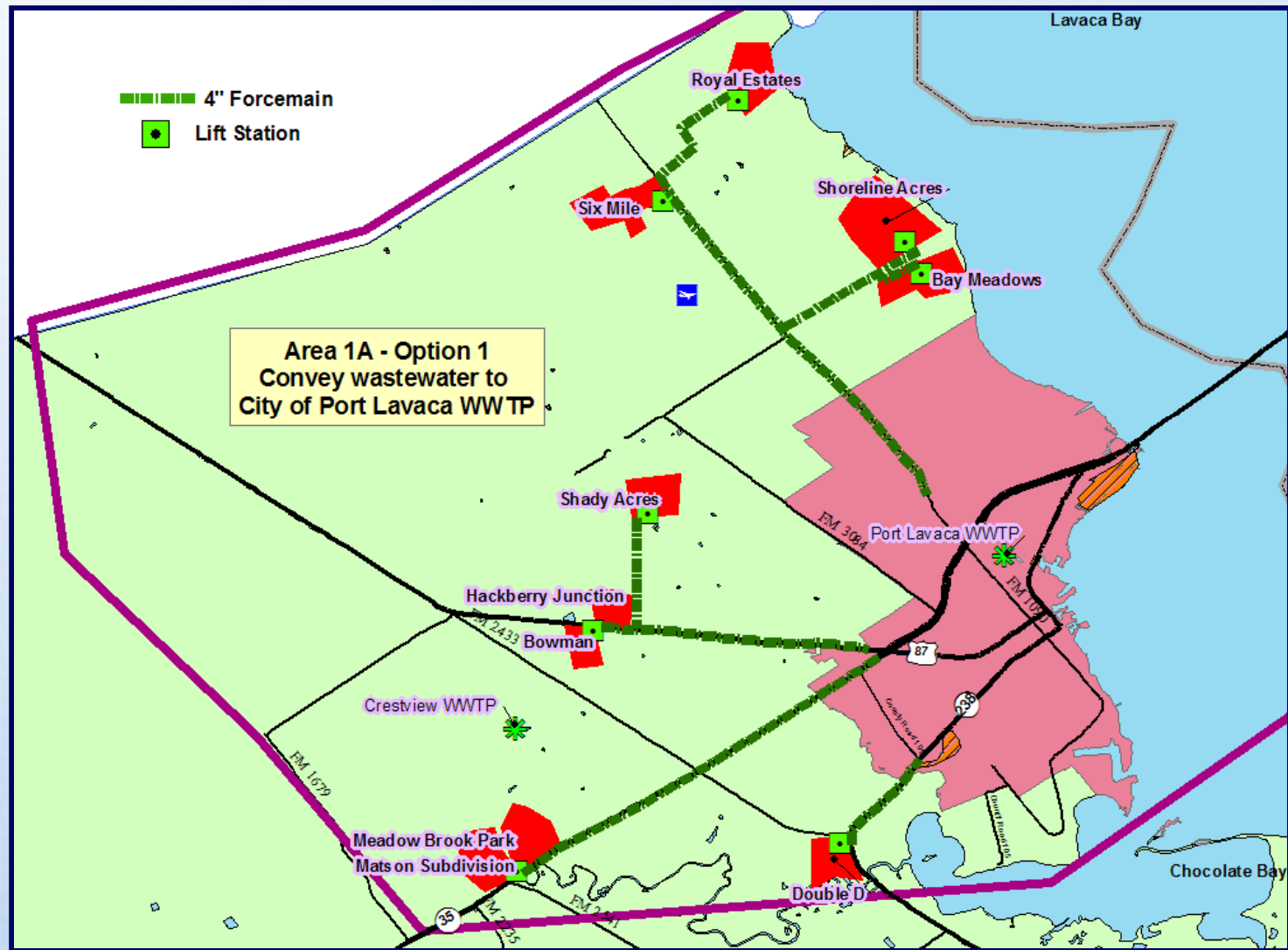
Wastewater Service (Cont.)

- 5) City of Point Comfort provide centralized wastewater service to Port Alto WSC, Olivia, and other developments in the area**
- 6) Install small package plant to serve Campbell Carancahua Beach Subdivision, El Campo Club Community & Schicke Point Community**

Reclaimed Water

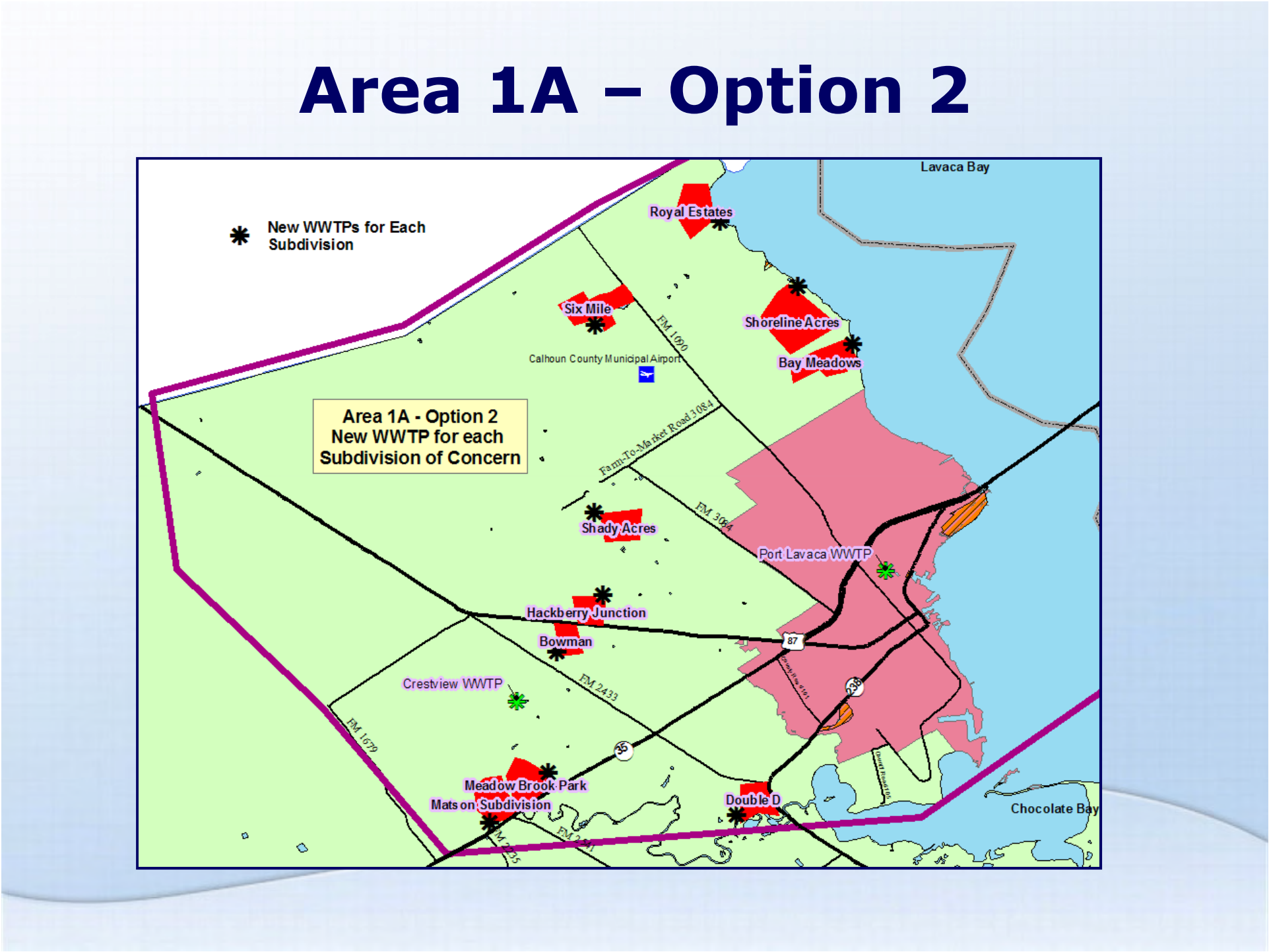
- 1) Stand-alone alternative**
- 2) Formosa Plastics and Alcoa receive treated effluent/reuse from Cities of Point Comfort and Port Lavaca**

Area 1A – Option 1

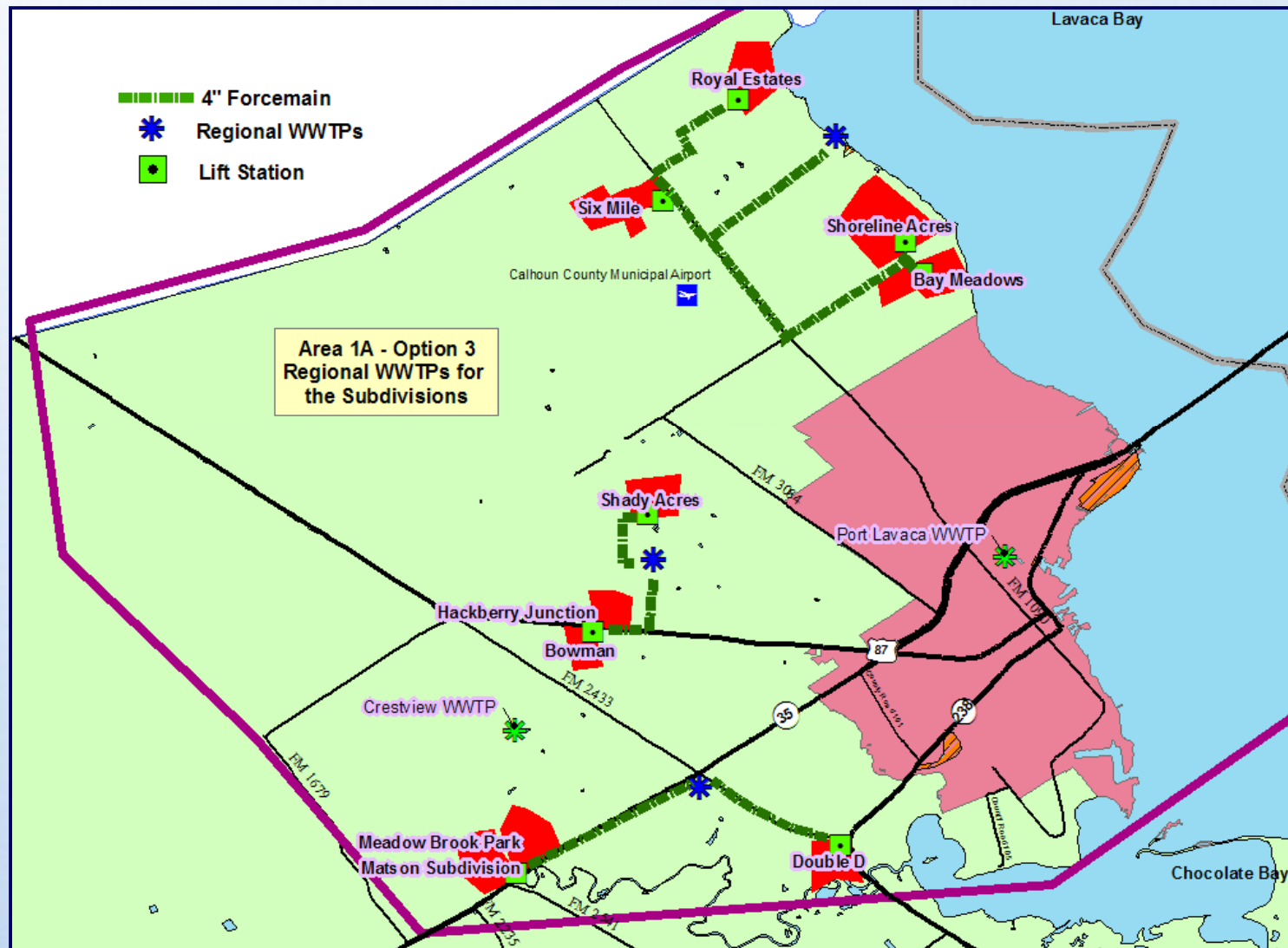


Area 1A – Option 2

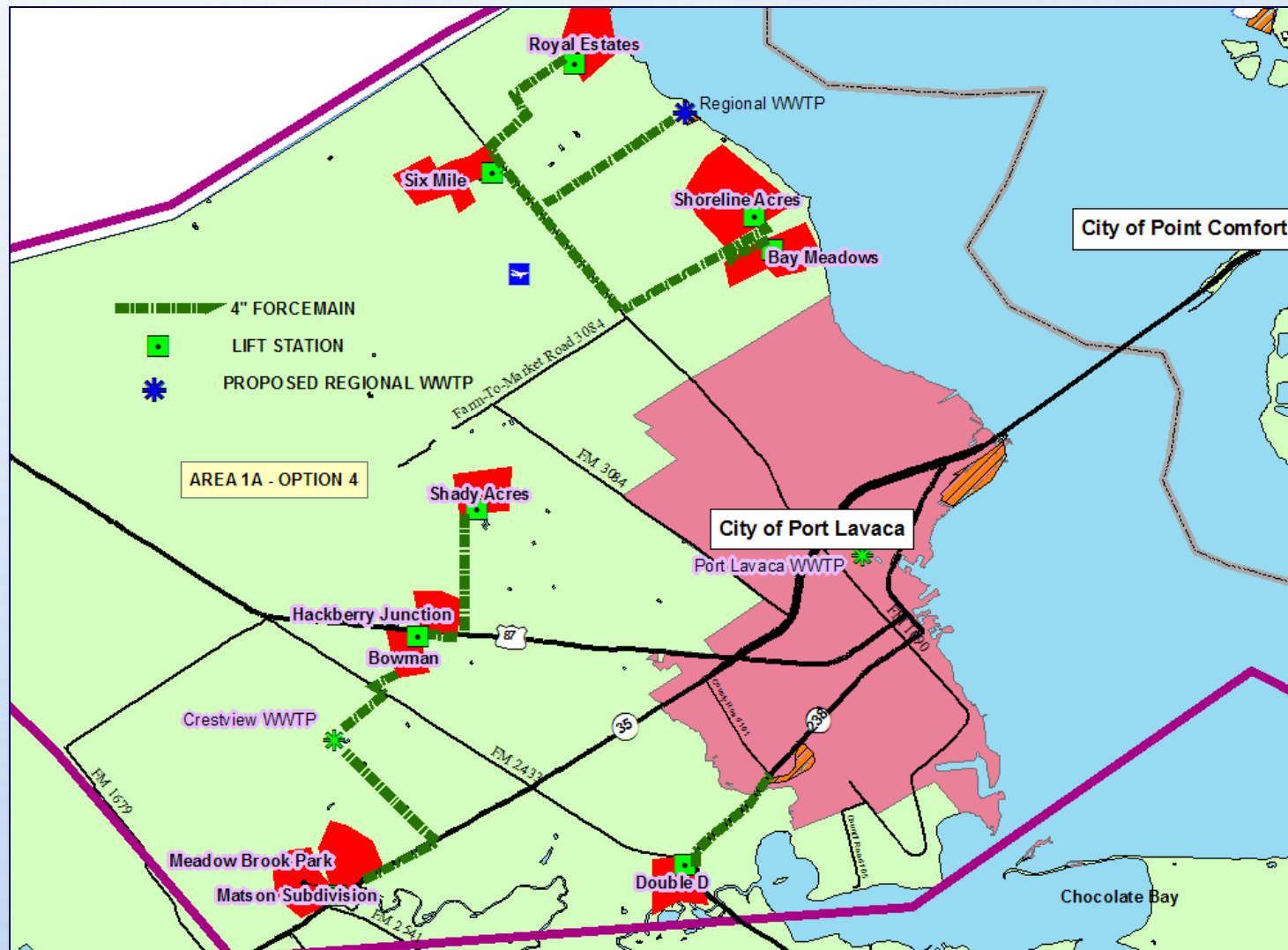
The map displays the geographical layout of Area 1A under Option 2. A yellow box in the center-left contains the text: "Area 1A - Option 2 New WWTP for each Subdivision of Concern". A legend in the top-left corner indicates that black asterisks represent "New WWTPs for Each Subdivision". The map shows several subdivisions highlighted in red: Royal Estates, Six Mile, Shoreline Acres, Bay Meadows, Shady Acres, Hackberry Junction, Bowman, Meadow Brook Park Mats on Subdivision, and Double D. Existing wastewater treatment plants are marked with green asterisks: Port Lavaca WWTP and Crestview WWTP. The map also shows the Calhoun County Municipal Airport, major roads (FM 190, FM 3084, FM 2433, FM 1679, FM 241, FM 225, and Highway 87), and bodies of water (Lavaca Bay and Chocolate Bay). A thick purple line outlines the boundary of the area shown.



Area 1A – Option 3



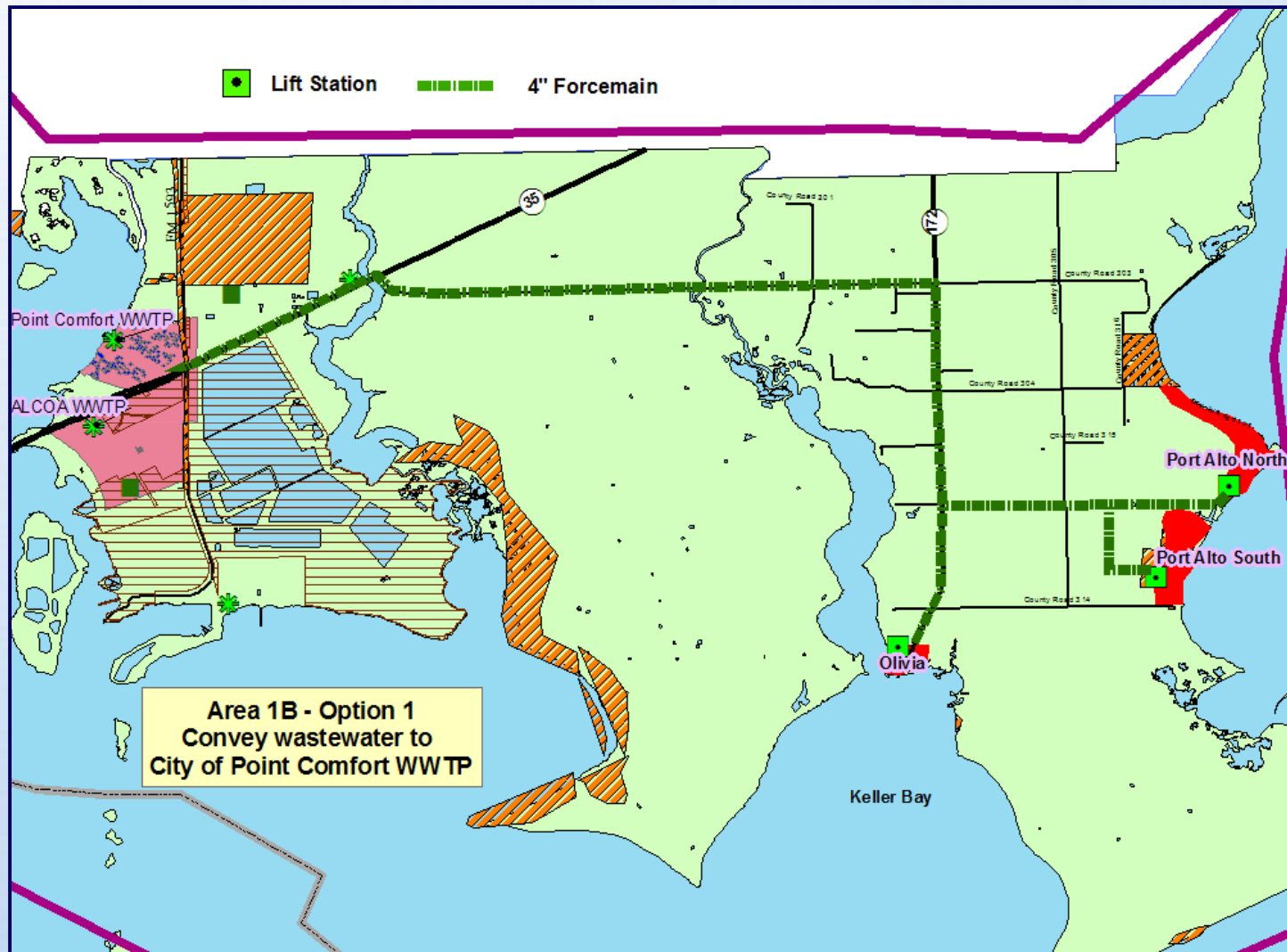
Area 1A – Option 4



Cost Comparisons for Area 1A

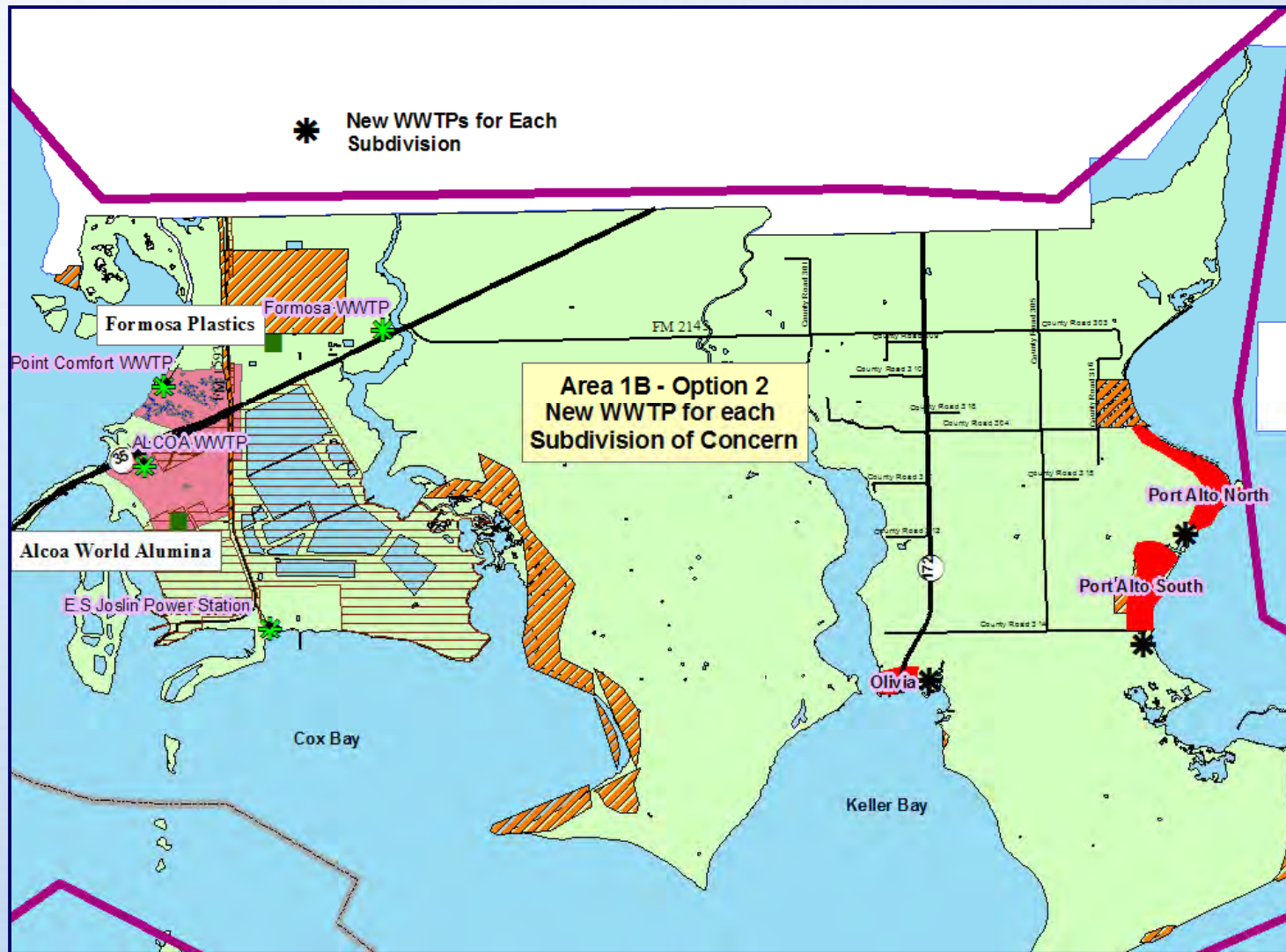
Subdivision	Option 1	Option 2	Option 3	Option 4
Double D	\$123.51	\$177.08	\$157.35	\$123.51
Matson	\$141.05	\$186.11	\$157.40	\$134.05
Meadow Brook	\$137.14	\$186.11	\$154.78	\$130.79
Royal Estate	\$190.91	\$186.11	\$183.87	\$183.87
Shoreline Acres	\$129.57	\$177.08	\$148.10	\$148.10
Six Mile	\$127.66	\$177.08	\$139.72	\$139.72
Hackberry Junction	\$132.96	\$186.11	\$166.36	\$134.05
Bay Meadows	\$154.13	\$186.11	\$173.27	\$173.27
Bowman	\$140.60	\$186.11	\$173.64	\$134.05
Shady Acres	\$164.08	\$186.11	\$179.96	

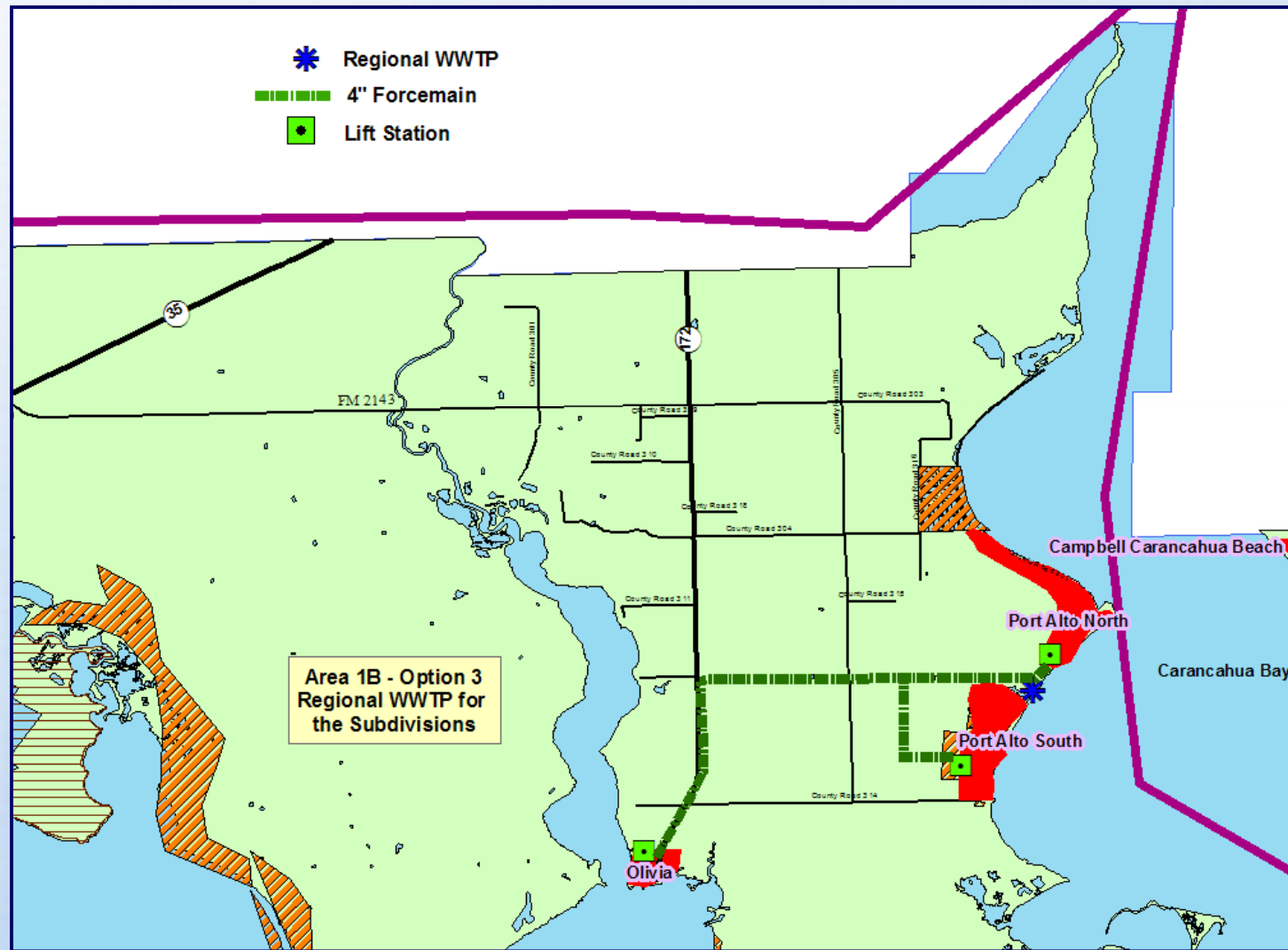
Area 1B –Option 1



Area 1B – Option 2

The map displays a coastal region with several subdivisions and water bodies. A legend at the top indicates that black asterisks represent 'New WWTPs for Each Subdivision'. The subdivisions shown include Formosa Plastics, Point Comfort WWTP, Alcoa World Alumina, E.S. Joslin Power Station, Formosa WWTP, and Olivia. A central yellow box highlights 'Area 1B - Option 2 New WWTP for each Subdivision of Concern'. The map also shows Cox Bay, Keller Bay, and Port Alto North and South. Various county roads are labeled, including FM 2145, County Road 210, County Road 212, County Road 214, County Road 216, County Road 218, County Road 220, County Road 222, County Road 224, County Road 226, County Road 228, County Road 230, County Road 232, County Road 234, County Road 236, County Road 238, County Road 240, County Road 242, County Road 244, County Road 246, County Road 248, County Road 250, County Road 252, County Road 254, County Road 256, County Road 258, County Road 260, County Road 262, County Road 264, County Road 266, County Road 268, County Road 270, County Road 272, County Road 274, County Road 276, County Road 278, County Road 280, County Road 282, County Road 284, County Road 286, County Road 288, County Road 290, County Road 292, County Road 294, County Road 296, County Road 298, County Road 300, County Road 302, County Road 304, County Road 306, County Road 308, County Road 310, County Road 312, County Road 314, County Road 316, County Road 318, County Road 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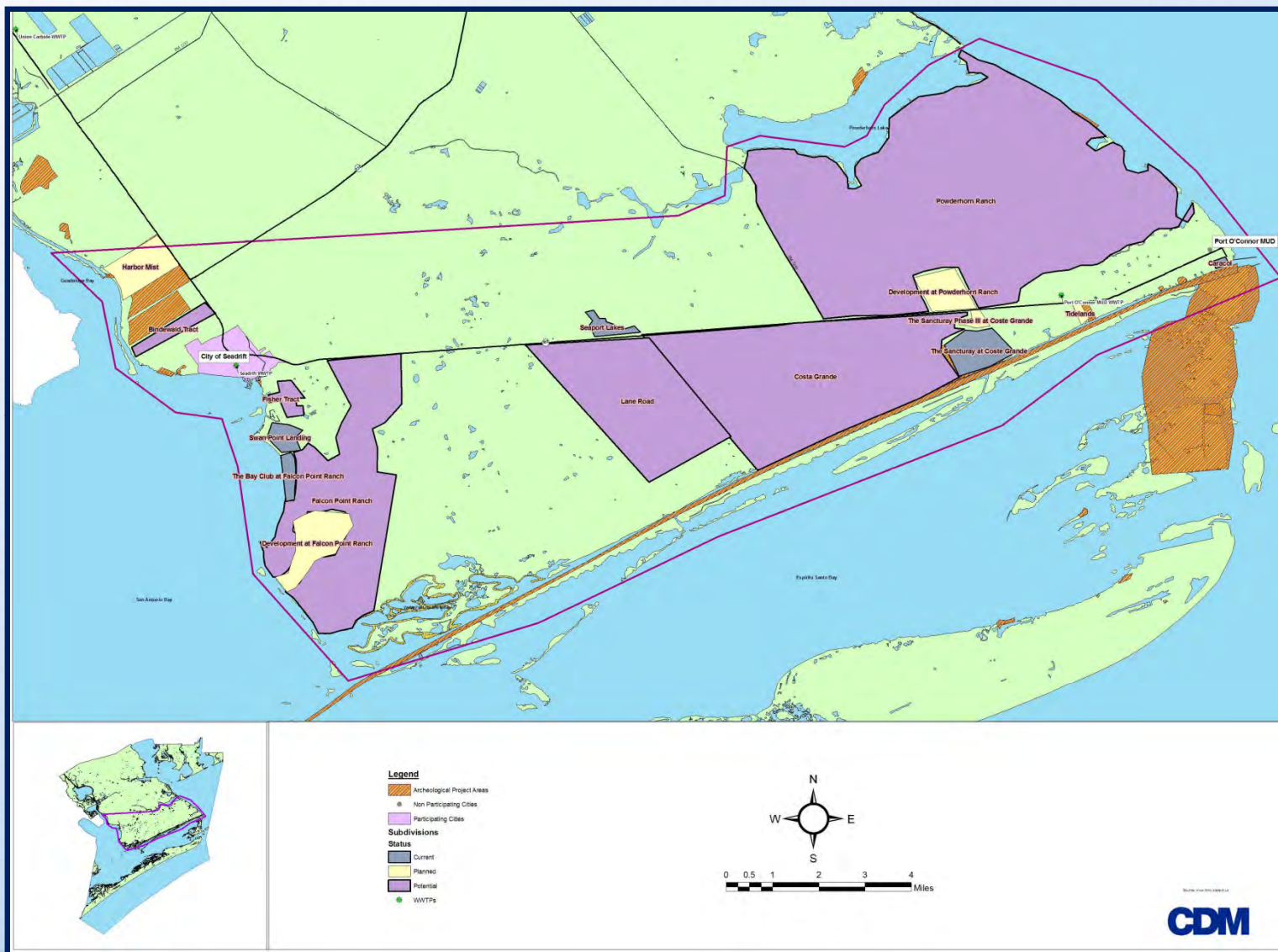


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Cost Comparisons for Area 1B

Subdivisions	Option 1	Option 2	Option 3
Olivia	\$136.24	\$145.22	\$142.13
Port Alto South	\$100.14	\$142.22	\$109.07
Port Alto North	\$92.88	\$177.08	\$106.97

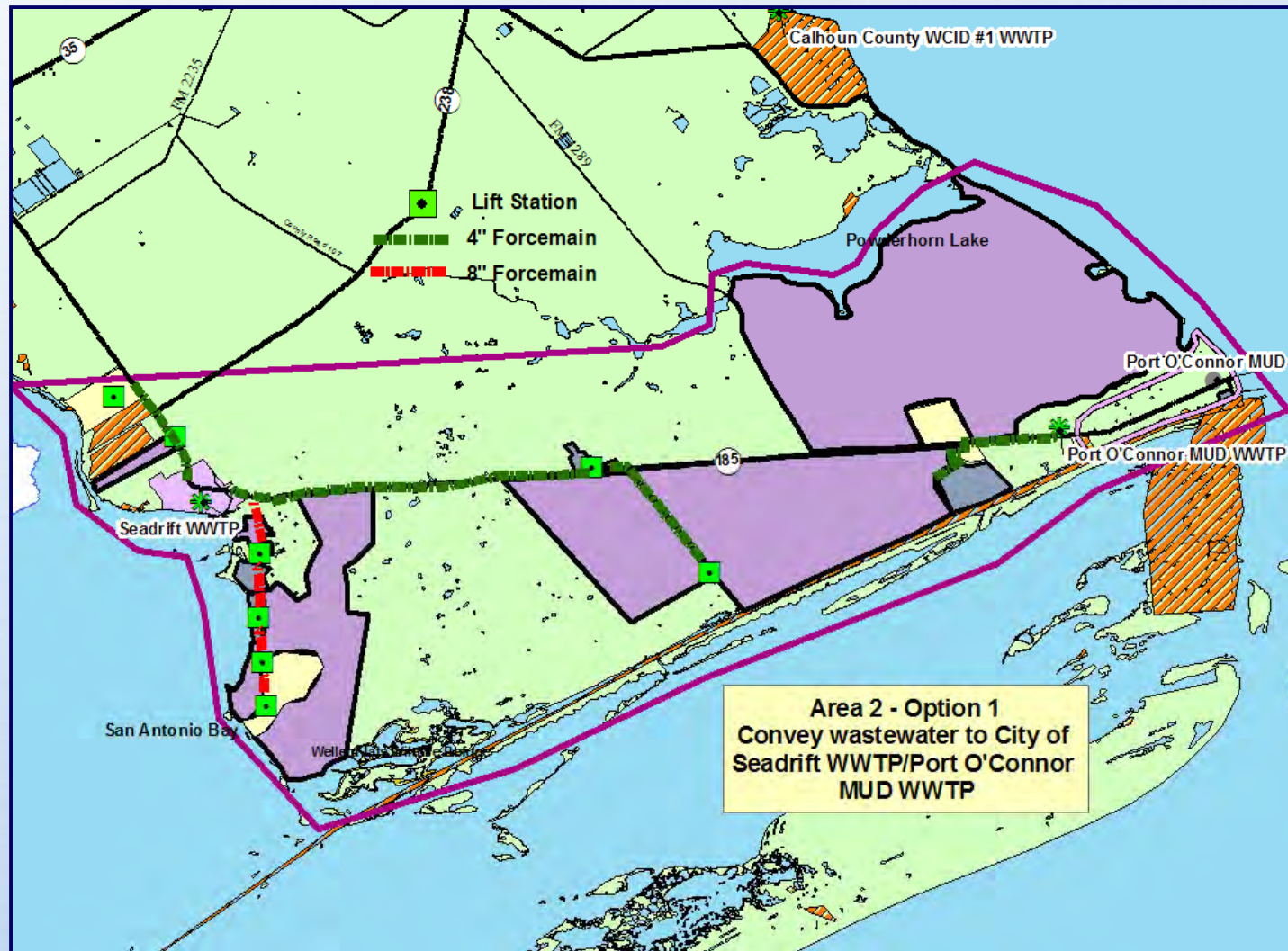
Area No. 2 Regional Options



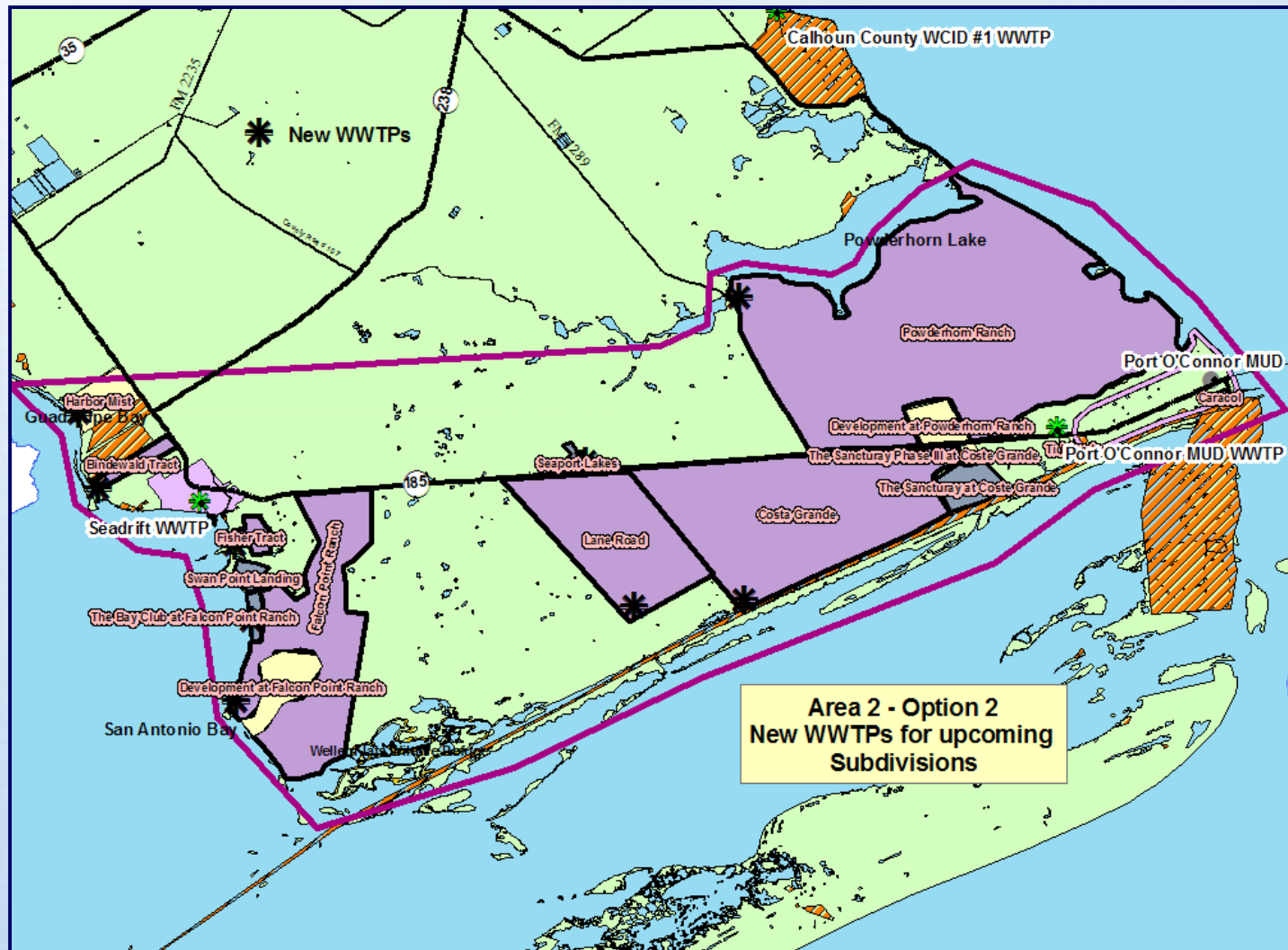
Area No. 2 Regional Options

- 1) a. City of Seadrift serve Swan Point Landing, Falcon Point and others located in close proximity**
b. Port O'Connor MUD extend wastewater service west along Highway 185 to Lane Road Development, The Sanctuary, Powder Horn Ranch & Costa Grande
- 2) City of Seadrift and Port O'Connor MUD provide wastewater service to their existing areas; install package plant near Lane Road Development to serve developments along Highway 185**

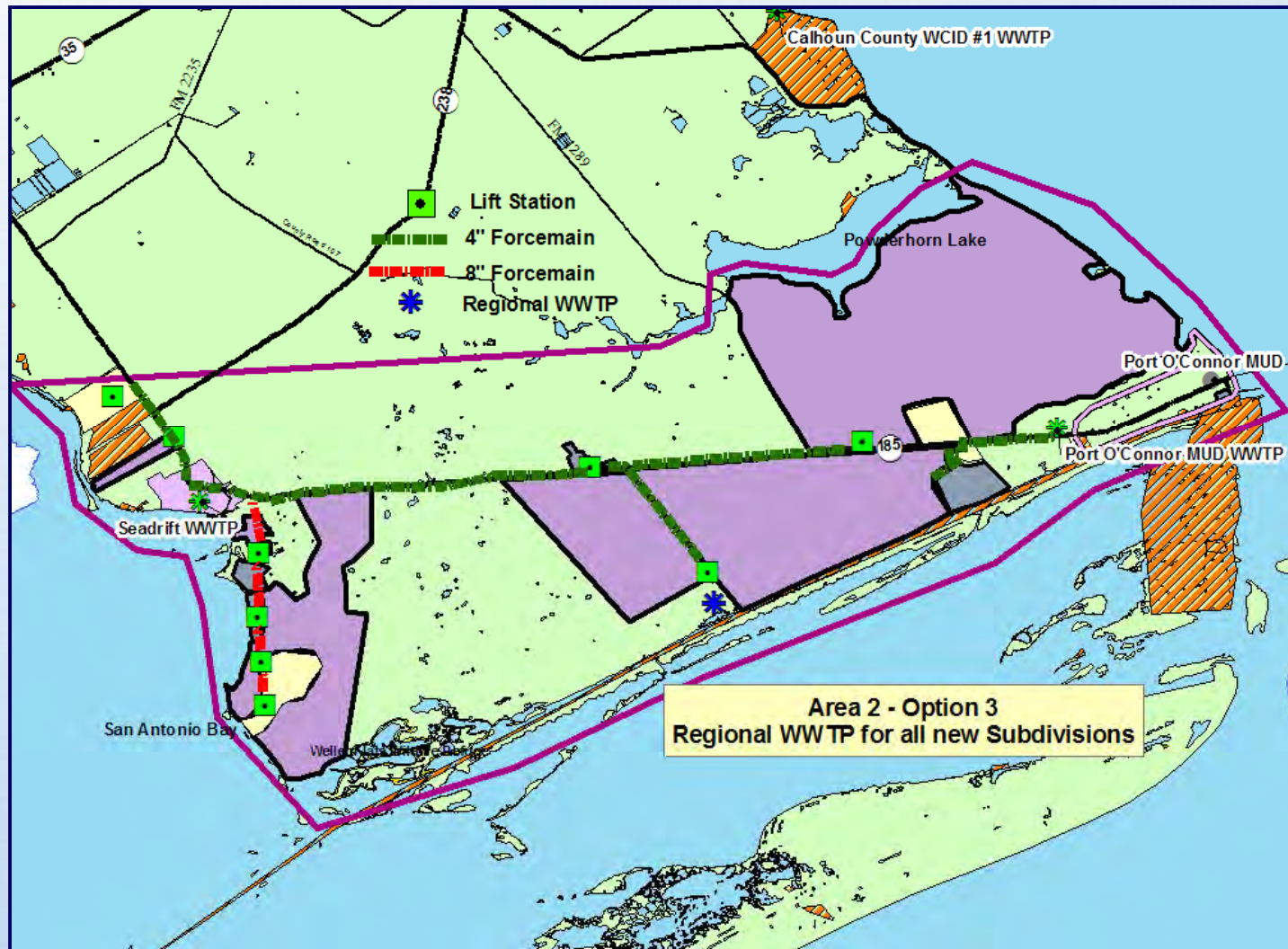
Area 2 – Option 1



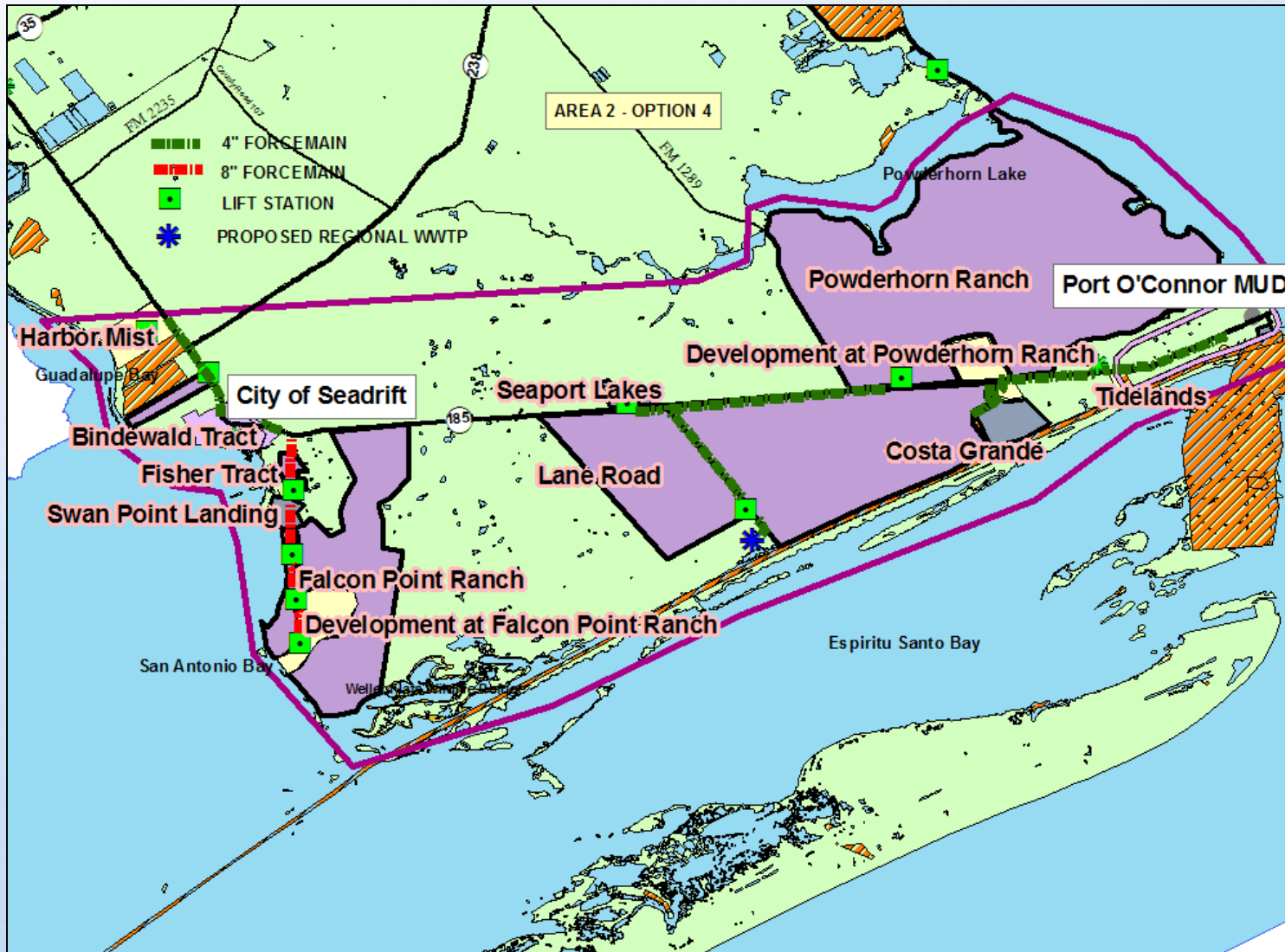
Area 2 – Option 2



Area 2 - Option 3



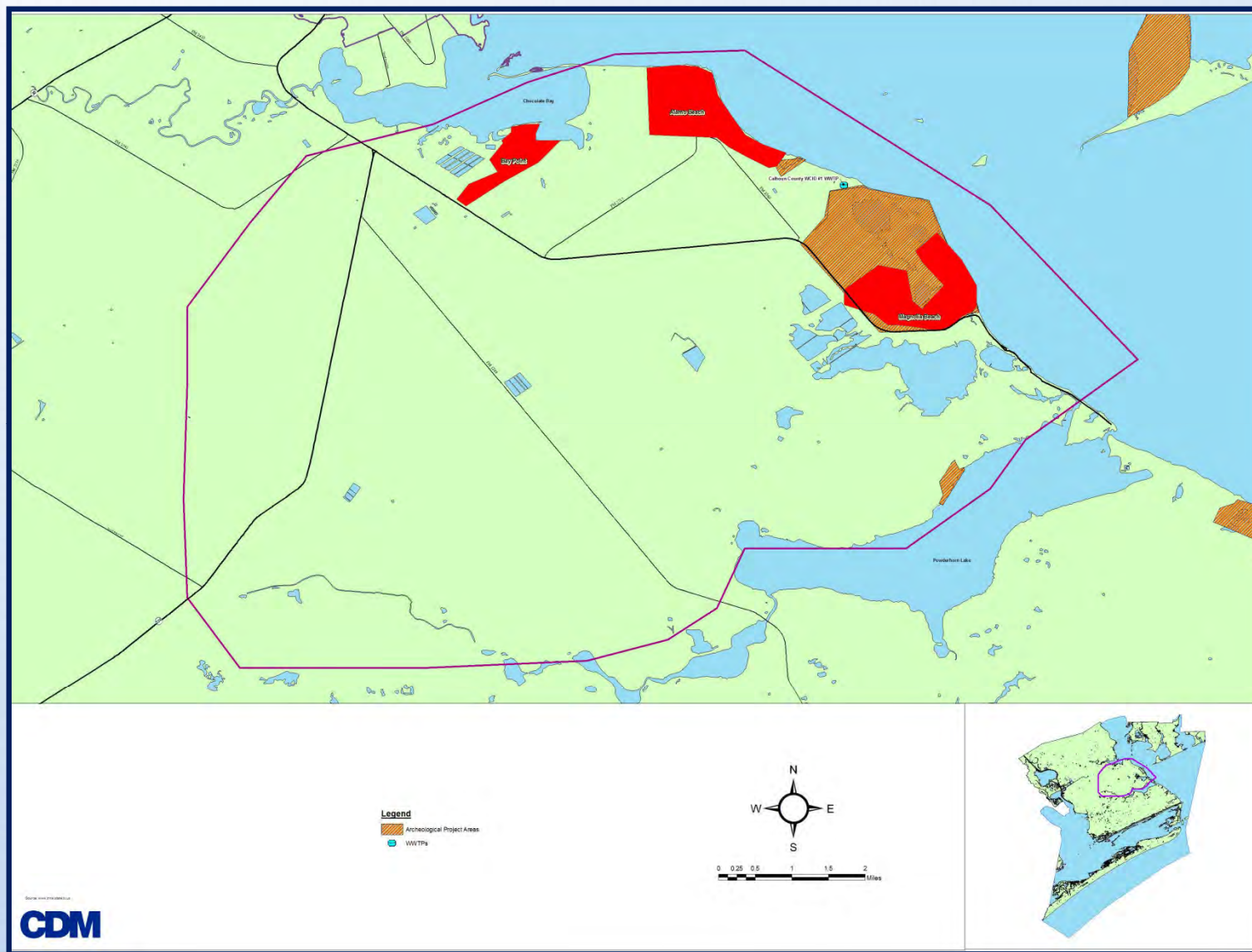
Area 2 - Option 4



Cost Comparisons for Area 2

Subdivisions	Option 1	Option 2	Option 3	Option 4
Harbor Mist	\$171.10	\$180.85	\$119.02	\$171.10
Bindewald	\$162.52	\$170.96	\$107.85	\$162.52
Fisher	\$166.48	\$170.96	\$111.81	\$166.48
Swan Point Landing	\$257.69	\$224.96	\$186.20	\$257.69
Falcon Point	\$146.08	\$104.77	\$89.47	\$146.08
Seaport Lakes	\$296.69	\$224.96	\$194.67	\$202.27
Lane Road	\$158.71	\$159.93	\$96.27	\$103.88
Costa Grande	\$142.35	\$81.17	\$81.48	\$89.09
Powderhorn	\$150.79	\$141.29	\$116.99	\$124.59

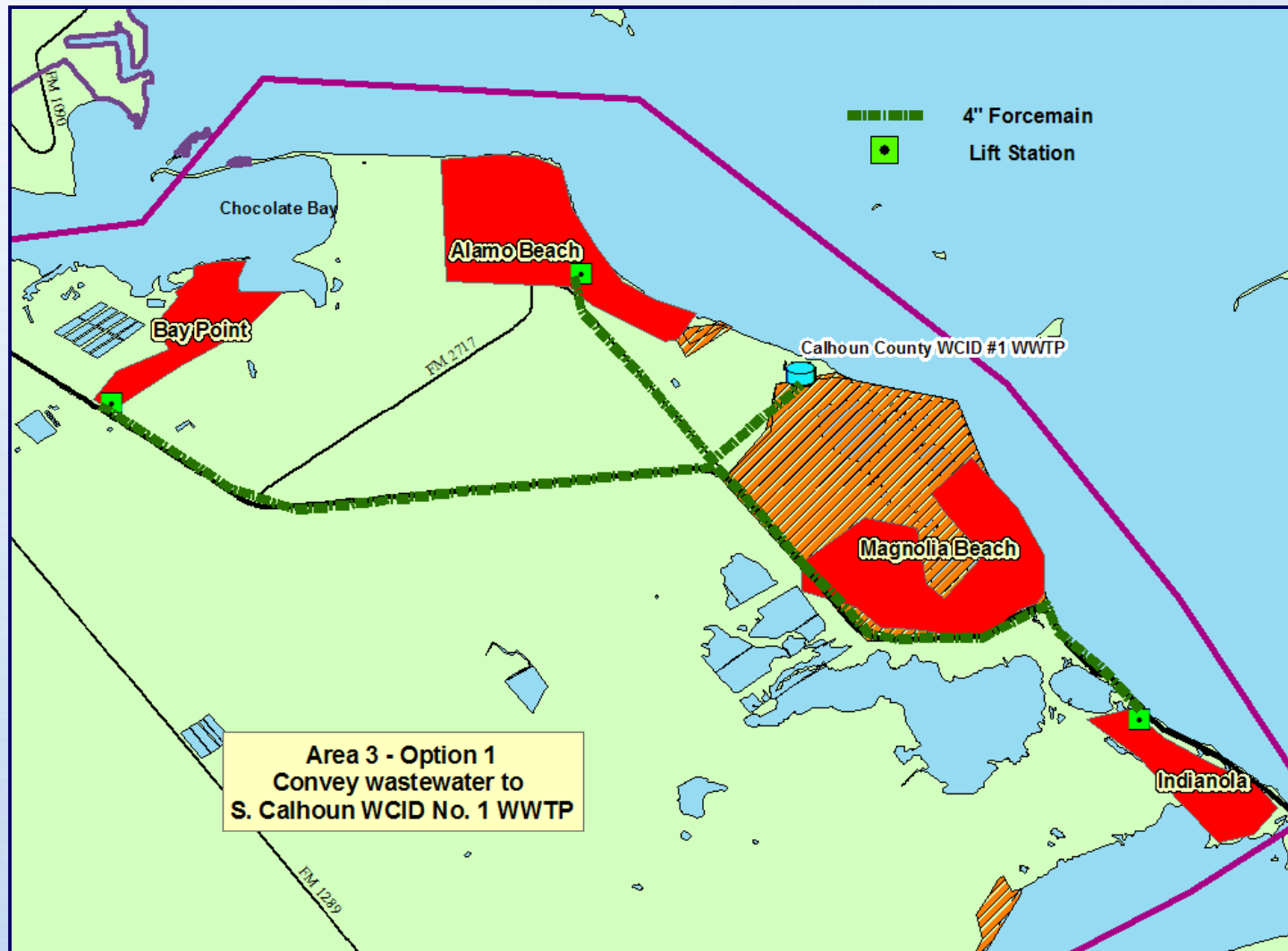
Area No. 3 Regional Options



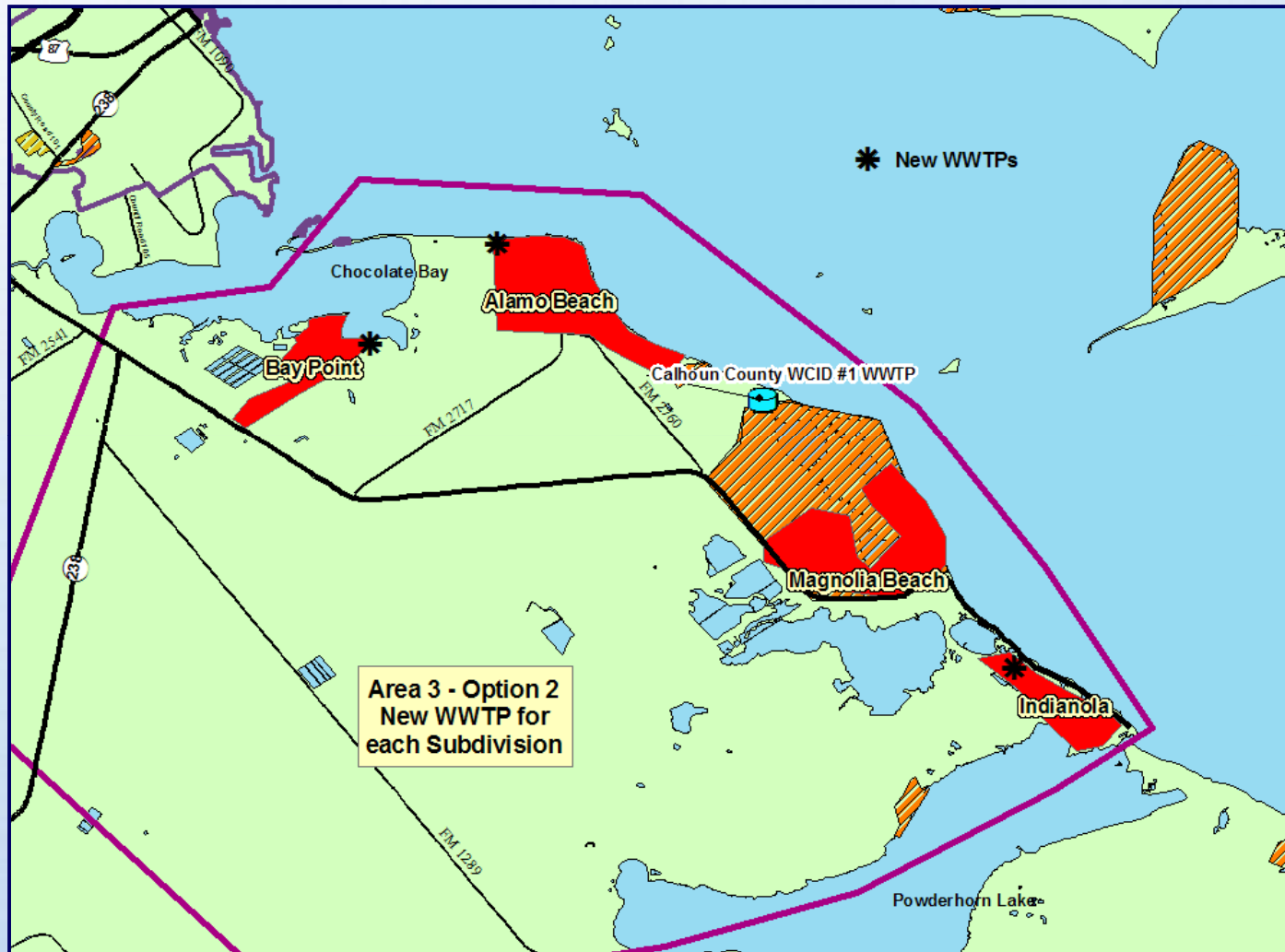
Area No. 3 Regional Options

- 1) Magnolia Beach WWTP expand its system to serve Indianola, Alamo Beach, Baypoint Subdivision and other areas on septic systems**

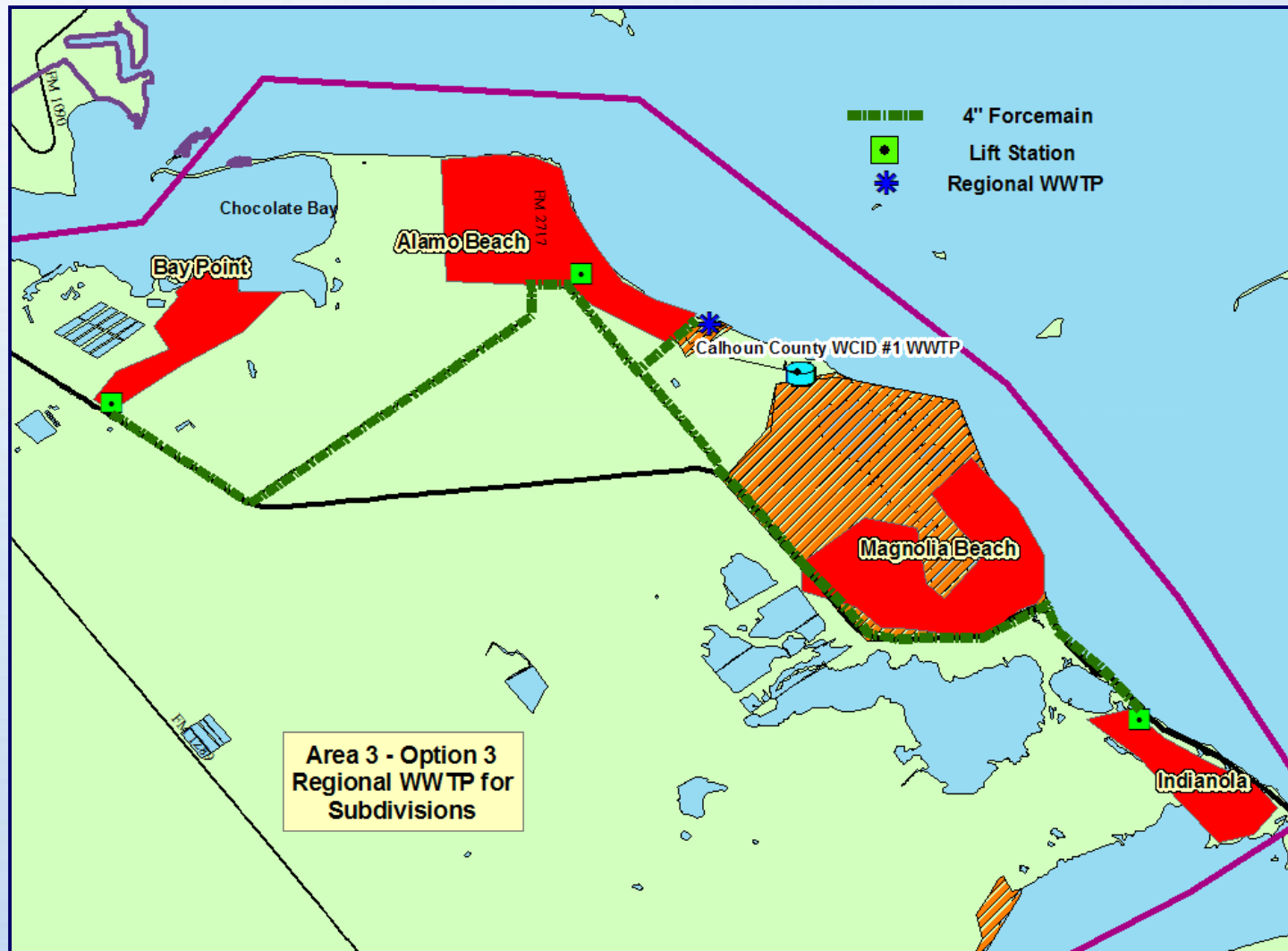
Area 3 - Option 1



Area 3 – Option 2



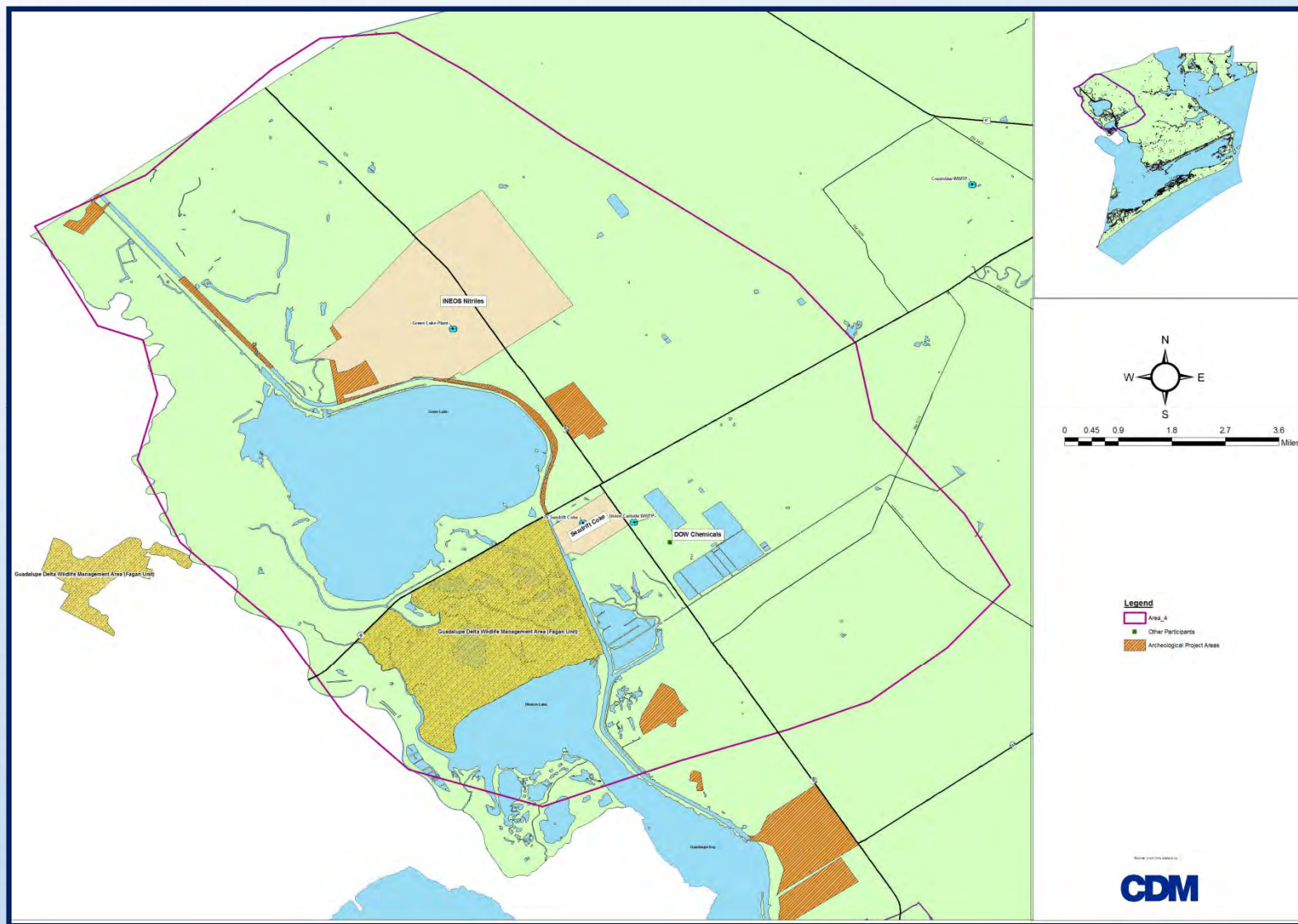
Area 3 –Option 3



Cost Comparisons for Area 3

Subdivisions	Option 1	Option 2	Option 3
Indianola	\$97.08	\$129.30	\$146.46
Alamo Beach	\$83.47	\$139.05	\$132.84
Bay Point	\$79.04	\$139.05	\$128.41

Area No. 4 Regional Options



Area No. 4 Regional Options

- 1) Construct small package plant to provide centralized wastewater service to 300 acre site adjacent to INEOS Nitriles.**
- 2) Dow Chemical and Seadrift Coke receive treated effluent/reuse from the City of Seadrift WWTP and new INEOS Nitriles package plant.**

Cost Comparisons for Area 4

Type of Activity	Option 1	Option 2
Reclaimed water from City of Port Lavaca WWTP	\$878.90*	\$632.36*

* Annual cost per acre foot

Summary of Economical Options

AREA 1A

- Double D conveys to Port Lavaca WWTP
- Matson, Meadow Brook, Bowman and Hackberry Junction
- Convey wastewater to Crestview WWTP
- Shoreline Acres, Six Mile, Bay Meadows and Shady Acres
- Convey wastewater to Port Lavaca WWTP
- Royal Estates can have its own package plant

AREA 1B

- All subdivisions convey wastewater to Point Comfort WWTP

AREA 2

- All subdivisions convey wastewater to Regional WWTP

AREA 3

- All subdivisions convey wastewater to SCC WCID No. 1 WWTP

EPA Affordability Index

As per “National Level Affordability Criteria” under the 1996 Amendments to the Safe Drinking Water Act (Final Draft Report) from U.S. EPA, the affordability criterion for wastewater systems is:

- 2% of Median Household Income (MHI)
- 4% benchmark for affordability for both water and wastewater

◆ **Calhoun County MHI for 2009: \$43,405.00**

◆ **Monthly Affordable Wastewater bill: \$72.34
(MHI*0.02/12)**

Conclusions & Recommendations

- ◆ **The monthly cost for providing service to the proposed developments ranged from \$81.17 to \$296.69.**
- ◆ **For the proposed developments, the monthly cost to the homeowners will not be a wastewater fee; however, it will be included in the home purchase cost and collected as part of the homeowner's mortgage.**
- ◆ **The monthly costs for providing service to the existing subdivisions ranged from \$123.51 to \$183.87.**

Conclusions & Recommendations

- ◆ For the existing subdivisions with OSSFs, it will be difficult to finance constructing a new collection/regional treatment system that results in an average monthly wastewater bill of \$72 unless grant funding can be obtained.
- ◆ Transporting treated effluent from the Port Lavaca WWTP across Lavaca Bay to Formosa Plastics is an expensive alternative. The average flow from the Port Lavaca WWTP is 1.11 MGD and the cost per acre-foot for this reclaimed water is \$878.9/ac-ft.
- ◆ A number of water reduction mechanisms were identified for the industrial project participants; further evaluation would be required to assess the viability of the proposed options.

Industrial Water & Wastewater Findings

Alcoa – Point Comfort Operations

- 1) Interested in source water (could be reuse water) for dust suppression and process water use**
 - Dry weather only
 - Minimal discharge due to reuse practices already implemented
- 2) 25,300 gpd dry weather**
- 3) 45,500 gpd wet weather**
- 4) Evaluating reuse opportunity with Formosa Plastics Corporation**

Dow Chemical – Seadrift Operations

- 1) Largest water reduction potential if economically justified**
- 2) Average water usage from 2007 to 2009 varied from 10 to 27 MGD**
- 3) Substantial water use for cooling, cycles through ponds**
- 4) Average discharges**
 - Treated effluent: 1 MGD
 - Cooling water: 3.5 to 4 MGD
- 5) Potential water reduction strategies:**
 - Use treated effluent to supplement cooling water
 - Consider recirculating coolers (cooling towers, wet surface air coolers)

Formosa Plastics Corporation

- 1) Needs additional water supplies**
- 2) Cooling tower blowdown available for re-use**
- 3) Average site water usage 33 MGD; 16 process units**
- 4) Cooling towers are significant water user**
- 5) Multiple waste streams reused internally**
 - Condensate
 - Biological treatment effluent
 - Sanitary
 - Boiler blowdown
 - Backwash
 - Stormwater
- 6) Additional reuse opportunities being considered**
- 7) Site discharge is 20% of water usage (7.6 MGD):
Internal reuse and evaporative losses**
- 8) Effluent TDS = 17,000 mg/L (limited reuse opportunities)**

INEOS Nitriles

- 1) Can provide land for reuse water storage or treatment facilities**
- 2) Potential to supply effluent to other facilities for reuse**
 - Treated sanitary effluent and utility wastewaters (0.5 MGD average)
 - Stormwater
- 3) Would need to conduct a water balance study to evaluate reuse opportunities**

Seadrift Coke, L.P.

- 1) Interested in opportunities to reduce costs for purchased water and implementing water reduction strategies**
- 2) Treated effluent is a potential candidate for reuse**
 - Currently uses carbon polishing to insure compliance with effluent limits
 - Effluent TDS < 1,000 mg/L
- 3) Would need to conduct a water balance study to evaluate reuse opportunities**

Funding Opportunities

Q&A Discussion

Next Steps

Project Contacts

Project Contacts:

**Susan K. Roth, P.E.
Susan Roth Consulting, LLC
(512) 796-6692
susan@srothconsulting.com**

**Bryan Serold
GBRA, Lower Basin Manager
(361) 575-6366
bserold@gbra.org**

Calhoun County Regional Wastewater Facility Study

Project Meeting

August 11, 2011

Name	Title	City/Entity	Phone Number	Email Address
Allen Woelke		CDM	512-346-1100	woelkead@cdm.com
Joel Cymann		CDM	713-423-7410	cymann.jdc@cdm.com
Matt Glaz		Urban Eng.	361-578-9836	mglaz@urbanvictoria.com
DAVID Meesey		TWOB	512-936-0852	David.Meesey@TWOB.STATE.TX.US
Mike P. f.		Calhoun County	361-553-4600	
Tommy Scitulla		GBRA	332-928-0610	tschultze@gbra.org
Thomas D. Hill		GBRA	830-379-5822	thill@gbra.org
Stephanie Shelly		GBRA	361-552-9751	sshelly@gbra.org
Arb Wittliff		"	"	hwittliff@gbra.org
BRYAN SEROLD		"	361-575-6366	bserold@gbra.org
Vern Hyssy		Calhoun County	361-212-9656	Vern.Hyssy@calhounco.tx.org
Neil E. Fritsch	Commissioner	Calhoun Co.	361-920-5346	neil.fritsch@calhounco.tx.org
Wesley Waida		INEOS	361-552-8642	wesley.waida@ineos
Tom Schmidt		Urban	578-5831	Tschmidt@urbanvictoria.com
Elmer DeForest	Mayor	Seadrift	361-785-2251	seadrift@tisd.net
BOB TURNER		PORT LAVACA	361-745-0446	bturner@portlavaca.org
ARLENE MARSHALL		PORT LAVACA	361-553-7600	amarshall@calhounco.tx.org
Bruce Gertner	Technical Manager	Seadrift Coke L.P.	361-551-4580	bgertner@seadriftcoke.com
Nelda Benavides		Dow Chemical Co	361-553-2225	
BRAD Fedorchak	Site Director	Dow chemical	989-859-9029	bbfedorchak@dow.com
Tim Schon	Env. manager	Alcoa	361-987-6505	Jim.Schon@alcoa.com

Calhoun County Regional Wastewater Facility Study Project Meeting August 11, 2011

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APPENDIX F

TEXAS WATER DEVELOPMENT BOARD
COMMENTS

NOV 22 2011

Texas Water Development Board

Seguin Office

P.O. Box 13231, 1700 N. Congress Ave.
Austin, TX 78711-3231, www.twdb.state.tx.us
Phone (512) 463-7847, Fax (512) 475-2053

November 18, 2011

Thomas D. Hill
Chief Engineer
Guadalupe-Blanco River Authority
933 East Court Street
Seguin, Texas 78155

RE: Regional Wastewater Facility Grant Contract between the Texas Water Development Board (TWDB) and the Guadalupe-Blanco River Authority (GBRA); TWDB Contract No. 1004831073, Draft Report Comments

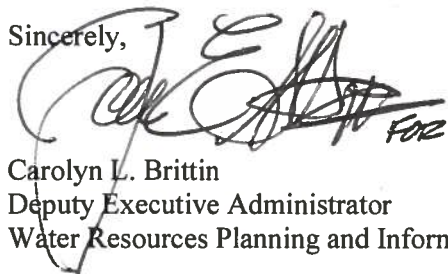
Dear Mr. Hill:

Staff members of the TWDB have completed a review of the draft report prepared under the above-referenced contract. ATTACHMENT I provides the comments resulting from this review. As stated in the TWDB contract, the GBRA will consider incorporating draft report comments from the EXECUTIVE ADMINISTRATOR as well as other reviewers into the final report. In addition, the GBRA will include a copy of the EXECUTIVE ADMINISTRATOR'S draft report comments in the Final Report.

The TWDB looks forward to receiving one (1) electronic copy of the entire Final Report in Portable Document Format (PDF) and six (6) bound double-sided copies. The GBRA shall also submit one (1) electronic copy of any computer programs or models, and, if applicable, an operations manual developed under the terms of this Contract.

If you have any questions concerning the contract, please contact Kathleen Ligon, the TWDB's designated Contract Manager for this project at (512) 463-8294.

Sincerely,



Carolyn L. Brittin
Deputy Executive Administrator
Water Resources Planning and Information

Enclosures

c: Kathleen Ligon, TWDB

Our Mission

To provide leadership, planning, financial assistance, information, and education for the conservation and responsible development of water for Texas

Board Members

Edward G. Vaughan, Chairman
Joe M. Crutcher, Vice Chairman
Melanie Callahan, Interim Executive Administrator

Thomas Weir Labatt III, Member
Lewis H. McMahan, Member

Billy R. Bradford Jr., Member
Monte Cluck, Member

Attachment I

**Calhoun County Regional Wastewater Facility Study
TWDB contract #1004831073
Draft Report Review Comments**

1. Please include an executive summary of the report.
2. Please include a list of all water conservation and drought management plans available in the study area. Please include copies of all plans that you prepared for entities without them as stated in Scope of Work item 9.
3. Please include a section describing the four public meetings held on the project and consider including sign-in sheets or meeting handouts, as appropriate.

Memorandum

Calhoun County Regional Wastewater Study – Response to TWDB Draft Report Review Comments

TO: *Kathleen Ligon (TWDB)*
FROM: *Susan K. Roth, P.E. (Susan Roth Consulting, LLC)*
DATE: *December 7, 2011*

This memorandum summarizes the project team's responses to the draft report review comments provided by the Texas Water Development Board (TWDB) for the Calhoun County Regional Wastewater Study on November 18, 2011 .

General Comments

- Will provide double-sided copies of the final report to both TWDB and the project participants
- Included executive summary in the report
- Provided copies of available water conservation and drought contingency plans for the project participants in Appendix A
- Provided copies of the presentation slides and meeting sign-in sheets for all four public meetings in Appendix E



CDM

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