

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



CALHOUN COUNTY REGIONAL WASTEWATER FACILITY STUDY

Wastewater Facility Study

Prepared for
Guadalupe- Blanco River Authority
Partially Funded by
Texas Water Development Board

January 2012



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 P.E.
1/18/12



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



Allen D. Woelke P.E.
1/20/12

THIS PAGE INTENTIONALLY LEFT BLANK

TABLE OF CONTENTS

Section 1 Introduction	1-1
1.1 Background	1-2
1.2 Scope of Study	1-3
Section 2 Growth Projection	2-1
2.1 Population (of Cities)	2-1
2.2 Subdivisions of Concern	2-4
2.3 Proposed Developments	2-5
Section 3 Existing Wastewater Facilities	3-1
3.1 City of Point Comfort WWTP	3-1
3.2 City of Port Lavaca WWTP	3-2
3.3 City of Seadrift WWTP	3-3
3.4 Port O'Connor MUD WWTP	3-4
3.5 Others	3-5
3.6 Wastewater Flow Projections	3-7
3.6.1 Area 1A (Port Lavaca) & Area 1B (Point Comfort)	3-7
3.6.2 Area 2 (Seadrift and Port O'Connor MUD)	3-10
Section 4 Development of Alternatives	4-1
4.1 Collection and Treatment Alternatives	4-1
4.1.1 Collection Alternatives	4-1
4.1.1.1 Gravity Sewer	4-1
4.1.1.2 Vacuum Sewer	4-2
4.1.1.3 Pressure Sewer	4-3
4.1.1.4 OSSF (On-Site Septic System)	4-4
4.1.2 Treatment Alternatives	4-5
4.2 Advantages and Disadvantages of Collection and Treatment Alternatives	4-6
4.2.1 Gravity Sewer	4-6
4.2.2 Vacuum Sewer	4-7
4.2.3 Pressure Sewer	4-7
4.2.4 Package Treatment Plants	4-8
4.2.5 Pumping to a Regional Treatment Plant	4-9
4.3 Development and Description of Initial Alternatives	4-10
4.3.1 Areas 1A	4-11
4.3.2 Areas 1B	4-12
4.3.3 Area 2	4-12
4.3.4 Area 3	4-13

4.3.5 Area 4 4-14

4.4 Advantages and Disadvantages of initial Alternatives 4-15

4.4.1 Area 1 4-15

4.4.2 Area 2 4-16

4.4.3 Area 3 4-16

4.5 Screening of Initial Alternatives 4-16

4.6 Regional Alternatives Selected for Detailed Evaluation 4-17

4.6.1 Area 1A & 1B 4-17

4.6.2 Area 2 4-17

4.6.3 Area 3 4-18

4.6.4 Area 4 4-18

4.7 Effluent Reuse Evaluation 4-18

4.7.1 Industrial Effluent Reuse 4-18

4.7.2 DOW Seadrift 4-19

4.7.3 INEOS Nitriles 4-21

4.7.4 FORMOSA 4-21

4.7.5 ALCOA 4-23

4.7.6 Seadrift Coke L.P. 4-23

4.8 Water Conservation and Drought Contingency Plans 4-24

Section 5 Cost Estimating Process 5-1

5.1 Sizing of Facilities 5-1

5.2 Phasing Consideration 5-1

5.3 Capitol Costs 5-2

5.3.1 Collection System 5-2

5.3.2 Conveyance System 5-3

5.3.3 Treatment Plants 5-3

5.3.4 Contingencies and Professional Services 5-4

5.3.5 Cost of Easements and Land Acquisition 5-5

5.4 Operation and Maintenance Costs 5-5

5.5 Total Cost 5-6

Section 6 Evaluation of Final Alternatives 6-1

6.1 Regional Options 6-1

6.1.1 Area 1 6-1

6.1.2 Area 1B 6-3

6.1.3 Area 2 6-5

6.1.4 Area 3 6-8

6.1.5 Area 4 6-11

6.2 Cost Comparisons 6-14

- 6.2.1 Area 1 6-14
- 6.2.2 Area 2 6-15
- 6.2.3 Area 3 6-16
- 6.2.4 Area 4 6-17

6.3 Affordability Index 6-18

Section 7 Potential Funding Sources..... 7-1

- 7.1 Federal and State Infrastructure Programs 7-2**
 - 7.1.1 TWDB Funding Options..... 7-2
 - 7.1.2 TDRA Funding Options 7-4
 - 7.1.3 USDA Rural Development Funding Options..... 7-5
- 7.2 Revenue Bonds 7-6**
- 7.3 Developer Participation 7-6**

Section 8 Conclusions and Recommendations 8-1

- 8.1 Implementation Plan 8-3**

Section 9 Environmental Assessment 9-1

THIS PAGE INTENTIONALLY LEFT BLANK

APPENDICES

**Appendix A – Water Conservation and Drought Contingency Plans-
Calhoun Project Participants**

Appendix B – Cost Estimation

Appendix C – Maps

Appendix D – Effluent Reuse Regulations

**Appendix E – Calhoun County Meeting Presentations and Sign in
Sheets**

Appendix F – Texas Water Development Board Comments

THIS PAGE INTENTIONALLY LEFT BLANK

FIGURES

- Section 1 Introduction 1-1**
 - 1-1 Map of Study Area 1-2

- Section 2 Growth Projection 2-1**
 - 2-1 Point Comfort Population Projections – Comparison of Data..... 2-3
 - 2-2 Seadrift Population Projections – Comparison of Data 2-3
 - 2-3 Port O’Connor Population Projections – Comparison of Data 2-4
 - 2-4 Current, Planned and Potential Subdivisions 2-5

- Section 3 Existing Wastewater Facilities 3-1**
 - 3-1 City of Point Comfort WWTP 3-1
 - 3-2 City of Port Lavaca WWTP..... 3-2
 - 3-3 City of Seadrift WWTP 3-3
 - 3-4 Port O’Connor MUD WWTP 3-4
 - 3-5 Crestview WWTP 3-5
 - 3-6 SCC WCID #1 WWTP..... 3-6
 - 3-7 Wastewater Flow Projections for City of Point Comfort without and
With Flows from Subdivisions of Concern 3-8
 - 3-8 Wastewater Flow Projections for City of Port Lavaca without and
With Flows from Subdivisions of Concern 3-9
 - 3-9 Wastewater Flow Projections for City of Seadrift without and With
Flows from Proposed Subdivisions..... 3-10
 - 3-10 Wastewater Flow Projections for Port O’Connor MUD Without and
With Flows from Proposed Subdivisions 3-12

- Section 4 Development of Alternatives 4-1**
 - 4-1 Gravity Sewer System 4-2
 - 4-2 Vacuum Sewer 4-3
 - 4-3 Pressure Sewer 4-3
 - 4-4 OSSF 4-4
 - 4-5 Overview Map of Study Area 4-11
 - 4-6 Overview Map of Area 1 4-12
 - 4-7 Overview Map of Area 2 4-13
 - 4-8 Overview Map of Area 3 4-14
 - 4-9 Overview Map of Area 4 4-15

Section 5 Cost Estimating Process..... 5-1

- 5-1 Collection System Cost Estimates 5-3
- 5-2 WWTP Cost Estimates in Cost per Gallon 5-4
- 5-3 O&M Cost for WWTPs..... 5-6

Section 6 Evaluation of Final Alternatives 6-1

- 6-1 Area 1A Option 1 6-1
- 6-2 Area 1A Option 2 6-2
- 6-3 Area 1A Option 3 6-2
- 6-4 Area 1A Option 4 6-3
- 6-5 Area 1B Option 1..... 6-4
- 6-6 Area 1B Option 2..... 6-4
- 6-7 Area 1B Option 3..... 6-5
- 6-8 Area 2 Option 1..... 6-6
- 6-9 Area 2 Option 2..... 6-6
- 6-10 Area 2 Option 3..... 6-7
- 6-11 Area 2 Option 4..... 6-8
- 6-12 Area 3 Option 1..... 6-9
- 6-13 Area 3 Option 2..... 6-10
- 6-14 Area 3 Option 3..... 6-10

TABLES

Section 2 Growth Projection	2-1
2-1 Population and Growth Projections	2-1
2-2 Proposed Units in Each Subdivision	2-6
Section 3 Existing Wastewater Facilities	3-1
3-1 Permitted Flow Data for Point Comfort WWTP	3-2
3-2 Permitted Flow Data for Port Lavaca WWTP.....	3-3
3-3 Permitted Flow Data for Seadrift WWTP	3-4
3-4 Permitted Flow Data for Port O'Connor MUD WWTP	3-4
3-5 Permitted Flow Data for Crestview WWTP	3-5
3-6 Permitted Flow Data for SCC WCID #1 WWTP.....	3-6
3-7 Area 1B Flow Data (Point Comfort).....	3-8
3-8 Area 1A Flow Data (Port Lavaca).....	3-9
3-9 Area 2 Flow Data (Seadrift & Port O'Connor MUD).....	3-11
Section 4 Development of Alternatives	4-1
4-1 Threshold Levels for Industrial Reclaimed Water	4-19
4-2 Average daily water usage at Dow Seadrift	4-20
4-3 Effluent flow data at Dow Seadrift.....	4-21
4-4 Wastewater Streams at Formosa Plastics Corporation	4-22
4-5 Wastewater Streams at Seadrift Coke L.P.....	4-24
Section 5 Cost Estimating Process	5-1
5-1 Projected Flow Data for Lane Road, Seaport Lakes, Costa Grande and Powderhorn Ranch	5-2
5-2 Contingency and Professional Services Percentage.....	5-5
Section 6 Evaluation of Final Alternatives.....	6-1
6-1 Cost Comparisons for Area 1A	6-14
6-2 Cost Comparisons for Area 1B	6-15
6-3 Cost Comparisons for Area 2.....	6-16
6-4 Cost Comparisons for Area 3.....	6-17
6-5 Cost Comparison for Reclaimed Water Options	6-17

THIS PAGE INTENTIONALLY LEFT BLANK