

FINAL

Water and Wastewater Master Plan

Appendices • December 2013



CITY OF EDMOND, OKLAHOMA

**WATER AND WASTEWATER
SYSTEM MASTER PLAN**

December 2013

FINAL



**Water and Wastewater System
Master Plan**

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VOLUME 2

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**APPENDIX A – BASIS OF PLANNING
TECHNICAL MEMORANDUM**



CITY OF EDMOND, OKLAHOMA
WATER AND WASTEWATER SYSTEM MASTER PLAN

TECHNICAL MEMORANDUM
NO. 2
WATER WELL SUPPLEMENTATION ALTERNATIVE

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WATER WELL SUPPLEMENTATION ALTERNATIVE

1.0 WELL REQUIREMENTS

Garber- Wellington wells in this area typically are in the range of 700 feet vertical depth. Typical capacities are 150 gallons per minute or higher. Lower zones (>650 feet) can contain significant Arsenic concentrations which exceed the DEQ limit of 10 parts per billion (ppb).

For researching potential well sites, the Engineers usually seek properties with an excess of 40 acres of surface area. The Oklahoma Water Resources Board, at this time, allows two (2) acre-feet of Water Rights per surface acre of leased or owned property.

40 Acres x 2 x 325,851 gallons per acre-feet = 26.068 Million gallons annually. More than one well can be permitted on an individual Water Rights permit.

These specific wells should be located near the 30 " water line, from Oklahoma City, running east on Covell Road, then north to the NW Complex on Broadway. Other wells should be located near the 24" waterline running along Coffee Creek Road from Sooner Road to the NW Complex. Availability of pipeline easement purchase is also required.

Wells should be at least 300 feet from potential sources of pollution and with wellheads at least two (2) feet above the 100-year flood plain as identified on current FEMA maps.

The City of Edmond also requires well buildings to house and protect the well.

2.0 POTENTIAL WELL LOCATIONS

The following well-site and water rights properties were identified:

Coffee Creek Road

Lucille Fancey Trust	79 Acres	JCH Properties, LLC	158 Acres
JCH Properties, LLC	80 Acres	Harper – Lytle Properties, LLC	88 Acres
Gwen Harper Living Trust	80 Acres	Harper – Lytle Properties, LLC	160 Acres

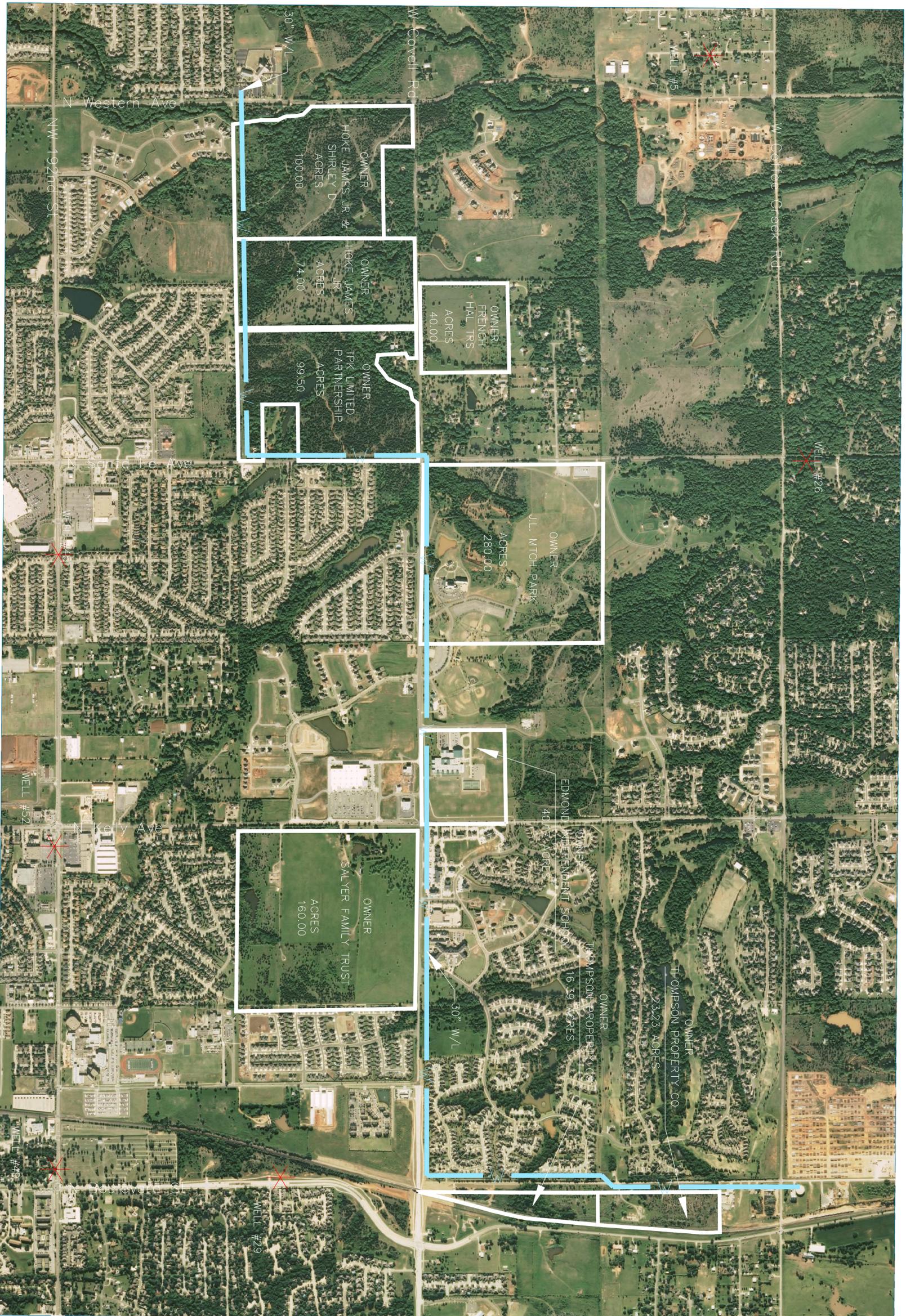
Covell Road

James Hoke	100 Acres	Edmond Independent Schools	40.17 Acres
James Hoke	74 Acres	Salyer Family Trust	160 Acres
TPK Limited Partnership	99.5 Acres	Thompson Property Co.	39.6 Acres
J.L. Mitch Park	280 Acres*		

* Mitch Park has an existing water well that could be used

A well map is included in Figure 2.1.


Max J. Baldischwiler, P.E.



SCALE:
N.T.S.

PROJ: 113522
DATE: 6-14-12

DRAWN BY: MT
DESIGNED BY: MT
CHECKED BY: CT

PROPOSED WELL
LOCATIONS & WATER
RIGHTS

EXISTING CITY WELLS

CITY OF EDMOND PROPOSED WELLS

30" WATER LINE EXHIBIT



SMITH ROBERTS BALDSCHWILER, LLC
OKLAHOMA CITY OFFICE:
100 N.E. 3th Street 2104
Oklahoma City, OK 73104
Telephone: (405) 840-7994
Fax: (405) 840-9116

CHICKASHA OFFICE:
104 S. 2nd Street
Oklahoma City, OK 73104
Telephone: (405) 224-1444
Fax: (405) 224-1485

ENGINEERS • SURVEYORS • PLANNERS
CERTIFICATE OF AUTHORIZATION NO. 3949 EXPIRES JUNE 30, 2013



SCALE:
N.T.S.

PROJ. 113522
DATE: 6-14-12
DRAWN BY: MT
DESIGNED BY: MT
CHECKED BY: CT

 PROPOSED WELL
LOCATIONS & WATER
RIGHTS

 EXISTING CITY WELLS

CITY OF EDMOND PROPOSED WELLS
24" WATER LINE EXHIBIT

 **SMITH ROBERTS BALDISCHWILER, LLC**
OKLAHOMA CITY OFFICE:
100 N.E. 26th Street
Oklahoma City, OK 73104
Telephone: (405) 840-7094
Fax: (405) 840-9118
CHICKASHA OFFICE:
104 S. 2nd Street
Chickasha, OK 73018
Telephone: (405) 224-1444
FAX: (405) 224-1485
ENGINEERS • SURVEYORS • PLANNERS
CERTIFICATE OF AUTHORIZATION NO. 3949 EXPIRES JUNE 30, 2013

City of Edmond Water and Wastewater System Master Plan

**APPENDIX B – WHOLESALE WATER RATES FOR
OKLAHOMA CITY**

(Published in the Journal Record September 29, 2010)

ORDINANCE NO. 24,137

AN ORDINANCE AMENDING THE OKLAHOMA CITY MUNICIPAL CODE, 2007, BY AMENDING CHAPTER 60, RELATING TO THE GENERAL SCHEDULE OF FEES, BY REPEALING SECTIONS 60-47-29, 60-47-30, 60-55-15, 60-55-16, 60-55-26, AND 60-55-28, REGARDING SANITARY SEWER AND WATER USER CHARGES, GENERALLY, AND BY ADOPTING NEW SECTION 60-47-29, REGARDING SANITARY SEWER USER CHARGES, NEW SECTION 60-47-30, REGARDING ADDITIONAL SURCHARGE FOR INDUSTRIAL USERS WITH ASSESSABLE CONCENTRATIONS, NEW SECTION 60-55-15, REGARDING HOUSEKEEPING UNIT CHARGES, NEW SECTION 60-55-16, REGARDING WATER USER CHARGES, MONTHLY, NEW SECTION 60-55-26, REGARDING DEDICATED PRIVATE FIRE LINE SERVICE CHARGES, NEW SECTION 60-55-28, REGARDING ADDITIONAL METER AND PRIVATE MONTHLY METER CHARGES; AND DECLARING AN EMERGENCY.

EMERGENCY ORDINANCE

BE IT ORDAINED BY THE COUNCIL OF THE CITY OF OKLAHOMA CITY:

SECTION 1. That Sections 60-47-29, 60-47-30, 60-55-15, 60-55-16, 60-55-26, and 60-55-28 of Chapter 60 of the Oklahoma City Municipal Code, 2007, are hereby repealed.

SECTION 2. That new Sections 60-47-29, 60-47-30, 60-55-15, 60-55-16, 60-55-26, and 60-55-28 of Chapter 60 of the Oklahoma City Municipal Code, 2007, are hereby adopted to read:

CHAPTER 60

GENERAL SCHEDULE OF FEES

* * *

TITLE 47. SEWERS AND SEWAGE DISPOSAL

* * *

ARTICLE VIII. RATES, CHARGES, BILLING, COLLECTION PROCEDURES

* * *

Section 60-47-29. Sanitary sewer user charges.

The sanitary sewer users shall be charged and shall pay sanitary sewer user charges consisting of a sanitary sewer volume charge for sanitary sewer services and, wherever applicable, such surcharges, monthly service charges, and deduct meter charges as set forth in this article. The sanitary sewer volume charge shall be the volume of discharge into the Oklahoma City sanitary sewer system times the applicable sanitary sewer volume rate per thousand gallons for the user's customer class. In addition, users who are non-City water customers or whose discharge exceeds certain quality or composition standards shall be charged and shall pay surcharges as established in this Code. The sanitary sewer volume charges are based upon the following rates for each customer class:

(a) Sanitary sewer volume charges – Inside City, Retail Rate.

- (1) Effective for utility bills issued through September 30, 2010:
\$ 1.62 (monthly base rate) times meter multiplier (see § 60-55-17); plus
\$ 3.24 per thousand gallons.
- (2) Effective for utility bills issued from October 1, 2010 through September 30, 2011 :
\$ 2.78 (monthly base rate) times meter multiplier (see § 60-55-17); plus
\$ 3.37 per thousand gallons.
- (3) Effective for utility bills issued from October 1, 2011 through September 30, 2012:
\$ 2.89 (monthly base rate) times meter multiplier (see § 60-55-17); plus
\$ 3.50 per thousand gallons.
- (4) Effective for utility bills issued from October 1, 2012 through September 30, 2013:
\$ 3.01 (monthly base rate) times meter multiplier (see § 60-55-17); plus
\$ 3.65 per thousand gallons.
- (5) Effective for utility bills issued from October 1, 2013 and thereafter:
\$ 3.13 (monthly base rate) times meter multiplier (see § 60-55-17); plus
\$ 3.79 per thousand gallons.

(b) Sanitary sewer volume charges – Outside City, Unincorporated, Retail Rate.

Service provided to a retail customer outside the City for which a fee in lieu of franchise is not paid.

- (1) Effective for utility bills issued through September 30, 2010:
\$ 1.62 (monthly base rate) times meter multiplier (see § 60-55-17); plus
\$ 2.89 per thousand gallons.
- (2) Effective for utility bills issued from October 1, 2010 through September 30, 2011 :
\$ 2.78 (monthly base rate) times meter multiplier (see § 60-55-17); plus
\$ 3.01 per thousand gallons.
- (3) Effective for utility bills issued from October 1, 2011 through September 30, 2012:
\$ 2.89 (monthly base rate) times meter multiplier (see § 60-55-17); plus
\$ 3.13 per thousand gallons.
- (4) Effective for utility bills issued from October 1, 2012 through September 30, 2013:
\$ 3.01 (monthly base rate) times meter multiplier (see § 60-55-17); plus
\$ 3.26 per thousand gallons.
- (5) Effective for utility bills issued from October 1, 2013 and thereafter:
\$ 3.13 (monthly base rate) times meter multiplier (see § 60-55-17); plus
\$ 3.39 per thousand gallons.

(c) Sanitary sewer volume charges – Outside City, Incorporated, Retail Rate.

Service provided to a retail customer outside the City for which a fee in lieu of franchise is paid.

- (1) Effective for utility bills issued through September 30, 2010:
\$ 1.62 (monthly base rate) times meter multiplier (see § 60-55-17); plus
\$ 2.95 per thousand gallons.
- (2) Effective for utility bills issued from October 1, 2010 through September 30, 2011 :

- \$ 2.84 (monthly base rate) times meter multiplier (see § 60-55-17); plus
\$ 3.07 per thousand gallons.
 - (3) Effective for utility bills issued from October 1, 2011 through September 30, 2012:
 - \$ 2.95 (monthly base rate) times meter multiplier (see § 60-55-17); plus
\$ 3.19 per thousand gallons.
 - (4) Effective for utility bills issued from October 1, 2012 through September 30, 2013:
 - \$ 3.07 (monthly base rate) times meter multiplier (see § 60-55-17); plus
\$ 3.32 per thousand gallons.
 - (5) Effective for utility bills issued from October 1, 2013 and thereafter:
 - \$ 3.19 (monthly base rate) times meter multiplier (see § 60-55-17); plus
\$ 3.45 per thousand gallons.
- (d) Sanitary sewer volume charges – Tinker Air Force Base Rate.**
- (1) Effective for utility bills issued through September 30, 2010:
 - \$ 1.62 (monthly base rate) times meter multiplier (see § 60-55-17); plus
\$ 1.89 per thousand gallons.
 - (2) Effective for utility bills issued from October 1, 2010 through September 30, 2011 :
 - \$ 2.78 (monthly base rate) times meter multiplier (see § 60-55-17); plus
\$ 1.97 per thousand gallons.
 - (3) Effective for utility bills issued from October 1, 2011 through September 30, 2012:
 - \$ 2.89 (monthly base rate) times meter multiplier (see § 60-55-17); plus
\$ 2.05 per thousand gallons.
 - (4) Effective for utility bills issued from October 1, 2012 through September 30, 2013:
 - \$ 3.01 (monthly base rate) times meter multiplier (see § 60-55-17); plus
\$ 2.13 per thousand gallons.
 - (5) Effective for utility bills issued from October 1, 2013 and thereafter:

\$ 3.13 (monthly base rate) times meter multiplier (see § 60-55-17); plus
\$ 2.22 per thousand gallons.

(e) Sanitary sewer volume charges – Outside City, Wholesale Rate.

- (1) Effective for utility bills issued through September 30, 2010:
\$ 1.62 (monthly base rate) times meter multiplier (see § 60-55-17); plus
\$ 2.48 per thousand gallons.
- (2) Effective for utility bills issued from October 1, 2010 through September 30, 2011 :
\$ 2.78 (monthly base rate) times meter multiplier (see § 60-55-17); plus
\$ 2.58 per thousand gallons.
- (3) Effective for utility bills issued from October 1, 2011 through September 30, 2012:
\$ 2.89 (monthly base rate) times meter multiplier (see § 60-55-17); plus
\$ 2.68 per thousand gallons.
- (4) Effective for utility bills issued from October 1, 2012 through September 30, 2013:
\$ 3.01 (monthly base rate) times meter multiplier (see § 60-55-17); plus
\$ 2.79 per thousand gallons.
- (5) Effective for utility bills issued from October 1, 2013 and thereafter:
\$ 3.13 (monthly base rate) times meter multiplier (see § 60-55-17); plus
\$ 2.90 per thousand gallons.

Section 60-47-30. Additional surcharge for industrial users with assessable concentrations.

Users whose discharge quality or composition exceeds the standards set forth below shall pay an industrial surcharge in addition to the sanitary sewer volume charge and the sanitary sewer utility charge. The industrial surcharges are as follows:

(a) Milligrams per liter of BOD in excess of 250 milligrams per liter (250 mg/l).

Users whose discharge exceeds 250 milligrams of BOD per liter shall pay an industrial surcharge equal to the product of the BOD surcharge rate times the total volume of discharge

times the sum of the number of milligrams of BOD per liter minus 250 milligrams per liter. The BOD surcharge rates are as follows:

- (1) Effective for utility bills issued through September 30, 2010:
\$ 2.77 per million gallons.
- (2) Effective for utility bills issued from October 1, 2010 through September 30, 2011 :
\$ 2.88 per million gallons.
- (3) Effective for utility bills issued from October 1, 2011 through September 30, 2012:
\$ 3.00 per million gallons.
- (4) Effective for utility bills issued from October 1, 2012 through September 30, 2013:
\$ 3.12 per million gallons.
- (5) Effective for utility bills issued from October 1, 2013 and thereafter:
\$ 3.24 per million gallons.

(b) Milligrams per liter of suspended solids (TSS) in excess of 300 milligrams per liter (300 mg/l).

Users whose discharge exceeds 300 milligrams of TSS per liter shall pay an industrial surcharge equal to the product of the TSS surcharge rate times the total volume of discharge times the sum of the number of milligrams of TSS per liter minus 300 milligrams per liter. The TSS surcharge rates are as follows:

- (1) Effective for utility bills issued through September 30, 2010:
\$ 1.94 per million gallons.
- (2) Effective for utility bills issued from October 1, 2010 through September 30, 2011 :
\$ 2.02 per million gallons.
- (3) Effective for utility bills issued from October 1, 2011 through September 30, 2012:

\$ 2.10 per million gallons.

- (4) Effective for utility bills issued from October 1, 2012 through September 30, 2013:

\$ 2.18 per million gallons.

- (5) Effective for utility bills issued from October 1, 2013 and thereafter:

\$ 2.27 per million gallons.

* * *

TITLE 55. UTILITIES

ARTICLE II. CITY WATER SERVICE

* * *

Section 60-55-15. Housekeeping unit charges.

The monthly housekeeping charge shall be the number of housekeeping units served by the same meter times the housekeeping charge rate as follows:

- (a) Effective for utility bills issued through September 30, 2010:

\$1.26

- (b) Effective for utility bills issued from October 1, 2010 through September 30, 2011:

\$1.50

- (c) Effective for utility bills issued from October 1, 2011 through September 30, 2012:

\$1.56

- (d) Effective for utility bills issued from October 1, 2012 through September 30, 2013:

\$1.62

- (e) Effective for utility bills issued from October 1, 2013 and thereafter:

\$1.69

Section 60-55-16. Water user charges.

The water user charges shall be the monthly customer service charge (the monthly base rate times meter multiplier) plus the water usage charge (volume), as use is measured or estimated pursuant to this Code or contract, times the applicable water rate per thousand gallons for the user's customer class. The water user charges for each customer class are:

(a) Water user charges – Inside City, Retail; and

Inside City, Retail, Non Dedicated Private Fire Line Service.

- (1) Effective for utility bills issued through September 30, 2010:
\$ 7.37 (monthly base rate) times meter multiplier (see § 60-55-17); plus
\$ 2.26 per thousand gallons.
- (2) Effective for utility bills issued from October 1, 2010 through September 30, 2011:
\$ 9.75 (monthly base rate) times meter multiplier (see § 60-55-17); plus
\$ 2.35 per thousand gallons.
- (3) Effective for utility bills issued from October 1, 2011 through September 30, 2012:
\$10.14 (monthly base rate) times meter multiplier (see § 60-55-17); plus
\$ 2.45 per thousand gallons.
- (4) Effective for utility bills issued from October 1, 2012 through September 30, 2013:
\$10.55 (monthly base rate) times meter multiplier (see § 60-55-17); plus
\$ 2.55 per thousand gallons.
- (5) Effective for utility bills issued from October 1, 2013 and thereafter:
\$10.97 (monthly base rate) times meter multiplier (see § 60-55-17); plus
\$ 2.65 per thousand gallons.

(b) Water user charges - Outside City, Unincorporated, Retail; and

Outside City, Unincorporated, Non-Dedicated Private Fire Line Service.

Service provided to a retail customer outside the City for which a fee in lieu of franchise is not paid.

- (1) Effective for utility bills issued through September 30, 2010:
\$ 9.07 (monthly base rate) times meter multiplier (see § 60-55-17); plus
\$ 2.96 per thousand gallons.
- (2) Effective for utility bills issued from October 1, 2010 through September 30, 2011:
\$12.00 (monthly base rate) times meter multiplier (see § 60-55-17); plus
\$ 3.08 per thousand gallons.
- (3) Effective for utility bills issued from October 1, 2011 through September 30, 2012:
\$12.48 (monthly base rate) times meter multiplier (see § 60-55-17); plus

\$ 3.20 per thousand gallons.

(4) Effective for utility bills issued from October 1, 2012 through September 30, 2013:

\$12.98 (monthly base rate) times meter multiplier (see § 60-55-17); plus

\$ 3.33 per thousand gallons.

(5) Effective for utility bills issued from October 1, 2013 and thereafter:

\$13.50 (monthly base rate) times meter multiplier (see § 60-55-17); plus

\$ 3.46 per thousand gallons.

(c) **Water user charges – Outside City, Incorporated, Retail; and Outside City, Incorporated, Non-Dedicated Private Fire Line Service.**

Service provided to a retail customer outside the City for which a fee in lieu of franchise is paid.

(1) Effective for utility bills issued through September 30, 2010:

\$ 9.24 (monthly base rate) times meter multiplier (see § 60-55-17); plus

\$ 3.05 per thousand gallons.

(2) Effective for utility bills issued from October 1, 2010 through September 30, 2011:

\$12.22 (monthly base rate) times meter multiplier (see § 60-55-17); plus

\$ 3.17 per thousand gallons.

(3) Effective for utility bills issued from October 1, 2011 through September 30, 2012:

\$12.71 (monthly base rate) times meter multiplier (see § 60-55-17); plus

\$ 3.30 per thousand gallons.

(4) Effective for utility bills issued from October 1, 2012 through September 30, 2013:

\$13.22 (monthly base rate) times meter multiplier (see § 60-55-17); plus

\$ 3.43 per thousand gallons.

(5) Effective for utility bills issued from October 1, 2013 and thereafter:

\$13.75 (monthly base rate) times meter multiplier (see § 60-55-17); plus

\$ 3.57 per thousand gallons.

(d) **Water user charges – Tinker Air Force Base.**

(1) Effective for utility bills issued through September 30, 2010:

\$ 8.65 (monthly base rate) times meter multiplier (see § 60-55-17); plus

\$ 3.10 per thousand gallons.

(2) Effective for utility bills issued from October 1, 2010 through September 30, 2011:

\$11.44 (monthly base rate) times meter multiplier (see § 60-55-17); plus

\$ 3.22 per thousand gallons.

(3) Effective for utility bills issued from October 1, 2011 through September 30, 2012:

\$11.90 (monthly base rate) times meter multiplier (see § 60-55-17); plus

\$ 3.35 per thousand gallons.

(4) Effective for utility bills issued from October 1, 2012 through September 30, 2013:

\$12.38 (monthly base rate) times meter multiplier (see § 60-55-17); plus

\$ 3.49 per thousand gallons.

(5) Effective for utility bills issued from October 1, 2013 and thereafter:

\$12.88 (monthly base rate) times meter multiplier (see § 60-55-17); plus

\$ 3.63 per thousand gallons.

(e) Water user charges - Outside City, Wholesale, Take-or-Pay.

The subscribed monthly usage is the minimum monthly usage the customer has determined and agreed to be charged by contract; provided that to qualify for this rate the customer's take-or-pay minimum monthly gallons must be at least fifteen percent of the customer's maximum historic monthly usage.

(1) Effective for utility bills issued through September 30, 2010:

\$ 9.24 (monthly base rate) times meter multiplier (see § 60-55-17); plus

\$ 2.01 per thousand gallons for subscribed monthly usage; plus

\$ 2.01 per thousand gallons for usage between subscribed monthly usage and 2.5 times subscribed monthly usage; plus

\$ 4.47 per thousand gallons for usage in excess of 2.5 times subscribed monthly usage.

(2) Effective for utility bills issued from October 1, 2010 through September 30, 2011:

\$12.22 (monthly base rate) times meter multiplier (see § 60-55-17); plus

\$ 2.09 per thousand gallons for subscribed monthly usage; plus

\$ 2.09 per thousand gallons for usage between subscribed monthly usage and 2.5 times subscribed monthly usage; plus

\$ 4.65 per thousand gallons for usage in excess of 2.5 times subscribed monthly usage.

(3) Effective for utility bills issued from October 1, 2011 through September 30, 2012:

\$12.71 (monthly base rate) times meter multiplier (see § 60-55-17); plus

\$ 2.17 per thousand gallons for subscribed monthly usage; plus

\$ 2.17 per thousand gallons for usage between subscribed monthly usage and 2.5 times subscribed monthly usage; plus

\$ 4.84 per thousand gallons for usage in excess of 2.5 times subscribed monthly usage.

(4) Effective for utility bills issued from October 1, 2012 through September 30, 2013:

\$13.22 (monthly base rate) times meter multiplier (see § 60-55-17); plus

\$ 2.26 per thousand gallons for subscribed monthly usage; plus

\$ 2.26 per thousand gallons for usage between subscribed monthly usage and 2.5 times subscribed monthly usage; plus

\$ 5.03 per thousand gallons for usage in excess of 2.5 times subscribed monthly usage.

(5) Effective for utility bills issued from October 1, 2013 and thereafter:

\$13.75 (monthly base rate) times meter multiplier (see § 60-55-17); plus

\$ 2.35 per thousand gallons for subscribed monthly usage; plus

\$ 2.35 per thousand gallons for usage between subscribed monthly usage and 2.5 times subscribed monthly usage; plus

\$ 5.23 per thousand gallons for usage in excess of 2.5 times subscribed monthly usage.

**(f) Water user service charges - Outside City, Wholesale, All Others, As Available.
(Demand Supply, Demand-Sole Source and Annual Take-or-Pay).**

There is no minimum monthly usage the customer has determined and agreed to be charged by contract.

(1) Effective for utility bills issued through September 30, 2010:

\$ 9.24 (monthly base rate) times meter multiplier (see § 60-55-17); plus
\$ 4.47 per thousand gallons.

(2) Effective for utility bills issued from October 1, 2010 through September 30, 2011:

\$12.22 (monthly base rate) times meter multiplier (see § 60-55-17); plus
\$ 4.65 per thousand gallons.

(3) Effective for utility bills issued from October 1, 2011 through September 30, 2012:

\$12.71 (monthly base rate) times meter multiplier (see § 60-55-17); plus
\$ 4.84 per thousand gallons.

(4) Effective for utility bills issued from October 1, 2012 through September 30, 2013:

\$13.22 (monthly base rate) times meter multiplier (see § 60-55-17); plus
\$ 5.03 per thousand gallons.

(5) Effective for utility bills issued from October 1, 2013 and thereafter:

\$13.75 (monthly base rate) times meter multiplier (see § 60-55-17); plus
\$ 5.23 per thousand gallons.

(g) Water user charges - Outside City, Wholesale, Service Availability.

The subscribed monthly capacity reservation is the minimum monthly reservation the customer has determined and agreed to be charged by contract; provided that to qualify for this rate the customer's monthly capacity reservation must be at least ninety percent of the customer's maximum historic monthly usage in gallons.

(1) Effective for utility bills issued through September 30, 2010:

\$ 9.24 (monthly base rate) times meter multiplier (see § 60-55-17); plus
\$.84 per thousand gallons for monthly capacity reservation charge; plus
\$.29 per thousand gallons for usage up to the subscribed monthly capacity reservation gallons; plus
\$ 4.47 per thousand gallons for usage in excess of subscribed monthly capacity reservation gallons.

(2) Effective for utility bills issued from October 1, 2010 through September 30, 2011:

\$12.22 (monthly base rate) times meter multiplier (see § 60-55-17); plus
\$.88 per thousand gallons for monthly capacity reservation charge; plus
\$.31 per thousand gallons for usage up to the subscribed monthly capacity reservation gallons; plus

\$ 4.65 per thousand gallons for usage in excess of subscribed monthly capacity reservation gallons.

(3) Effective for utility bills issued from October 1, 2011 through September 30, 2012:

\$12.71 (monthly base rate) times meter multiplier (see § 60-55-17); plus

\$.92 per thousand gallons for monthly capacity reservation charge; plus

\$.33 per thousand gallons for usage up to the subscribed monthly capacity reservation gallons; plus

\$ 4.84 per thousand gallons for usage in excess of subscribed monthly capacity reservation gallons.

(4) Effective for utility bills issued from October 1, 2012 through September 30, 2013:

\$13.22 (monthly base rate) times meter multiplier (see § 60-55-17); plus

\$.96 per thousand gallons for monthly capacity reservation charge; plus

\$.35 per thousand gallons for usage up to the subscribed monthly capacity reservation gallons; plus

\$ 5.03 per thousand gallons for usage in excess of subscribed monthly capacity reservation gallons.

(5) Effective for utility bills issued from October 1, 2013 and thereafter:

\$13.75 (monthly base rate) times meter multiplier (see § 60-55-17); plus

\$ 1.00 per thousand gallons for monthly capacity reservation charge; plus

\$.36 per thousand gallons for usage up to the subscribed monthly capacity reservation gallons; plus

\$ 5.23 per thousand gallons for usage in excess of subscribed monthly capacity reservation gallons.

(h) Water user service charges – Bulk, Usage through Flushmeters.

(1) Effective for utility bills issued through September 30, 2010:

\$ 7.54 (monthly base rate) for each meter, plus

\$ 4.47 per thousand gallons.

(2) Effective for utility bills issued from October 1, 2010 through September 30, 2011:

\$ 9.98 (monthly base rate) for each meter, plus

\$ 4.65 per thousand gallons.

- (3) Effective for utility bills issued from October 1, 2011 through September 30, 2012:
 - \$10.37 (monthly base rate) for each meter, plus
 - \$ 4.84 per thousand gallons.
- (4) Effective for utility bills issued from October 1, 2012 through September 30, 2013:
 - \$10.79 (monthly base rate) for each meter, plus
 - \$ 5.03 per thousand gallons.
- (5) Effective for utility bills issued from October 1, 2013 and thereafter:
 - \$11.22 (monthly base rate) for each meter, plus
 - \$ 5.23 per thousand gallons.

(i) “Maximum historic monthly usage” as used in this section shall mean the maximum historic usage of Oklahoma City water in gallons for any month regardless the rate or customer class at the time of usage, less and except as re-calculated by the Utilities Director in accordance with subsection (j) below. The maximum historic monthly usage shall be calculated and/or re-calculated upon the date designated by contract for establishing or amending the take-or-pay minimum monthly gallons or the monthly capacity reservation gallons.

(j) In the event a wholesale customer receiving service under subsections (e) (Outside City, Wholesale, Take-or-Pay) or (h) (Outside City, Wholesale, Service Availability) loses an outside City wholesale or retail customer, the Utilities Director may, subsequent to the receipt and review of adequate appropriate supporting documentation, prospectively re-calculate and reduce the maximum historic monthly usage based upon the contribution of the outside City customer to the maximum historic monthly usage.

(k) The Utilities Director is authorized to negotiate written contracts and amendments for water service under each established customer class and rate schedule subject to approval of the final written contracts by the Trust and the City. The Utilities Director may also negotiate contracts and amendments that phase a customer into a service availability customer class or rate schedule subject to approval of the final written contracts by the Trust and the City; provided such phase-in period may not exceed three contract years.

* * *

Section 60-55-26. Dedicated private fire line service charges – Monthly.

(Fire line service size in inches)	Charges effective for utility bills issued to 9/30/10	Charges effective for utility bills issued 10/1/10 through 9/30/11	Charges effective for utility bills issued 10/1/11 through 9/30/12	Charges effective for utility bills issued 10/1/12 through 9/30/13	Charges effective for utility bills issued 10/1/13 and thereafter
2	\$ 3.87	\$ 4.50	\$ 4.68	\$ 4.87	\$ 5.06
3	\$ 5.81	\$ 6.76	\$ 7.03	\$ 7.31	\$ 7.60
4	\$ 7.74	\$ 9.01	\$ 9.37	\$ 9.74	\$10.13
6	\$10.33	\$12.01	\$12.49	\$12.99	\$13.51
8	\$15.50	\$18.02	\$18.74	\$19.49	\$20.27
10	\$25.83	\$30.03	\$31.24	\$32.49	\$33.79
12	\$38.73	\$45.03	\$46.84	\$48.71	\$50.66

Fire service lines in excess of twelve inches shall be charged based upon a separate contract with the City.

* * *

Section 60-55-28. Additional City meter and private monthly meter charges.

The monthly meter charge for each additional City meter or private meter for establishing water usage or sanitary sewer discharge shall be paid by the customer and shall be equal to the following:

(1) Inside City customers:

(a) Effective for utility bills issued through September 30, 2010:

\$ 3.17

(b) Effective for utility bills issued from October 1, 2010 through September 30, 2011:

\$ 3.30

(c) Effective for utility bills issued from October 1, 2011 through September 30, 2012:

\$ 3.43

(d) Effective for utility bills issued from October 1, 2012 through September 30, 2013:
\$ 3.57

(e) Effective for utility bills issued from October 1, 2013 and thereafter:
\$ 3.71

(2) Outside City Customers:

(a) Effective for utility bills issued through September 30, 2010:
\$ 4.10

(b) Effective for utility bills issued from October 1, 2010 through September 30, 2011:
\$ 4.26

(c) Effective for utility bills issued from October 1, 2011 through September 30, 2012:
\$ 4.43

(d) Effective for utility bills issued from October 1, 2012 through September 30, 2013:
\$ 4.61

(e) Effective for utility bills issued from October 1, 2013 and thereafter:
\$ 4.80

* * *

SECTION 3. **EMERGENCY.** Whereas, it being immediately necessary, for the preservation of the peace, health, safety and public good of the City of Oklahoma City and the inhabitants thereof, that the provisions of this ordinance be put into full force and effect, an emergency is hereby declared to exist, by reason whereof, this ordinance shall take effect, and be in full force, from and after its passage, as provided by law.

INTRODUCED and **CONSIDERED** in open meeting of the Council of the City of Oklahoma City this 31st day of August, 2010.

ADOPTED by the Council of the City of Oklahoma City this 28th day of September, 2010.

SIGNED by the Mayor of the City of Oklahoma City this 28th day of September, 2010.

ATTEST: (seal)

Tranah Kersey

City Clerk



Phil Cantu

MAYOR

REVIEWED for form and legality

Diane Lewis

Assistant Municipal Counselor

U:\Ordinances\Chapter 60\Water and Sewer\bl-dc 2010 Rate Ordinance B (4.00%).doc
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**METER SIZES AND COST RATIOS
FOR DETERMINING MINIMUM MONTHLY
BASE CHARGES**

M Size		Cost Ratio
5/8 & 3/4		1.00
1"	1	1.14
1 1/2 "	1.5	3.59
2"	2	4.87
3"	3	9.24
4"	4	15.14
6"	6	29.37
8"	8	48.74
9"	9	60.98
10"	10	74.40
11"	11	88.96
12"	12	104.61
13"	13	121.28
14"	14	138.94
15"	15	157.52
16"	16	176.98
17"	17	197.25
18"	18	218.30
19"	19	240.05
20"	20	262.48
21"	21	285.51
22"	22	309.09
23"	23	333.19
24"	24	357.73

**APPENDIX C – RAW AND FINISHED WATER QUALITY
HISTOGRAMS**

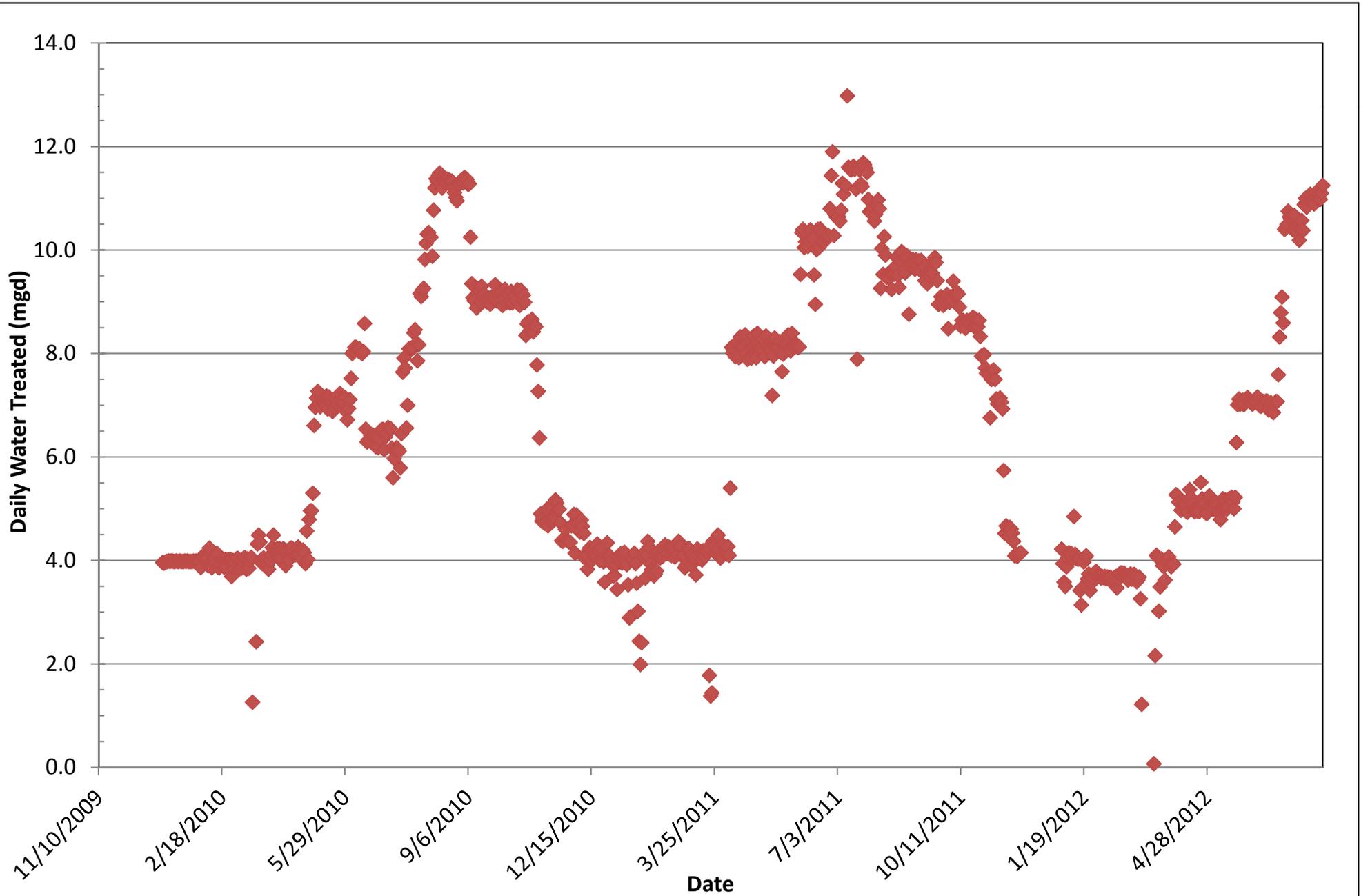


FIGURE C1 – Daily Water Production
 WATER & WASTEWATER SYSTEM MASTER PLAN
 CITY OF EDMOND, OKLAHOMA

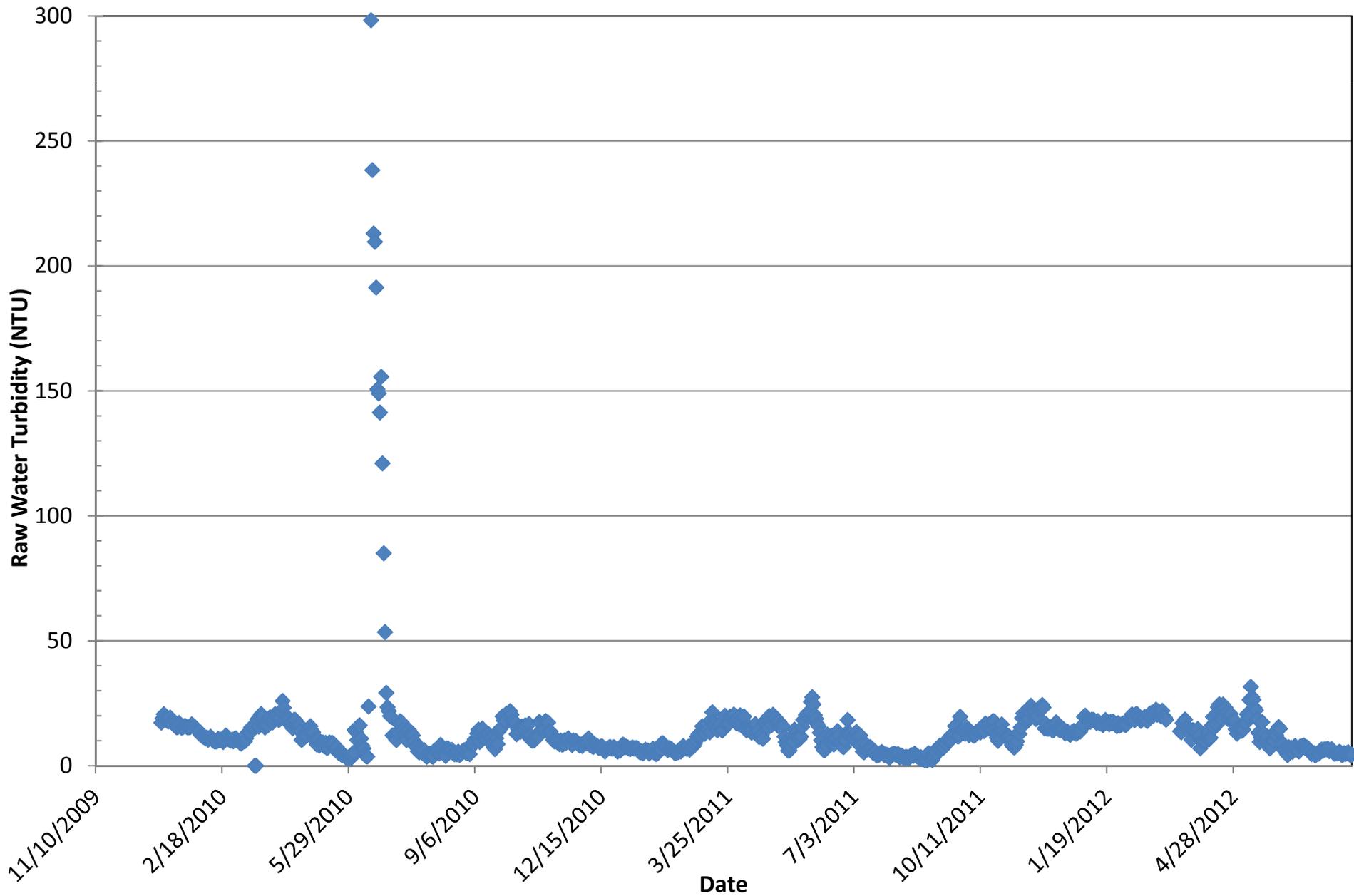


FIGURE C2 – Raw Water Turbidity
 WATER & WASTEWATER SYSTEM MASTER PLAN
 CITY OF EDMOND, OKLAHOMA

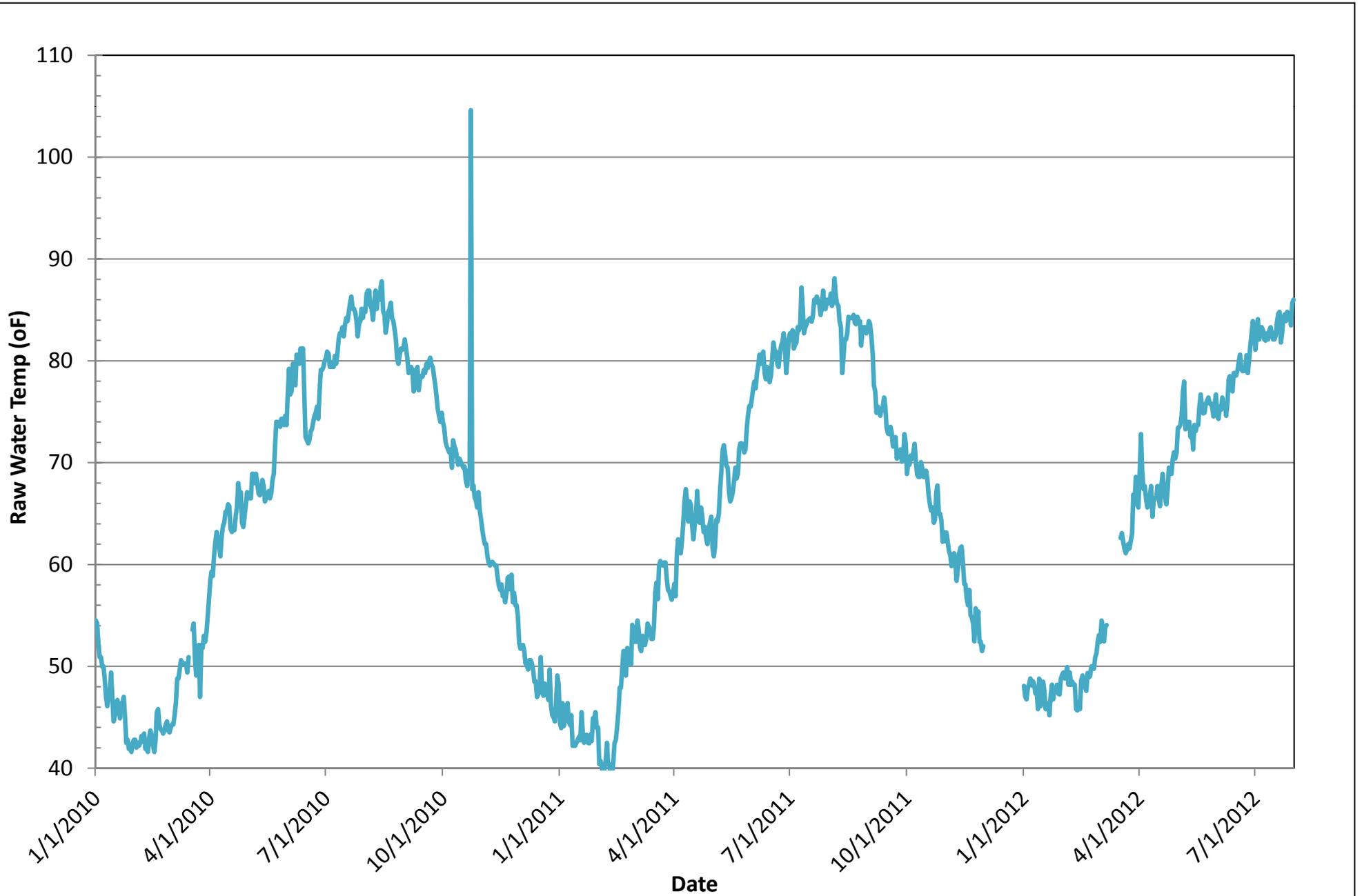


FIGURE C3 – Raw Water Temperature
 WATER & WASTEWATER SYSTEM MASTER PLAN
 CITY OF EDMOND, OKLAHOMA

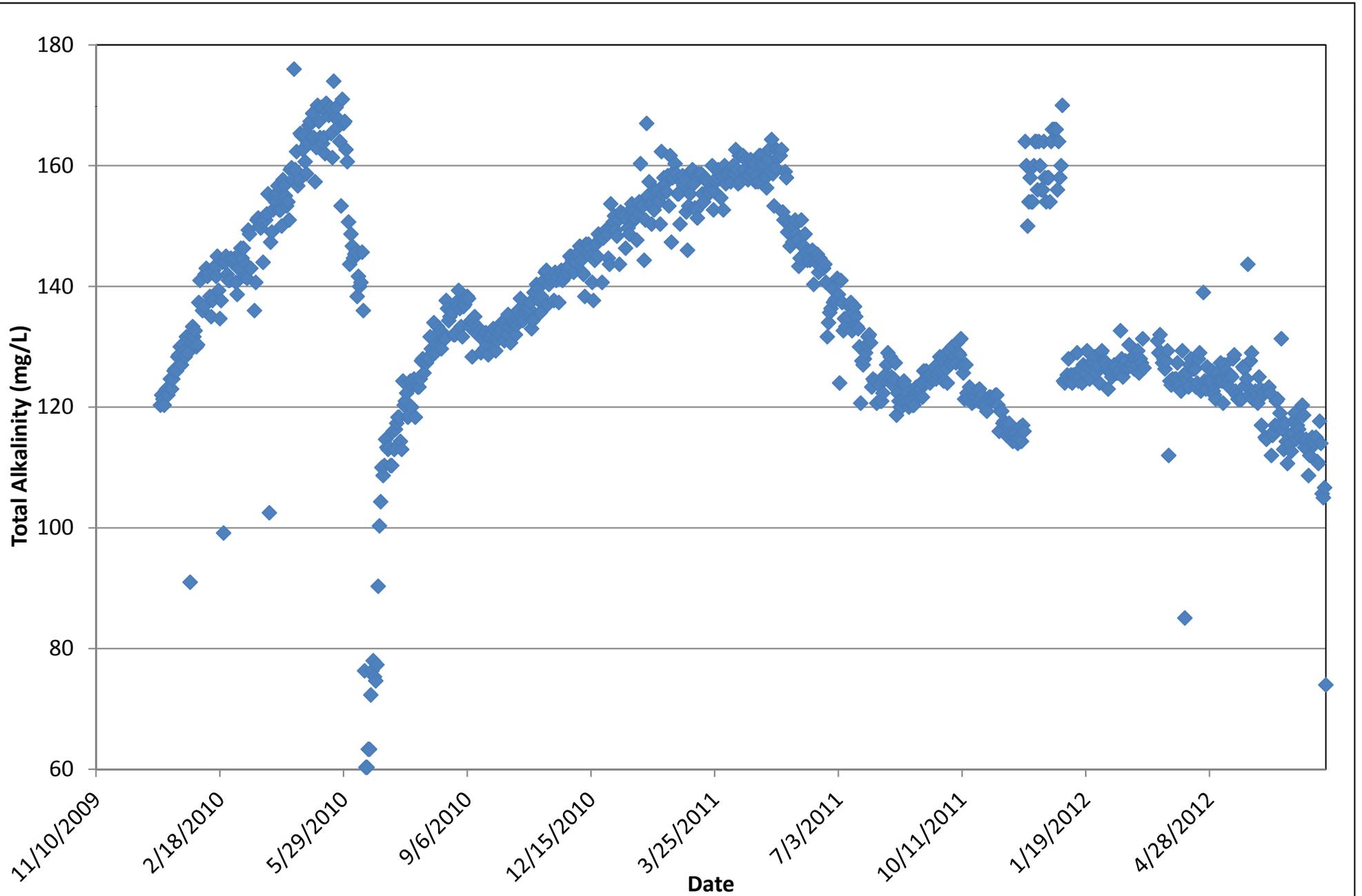


FIGURE C4 – Raw Water Alkalinity
 WATER & WASTEWATER SYSTEM MASTER PLAN
 CITY OF EDMOND, OKLAHOMA

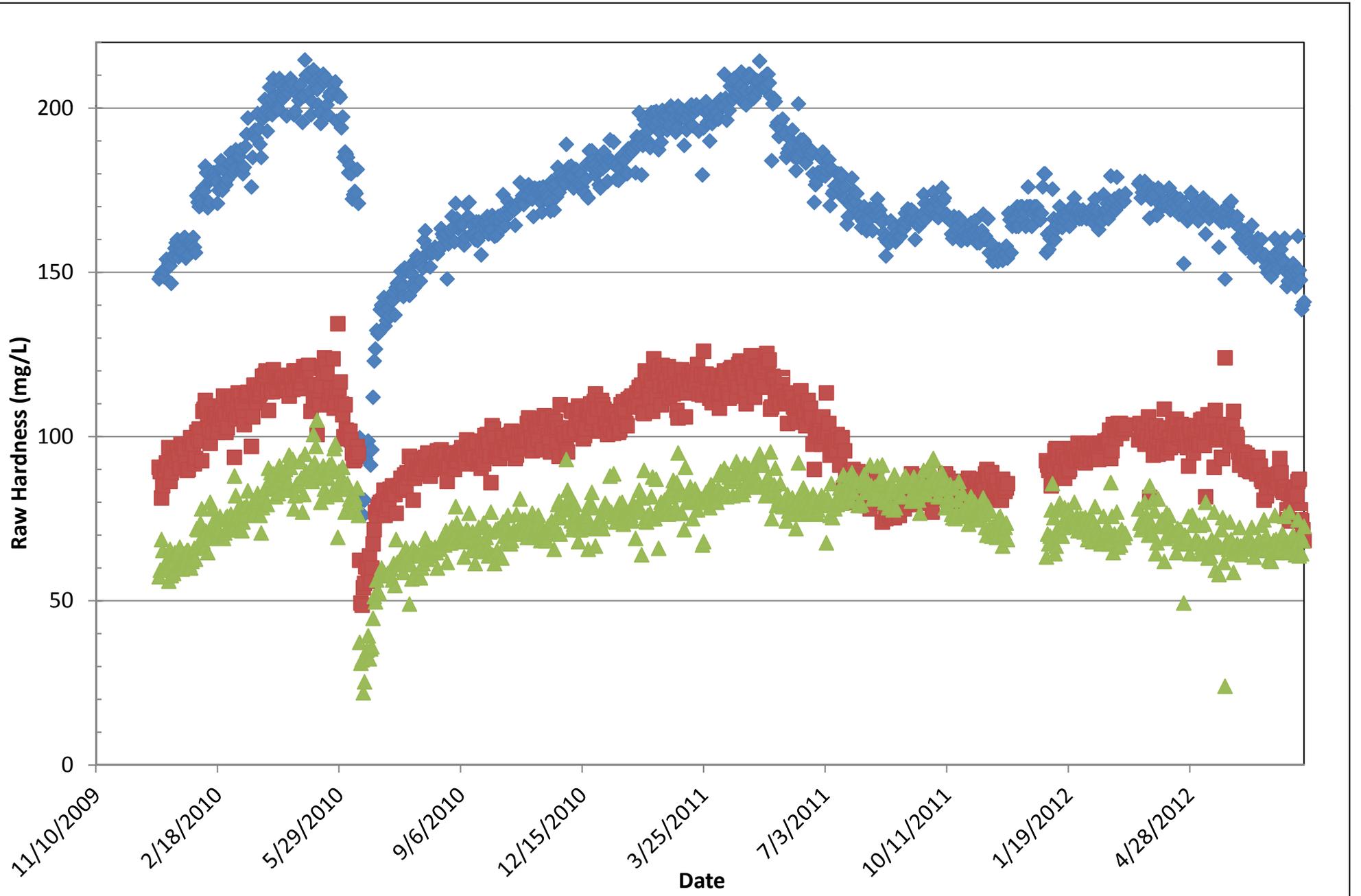


FIGURE C5 – Raw Water Hardness
 WATER & WASTEWATER SYSTEM MASTER PLAN
 CITY OF EDMOND, OKLAHOMA

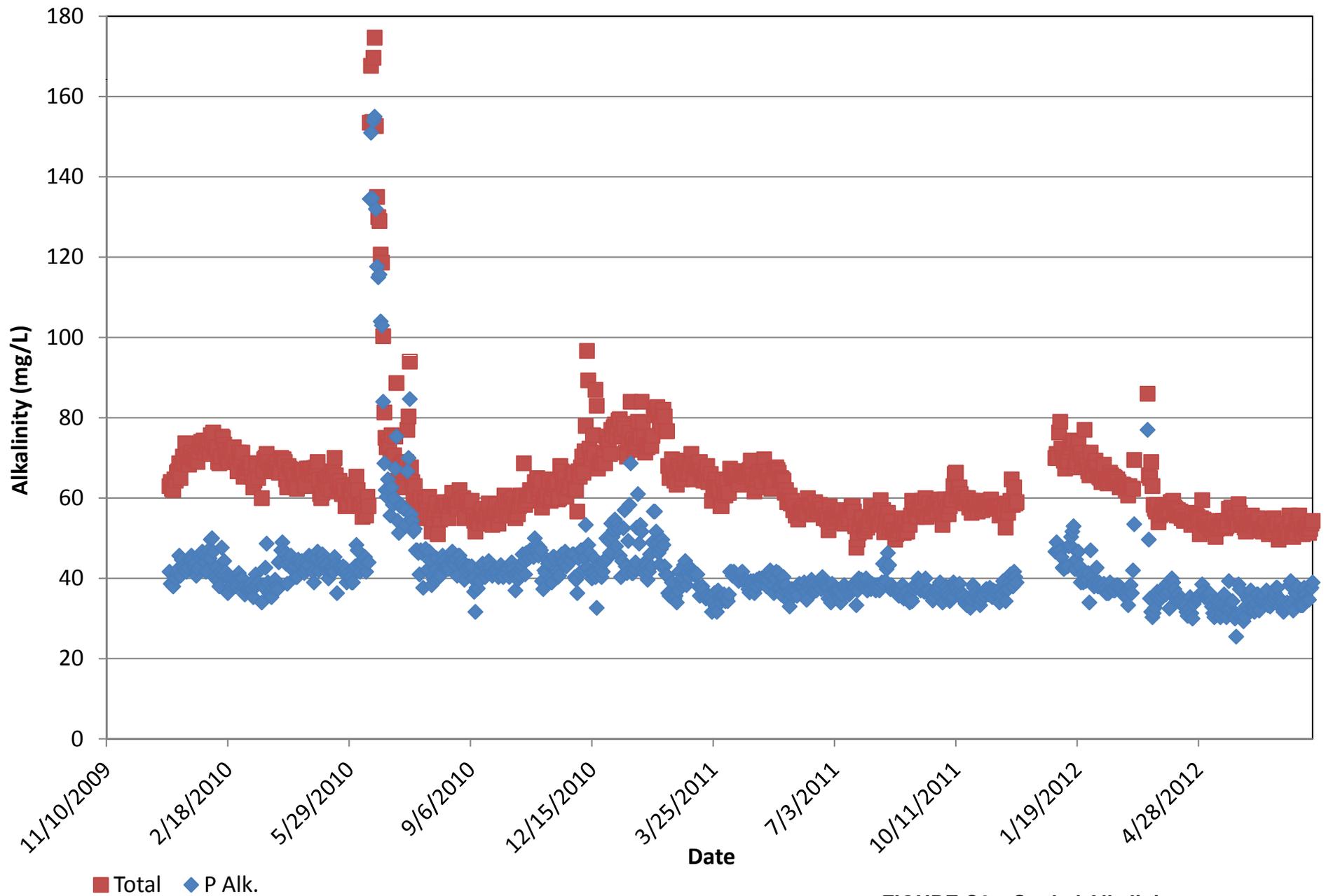


FIGURE C6 – Settled Alkalinity
 WATER & WASTEWATER SYSTEM MASTER PLAN
 CITY OF EDMOND, OKLAHOMA

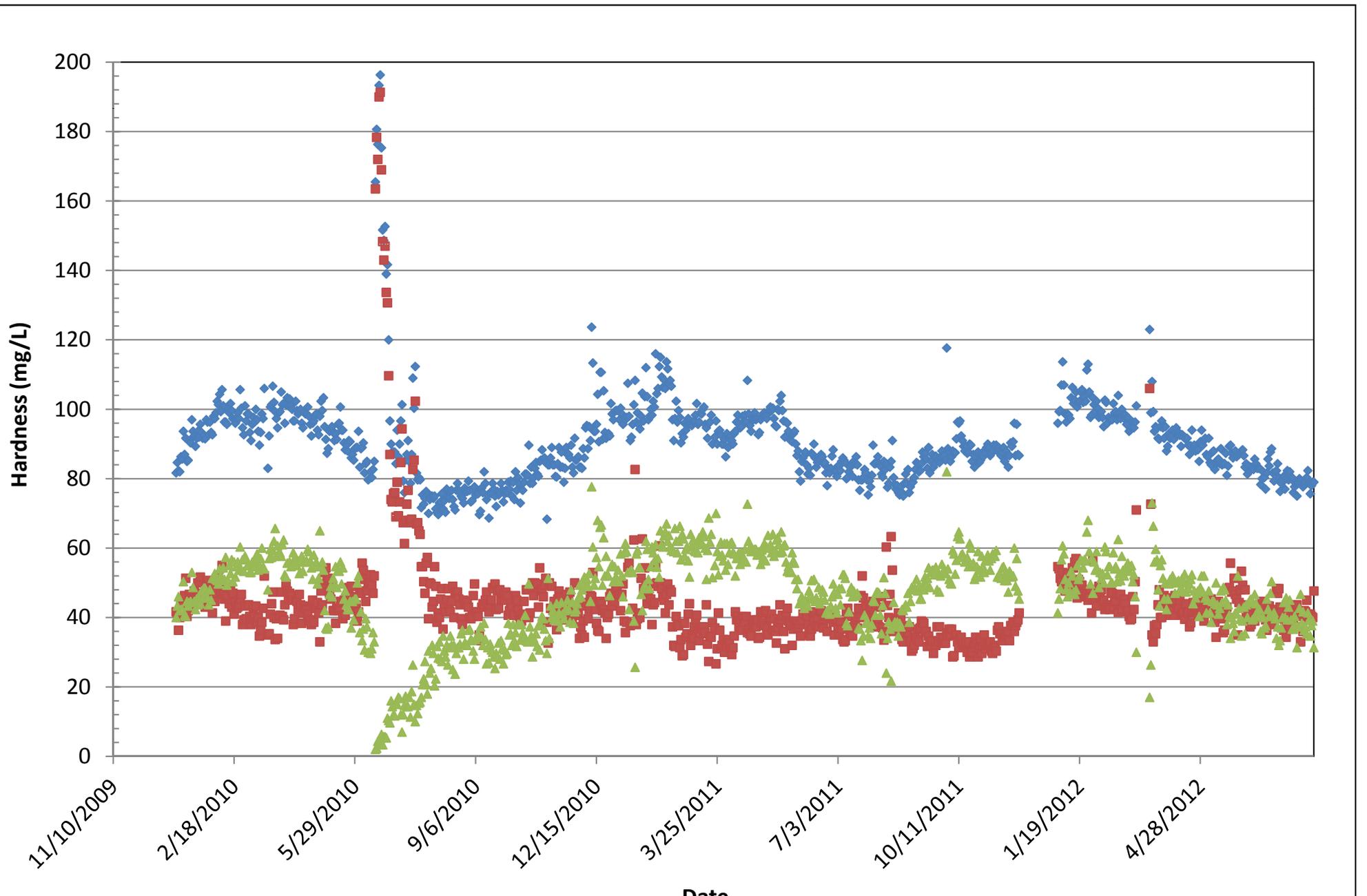
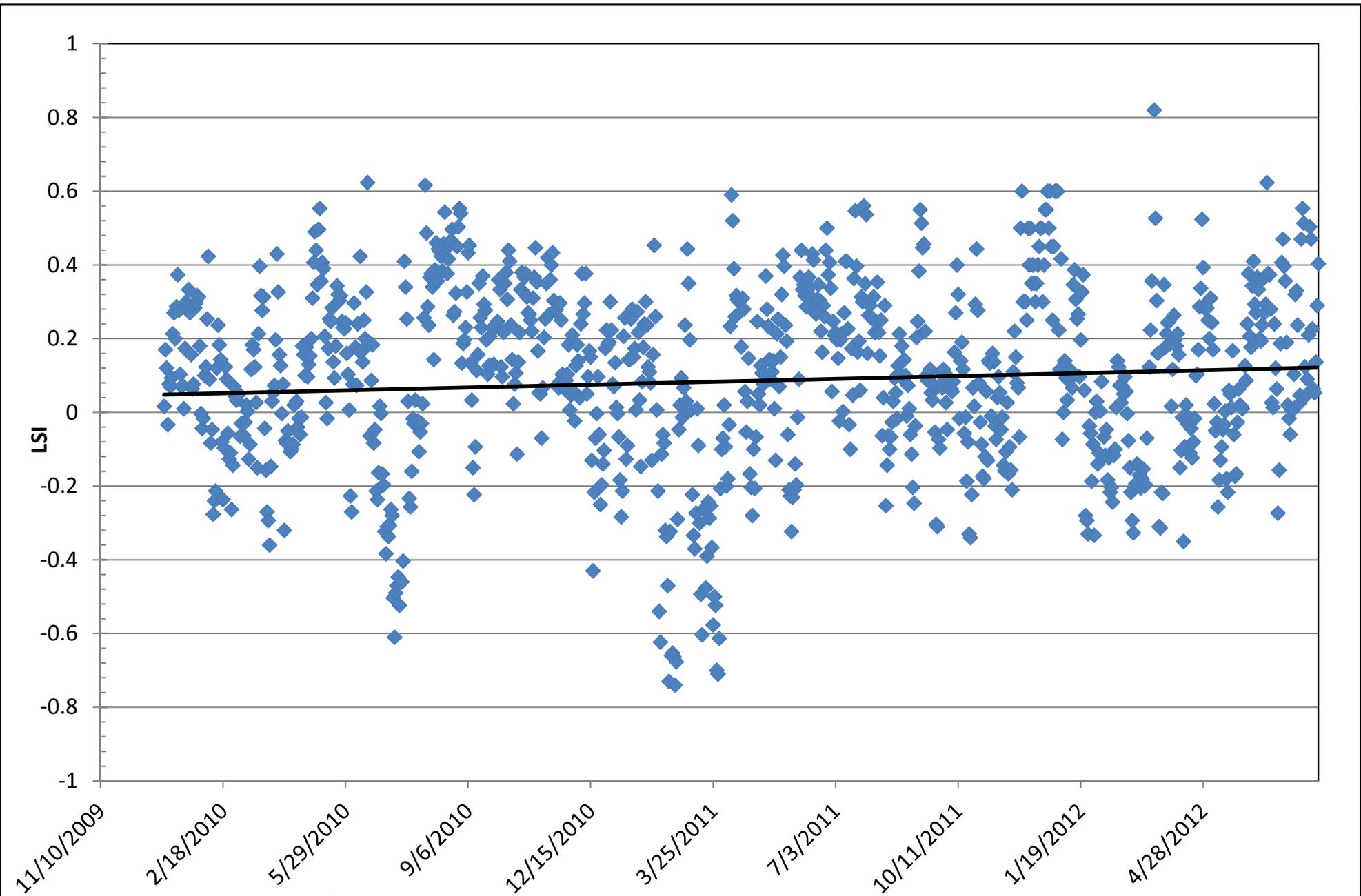


FIGURE C7 – Settled Hardness
 WATER & WASTEWATER SYSTEM MASTER PLAN
 CITY OF EDMOND, OKLAHOMA



◆ "LSI" — Linear ("LSI")

Date

FIGURE C8 – Finished LSI
 WATER & WASTEWATER SYSTEM MASTER PLAN
 CITY OF EDMOND, OKLAHOMA

**APPENDIX D – WATER TREATMENT PLANT CRITICALITY
REPORT**

Overall Condition Report

Appendix D

Sort Order : Data Tree Order

Current Year: 2013

	Condition	Criticality	Weight	Score
Facility Name: rcardia Lake WTP				0.00
System Name: Raw Water System			0 %	0.00
Subsystem Name: Raw Water Intake		Fatal	0 %	50.00
Unit				
Raw Water Gates/Actuators	2 - Satisfactory	Moderate	50 %	
Raw Water Valves/Actuators	2 - Satisfactory	Moderate	50 %	
	Sum of Selected Units for this Subsystem		100 %	
Subsystem Name: Raw Water Pump Station		Severe	0 %	50.00
Unit				
Pump	2 - Satisfactory	Severe	80 %	
Valves/Actuators	2 - Satisfactory	Severe	20 %	
	Sum of Selected Units for this Subsystem		100 %	
Subsystem Name: Raw Water Conveyance		Fatal	0 %	50.00
Unit				
Raw Water Piping - Buried	2 - Satisfactory	Fatal	34 %	
Raw Water Piping - Nonburied	2 - Satisfactory	Fatal	33 %	
Valves/Actuators	2 - Satisfactory	Fatal	33 %	
	Sum of Selected Units for this Subsystem		100 %	
Subsystem Name: Influent Flow Measurement		No Impact	0 %	100.00
Unit				
Flow Meters	4 - Excellent	No Impact	100 %	
	Sum of Selected Units for this Subsystem		100 %	
Subsystem Name: Field Structures			0 %	0.00
Unit				
Manholes		Minor	0 %	
Vaults			0 %	

Source: Water Treatment Plant Infrastructure Assessment Manager by Elliott, et al. c2001 AWWARF and AWWA

Overall Condition Report

Appendix D

Sort Order : Data Tree Order

Current Year: 2013

	Condition	Criticality	Weight	Score
Sum of Selected Units for this Subsystem			0 %	
Sum of Selected Subsystems for this System			0 %	
System Name: Water Treatment System			0 %	0.00
Subsystem Name: Screening and Aeration		Minor	0 %	40.00
Unit				
Micro-screens	1 - Unsatisfactory	Minor	70 %	
Aeration Tanks, Towers, Trays	3 - Good	No Impact	30 %	
Sum of Selected Units for this Subsystem			100 %	
Subsystem Name: Rapid Mix/ Coagulation		Moderate	0 %	35.00
Unit				
Rapid Mix Basin/Chamber	3 - Good	Moderate	10 %	
Gates/Actuators	3 - Good	Moderate	10 %	
Mechanical Mixer	1 - Unsatisfactory	Moderate	80 %	
Hydraulic Mixer			0 %	
Sum of Selected Units for this Subsystem			100 %	
Subsystem Name: FLocculating Clarifiers		Moderate	0 %	32.50
Unit				
Basin	3 - Good	Moderate	15 %	
Gates/Actuators	1 - Unsatisfactory	Moderate	15 %	
Clarifier Mechanism	1 - Unsatisfactory	Moderate	70 %	
Sum of Selected Units for this Subsystem			100 %	
Subsystem Name: Solids Contact Clarifiers		Fatal	0 %	60.00
Unit				
Basin	2 - Satisfactory	Fatal	30 %	
Gates/Actuators	2 - Satisfactory	Fatal	30 %	
Clarifier Mechanism	3 - Good	Fatal	40 %	

Source: Water Treatment Plant Infrastructure Assessment Manager by Elliott, et al. c2001 AWWARF and AWWA

Overall Condition Report

Appendix D

Sort Order : Data Tree Order

Current Year: 2013

		Condition	Criticality	Weight	Score
		Sum of Selected Units for this Subsystem		100 %	
Subsystem Name:	Filtration (Gravity)		Fatal	0 %	0.00
Unit					
	Filter Influent Piping (Interior)	3 - Good	Fatal	0 %	
	Filter Influent Valves/Actuators (interior)	2 - Satisfactory	Severe	0 %	
	Backwash Water Supply Piping (Interior)	2 - Satisfactory	Severe	0 %	
	Backwash Water Supply Valves/Actuators (interior)	2 - Satisfactory	Moderate	0 %	
	Backwash Waste Water Piping (Interior)	2 - Satisfactory	Severe	0 %	
	Backwash Waste Water Valves/Actuators (interior)	2 - Satisfactory	Severe	0 %	
	Filtered Water Piping (Interior)	2 - Satisfactory	Fatal	0 %	
	Filtered Water Valves/Actuators (interior)	2 - Satisfactory	Severe	0 %	
	Filtered to Waste Piping (Interior)	2 - Satisfactory	Minor	0 %	
	Filter to Waste Valves/Actuators (Interior)	2 - Satisfactory	Minor	0 %	
	Filter Drain Piping (Interior)	2 - Satisfactory	Moderate	0 %	
	Filter Drain Valves/Actuators (interior)	2 - Satisfactory	Moderate	0 %	
	Backwash Air Supply Piping (Interior)	3 - Good	Moderate	0 %	
	Backwash Air Supply Valves/Actuators (interior)	3 - Good	Severe	0 %	
	Backwash Blowers	3 - Good	Moderate	0 %	
	Channel/Conduit	4 - Excellent	Fatal	0 %	
	Filter	3 - Good	Fatal	0 %	
		Sum of Selected Units for this Subsystem		0 %	
Subsystem Name:	GAC Pressure Filters		Minor	0 %	0.00
Unit					
	Pressure Filter Piping - Nonburied	2 - Satisfactory	Minor	0 %	
	Valves/Actuators (interior)	2 - Satisfactory	Minor	0 %	
	Filter	3 - Good	Minor	0 %	

Overall Condition Report

Appendix D

Sort Order : Data Tree Order

Current Year: 2013

	Condition	Criticality	Weight	Score
Sum of Selected Units for this Subsystem			0 %	
Subsystem Name: Transfer Pump Station - GAC Filters		Minor	0 %	0.00
<i>Unit</i>				
Finished Water Pump	2 - Satisfactory	Minor	0 %	
Finished Water Piping - Nonburied	2 - Satisfactory	Minor	0 %	
Valves/Actuators	2 - Satisfactory	Minor	0 %	
Sum of Selected Units for this Subsystem			0 %	
Sum of Selected Subsystems for this System			0 %	
System Name: Finished Water System			0 %	0.00
Subsystem Name: High Service Pump Station			0 %	0.00
<i>Unit</i>				
Finished Water Pumps		Fatal	0 %	
Finished Water Piping - Nonburied		Fatal	0 %	
Valves/Actuators		Severe	0 %	
Sum of Selected Units for this Subsystem			0 %	
Subsystem Name: Finished Water Storage Tank/Reservoir		Moderate	0 %	0.00
<i>Unit</i>				
Tank/Reservoir	3 - Good	Moderate	0 %	
Valves/Actuators	3 - Good	Moderate	0 %	
Gates/Actuators	3 - Good	Moderate	0 %	
Sum of Selected Units for this Subsystem			0 %	
Subsystem Name: Finished Water Conveyance		Severe	0 %	0.00
<i>Unit</i>				
Finished Water Piping - Buried	3 - Good	Fatal	0 %	
Finished Water Piping - Nonburied	4 - Excellent	Fatal	0 %	
Valves/Actuators	2 - Satisfactory	Severe	0 %	

Source: Water Treatment Plant Infrastructure Assessment Manager by Elliott, et al. c2001 AWWARF and AWWA

Overall Condition Report

Appendix D

Sort Order : Data Tree Order

Current Year: 2013

	<i>Condition</i>	<i>Criticality</i>	<i>Weight</i>	<i>Score</i>
Gates/Actuators	2 - Satisfactory	Severe	0 %	
Channel/Conduit		N/A or Unknown	0 %	
Sum of Selected Units for this Subsystem			0 %	
Sum of Selected Subsystems for this System			0 %	
System Name: Civil / Sitework System			0 %	0.00
Subsystem Name: Site (Stormwater) Drainage		No Impact	0 %	0.00
Unit				
Surface Grading	1 - Unsatisfactory	No Impact	0 %	
Sum of Selected Units for this Subsystem			0 %	
Subsystem Name: Site Lighting/Site Security		Moderate	0 %	0.00
Unit				
Lighting	3 - Good	Moderate	0 %	
Fencing/Perimeter Walls	2 - Satisfactory	Severe	0 %	
Video	3 - Good	Moderate	0 %	
Security Alarms	3 - Good	Severe	0 %	
Sum of Selected Units for this Subsystem			0 %	
Sum of Selected Subsystems for this System			0 %	
System Name: Buildings			0 %	0.00
Subsystem Name: Administration, Filter, Lab, Control, Building			0 %	0.00
Unit				
Building Superstructure			0 %	
Building Electrical			0 %	
Building Lighting			0 %	
Hot Water Boilers			0 %	
Steam Boilers			0 %	
Chilled Water System			0 %	

Source: Water Treatment Plant Infrastructure Assessment Manager by Elliott, et al. c2001 AWWARF and AWWA

Overall Condition Report

Appendix D

Sort Order : Data Tree Order

Current Year: 2013

	Condition	Criticality	Weight	Score
Unit Heaters			0 %	
Dehumidifiers			0 %	
Fans			0 %	
Ductwork			0 %	
Air Handling Units			0 %	
Direct Expansion Air Handling Units			0 %	
Cabinet and Convector Heaters			0 %	
Baseboard Heaters			0 %	
Fire Protection			0 %	
Sanitary Drainage System			0 %	
Lavatory			0 %	
Potable Water System			0 %	
Sum of Selected Units for this Subsystem			0 %	
Subsystem Name: Screen Building			0 %	0.00
Unit				
Building Superstructure			6 %	
Building Electrical			6 %	
Building Lighting			6 %	
Hot Water Boilers			6 %	
Steam Boilers			6 %	
Chilled Water System			6 %	
Unit Heaters			6 %	
Dehumidifiers			6 %	
Fans			6 %	
Ductwork			6 %	
Air Handling Units			5 %	
Direct Expansion Air Handling Units			5	

Source: Water Treatment Plant Infrastructure Assessment Manager by Elliott, et al. c2001 AWWARF and AWWA

Overall Condition Report

Appendix D

Sort Order : Data Tree Order

Current Year: 2013

	Condition	Criticality	Weight	Score
			%	
Cabinet and Convector Heaters			5 %	
Baseboard Heaters			5 %	
Fire Protection			5 %	
Sanitary Drainage System			5 %	
Lavatory			5 %	
Potable Water System			5 %	
	Sum of Selected Units for this Subsystem		100 %	
Subsystem Name: Finished Water Pump Station			0 %	0.00
Unit				
Building Superstructure			0 %	
Building Electrical			0 %	
Building Lighting			0 %	
Hot Water Boilers			0 %	
Steam Boilers			0 %	
Chilled Water System			0 %	
Unit Heaters			0 %	
Dehumidifiers			0 %	
Fans			0 %	
Ductwork			0 %	
Air Handling Units			0 %	
Direct Expansion Air Handling Units			0 %	
Cabinet and Convector Heaters			0 %	
Baseboard Heaters			0 %	
Fire Protection			0 %	
Sanitary Drainage System			0 %	
Lavatory			0	

Overall Condition Report

Appendix D

Sort Order : Data Tree Order

Current Year: 2013

	Condition	Criticality	Weight	Score
Potable Water System			0 %	
			0 %	
			0 %	
Sum of Selected Units for this Subsystem			0 %	
Subsystem Name: Manhole/Vault Structure			0 %	0.00
Unit				
Building Superstructure			0 %	
Building Electrical			0 %	
Building Lighting			0 %	
Fire Protection			0 %	
			0 %	
Sum of Selected Units for this Subsystem			0 %	
Subsystem Name: Ozone Building			0 %	0.00
Unit				
Building Superstructure			0 %	
Building Electrical			0 %	
Building Lighting			0 %	
Hot Water Boilers			0 %	
Steam Boilers			0 %	
Chilled Water System			0 %	
Unit Heaters			0 %	
Dehumidifiers			0 %	
Fans			0 %	
Ductwork			0 %	
Air Handling Units			0 %	
Direct Expansion Air Handling Units			0 %	
Cabinet and Convector Heaters			0 %	
Baseboard Heaters			0 %	

Overall Condition Report

Appendix D

Sort Order : Data Tree Order

Current Year: 2013

	Condition	Criticality	Weight	Score
Fire Protection			0 %	
Sanitary Drainage System			0 %	
Lavatory			0 %	
Potable Water System			0 %	
	Sum of Selected Units for this Subsystem		0 %	
Subsystem Name: Raw Water Intake			0 %	0.00
Unit				
Building Superstructure			0 %	
Building Electrical			0 %	
Building Lighting			0 %	
Hot Water Boilers			0 %	
Steam Boilers			0 %	
Chilled Water System			0 %	
Unit Heaters			0 %	
Dehumidifiers			0 %	
Fans			0 %	
Ductwork			0 %	
Air Handling Units			0 %	
Direct Expansion Air Handling Units			0 %	
Cabinet and Convector Heaters			0 %	
Baseboard Heaters			0 %	
Fire Protection			0 %	
Sanitary Drainage System			0 %	
Lavatory			0 %	
Potable Water System			0 %	
	Sum of Selected Units for this Subsystem		0 %	

Overall Condition Report

Appendix D

Sort Order : Data Tree Order

Current Year: 2013

	Condition	Criticality	Weight	Score
Subsystem Name: Raw Water Pump Station			0 %	0.00
Unit				
Building Superstructure			0 %	
Building Electrical			0 %	
Building Lighting			0 %	
Hot Water Boilers			0 %	
Steam Boilers			0 %	
Chilled Water System			0 %	
Unit Heaters			0 %	
Dehumidifiers			0 %	
Fans			0 %	
Ductwork			0 %	
Air Handling Units			0 %	
Direct Expansion Air Handling Units			0 %	
Cabinet and Convector Heaters			0 %	
Baseboard Heaters			0 %	
Fire Protection			0 %	
Sanitary Drainage System			0 %	
Lavatory			0 %	
Potable Water System			0 %	
			Sum of Selected Units for this Subsystem	0 %
Subsystem Name: Vehicle Maintenance Building			0 %	0.00
Unit				
Building Superstructure			0 %	
Building Electrical			0 %	
Building Lighting			0 %	

Overall Condition Report

Appendix D

Sort Order : Data Tree Order

Current Year: 2013

	Condition	Criticality	Weight	Score
Hot Water Boilers			0 %	
Steam Boilers			0 %	
Chilled Water System			0 %	
Unit Heaters			0 %	
Dehumidifiers			0 %	
Fans			0 %	
Ductwork			0 %	
Air Handling Units			0 %	
Direct Expansion Air Handling Units			0 %	
Cabinet and Convector Heaters			0 %	
Baseboard Heaters			0 %	
Fire Protection			0 %	
Sanitary Drainage System			0 %	
Lavatory			0 %	
Potable Water System			0 %	
	Sum of Selected Units for this Subsystem		0 %	
	Sum of Selected Subsystems for this System		0 %	
System Name: Ozonation System			0 %	0.00
Subsystem Name: Liquid Oxygen (LOX) Storage and Feed System			0 %	0.00
Unit				
LOX Storage Tanks			0 %	
LOX Piping - Nonburied			0 %	
LOX System Valves/Actuators			0 %	
Vaporizers			0 %	
Gas Trim Heaters			0 %	
Oxygen Particulate Filter			0 %	
	Sum of Selected Units for this Subsystem			

Overall Condition Report

Appendix D

Sort Order : Data Tree Order

Current Year: 2013

	Condition	Criticality	Weight	Score
			0 %	
Subsystem Name:	Ozone Production System		0 %	0.00
<i>Unit</i>				
	Ozone Generators		0 %	
	Power Supply Units		0 %	
			Sum of Selected Units for this Subsystem	0 %
Subsystem Name:	Ozone Gas Application System		0 %	0.00
<i>Unit</i>				
	Diffusion System		0 %	
	Ozone Gas Valves/Actuators		0 %	
			Sum of Selected Units for this Subsystem	0 %
Subsystem Name:	Cooling Water System		0 %	0.00
<i>Unit</i>				
	Ozone Generator Cooling Water Pumps		0 %	
	Power Supply Unit Cooling Water Pumps		0 %	
	Cooling Water Piping - Nonburied		0 %	
	Cooling Water System Valves/Actuators		0 %	
			Sum of Selected Units for this Subsystem	0 %
Subsystem Name:	Ozone Analyzers		0 %	0.00
<i>Unit</i>				
	Ozone-in-Oxygen Analyzers		0 %	
	Ozone-in-Water Analyzers		0 %	
			Sum of Selected Units for this Subsystem	0 %
Subsystem Name:	Ozone Destruct System		0 %	0.00
<i>Unit</i>				
	Ozone Destruct Unit		0 %	

Source: Water Treatment Plant Infrastructure Assessment Manager by Elliott, et al. c2001 AWWARF and AWWA

Overall Condition Report

Appendix D

Sort Order : Data Tree Order

Current Year: 2013

	Condition	Criticality	Weight	Score
Ozone Off-Gas Blowers			0 %	
	Sum of Selected Units for this Subsystem		0 %	
Subsystem Name: Ozone Safety System			0 %	0.00
Unit				
Ambient Oxygen Gas Analyzer			0 %	
Ambient Ozone Gas Analyzer			0 %	
	Sum of Selected Units for this Subsystem		0 %	
Subsystem Name: Ozone Contact Basin			0 %	0.00
Unit				
Tank/Basin			0 %	
Ozone Feed Piping - Nonburied			0 %	
Valves/Actuators			0 %	
Gates/Actuators			0 %	
	Sum of Selected Units for this Subsystem		0 %	
Subsystem Name: Ozonated Water Conveyance			0 %	0.00
Unit				
Ozonated Water Piping - Buried			0 %	
Ozonated Water Piping - Nonburied			0 %	
Valves/Actuators			0 %	
Gates/Actuators			0 %	
Ozonated Water Channels/Conduits			0 %	
	Sum of Selected Units for this Subsystem		0 %	
	Sum of Selected Subsystems for this System		0 %	
System Name: Chemical Systems (excl. ozone)			0 %	0.00
Subsystem Name: Chemical - Liquid Sulfuric Acid		No Impact	0 %	0.00
Unit				

Overall Condition Report

Appendix D

Sort Order : Data Tree Order

Current Year: 2013

	<i>Condition</i>	<i>Criticality</i>	<i>Weight</i>	<i>Score</i>
Chemical Feed Piping	2 - Satisfactory	No Impact	0 %	
Chemical Unloading Piping	2 - Satisfactory	No Impact	0 %	
Valves/Actuators	1 - Unsatisfactory	No Impact	0 %	
Storage Tank	1 - Unsatisfactory	No Impact	0 %	
Metering Pumps	1 - Unsatisfactory	No Impact	0 %	
Transfer Pumps	2 - Satisfactory	No Impact	0 %	
Diffusers	Unknown	No Impact	0 %	
Electrical Systems	Unknown	No Impact	0 %	
Sum of Selected Units for this Subsystem			0 %	
Subsystem Name: Chemical - Gaseous Carbon Dioxide		Moderate	0 %	0.00
Unit				
Unloading	2 - Satisfactory	Moderate	0 %	
Storage	3 - Good	Moderate	0 %	
Feed Equipment	1 - Unsatisfactory	Moderate	0 %	
Valves/Actuators	3 - Good	Moderate	0 %	
Piping/Appurtenances	3 - Good	Moderate	0 %	
Diffusers	1 - Unsatisfactory	Moderate	0 %	
Safety Items	3 - Good	Moderate	0 %	
Electrical Systems	3 - Good	Moderate	0 %	
Sum of Selected Units for this Subsystem			0 %	
Subsystem Name: Chemical - Gaseous Chlorine		Fatal	0 %	0.00
Unit				
Unloading	3 - Good	Severe	0 %	
Storage	2 - Satisfactory	Fatal	0 %	
Feed Equipment	3 - Good	Fatal	0 %	
Valves/Actuators	2 - Satisfactory	Fatal	0 %	

Overall Condition Report

Appendix D

Sort Order : Data Tree Order

Current Year: 2013

	Condition	Criticality	Weight	Score
Piping/Appurtenances	3 - Good	Fatal	0 %	
Diffusers	3 - Good	Fatal	0 %	
Safety Items	1 - Unsatisfactory	Fatal	0 %	
Electrical Systems	3 - Good	Severe	0 %	
Sum of Selected Units for this Subsystem			0 %	
Subsystem Name: Chemical - Dry Aluminum Sulfate		Moderate	0 %	0.00
Unit				
Unloading	3 - Good	Minor	0 %	
Piping	3 - Good	Minor	0 %	
Valves/Actuators	2 - Satisfactory	Moderate	0 %	
Storage Bin/Silo	2 - Satisfactory	Moderate	0 %	
Dry Chemical Feeder	2 - Satisfactory	Moderate	0 %	
Rotary Arm Feeders (Roto-dip type)			0 %	
Slurry Mix Tanks			0 %	
Metering Pumps	2 - Satisfactory	Moderate	0 %	
Diffusers	2 - Satisfactory		0 %	
Electrical Systems	3 - Good		0 %	
Sum of Selected Units for this Subsystem			0 %	
Subsystem Name: Chemical - Dry Polymer, Powder			0 %	0.00
Unit				
Unloading			0 %	
Piping			0 %	
Valves/Actuators			0 %	
Storage Bin/Silo			0 %	
Dry Chemical Feeder			0 %	
Rotary Arm Feeders (Roto-dip type)			0 %	

Overall Condition Report

Appendix D

Sort Order : Data Tree Order

Current Year: 2013

	Condition	Criticality	Weight	Score
Slurry Mix Tanks			0 %	
Metering Pumps			0 %	
Diffusers			0 %	
Electrical Systems			0 %	
	Sum of Selected Units for this Subsystem		0 %	
	Sum of Selected Subsystems for this System		0 %	
System Name: Support Systems			0 %	0.00
Subsystem Name: Control System		Severe	0 %	0.00
Unit				
Plant Communications	2 - Satisfactory	Severe	0 %	
Plant Control System - Hardware	2 - Satisfactory	Severe	0 %	
Plant Control System - Software	2 - Satisfactory	Severe	0 %	
	Sum of Selected Units for this Subsystem		0 %	
Subsystem Name: Electric Power Supply/Distribution			0 %	0.00
Unit				
Electrical Distribution			0 %	
	Sum of Selected Units for this Subsystem		0 %	
Subsystem Name: Backwash System (excluding piping/valves in Filter Bldg.)			0 %	0.00
Unit				
Filter Backwash Pump			0 %	
Filter Backwash Supply Valves/Actuators			0 %	
Piping (external of Filter Building)			0 %	
Backwash Storage Tank			0 %	
	Sum of Selected Units for this Subsystem		0 %	
Subsystem Name: Residuals Handling		Severe	0 %	0.00
Unit				

Overall Condition Report

Appendix D

Sort Order : Data Tree Order

Current Year: 2013

	Condition	Criticality	Weight	Score
Residuals Process Piping			0 %	
Residuals Process Valves/Actuators			0 %	
Residuals Lagoons	3 - Good	Severe	0 %	
Sum of Selected Units for this Subsystem			0 %	
Sum of Selected Subsystems for this System			0 %	
Sum of Selected Systems for this Facility			0 %	
Facility Name: Undefined Facility				0.00
System Name: Chlorine Feed Facility			0 %	0.00
Subsystem Name: Chemical - Liquid Aluminum Sulfate			0 %	0.00
Unit				
Chemical Feed Piping			0 %	
Chemical Unloading Piping			0 %	
Valves/Actuators			0 %	
Storage Tank			0 %	
Metering Pumps			0 %	
Transfer Pumps			0 %	
Diffusers			0 %	
Electrical Systems			0 %	
Sum of Selected Units for this Subsystem			0 %	
Subsystem Name: Chemical - Liquid Aqueous Ammonia			0 %	0.00
Unit				
Chemical Feed Piping			0 %	
Chemical Unloading Piping			0 %	
Valves/Actuators			0 %	
Storage Tank			0 %	
Metering Pumps			0 %	

Overall Condition Report

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Sort Order : Data Tree Order

Current Year: 2013

	Condition	Criticality	Weight	Score
Transfer Pumps			0 %	
Diffusers			0 %	
Electrical Systems			0 %	
Sum of Selected Units for this Subsystem			0 %	
Subsystem Name:	Chemical - Liquid Calcium Hypochlorite		0 %	0.00
<i>Unit</i>				
Chemical Feed Piping			0 %	
Chemical Unloading Piping			0 %	
Valves/Actuators			0 %	
Storage Tank			0 %	
Metering Pumps			0 %	
Transfer Pumps			0 %	
Diffusers			0 %	
Electrical Systems			0 %	
Sum of Selected Units for this Subsystem			0 %	
Subsystem Name:	Chemical - Liquid Ferric Chloride		0 %	0.00
<i>Unit</i>				
Chemical Feed Piping			0 %	
Chemical Unloading Piping			0 %	
Valves/Actuators			0 %	
Storage Tank			0 %	
Metering Pumps			0 %	
Transfer Pumps			0 %	
Diffusers			0 %	
Electrical Systems			0 %	
Sum of Selected Units for this Subsystem			0 %	

Overall Condition Report

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Sort Order : Data Tree Order

Current Year: 2013

	Condition	Criticality	Weight	Score
Subsystem Name: Chemical - Liquid Ferric Sulfate			0 %	0.00
Unit				
Chemical Feed Piping			0 %	
Chemical Unloading Piping			0 %	
Valves/Actuators			0 %	
Storage Tank			0 %	
Metering Pumps			0 %	
Transfer Pumps			0 %	
Diffusers			0 %	
Electrical Systems			0 %	
	Sum of Selected Units for this Subsystem		0 %	
Subsystem Name: Chemical - Liquid Hydrochloric Acid			0 %	0.00
Unit				
Chemical Feed Piping			0 %	
Chemical Unloading Piping			0 %	
Valves/Actuators			0 %	
Storage Tank			0 %	
Metering Pumps			0 %	
Transfer Pumps			0 %	
Diffusers			0 %	
Electrical Systems			0 %	
	Sum of Selected Units for this Subsystem		0 %	
Subsystem Name: Chemical - Liquid Hydrofluorosilicic Acid			0 %	0.00
Unit				
Chemical Feed Piping			0 %	
Chemical Unloading Piping			0 %	

Overall Condition Report

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Sort Order : Data Tree Order

Current Year: 2013

	Condition	Criticality	Weight	Score
Valves/Actuators			0 %	
Storage Tank			0 %	
Metering Pumps			0 %	
Transfer Pumps			0 %	
Diffusers			0 %	
Electrical Systems			0 %	
Sum of Selected Units for this Subsystem			0 %	
Subsystem Name:	Chemical - Liquid Hydrogen Peroxide		0 %	0.00
Unit				
Chemical Feed Piping			0 %	
Chemical Unloading Piping			0 %	
Valves/Actuators			0 %	
Storage Tank			0 %	
Metering Pumps			0 %	
Transfer Pumps			0 %	
Diffusers			0 %	
Electrical Systems			0 %	
Sum of Selected Units for this Subsystem			0 %	
Subsystem Name:	Chemical - Liquid Polyaluminum Chloride		0 %	0.00
Unit				
Chemical Feed Piping			0 %	
Chemical Unloading Piping			0 %	
Valves/Actuators			0 %	
Storage Tank			0 %	
Metering Pumps			0 %	
Transfer Pumps			0 %	

Overall Condition Report

Appendix D

Sort Order : Data Tree Order

Current Year: 2013

	Condition	Criticality	Weight	Score
Diffusers			0 %	
Electrical Systems			0 %	
	Sum of Selected Units for this Subsystem		0 %	
Subsystem Name:	Chemical - Liquid Polymer		0 %	0.00
<i>Unit</i>				
Chemical Feed Piping			0 %	
Chemical Unloading Piping			0 %	
Valves/Actuators			0 %	
Storage Tank			0 %	
Metering Pumps			0 %	
Transfer Pumps			0 %	
Diffusers			0 %	
Electrical Systems			0 %	
	Sum of Selected Units for this Subsystem		0 %	
Subsystem Name:	Chemical - Liquid Sodium Hydroxide		0 %	0.00
<i>Unit</i>				
Chemical Feed Piping			0 %	
Chemical Unloading Piping			0 %	
Valves/Actuators			0 %	
Storage Tank			0 %	
Metering Pumps			0 %	
Transfer Pumps			0 %	
Diffusers			0 %	
Electrical Systems			0 %	
	Sum of Selected Units for this Subsystem		0 %	

Overall Condition Report

Appendix D

Sort Order : Data Tree Order

Current Year: 2013

	Condition	Criticality	Weight	Score
Subsystem Name: Chemical - Liquid Sodium Hypochlorite		Severe	0 %	0.00
Unit				
Chemical Feed Piping			0 %	
Chemical Unloading Piping			0 %	
Valves/Actuators			0 %	
Storage Tank			0 %	
Metering Pumps			0 %	
Transfer Pumps			0 %	
Diffusers			0 %	
Electrical Systems			0 %	
	Sum of Selected Units for this Subsystem		0 %	
Subsystem Name: Chemical - Liquid Sulfuric Acid			0 %	0.00
Unit				
Chemical Feed Piping			0 %	
Chemical Unloading Piping			0 %	
Valves/Actuators			0 %	
Storage Tank			0 %	
Metering Pumps			0 %	
Transfer Pumps			0 %	
Diffusers			0 %	
Electrical Systems			0 %	
	Sum of Selected Units for this Subsystem		0 %	
Subsystem Name: Scrubber			0 %	0.00
Unit				
Dry Scrubber			0 %	
Wet Scrubber			0 %	

Overall Condition Report

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Sort Order : Data Tree Order

Current Year: 2013

	Condition	Criticality	Weight	Score
Sum of Selected Units for this Subsystem			0 %	
Subsystem Name:	Chemical - Gaseous Anhydrous Ammonia		0 %	0.00
Unit				
Unloading			0 %	
Storage			0 %	
Feed Equipment			0 %	
Valves/Actuators			0 %	
Piping/Appurtenances			0 %	
Diffusers			0 %	
Safety Items			0 %	
Electrical Systems			0 %	
Sum of Selected Units for this Subsystem			0 %	
Subsystem Name:	Chemical - Gaseous Carbon Dioxide		0 %	0.00
Unit				
Unloading			0 %	
Storage			0 %	
Feed Equipment			0 %	
Valves/Actuators			0 %	
Piping/Appurtenances			0 %	
Diffusers			0 %	
Safety Items			0 %	
Electrical Systems			0 %	
Sum of Selected Units for this Subsystem			0 %	
Subsystem Name:	Chemical - Gaseous Chlorine		0 %	0.00
Unit				
Unloading			0 %	

Overall Condition Report

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Sort Order : Data Tree Order

Current Year: 2013

	Condition	Criticality	Weight	Score
Storage			0 %	
Feed Equipment			0 %	
Valves/Actuators			0 %	
Piping/Appurtenances			0 %	
Diffusers			0 %	
Safety Items			0 %	
Electrical Systems			0 %	
Sum of Selected Units for this Subsystem			0 %	
Subsystem Name:	Chemical - Dry Aluminum Sulfate		0 %	0.00
Unit				
Unloading			0 %	
Piping			0 %	
Valves/Actuators			0 %	
Storage Bin/Silo			0 %	
Dry Chemical Feeder			0 %	
Rotary Arm Feeders (Roto-dip type)			0 %	
Slurry Mix Tanks			0 %	
Metering Pumps			0 %	
Diffusers			0 %	
Electrical Systems			0 %	
Sum of Selected Units for this Subsystem			0 %	
Subsystem Name:	Chemical - Dry Calcium Hydroxide / Calcium Oxide		0 %	0.00
Unit				
Unloading			0 %	
Piping			0 %	
Valves/Actuators			0 %	

Overall Condition Report

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Sort Order : Data Tree Order

Current Year: 2013

	Condition	Criticality	Weight	Score
Storage Bin/Silo			0 %	
Dry Chemical Feeder			0 %	
Rotary Arm Feeders (Roto-dip type)			0 %	
Slurry Mix Tanks			0 %	
Metering Pumps			0 %	
Diffusers			0 %	
Electrical Systems			0 %	
	Sum of Selected Units for this Subsystem		0 %	
Subsystem Name:	Chemical - Dry Copper Sulfate		0 %	0.00
Unit				
Unloading			0 %	
Piping			0 %	
Valves/Actuators			0 %	
Storage Bin/Silo			0 %	
Dry Chemical Feeder			0 %	
Rotary Arm Feeders (Roto-dip type)			0 %	
Slurry Mix Tanks			0 %	
Metering Pumps			0 %	
Diffusers			0 %	
Electrical Systems			0 %	
	Sum of Selected Units for this Subsystem		0 %	
Subsystem Name:	Chemical - Dry Ferric Sulfate		0 %	0.00
Unit				
Unloading			0 %	
Piping			0 %	
Valves/Actuators			0 %	

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Sort Order : Data Tree Order

Current Year: 2013

	Condition	Criticality	Weight	Score
Storage Bin/Silo			0 %	
Dry Chemical Feeder			0 %	
Rotary Arm Feeders (Roto-dip type)			0 %	
Slurry Mix Tanks			0 %	
Metering Pumps			0 %	
Diffusers			0 %	
Electrical Systems			0 %	
Sum of Selected Units for this Subsystem			0 %	
Subsystem Name:	Chemical - Dry Ferrous Sulfate		0 %	0.00
Unit				
Unloading			0 %	
Piping			0 %	
Valves/Actuators			0 %	
Storage Bin/Silo			0 %	
Dry Chemical Feeder			0 %	
Rotary Arm Feeders (Roto-dip type)			0 %	
Slurry Mix Tanks			0 %	
Metering Pumps			0 %	
Diffusers			0 %	
Electrical Systems			0 %	
Sum of Selected Units for this Subsystem			0 %	
Subsystem Name:	Chemical - Dry Polymer, Powder		0 %	0.00
Unit				
Unloading			0 %	
Piping			0 %	
Valves/Actuators			0 %	

Overall Condition Report

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Sort Order : Data Tree Order

Current Year: 2013

	Condition	Criticality	Weight	Score
Storage Bin/Silo			0 %	
Dry Chemical Feeder			0 %	
Rotary Arm Feeders (Roto-dip type)			0 %	
Slurry Mix Tanks			0 %	
Metering Pumps			0 %	
Diffusers			0 %	
Electrical Systems			0 %	
Sum of Selected Units for this Subsystem			0 %	
Subsystem Name:	Chemical - Dry Potassium Permanganate		0 %	0.00
Unit				
Unloading			0 %	
Piping			0 %	
Valves/Actuators			0 %	
Storage Bin/Silo			0 %	
Dry Chemical Feeder			0 %	
Rotary Arm Feeders (Roto-dip type)			0 %	
Slurry Mix Tanks			0 %	
Metering Pumps			0 %	
Diffusers			0 %	
Electrical Systems			0 %	
Sum of Selected Units for this Subsystem			0 %	
Subsystem Name:	Chemical - Dry Powdered Activated Carbon		0 %	0.00
Unit				
Unloading			0 %	
Piping			0 %	
Valves/Actuators			0 %	

Overall Condition Report

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Sort Order : Data Tree Order

Current Year: 2013

	Condition	Criticality	Weight	Score
Storage Bin/Silo			0 %	
Dry Chemical Feeder			0 %	
Rotary Arm Feeders (Roto-dip type)			0 %	
Slurry Mix Tanks			0 %	
Metering Pumps			0 %	
Diffusers			0 %	
Electrical Systems			0 %	
	Sum of Selected Units for this Subsystem		0 %	
Subsystem Name: Chemical - Dry Soda Ash			0 %	0.00
Unit				
Unloading			0 %	
Piping			0 %	
Valves/Actuators			0 %	
Storage Bin/Silo			0 %	
Dry Chemical Feeder			0 %	
Rotary Arm Feeders (Roto-dip type)			0 %	
Slurry Mix Tanks			0 %	
Metering Pumps			0 %	
Diffusers			0 %	
Electrical Systems			0 %	
	Sum of Selected Units for this Subsystem		0 %	
Subsystem Name: Chemical - Dry Sodium Fluorosilicate			0 %	0.00
Unit				
Unloading			0 %	
Piping			0 %	
Valves/Actuators			0 %	

Overall Condition Report

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Sort Order : Data Tree Order

Current Year: 2013

	Condition	Criticality	Weight	Score
Storage Bin/Silo			0 %	
Dry Chemical Feeder			0 %	
Rotary Arm Feeders (Roto-dip type)			0 %	
Slurry Mix Tanks			0 %	
Metering Pumps			0 %	
Diffusers			0 %	
Electrical Systems			0 %	
	Sum of Selected Units for this Subsystem		0 %	
Subsystem Name:	Chemical - Dry Sodium Hexametaphosphate		0 %	0.00
Unit				
Unloading			0 %	
Piping			0 %	
Valves/Actuators			0 %	
Storage Bin/Silo			0 %	
Dry Chemical Feeder			0 %	
Rotary Arm Feeders (Roto-dip type)			0 %	
Slurry Mix Tanks			0 %	
Metering Pumps			0 %	
Diffusers			0 %	
Electrical Systems			0 %	
	Sum of Selected Units for this Subsystem		0 %	
Subsystem Name:	Chemical - Dry Sodium Hydroxide		0 %	0.00
Unit				
Unloading			0 %	
Piping			0 %	
Valves/Actuators			0 %	

Overall Condition Report

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Sort Order : Data Tree Order

Current Year: 2013

	Condition	Criticality	Weight	Score
Storage Bin/Silo			0 %	
Dry Chemical Feeder			0 %	
Rotary Arm Feeders (Roto-dip type)			0 %	
Slurry Mix Tanks			0 %	
Metering Pumps			0 %	
Diffusers			0 %	
Electrical Systems			0 %	
	Sum of Selected Units for this Subsystem		0 %	
	Sum of Selected Subsystems for this System		0 %	
System Name: Distribution Pump Stations			0 %	0.00
Subsystem Name: College Road Tank			0 %	0.00
Unit				
Tank/Reservoir			0 %	
Valves/Actuators			0 %	
Gates/Actuators			0 %	
	Sum of Selected Units for this Subsystem		0 %	
Subsystem Name: College Pump Station facility			0 %	0.00
Unit				
Finished Water Pump	2 - Satisfactory		0 %	
Finished Water Piping - Nonburied			0 %	
Valves/Actuators			0 %	
	Sum of Selected Units for this Subsystem		0 %	
Subsystem Name: Post RoadWater Storage Tank/Reservoir			0 %	0.00
Unit				
Tank/Reservoir	3 - Good		0 %	
Valves/Actuators			0 %	

Overall Condition Report

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Sort Order : Data Tree Order

Current Year: 2013

	Condition	Criticality	Weight	Score
Gates/Actuators			0 %	
	Sum of Selected Units for this Subsystem		0 %	
Subsystem Name: Finished Water Conveyance			0 %	0.00
Unit				
Finished Water Piping - Buried			0 %	
Finished Water Piping - Nonburied			0 %	
Valves/Actuators			0 %	
Gates/Actuators			0 %	
Channel/Conduit			0 %	
	Sum of Selected Units for this Subsystem		0 %	
Subsystem Name: college vaults FM and PRv			0 %	0.00
Unit				
Manholes			0 %	
Vaults			0 %	
	Sum of Selected Units for this Subsystem		0 %	
Subsystem Name: Effluent Flow Measurement			0 %	0.00
Unit				
Flow Meters			0 %	
Flumes			0 %	
Weirs			0 %	
	Sum of Selected Units for this Subsystem		0 %	
Subsystem Name: College Ground Storage Tank/Reservoir			0 %	0.00
Unit				
Tank/Reservoir			0 %	
Valves/Actuators			0 %	
Gates/Actuators			0 %	

Overall Condition Report

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Sort Order : Data Tree Order

Current Year: 2013

	Condition	Criticality	Weight	Score
	Sum of Selected Units for this Subsystem		0 %	
	Sum of Selected Subsystems for this System		0 %	
System Name: Copy of Buildings			0 %	0.00
Subsystem Name: Administration Building			0 %	0.00
Unit				
Building Superstructure			0 %	
Building Electrical			0 %	
Building Lighting			0 %	
Hot Water Boilers			0 %	
Steam Boilers			0 %	
Chilled Water System			0 %	
Unit Heaters			0 %	
Dehumidifiers			0 %	
Fans			0 %	
Ductwork			0 %	
Air Handling Units			0 %	
Direct Expansion Air Handling Units			0 %	
Cabinet and Convector Heaters			0 %	
Baseboard Heaters			0 %	
Fire Protection			0 %	
Sanitary Drainage System			0 %	
Lavatory			0 %	
Potable Water System			0 %	
	Sum of Selected Units for this Subsystem		0 %	
Subsystem Name: Chemical Building			0 %	0.00
Unit				

Overall Condition Report

Appendix D

Sort Order : Data Tree Order

Current Year: 2013

	Condition	Criticality	Weight	Score
Building Superstructure			0 %	
Building Electrical			0 %	
Building Lighting			0 %	
Hot Water Boilers			0 %	
Steam Boilers			0 %	
Chilled Water System			0 %	
Unit Heaters			0 %	
Dehumidifiers			0 %	
Fans			0 %	
Ductwork			0 %	
Air Handling Units			0 %	
Direct Expansion Air Handling Units			0 %	
Cabinet and Convector Heaters			0 %	
Baseboard Heaters			0 %	
Fire Protection			0 %	
Sanitary Drainage System			0 %	
Lavatory			0 %	
Potable Water System			0 %	
Sum of Selected Units for this Subsystem			0 %	
Subsystem Name: Chlorine Building			0 %	0.00
Unit				
Building Superstructure			0 %	
Building Electrical			0 %	
Building Lighting			0 %	
Hot Water Boilers			0 %	
Steam Boilers			0 %	
Chilled Water System			0	

Source: Water Treatment Plant Infrastructure Assessment Manager by Elliott, et al. c2001 AWWARF and AWWA

Overall Condition Report

Appendix D

Sort Order : Data Tree Order

Current Year: 2013

	Condition	Criticality	Weight	Score
			%	
Unit Heaters			0 %	
Dehumidifiers			0 %	
Fans			0 %	
Ductwork			0 %	
Air Handling Units			0 %	
Direct Expansion Air Handling Units			0 %	
Cabinet and Convector Heaters			0 %	
Baseboard Heaters			0 %	
Fire Protection			0 %	
Sanitary Drainage System			0 %	
Lavatory			0 %	
Potable Water System			0 %	
	Sum of Selected Units for this Subsystem		0 %	
Subsystem Name: Control Building			0 %	0.00
Unit				
Building Superstructure			0 %	
Building Electrical			0 %	
Building Lighting			0 %	
Hot Water Boilers			0 %	
Steam Boilers			0 %	
Chilled Water System			0 %	
Unit Heaters			0 %	
Dehumidifiers			0 %	
Fans			0 %	
Ductwork			0 %	
Air Handling Units			0	

Overall Condition Report

Appendix D

Sort Order : Data Tree Order

Current Year: 2013

	Condition	Criticality	Weight	Score
			%	
Direct Expansion Air Handling Units			0 %	
Cabinet and Convector Heaters			0 %	
Baseboard Heaters			0 %	
Fire Protection			0 %	
Sanitary Drainage System			0 %	
Lavatory			0 %	
Potable Water System			0 %	
	Sum of Selected Units for this Subsystem		0 %	
Subsystem Name: Dewatering Building			0 %	0.00
Unit				
Building Superstructure			0 %	
Building Electrical			0 %	
Building Lighting			0 %	
Hot Water Boilers			0 %	
Steam Boilers			0 %	
Chilled Water System			0 %	
Unit Heaters			0 %	
Dehumidifiers			0 %	
Fans			0 %	
Ductwork			0 %	
Air Handling Units			0 %	
Direct Expansion Air Handling Units			0 %	
Cabinet and Convector Heaters			0 %	
Baseboard Heaters			0 %	
Fire Protection			0 %	
Sanitary Drainage System			0	

Overall Condition Report

Appendix D

Sort Order : Data Tree Order

Current Year: 2013

	Condition	Criticality	Weight	Score
			%	
Lavatory			0 %	
Potable Water System			0 %	
	Sum of Selected Units for this Subsystem		0 %	
Subsystem Name: Electrical Building			0 %	0.00
Unit				
Building Superstructure			0 %	
Building Electrical			0 %	
Building Lighting			0 %	
Hot Water Boilers			0 %	
Steam Boilers			0 %	
Chilled Water System			0 %	
Unit Heaters			0 %	
Dehumidifiers			0 %	
Fans			0 %	
Ductwork			0 %	
Air Handling Units			0 %	
Direct Expansion Air Handling Units			0 %	
Cabinet and Convector Heaters			0 %	
Baseboard Heaters			0 %	
Fire Protection			0 %	
Sanitary Drainage System			0 %	
Lavatory			0 %	
Potable Water System			0 %	
	Sum of Selected Units for this Subsystem		0 %	

Overall Condition Report

Appendix D

Sort Order : Data Tree Order

Current Year: 2013

	Condition	Criticality	Weight	Score
Subsystem Name: Filter Building			0 %	0.00
Unit				
Building Superstructure			0 %	
Building Electrical			0 %	
Building Lighting			0 %	
Hot Water Boilers			0 %	
Steam Boilers			0 %	
Chilled Water System			0 %	
Unit Heaters			0 %	
Dehumidifiers			0 %	
Fans			0 %	
Ductwork			0 %	
Air Handling Units			0 %	
Direct Expansion Air Handling Units			0 %	
Cabinet and Convector Heaters			0 %	
Baseboard Heaters			0 %	
Fire Protection			0 %	
Sanitary Drainage System			0 %	
Lavatory			0 %	
Potable Water System			0 %	
			Sum of Selected Units for this Subsystem	0 %
Subsystem Name: Finished Water Pump Station			0 %	0.00
Unit				
Building Superstructure			0 %	
Building Electrical			0 %	
Building Lighting			0 %	

Overall Condition Report

Appendix D

Sort Order : Data Tree Order

Current Year: 2013

	Condition	Criticality	Weight	Score
Hot Water Boilers			0 %	
Steam Boilers			0 %	
Chilled Water System			0 %	
Unit Heaters			0 %	
Dehumidifiers			0 %	
Fans			0 %	
Ductwork			0 %	
Air Handling Units			0 %	
Direct Expansion Air Handling Units			0 %	
Cabinet and Convector Heaters			0 %	
Baseboard Heaters			0 %	
Fire Protection			0 %	
Sanitary Drainage System			0 %	
Lavatory			0 %	
Potable Water System			0 %	
	Sum of Selected Units for this Subsystem		0 %	
Subsystem Name: Laboratory			0 %	0.00
Unit				
Building Superstructure			0 %	
Building Electrical			0 %	
Building Lighting			0 %	
Hot Water Boilers			0 %	
Steam Boilers			0 %	
Chilled Water System			0 %	
Unit Heaters			0 %	
Dehumidifiers			0 %	
Fans			0	

Overall Condition Report

Appendix D

Sort Order : Data Tree Order

Current Year: 2013

	Condition	Criticality	Weight	Score
			%	
Ductwork			0 %	
Air Handling Units			0 %	
Direct Expansion Air Handling Units			0 %	
Cabinet and Convectector Heaters			0 %	
Baseboard Heaters			0 %	
Fire Protection			0 %	
Sanitary Drainage System			0 %	
Lavatory			0 %	
Potable Water System			0 %	
	Sum of Selected Units for this Subsystem		0 %	
Subsystem Name: Maintenance Building			0 %	0.00
Unit				
Building Superstructure			0 %	
Building Electrical			0 %	
Building Lighting			0 %	
Hot Water Boilers			0 %	
Steam Boilers			0 %	
Chilled Water System			0 %	
Unit Heaters			0 %	
Dehumidifiers			0 %	
Fans			0 %	
Ductwork			0 %	
Air Handling Units			0 %	
Direct Expansion Air Handling Units			0 %	
Cabinet and Convectector Heaters			0 %	
Baseboard Heaters			0	

Overall Condition Report

Appendix D

Sort Order : Data Tree Order

Current Year: 2013

	Condition	Criticality	Weight	Score
			%	
Fire Protection			0 %	
Sanitary Drainage System			0 %	
Lavatory			0 %	
Potable Water System			0 %	
	Sum of Selected Units for this Subsystem		0 %	
Subsystem Name:	Manhole/Vault Structure		0 %	0.00
Unit				
Building Superstructure			0 %	
Building Electrical			0 %	
Building Lighting			0 %	
Fire Protection			0 %	
	Sum of Selected Units for this Subsystem		0 %	
Subsystem Name:	Multiple-Use Building (specify)		0 %	0.00
Unit				
Building Superstructure			0 %	
Building Electrical			0 %	
Building Lighting			0 %	
Hot Water Boilers			0 %	
Steam Boilers			0 %	
Chilled Water System			0 %	
Unit Heaters			0 %	
Dehumidifiers			0 %	
Fans			0 %	
Ductwork			0 %	
Air Handling Units			0 %	

Overall Condition Report

Appendix D

Sort Order : Data Tree Order

Current Year: 2013

	Condition	Criticality	Weight	Score
Direct Expansion Air Handling Units			0 %	
Cabinet and Convector Heaters			0 %	
Baseboard Heaters			0 %	
Fire Protection			0 %	
Sanitary Drainage System			0 %	
Lavatory			0 %	
Potable Water System			0 %	
	Sum of Selected Units for this Subsystem		0 %	
Subsystem Name: Ozone Building			0 %	0.00
Unit				
Building Superstructure			0 %	
Building Electrical			0 %	
Building Lighting			0 %	
Hot Water Boilers			0 %	
Steam Boilers			0 %	
Chilled Water System			0 %	
Unit Heaters			0 %	
Dehumidifiers			0 %	
Fans			0 %	
Ductwork			0 %	
Air Handling Units			0 %	
Direct Expansion Air Handling Units			0 %	
Cabinet and Convector Heaters			0 %	
Baseboard Heaters			0 %	
Fire Protection			0 %	
Sanitary Drainage System			0 %	
Lavatory			0	

Overall Condition Report

Appendix D

Sort Order : Data Tree Order

Current Year: 2013

	Condition	Criticality	Weight	Score
Potable Water System			0 %	
			0 %	
			0 %	
Sum of Selected Units for this Subsystem			0 %	
Subsystem Name: Parking Garage			0 %	0.00
Unit				
Building Superstructure			0 %	
Building Electrical			0 %	
Building Lighting			0 %	
Fire Protection			0 %	
			0 %	
Sum of Selected Units for this Subsystem			0 %	
Subsystem Name: Raw Water Intake			0 %	0.00
Unit				
Building Superstructure			0 %	
Building Electrical			0 %	
Building Lighting			0 %	
Hot Water Boilers			0 %	
Steam Boilers			0 %	
Chilled Water System			0 %	
Unit Heaters			0 %	
Dehumidifiers			0 %	
Fans			0 %	
Ductwork			0 %	
Air Handling Units			0 %	
Direct Expansion Air Handling Units			0 %	
Cabinet and Convector Heaters			0 %	
Baseboard Heaters			0 %	

Overall Condition Report

Appendix D

Sort Order : Data Tree Order

Current Year: 2013

	Condition	Criticality	Weight	Score
Fire Protection			0 %	
Sanitary Drainage System			0 %	
Lavatory			0 %	
Potable Water System			0 %	
Sum of Selected Units for this Subsystem			0 %	
Subsystem Name: Raw Water Pump Station			0 %	0.00
Unit				
Building Superstructure			0 %	
Building Electrical			0 %	
Building Lighting			0 %	
Hot Water Boilers			0 %	
Steam Boilers			0 %	
Chilled Water System			0 %	
Unit Heaters			0 %	
Dehumidifiers			0 %	
Fans			0 %	
Ductwork			0 %	
Air Handling Units			0 %	
Direct Expansion Air Handling Units			0 %	
Cabinet and Convector Heaters			0 %	
Baseboard Heaters			0 %	
Fire Protection			0 %	
Sanitary Drainage System			0 %	
Lavatory			0 %	
Potable Water System			0 %	
Sum of Selected Units for this Subsystem			0 %	

Overall Condition Report

Appendix D

Sort Order : Data Tree Order

Current Year: 2013

	Condition	Criticality	Weight	Score
Subsystem Name: Residuals Handling Building			0 %	0.00
Unit				
Building Superstructure			0 %	
Building Electrical			0 %	
Building Lighting			0 %	
Hot Water Boilers			0 %	
Steam Boilers			0 %	
Chilled Water System			0 %	
Unit Heaters			0 %	
Dehumidifiers			0 %	
Fans			0 %	
Ductwork			0 %	
Air Handling Units			0 %	
Direct Expansion Air Handling Units			0 %	
Cabinet and Convector Heaters			0 %	
Baseboard Heaters			0 %	
Fire Protection			0 %	
Sanitary Drainage System			0 %	
Lavatory			0 %	
Potable Water System			0 %	
			Sum of Selected Units for this Subsystem	0 %
Subsystem Name: Vehicle Maintenance Building			0 %	0.00
Unit				
Building Superstructure			0 %	
Building Electrical			0 %	
Building Lighting			0 %	

Overall Condition Report

Appendix D

Sort Order : Data Tree Order

Current Year: 2013

	Condition	Criticality	Weight	Score
Hot Water Boilers			0 %	
Steam Boilers			0 %	
Chilled Water System			0 %	
Unit Heaters			0 %	
Dehumidifiers			0 %	
Fans			0 %	
Ductwork			0 %	
Air Handling Units			0 %	
Direct Expansion Air Handling Units			0 %	
Cabinet and Convector Heaters			0 %	
Baseboard Heaters			0 %	
Fire Protection			0 %	
Sanitary Drainage System			0 %	
Lavatory			0 %	
Potable Water System			0 %	
	Sum of Selected Units for this Subsystem		0 %	
	Sum of Selected Subsystems for this System		0 %	
System Name: Copy of Chemical Systems (excl. ozone)			0 %	0.00
Subsystem Name: Chemical - Liquid Aluminum Sulfate			0 %	0.00
Unit				
Chemical Feed Piping			0 %	
Chemical Unloading Piping			0 %	
Valves/Actuators			0 %	
Storage Tank			0 %	
Metering Pumps			0 %	
Transfer Pumps			0 %	
Diffusers			0	

Source: Water Treatment Plant Infrastructure Assessment Manager by Elliott, et al. c2001 AWWARF and AWWA

Overall Condition Report

Appendix D

Sort Order : Data Tree Order

Current Year: 2013

	Condition	Criticality	Weight	Score
			%	
Electrical Systems			0 %	
	Sum of Selected Units for this Subsystem		0 %	
Subsystem Name:	Chemical - Liquid Aqueous Ammonia		0 %	0.00
Unit				
Chemical Feed Piping			0 %	
Chemical Unloading Piping			0 %	
Valves/Actuators			0 %	
Storage Tank			0 %	
Metering Pumps			0 %	
Transfer Pumps			0 %	
Diffusers			0 %	
Electrical Systems			0 %	
	Sum of Selected Units for this Subsystem		0 %	
Subsystem Name:	Chemical - Liquid Calcium Hypochlorite		0 %	0.00
Unit				
Chemical Feed Piping			0 %	
Chemical Unloading Piping			0 %	
Valves/Actuators			0 %	
Storage Tank			0 %	
Metering Pumps			0 %	
Transfer Pumps			0 %	
Diffusers			0 %	
Electrical Systems			0 %	
	Sum of Selected Units for this Subsystem		0 %	

Overall Condition Report

Appendix D

Sort Order : Data Tree Order

Current Year: 2013

	Condition	Criticality	Weight	Score
Subsystem Name: Chemical - Liquid Ferric Chloride			0 %	0.00
Unit				
Chemical Feed Piping			0 %	
Chemical Unloading Piping			0 %	
Valves/Actuators			0 %	
Storage Tank			0 %	
Metering Pumps			0 %	
Transfer Pumps			0 %	
Diffusers			0 %	
Electrical Systems			0 %	
	Sum of Selected Units for this Subsystem		0 %	
Subsystem Name: Chemical - Liquid Ferric Sulfate			0 %	0.00
Unit				
Chemical Feed Piping			0 %	
Chemical Unloading Piping			0 %	
Valves/Actuators			0 %	
Storage Tank			0 %	
Metering Pumps			0 %	
Transfer Pumps			0 %	
Diffusers			0 %	
Electrical Systems			0 %	
	Sum of Selected Units for this Subsystem		0 %	
Subsystem Name: Chemical - Liquid Hydrochloric Acid			0 %	0.00
Unit				
Chemical Feed Piping			0 %	
Chemical Unloading Piping			0 %	

Overall Condition Report

Appendix D

Sort Order : Data Tree Order

Current Year: 2013

	Condition	Criticality	Weight	Score
Valves/Actuators			0 %	
Storage Tank			0 %	
Metering Pumps			0 %	
Transfer Pumps			0 %	
Diffusers			0 %	
Electrical Systems			0 %	
Sum of Selected Units for this Subsystem			0 %	
Subsystem Name:	Chemical - Liquid Hydrofluorosilicic Acid		0 %	0.00
Unit				
Chemical Feed Piping			0 %	
Chemical Unloading Piping			0 %	
Valves/Actuators			0 %	
Storage Tank			0 %	
Metering Pumps			0 %	
Transfer Pumps			0 %	
Diffusers			0 %	
Electrical Systems			0 %	
Sum of Selected Units for this Subsystem			0 %	
Subsystem Name:	Chemical - Liquid Hydrogen Peroxide		0 %	0.00
Unit				
Chemical Feed Piping			0 %	
Chemical Unloading Piping			0 %	
Valves/Actuators			0 %	
Storage Tank			0 %	
Metering Pumps			0 %	
Transfer Pumps			0 %	

Overall Condition Report

Appendix D

Sort Order : Data Tree Order

Current Year: 2013

	Condition	Criticality	Weight	Score
Diffusers			0 %	
Electrical Systems			0 %	
Sum of Selected Units for this Subsystem			0 %	
Subsystem Name:	Chemical - Liquid Polyaluminum Chloride		0 %	0.00
Unit				
Chemical Feed Piping			0 %	
Chemical Unloading Piping			0 %	
Valves/Actuators			0 %	
Storage Tank			0 %	
Metering Pumps			0 %	
Transfer Pumps			0 %	
Diffusers			0 %	
Electrical Systems			0 %	
Sum of Selected Units for this Subsystem			0 %	
Subsystem Name:	Chemical - Liquid Polymer		0 %	0.00
Unit				
Chemical Feed Piping			0 %	
Chemical Unloading Piping			0 %	
Valves/Actuators			0 %	
Storage Tank			0 %	
Metering Pumps			0 %	
Transfer Pumps			0 %	
Diffusers			0 %	
Electrical Systems			0 %	
Sum of Selected Units for this Subsystem			0 %	

Overall Condition Report

Appendix D

Sort Order : Data Tree Order

Current Year: 2013

	Condition	Criticality	Weight	Score
Subsystem Name: Chemical - Liquid Sodium Hydroxide			0 %	0.00
Unit				
Chemical Feed Piping			0 %	
Chemical Unloading Piping			0 %	
Valves/Actuators			0 %	
Storage Tank			0 %	
Metering Pumps			0 %	
Transfer Pumps			0 %	
Diffusers			0 %	
Electrical Systems			0 %	
	Sum of Selected Units for this Subsystem		0 %	
Subsystem Name: Chemical - Liquid Sodium Hypochlorite			0 %	0.00
Unit				
Chemical Feed Piping			0 %	
Chemical Unloading Piping			0 %	
Valves/Actuators			0 %	
Storage Tank			0 %	
Metering Pumps			0 %	
Transfer Pumps			0 %	
Diffusers			0 %	
Electrical Systems			0 %	
	Sum of Selected Units for this Subsystem		0 %	
Subsystem Name: Chemical - Liquid Sulfuric Acid			0 %	0.00
Unit				
Chemical Feed Piping			0 %	
Chemical Unloading Piping			0 %	

Overall Condition Report

Appendix D

Sort Order : Data Tree Order

Current Year: 2013

	Condition	Criticality	Weight	Score
Valves/Actuators			0 %	
Storage Tank			0 %	
Metering Pumps			0 %	
Transfer Pumps			0 %	
Diffusers			0 %	
Electrical Systems			0 %	
Sum of Selected Units for this Subsystem			0 %	
Subsystem Name:	Scrubber		0 %	0.00
Unit				
Dry Scrubber			0 %	
Wet Scrubber			0 %	
Sum of Selected Units for this Subsystem			0 %	
Subsystem Name:	Chemical - Gaseous Anhydrous Ammonia		0 %	0.00
Unit				
Unloading			0 %	
Storage			0 %	
Feed Equipment			0 %	
Valves/Actuators			0 %	
Piping/Appurtenances			0 %	
Diffusers			0 %	
Safety Items			0 %	
Electrical Systems			0 %	
Sum of Selected Units for this Subsystem			0 %	
Subsystem Name:	Chemical - Gaseous Carbon Dioxide		0 %	0.00
Unit				
Unloading			0 %	

Overall Condition Report

Appendix D

Sort Order : Data Tree Order

Current Year: 2013

	Condition	Criticality	Weight	Score
Storage			0 %	
Feed Equipment			0 %	
Valves/Actuators			0 %	
Piping/Appurtenances			0 %	
Diffusers			0 %	
Safety Items			0 %	
Electrical Systems			0 %	
Sum of Selected Units for this Subsystem			0 %	
Subsystem Name:	Chemical - Gaseous Chlorine		0 %	0.00
Unit				
Unloading			0 %	
Storage			0 %	
Feed Equipment			0 %	
Valves/Actuators			0 %	
Piping/Appurtenances			0 %	
Diffusers			0 %	
Safety Items			0 %	
Electrical Systems			0 %	
Sum of Selected Units for this Subsystem			0 %	
Subsystem Name:	Chemical - Dry Aluminum Sulfate		0 %	0.00
Unit				
Unloading			0 %	
Piping			0 %	
Valves/Actuators			0 %	
Storage Bin/Silo			0 %	
Dry Chemical Feeder			0 %	

Overall Condition Report

Appendix D

Sort Order : Data Tree Order

Current Year: 2013

	Condition	Criticality	Weight	Score
Rotary Arm Feeders (Roto-dip type)			0 %	
Slurry Mix Tanks			0 %	
Metering Pumps			0 %	
Diffusers			0 %	
Electrical Systems			0 %	
	Sum of Selected Units for this Subsystem		0 %	
Subsystem Name:	Chemical - Dry Calcium Hydroxide / Calcium Oxide		0 %	0.00
Unit				
Unloading			0 %	
Piping			0 %	
Valves/Actuators			0 %	
Storage Bin/Silo			0 %	
Dry Chemical Feeder			0 %	
Rotary Arm Feeders (Roto-dip type)			0 %	
Slurry Mix Tanks			0 %	
Metering Pumps			0 %	
Diffusers			0 %	
Electrical Systems			0 %	
	Sum of Selected Units for this Subsystem		0 %	
Subsystem Name:	Chemical - Dry Copper Sulfate		0 %	0.00
Unit				
Unloading			0 %	
Piping			0 %	
Valves/Actuators			0 %	
Storage Bin/Silo			0 %	
Dry Chemical Feeder			0 %	

Overall Condition Report

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Sort Order : Data Tree Order

Current Year: 2013

	Condition	Criticality	Weight	Score
Rotary Arm Feeders (Roto-dip type)			0 %	
Slurry Mix Tanks			0 %	
Metering Pumps			0 %	
Diffusers			0 %	
Electrical Systems			0 %	
Sum of Selected Units for this Subsystem			0 %	
Subsystem Name: Chemical - Dry Ferric Sulfate			0 %	0.00
Unit				
Unloading			0 %	
Piping			0 %	
Valves/Actuators			0 %	
Storage Bin/Silo			0 %	
Dry Chemical Feeder			0 %	
Rotary Arm Feeders (Roto-dip type)			0 %	
Slurry Mix Tanks			0 %	
Metering Pumps			0 %	
Diffusers			0 %	
Electrical Systems			0 %	
Sum of Selected Units for this Subsystem			0 %	
Subsystem Name: Chemical - Dry Ferrous Sulfate			0 %	0.00
Unit				
Unloading			0 %	
Piping			0 %	
Valves/Actuators			0 %	
Storage Bin/Silo			0 %	
Dry Chemical Feeder			0 %	

Overall Condition Report

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Sort Order : Data Tree Order

Current Year: 2013

	Condition	Criticality	Weight	Score
Rotary Arm Feeders (Roto-dip type)			0 %	
Slurry Mix Tanks			0 %	
Metering Pumps			0 %	
Diffusers			0 %	
Electrical Systems			0 %	
Sum of Selected Units for this Subsystem			0 %	
Subsystem Name: Chemical - Dry Polymer, Powder			0 %	0.00
Unit				
Unloading			0 %	
Piping			0 %	
Valves/Actuators			0 %	
Storage Bin/Silo			0 %	
Dry Chemical Feeder			0 %	
Rotary Arm Feeders (Roto-dip type)			0 %	
Slurry Mix Tanks			0 %	
Metering Pumps			0 %	
Diffusers			0 %	
Electrical Systems			0 %	
Sum of Selected Units for this Subsystem			0 %	
Subsystem Name: Chemical - Dry Potassium Permanganate			0 %	0.00
Unit				
Unloading			0 %	
Piping			0 %	
Valves/Actuators			0 %	
Storage Bin/Silo			0 %	
Dry Chemical Feeder			0 %	

Overall Condition Report

Appendix D

Sort Order : Data Tree Order

Current Year: 2013

	Condition	Criticality	Weight	Score
Rotary Arm Feeders (Roto-dip type)			0 %	
Slurry Mix Tanks			0 %	
Metering Pumps			0 %	
Diffusers			0 %	
Electrical Systems			0 %	
	Sum of Selected Units for this Subsystem		0 %	
Subsystem Name: Chemical - Dry Powdered Activated Carbon			0 %	0.00
Unit				
Unloading			0 %	
Piping			0 %	
Valves/Actuators			0 %	
Storage Bin/Silo			0 %	
Dry Chemical Feeder			0 %	
Rotary Arm Feeders (Roto-dip type)			0 %	
Slurry Mix Tanks			0 %	
Metering Pumps			0 %	
Diffusers			0 %	
Electrical Systems			0 %	
	Sum of Selected Units for this Subsystem		0 %	
Subsystem Name: Chemical - Dry Soda Ash			0 %	0.00
Unit				
Unloading			0 %	
Piping			0 %	
Valves/Actuators			0 %	
Storage Bin/Silo			0 %	
Dry Chemical Feeder			0 %	

Overall Condition Report

Appendix D

Sort Order : Data Tree Order

Current Year: 2013

	Condition	Criticality	Weight	Score
Rotary Arm Feeders (Roto-dip type)			0 %	
Slurry Mix Tanks			0 %	
Metering Pumps			0 %	
Diffusers			0 %	
Electrical Systems			0 %	
	Sum of Selected Units for this Subsystem		0 %	
Subsystem Name: Chemical - Dry Sodium Fluorosilicate			0 %	0.00
Unit				
Unloading			0 %	
Piping			0 %	
Valves/Actuators			0 %	
Storage Bin/Silo			0 %	
Dry Chemical Feeder			0 %	
Rotary Arm Feeders (Roto-dip type)			0 %	
Slurry Mix Tanks			0 %	
Metering Pumps			0 %	
Diffusers			0 %	
Electrical Systems			0 %	
	Sum of Selected Units for this Subsystem		0 %	
Subsystem Name: Chemical - Dry Sodium Hexametaphosphate			0 %	0.00
Unit				
Unloading			0 %	
Piping			0 %	
Valves/Actuators			0 %	
Storage Bin/Silo			0 %	
Dry Chemical Feeder			0 %	

Overall Condition Report

Appendix D

Sort Order : Data Tree Order

Current Year: 2013

	Condition	Criticality	Weight	Score
Rotary Arm Feeders (Roto-dip type)			0 %	
Slurry Mix Tanks			0 %	
Metering Pumps			0 %	
Diffusers			0 %	
Electrical Systems			0 %	
	Sum of Selected Units for this Subsystem		0 %	
Subsystem Name: Chemical - Dry Sodium Hydroxide			0 %	0.00
Unit				
Unloading			0 %	
Piping			0 %	
Valves/Actuators			0 %	
Storage Bin/Silo			0 %	
Dry Chemical Feeder			0 %	
Rotary Arm Feeders (Roto-dip type)			0 %	
Slurry Mix Tanks			0 %	
Metering Pumps			0 %	
Diffusers			0 %	
Electrical Systems			0 %	
	Sum of Selected Units for this Subsystem		0 %	
	Sum of Selected Subsystems for this System		0 %	
System Name: Copy of Support Systems			0 %	0.00
Subsystem Name: Control System			0 %	0.00
Unit				
Plant Communications			0 %	
Plant Control System - Hardware			0 %	
Plant Control System - Software			0 %	

Overall Condition Report

Appendix D

Sort Order : Data Tree Order

Current Year: 2013

	Condition	Criticality	Weight	Score
Sum of Selected Units for this Subsystem			0 %	
Subsystem Name:	Electric Power Supply/Distribution		0 %	0.00
Unit				
	Electrical Distribution		0 %	
Sum of Selected Units for this Subsystem			0 %	
Subsystem Name:	Backwash System (excluding piping/valves in Filter Bldg.)		0 %	0.00
Unit				
	Filter Backwash Pump		0 %	
	Filter Backwash Supply Valves/Actuators		0 %	
	Piping (external of Filter Building)		0 %	
	Backwash Storage Tank		0 %	
Sum of Selected Units for this Subsystem			0 %	
Subsystem Name:	Residuals Handling		0 %	0.00
Unit				
	Sludge Thickener Tank/Basin		0 %	
	Sludge Collector Mechanism		0 %	
	Residuals Pump		0 %	
	Residuals Process Piping		0 %	
	Residuals Process Valves/Actuators		0 %	
	Residuals Lagoons		0 %	
	Vacuum Filter		0 %	
	Centrifuge		0 %	
	Belt Filter Press		0 %	
Sum of Selected Units for this Subsystem			0 %	
Subsystem Name:	Compressed Air		0 %	0.00
Unit				

Overall Condition Report

Appendix D

Sort Order : Data Tree Order

Current Year: 2013

	Condition	Criticality	Weight	Score
Compressors			0 %	
Piping			0 %	
Valves/Actuators			0 %	
	Sum of Selected Units for this Subsystem		0 %	
	Sum of Selected Subsystems for this System		0 %	
	Sum of Selected Systems for this Facility		0 %	
Facility Name: Distribution System				0.00
System Name: Chorination System			0 %	0.00
Subsystem Name: Chemical - Liquid Sodium Hypochlorite			0 %	0.00
Unit				
Undefined Unit			0 %	
Chemical Feed Piping			0 %	
Chemical Unloading Piping			0 %	
Valves/Actuators			0 %	
Storage Tank			0 %	
Metering Pumps			0 %	
Transfer Pumps			0 %	
Diffusers			0 %	
Electrical Systems			0 %	
	Sum of Selected Units for this Subsystem		0 %	
	Sum of Selected Subsystems for this System		0 %	
System Name: Distribution System Pumping			0 %	0.00
Subsystem Name: 33rd Street Station			0 %	0.00
Unit				
Finished Water Pump			0 %	
Finished Water Piping - Nonburied			0 %	

Overall Condition Report

Appendix D

Sort Order : Data Tree Order

Current Year: 2013

	Condition	Criticality	Weight	Score
Valves/Actuators			0 %	
Sum of Selected Units for this Subsystem			0 %	
Subsystem Name:	Finished Water Storage Tank/Reservoir		0 %	0.00
Unit				
Undefined Unit			0 %	
Tank/Reservoir			0 %	
Valves/Actuators			0 %	
Gates/Actuators			0 %	
Sum of Selected Units for this Subsystem			0 %	
Subsystem Name:	Finished Water Conveyance		0 %	0.00
Unit				
Undefined Unit			0 %	
Finished Water Piping - Buried			0 %	
Finished Water Piping - Nonburied			0 %	
Valves/Actuators			0 %	
Gates/Actuators			0 %	
Channel/Conduit			0 %	
Sum of Selected Units for this Subsystem			0 %	
Subsystem Name:	Field Structures		0 %	0.00
Unit				
PRV Vaults/Valves			0 %	
Manholes			0 %	
Vaults			0 %	
Sum of Selected Units for this Subsystem			0 %	
Subsystem Name:	Effluent Flow Measurement		0 %	0.00
Unit				

Overall Condition Report

Appendix D

Sort Order : Data Tree Order

Current Year: 2013

	Condition	Criticality	Weight	Score
Undefined Unit			0 %	
Flow Meters			0 %	
	Sum of Selected Units for this Subsystem		0 %	
	Sum of Selected Subsystems for this System		0 %	
System Name: Buildings			0 %	0.00
Subsystem Name: Maintenance Building			0 %	0.00
Unit				
Building Superstructure			0 %	
Building Electrical			0 %	
Building Lighting			0 %	
Unit Heaters			0 %	
Fans			0 %	
Ductwork			0 %	
Air Handling Units			0 %	
Fire Protection			0 %	
Sanitary Drainage System			0 %	
Lavatory			0 %	
Potable Water System			0 %	
	Sum of Selected Units for this Subsystem		0 %	
Subsystem Name: Manhole/Vault Structure			0 %	0.00
Unit				
Undefined Unit			0 %	
Building Superstructure			0 %	
Building Electrical			0 %	
Building Lighting			0 %	
Fire Protection			0 %	

Overall Condition Report

Appendix D

Sort Order : Data Tree Order

Current Year: 2013

	Condition	Criticality	Weight	Score
Sum of Selected Units for this Subsystem			0 %	
Subsystem Name:	Multiple-Use Building (specify)		0 %	0.00
Unit				
Undefined Unit			0 %	
Building Superstructure			0 %	
Building Electrical			0 %	
Building Lighting			0 %	
Hot Water Boilers			0 %	
Steam Boilers			0 %	
Chilled Water System			0 %	
Unit Heaters			0 %	
Dehumidifiers			0 %	
Fans			0 %	
Ductwork			0 %	
Air Handling Units			0 %	
Direct Expansion Air Handling Units			0 %	
Cabinet and Convector Heaters			0 %	
Baseboard Heaters			0 %	
Fire Protection			0 %	
Sanitary Drainage System			0 %	
Lavatory			0 %	
Potable Water System			0 %	
Sum of Selected Units for this Subsystem			0 %	
Sum of Selected Subsystems for this System			0 %	
System Name:	Support Systems		0 %	0.00

Overall Condition Report

Appendix D

Sort Order : Data Tree Order

Current Year: 2013

	Condition	Criticality	Weight	Score
Subsystem Name: Electric Power Supply/Distribution			0 %	0.00
Unit				
Undefined Unit			0 %	
Electrical Distribution			0 %	
	Sum of Selected Units for this Subsystem		0 %	
	Sum of Selected Subsystems for this System		0 %	
System Name: Civil / Sitework System			0 %	0.00
Subsystem Name: Site (Stormwater) Drainage			0 %	0.00
Unit				
Undefined Unit			0 %	
Surface Grading			0 %	
	Sum of Selected Units for this Subsystem		0 %	
Subsystem Name: Site Lighting/Site Security			0 %	0.00
Unit				
Undefined Unit			0 %	
Lighting			0 %	
Fencing/Perimeter Walls			0 %	
Video			0 %	
Security Alarms			0 %	
	Sum of Selected Units for this Subsystem		0 %	
Subsystem Name: Transportation			0 %	0.00
Unit				
Undefined Unit			0 %	
Roadways			0 %	
Parking Areas			0 %	
Walks			0 %	

Overall Condition Report

Appendix D

Sort Order : Data Tree Order

Current Year: 2013

	<i>Condition</i>	<i>Criticality</i>	<i>Weight</i>	<i>Score</i>
	Sum of Selected Units for this Subsystem		0 %	
Subsystem Name:	Sanitary Sewers		0 %	0.00
Unit				
	Undefined Unit		0 %	
	Sewer Piping		0 %	
	Sanitary Sewer Manholes		0 %	
	Sum of Selected Units for this Subsystem		0 %	
Subsystem Name:	Site Landscaping		0 %	0.00
Unit				
	Undefined Unit		0 %	
	Irrigation		0 %	
	Sum of Selected Units for this Subsystem		0 %	
	Sum of Selected Subsystems for this System		0 %	
	Sum of Selected Systems for this Facility		0 %	
Facility Name:	New Facility			0.00
System Name:	Arcadia Lake WTP Unit Processes		0 %	0.00
	Sum of Selected Subsystems for this System		%	
System Name:	Lime, Polymer and Chlorine Systems		0 %	0.00
	Sum of Selected Subsystems for this System		%	
System Name:	Ozonation System		0 %	0.00
	Sum of Selected Subsystems for this System		%	
System Name:	Storage and High Service Pump Station		0 %	0.00
	Sum of Selected Subsystems for this System		%	
System Name:	WTP Buildings		0 %	0.00
	Sum of Selected Subsystems for this System		%	

Overall Condition Report

Appendix D

Sort Order : Data Tree Order

Current Year: 2013

	<i>Condition</i>	<i>Criticality</i>	<i>Weight</i>	<i>Score</i>
<i>System Name:</i> WTP Support Systems			0 %	0.00
	Sum of Selected Subsystems for this System		%	
	Sum of Selected Systems for this Facility		0 %	

City of Edmond Water and Wastewater System Master Plan

APPENDIX E – DETAILED CIP COST ESTIMATES



Estimate Level:
ENR (December 2013)

Class 4
9667

Project Water & Wastewater System Master Plan
City of Edmond, OK
Cost Opinion - Expand Existing full softening process from 10.5 to 13 mgd
Construct 12 mgd LLPS Addition
Job No 8967A.00

By: G. Sheehan
Date: 11/15/2012
Checked: T Crowley
Date: 11/25/2013

DIV	Description	Quantity	Units	Unit Cost	Material Cost	Install Factor	Install Cost	Total Cost	Cost w/ Global Markups	Comments
Solids Contact Clarifiers										
	Quantity	1	cuyd							
	Diameter, ft	70	LS							
	SWD, ft	15	VLF							
	Exc Depth, ft	12	LS							
Division 2 - Sitework										
	Excavation	2,874	cu yd	\$15	\$ 43,200	1	\$ -	\$ 43,200		Assumes excavation at 1:1 slope, 2 foot overexca 25% Swell Factor
	Hauling	1,775	cu yd	\$2	\$ 3,600	1	\$ -	\$ 3,600		
	Backfill	1,454	cu yd	\$10	\$ 14,600	1	\$ -	\$ 14,600		
	Drilled Piers	64	EA	\$3,000	\$ 192,000	1	\$ -	\$ 192,000		
Division 3 - Concrete										
	Concrete - Base Slab	318.6	cu yd	\$500	\$ 159,300	1	\$ -	\$ 159,300		Assumes 24" thick slab
	Concrete - Curved Walls	207.7	cu yd	\$750	\$ 155,800	1	\$ -	\$ 155,800		Assumes 18" thick walls, 2' freeboard
	Floor Grout	47.5	cu yd	\$400	\$ 19,100	1	\$ -	\$ 19,100		
Division 5 - Metals										
	Misc Metals	1	LS	\$ 5,000	\$ 5,000	1	\$ -	\$ 5,000		
Division 11 - Equipment										
	Sludge Collector Mechanism	1	EA	\$ 435,000	\$ 435,000	1	\$ -	\$ 435,000		Use two-thirds rule on \$435,000 per 70 ft diameter
	Sludge Collector Mechanism - Installation	1	LS	\$ 43,500	\$ 43,500	1	\$ -	\$ 43,500		Assume 10% of equipment cost
Division 15 - Piping										
	Piping	1	LS	\$ 30,000	\$ 30,000	1	\$ -	\$ 30,000		
Division 16 - Electrical										
	Electrical	1	LS	\$ 5,000	\$ 5,000	1	\$ -	\$ 5,000		Also see contingency below
Division 17 - Instrumentation										
	Instrumentation	1	LS	\$ 5,000	\$ 5,000	1	\$ -	\$ 5,000		Also see contingency below
SUBTOTAL NEW SCC										
								\$ 1,111,100		
Division 2 - Sitework										
2	Pavement (Concrete) Demolition	1,000	sf	\$ 3	\$ 3,000	1	\$ -	\$ 3,000		
2	Pavement (Concrete) Replacement	1,000	sf	\$ 7	\$ 7,000	1	\$ -	\$ 7,000		
Division 13 - Special Construction										
13	Chemical System Modifications at Chemical Building	1	LS	\$ 25,000	\$ 25,000	1	\$ -	\$ 25,000		
13	Chemical System Modifications at Solids Contact Clarifiers	4	EA	\$ 5,000	\$ 20,000	1	\$ -	\$ 20,000		
Division 15 - Piping										
15	24" STW Inlet Piping (Buried)	200	LF	\$ 100	\$ 20,000	1	\$ -	\$ 20,000		
15	24" STW Inlet Wall Pipe	2	EA	\$ 2,500	\$ 5,000	1	\$ -	\$ 5,000		
15	24" STW Inlet Elbow (Buried)	2	EA	\$ 2,500	\$ 5,000	1	\$ -	\$ 5,000		
15	24" STW Inlet Pipe Coupling (Buried)	2	EA	\$ 1,000	\$ 2,000	1	\$ -	\$ 2,000		
15	24" STW Inlet Piping Fittings and Appurtenances (Buried)	1	LS	\$ 1,000	\$ 1,000	1	\$ -	\$ 1,000		



Estimate Level:
ENR (December 2013)

Class 4
9667

Project Water & Wastewater System Master Plan
City of Edmond, OK
Cost Opinion - Expand Existing full softening process from 10.5 to 13 mgd
Construct 12 mgd LLPS Addition
Job No 8967A.00

By: G. Sheehan
Date: 11/15/2012
Checked: T Crowley
Date: 11/25/2013

DIV	Description	Quantity	Units	Unit Cost	Material Cost	Install Factor	Install Cost	Total Cost	Cost w/ Global Markups	Comments
15	24" STW Inlet Pipe Trench	200	EA	\$ 100	\$ 20,000	1	\$ -	\$ 20,000		
15	24" STW Outlet Piping (Buried)	200	LF	\$ 100	\$ 20,000	1	\$ -	\$ 20,000		
15	24" STW Outlet Wall Pipe	2	EA	\$ 2,500	\$ 5,000	1	\$ -	\$ 5,000		
15	24" STW Outlet Elbow (Buried)	2	EA	\$ 2,500	\$ 5,000	1	\$ -	\$ 5,000		
15	24" STW Outlet Pipe Coupling (Buried)	2	EA	\$ 1,000	\$ 2,000	1	\$ -	\$ 2,000		
15	24" STW Outlet Piping Fittings and Appurtenances (Buried)	1	LS	\$ 1,000	\$ 1,000	1	\$ -	\$ 1,000		
15	24" STW Outlet Pipe Trench	200	EA	\$ 100	\$ 20,000	1	\$ -	\$ 20,000		
Division 16 - Electrical					\$ -	1	\$ -	\$ -		
16	Electrical	1	LS	\$ 5,000	\$ 5,000	1	\$ -	\$ 5,000		
Division 17 - Instrumentation					\$ -	1	\$ -	\$ -		
17	Instrumentation	1	LS	\$ 5,000	\$ 5,000	1	\$ -	\$ 5,000		
Subtotal for Other Construction								\$ 171,000		
Additional Markups										
Yard Piping		1%			\$1,800	1	\$ -	\$ 1,800		
Paving/Grading		1%			\$1,800	1	\$ -	\$ 1,800		
Coatings		1%			\$1,800	1	\$ -	\$ 1,800		
Electrical		5%			\$8,600	1	\$ -	\$ 8,600		
Instrumentation		10%			\$17,100	1	\$ -	\$ 17,100		
SUBTOTAL Other construction								\$ 202,100		
								\$ 1,313,200		
General Conditions		Subtotal	15%					\$ 1,510,180		
Overhead and Profit		Subtotal	7%					\$ 1,615,893		
Taxes		Subtotal	7%					\$ 1,729,005		
Contingency		Subtotal	30%					\$ 2,247,707		
Engineering and Admin		Subtotal	25%					\$ 2,809,633		
Allowance during construction		Subtotal	5%					\$ 2,950,115		
		Total						\$ 2,950,115		



Estimate Level:
ENR (December 2013)

Class 4
9667

Project Water & Wastewater System Master Plan
City of Edmond, OK
Cost Opinion Expansion of WTP From 10.5 to 30 mgd
Full Softening Alternative No. 2
Job Nu 8967A.00

By: R Rossell
Date: 11/15/2012
Checked: T Crowley
Date: 11/25/2013

DIV	Description	Quantity	Units	Unit Cost	Material Cost	Install Factor	Install Cost	Total Cost	Cost w/ Global Markups	Comments
	New Fine Screening (2 screens at 10 mgd each)									
	Quantity	2.00								
	Height	32.00	ft							
	Width	20.00	ft							
	Length	20.00	ft							
	Over Excav.	2.00	ft							
	H:V = 1:	1.00								
	D	25.00	ft							
	Exc. Depth	9.00	ft							
	Added W/L	4.50	ft							
Division 2 - Sitework										
2	Excavation	280	cu yd	\$15	\$ 4,300	1	\$ -	\$ 4,300		18' SWD + 2' Freeboard (Assumed) + 12' (operating floor above screens)
2	Hauling	74	cu yd	\$2	\$ 200	1	\$ -	\$ 200		20' per screen (similar to other screens)
2	Backfill	221	cu yd	\$10	\$ 2,300	1	\$ -	\$ 2,300		20' per screen (similar to other screens)
2	Drilled Piers	9	EA	\$3,000	\$ 27,000	1	\$ -	\$ 27,000		Over Excavation (assumed)
					\$ -	1	\$ -	\$ -		Horizontal to vertical slope
					\$ -	1	\$ -	\$ -		Distance from grade to top of structure (estimated)
Division 3 - Concrete										Total Excavation Depth
	Concrete - 20" Base Slab	25	cu yd	\$500	\$ 12,400	1	\$ -	\$ 12,400		Based on side slope
	Concrete Walls - Exterior	95	cu yd	\$840	\$ 79,700	1	\$ -	\$ 79,700		
	Concrete Walls - Interior walls	22	cu yd	\$840	\$ 18,700	1	\$ -	\$ 18,700		
	Operating Floor	15	cu yd	\$404	\$ 6,000	1	\$ -	\$ 6,000		
	Roof	15	cu yd	\$404	\$ 6,000	1	\$ -	\$ 6,000		Doesn't account for sloped sides of excavation
					\$ -	1	\$ -	\$ -		25% Swell Factor, hauling to or from site
Division 11 - Equipment										25% Swell Factor
	Screen Mechanism	2	EA	\$190,000	\$ 380,000	1.2	\$ 76,000	\$ 456,000		
					\$ -	1	\$ -	\$ -		
Division 15 - Piping										
	36" STW Inlet Piping (Buried)	120	LF	\$200	\$ 24,000	1	\$ -	\$ 24,000		Assumes 20" thick slab on grade
	36" STW Inlet Wall Pipe	2	EA	\$3,500	\$ 7,000	1	\$ -	\$ 7,000		12" thick wall, cost from CCES for straight 12" wall, >8' tall
	36" STW Inlet Elbow (Buried)	2	EA	\$3,500	\$ 7,000	1	\$ -	\$ 7,000		12" thick interior wall running along the width of each screen
	36" STW Inlet Pipe Coupling (Buried)	2	EA	\$2,000	\$ 4,000	1	\$ -	\$ 4,000		Elevated Slab - 12" thick, cost from CCES
	36" STW Inlet Piping Fittings and Appurtenances (Buried)	2	LS	\$2,000	\$ 4,000	1	\$ -	\$ 4,000		Elevated Slab - 12" thick, cost from CCES
	36" STW Inlet Pipe Trench	120	EA	\$150	\$ 18,000	1	\$ -	\$ 18,000		
					\$ -	1	\$ -	\$ -		
Division 16 - Electrical										Estimated
	Electrical	1	LS	\$50,000	\$ 50,000	1	\$ -	\$ 50,000		
Division 17 - Instrumentation										
	Instrumentation	1	LS	\$25,000	\$ 25,000	1	\$ -	\$ 25,000		Estimated per Figure 7.1
	Subtotal for New Intake Screen(s)				\$612,000					
	Intake Screen(s) Cost		#	2	\$1,224,000	1	\$ -	\$ 1,224,000		
						1	\$ -	\$ -		
	Piping Subtotal				\$64,000	1	\$ -	\$ 64,000		



Estimate Level:
ENR (December 2013)

Class 4
9667

Project Water & Wastewater System Master Plan
City of Edmond, OK
Cost Opinion Expansion of WTP From 10.5 to 30 mgd
Full Softening Alternative No. 2
Job Nu 8967A.00

By: R Rossell
Date: 11/15/2012
Checked: T Crowley
Date: 11/25/2013

DIV	Description	Quantity	Units	Unit Cost	Material Cost	Install Factor	Install Cost	Total Cost	Cost w/ Global Markups	Comments
	Total for New Intake Screen(s)				\$1,288,000	1	\$ -	\$ 1,288,000		
	New Pre-Ozone Contactor (2 parallel trains at 15 mgd each)									
	Height	21.00	ft							2 Parallel Trains @ 15 mgd each 18' min depth and 3' freeboard, and min contact time = 10 minutes (per O Includes space for 10' access hatch Includes space for 6' influent/effluent chambers Over Excavation (assumed) Horizontal to vertical slope Distance from grade to top of structure Total Excavation Depth Based on side slope
	Width	65.00	ft							
	Length	65.00	ft							
	Over Excav.	2.00	ft							
	H:V = 1:	1.00								
	D	1.00	ft							
	Exc. Depth	22.00	ft							
	Added W/L	11.00	ft							
	Division 2 - Sitework									Doesn't account for sloped sides of excavation 25% Swell Factor 25% Swell Factor
	Excavation	6167.33	cu yd	\$ 15	\$ 92,600	1	\$ -	\$ 92,600		
	Hauling	2962.75	cu yd	\$ 2	\$ 6,000	1	\$ -	\$ 6,000		
	Backfill	3797.13	cu yd	\$ 10	\$ 38,000	1	\$ -	\$ 38,000		
	Drilled Piers	64.00	EA	\$ 3,000	\$ 192,000	1	\$ -	\$ 192,000		
	Division 3 - Concrete									Assumes 20" thick slab on grade 12" thick wall, cost from CCES for straight 12" wall, >8' tall 12" thick walls spaced at 5' (resilient and effluent channels, and 10' access corridor), cost from CCES for 8" straight wall >8' tall, assumes flow depth = 3' lower than total wall height Elevated Slab - 12" thick, cost from CCES
	Concrete - 20" Base Slab	260.80	cu yd	\$ 500	\$ 130,500	1	\$ -	\$ 130,500		
	Concrete Walls - Exterior	202.22	cu yd	\$ 840	\$ 169,900	1	\$ -	\$ 169,900		
	Concrete Walls - Interior Baffle walls	36.67	cu yd	\$ 840	\$ 30,800	1	\$ -	\$ 30,800		
	Roof	156.48	cu yd	\$ 404	\$ 63,200	1	\$ -	\$ 63,200		
	Division 8 - Doors and Windows									
	Doors and Windows	1.00	LS	\$ 5,000	\$ 5,000	1	\$ -	\$ 5,000		
	Division 11 - Equipment									
	Ozone Diffusers and Piping	1.00	LS	\$ 55,000	\$ 55,000	1.2	\$ 11,000	\$ 66,000		
	Ozone Destruct Units	2.00	EA	\$ 50,000	\$ 100,000	1.1	\$ 10,000	\$ 110,000		
	Nitrogen Purge System	1.00	EA	\$ 35,000	\$ 35,000	1.1	\$ 3,500	\$ 38,500		
	Division 15 - Piping									Assumption, similar to McBaine WTP estimate (accounts for LOX piping, and general piping)
	Piping	1.00	LS	\$ 60,000	\$ 60,000	1	\$ -	\$ 60,000		
	Division 16 - Electrical									Similar to McBaine WTP est.
	Electrical	1.00	LS	\$ 25,000	\$ 25,000	1	\$ -	\$ 25,000		
	Division 17 - Instrumentation									Similar to McBaine WTP est.
	Instrumentation	1.00	LS	\$ 25,000	\$ 25,000	1	\$ -	\$ 25,000		
	Subtotal for New Pre-Ozone Contactor							\$ 1,052,500		
	New Pre-Ozone Generation Building and LOX Storage (20 mgd expandable to 30 mgd)									
	Height	12.00	ft							



Estimate Level:
ENR (December 2013)

Class 4
9667

Project Water & Wastewater System Master Plan
City of Edmond, OK
Cost Opinion Expansion of WTP From 10.5 to 30 mgd
Full Softening Alternative No. 2
Job Nu 8967A.00

By: R Rossell
Date: 11/15/2012
Checked: T Crowley
Date: 11/25/2013

DIV	Description	Quantity	Units	Unit Cost	Material Cost	Install Factor	Install Cost	Total Cost	Cost w/ Global Markups	Comments
	Width	30.00	ft							Assumed building size for new ozone generation system Over Excavation (assumed) Horizontal to vertical slope Distance from grade to top of structure Total Excavation Depth Based on side slope Doesn't account for sloped sides of excavation 25% Swell Factor Assumes 12" thick slab on grade, cost from CCES 12" thick wall, cost from CCES for straight 12" wall, >8' tall Using 2/3 Rule on \$1,013,333 per 560 lb/day Generator Using 2/3 Rule on \$460,000 for 15,000 gal tanks and vaporizers from McBaine WTP estimate, transformed to 2013 dollars @ 3% from McBaine WTP estimate, transformed to 2013 dollars @ 3% Assumption, similar to McBaine WTP estimate (accounts for LOX piping, and general piping) Similar to McBaine WTP est. Similar to McBaine WTP est. 24' SWD + 2' Freeboard 7.45' square basin with 12" weir wall and 24" effluent chamber Over Excavation (assumed) Horizontal to vertical slope Distance from grade to top of structure (estimated) Total Excavation Depth Based on side slope Doesn't account for sloped sides of excavation
	Length	65.00	ft							
	Over Excav.	2.00	ft							
		H:V = 1:								
		D	10.00	ft						
	Exc. Depth	4.00	ft							
		Added W/L	2.00	ft						
Division 2 - Sitework	Excavation	347.56	cu yd	\$ 15	\$ 5,300	1	\$ -	\$ 5,300		
	Hauling	117.08	cu yd	\$ 2	\$ 300	1	\$ -	\$ 300		
	Backfill	253.89	cu yd	\$ 10	\$ 2,600	1	\$ -	\$ 2,600		
	Drilled Piers	32.00	EA	\$ 3,000	\$ 96,000	1	\$ -	\$ 96,000		
Division 3 - Concrete				\$ -	\$ -	1	\$ -	\$ -		
	Concrete - 12" Base Slab	72.22	cu yd	\$ 350	\$ 25,300	1	\$ -	\$ 25,300		
	Concrete Walls - Exterior	84.44	cu yd	\$ 840	\$ 71,000	1	\$ -	\$ 71,000		
Division 8 - Doors and Windows				\$ -	\$ -	1	\$ -	\$ -		
	Doors and Windows	1.00	LS	\$ 15,000	\$ 15,000	1	\$ -	\$ 15,000		
Division 11 - Equipment				\$ -	\$ -	1	\$ -	\$ -		
	650 lb/d Ozone Generator and Power Supply Unit	3.00	EA	\$ 1,119,186	\$ 3,357,600	1	\$ -	\$ 3,357,600		
	LOX Storage Tanks - 10,000 gal and Vaporizers	3.00	EA	\$ 351,046	\$ 1,053,200	1	\$ -	\$ 1,053,200		
	Diffusers	1.00	LS	\$ 200,000	\$ 200,000	1	\$ -	\$ 200,000		
	Destruct Unit	1	LS	\$ 100,000	\$ 100,000	1	\$ -	\$ 100,000		
	Installation of Equipment (% of total equipment cost)	0.2	%	\$ 1	\$ 100	1	\$ -	\$ 100		
Division 15 - Piping				\$ -	\$ -	1	\$ -	\$ -		
	Piping	1	LS	\$ 185,000	\$ 185,000	1	\$ -	\$ 185,000		
Division 16 - Electrical				\$ -	\$ -	1	\$ -	\$ -		
	Electrical	1	LS	160000	\$ 160,000	1	\$ -	\$ 160,000		
Division 17 - Instrumentation				\$ -	\$ -	1	\$ -	\$ -		
	Instrumentation	1	LS	160000	\$ 160,000	1	\$ -	\$ 160,000		
Subtotal for Generation Building								\$ 5,431,400		
New RM Basins (2@20 mgd)										
	Quantity	2.00								
	Height	26.00	ft							
	Width	7.45	ft							
	Length	10.45	ft							
	Over Excav.	2.00	ft							
		H:V = 1:								
		D	8.00	ft						
	Exc. Depth	20.00	ft							
		Added W/L	10.00	ft						
Division 2 - Sitework										



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DIV	Description	Quantity	Units	Unit Cost	Material Cost	Install Factor	Install Cost	Total Cost	Cost w/ Global Markups	Comments
	Excavation	619.15	cu yd	\$ 15	\$ 9,300	1	\$ -	\$ 9,300		25% Swell Factor, hauling to or from site
	Hauling	112.39	cu yd	\$ 2	\$ 300	1	\$ -	\$ 300		25% Swell Factor
	Backfill	709.06	cu yd	\$ 10	\$ 7,100	1	\$ -	\$ 7,100		
	Drilled Piers	6.00	EA	\$ 3,000	\$ 18,000	1	\$ -	\$ 18,000		
				\$ -	\$ -	1	\$ -	\$ -		
	Division 3 - Concrete			\$ -	\$ -	1	\$ -	\$ -		
	Concrete - 20" Base Slab	4.81	cu yd	\$ 500	\$ 2,500	1	\$ -	\$ 2,500		Assumes 20" thick slab on grade
	Concrete Walls - Exterior	34.47	cu yd	\$ 840	\$ 29,000	1	\$ -	\$ 29,000		12" thick wall, cost from CCES for straight 12" wall, >8' tall
	Concrete Walls - Interior Baffle walls	6.62	cu yd	\$ 840	\$ 5,600	1	\$ -	\$ 5,600		12" thick weir wall
	Division 5 Metals									
	Miscellaneous Metals	1.00	LS	\$ 20,000	\$ 20,000	1	\$ -	\$ 20,000		Estimated per Figure 7.1
	Division 11 - Equipment									
	Rapid Mix Devices	2.00	Ea	\$ 90,000	\$ 180,000	1.2	\$ 36,000	\$ 216,000		
	Automated Wier Gates	4.00	ea	\$ 23,000	\$ 92,000	1.2	\$ 18,400	\$ 110,400		
	Division 15 - Piping									
	24" STW Inlet Piping (Buried)	120.00	LF	\$ 100	\$ 12,000	1	\$ -	\$ 12,000		Estimated per Figure 7.1
	24" STW Inlet Wall Pipe	2.00	EA	\$ 2,500	\$ 5,000	1	\$ -	\$ 5,000		
	24" STW Inlet Elbow (Buried)	2.00	EA	\$ 2,500	\$ 5,000	1	\$ -	\$ 5,000		
	24" STW Inlet Pipe Coupling (Buried)	2.00	EA	\$ 1,000	\$ 2,000	1	\$ -	\$ 2,000		
	24" STW Inlet Piping Fittings and Appurtenances (Buried)	2.00	LS	\$ 1,000	\$ 2,000	1	\$ -	\$ 2,000		
	24" STW Inlet Pipe Trench	120.00	EA	\$ 100	\$ 12,000	1	\$ -	\$ 12,000		
	24" STW Outlet Piping (Buried)	170.00	LF	\$ 100	\$ 17,000	1	\$ -	\$ 17,000		
	24" STW Outlet Wall Pipe	2.00	EA	\$ 2,500	\$ 5,000	1	\$ -	\$ 5,000		Estimated for each RM Basin
	24" STW Outlet Elbow (Buried)	2.00	EA	\$ 2,500	\$ 5,000	1	\$ -	\$ 5,000		
	24" STW Outlet Pipe Coupling (Buried)	2.00	EA	\$ 1,000	\$ 2,000	1	\$ -	\$ 2,000		Estimated for each RM Basin
	24" STW Outlet Piping Fittings and Appurtenances (Buried)	2.00	LS	\$ 1,000	\$ 2,000	1	\$ -	\$ 2,000		
	24" STW Outlet Pipe Trench	170.00	EA	\$ 100	\$ 17,000	1	\$ -	\$ 17,000		
	Division 16 - Electrical									
	Electrical	1.00	LS	\$ 50,000	\$ 50,000	1	\$ -	\$ 50,000		
	Division 17 - Instrumentation									
	Instrumentation	1.00	LS	\$ 15,000	\$ 15,000	1	\$ -	\$ 15,000		
	Subtotal for New RM Basin							\$ 569,200		
	New Presed Basins (2@10 mgd)									
	Quantity	2								Each rated at 10 MGD
	Diameter, ft	100								
	SWD, ft	16								
	Exc Depth, ft	12								
	Division 2 - Sitework									
	Excavation	10600.00	cu yd	\$ 15	\$ 159,000	1	\$ -	\$ 159,000		Assumes excavation at 1:1 slope, 2 foot overexcavation
	Hauling	7600.00	cu yd	\$ 2	\$ 15,200	1	\$ -	\$ 15,200		25% Swell Factor
	Backfill	4600.00	cu yd	\$ 10	\$ 46,000	1	\$ -	\$ 46,000		



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Job Nu 8967A.00

By: R Rossell
Date: 11/15/2012
Checked: T Crowley
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DIV	Description	Quantity	Units	Unit Cost	Material Cost	Install Factor	Install Cost	Total Cost	Cost w/ Global Markups	Comments
Division 3 - Concrete	Drilled Piers	9600.00	VLF	\$ 50	\$ 480,000	1	\$ -	\$ 480,000		
	Concrete - Base Slab	1260.00	cu yd	\$ 500	\$ 630,000	1	\$ -	\$ 630,000		Assumes 24" thick slab
	Concrete - Curved Walls	630.00	cu yd	\$ 750	\$ 472,500	1	\$ -	\$ 472,500		Assumes 18" thick walls, 2' freeboard
	Floor Grout	194.00	cu yd	\$ 400	\$ 77,600	1	\$ -	\$ 77,600		
Division 5 - Metals	Misc Metals	2.00	LS	\$ 30,000	\$ 60,000	1	\$ -	\$ 60,000		
Division 11 - Equipment	Clarifier Mechanism	2.00	EA	\$ 350,000	\$ 700,000	1.5	\$ 350,000	\$ 1,050,000		Per CCES for 100' diameter clarifier mechanism
Division 15 - Piping	Misc Piping	1.00	LS	\$ 30,000	\$ 30,000	1	\$ -	\$ 30,000		
	24" STW Inlet Piping (Buried)	300.00	LF	\$ 100	\$ 30,000	1	\$ -	\$ 30,000		
	24" STW Inlet Wall Pipe	2.00	EA	\$ 2,500	\$ 5,000	1	\$ -	\$ 5,000		
	24" STW Inlet Elbow (Buried)	2.00	EA	\$ 2,500	\$ 5,000	1	\$ -	\$ 5,000		
	24" STW Inlet Pipe Coupling (Buried)	2.00	EA	\$ 1,000	\$ 2,000	1	\$ -	\$ 2,000		
	24" STW Inlet Piping Fittings and Appurtenances (Buried)	2.00	LS	\$ 1,000	\$ 2,000	1	\$ -	\$ 2,000		
	24" STW Inlet Pipe Trench	300.00	EA	\$ 100	\$ 30,000	1	\$ -	\$ 30,000		
	24" STW Outlet Piping (Buried)	300.00	LF	\$ 100	\$ 30,000	1	\$ -	\$ 30,000		
	24" STW Outlet Wall Pipe	2.00	EA	\$ 2,500	\$ 5,000	1	\$ -	\$ 5,000		
	24" STW Outlet Elbow (Buried)	2.00	EA	\$ 2,500	\$ 5,000	1	\$ -	\$ 5,000		
	24" STW Outlet Pipe Coupling (Buried)	2.00	EA	\$ 1,000	\$ 2,000	1	\$ -	\$ 2,000		
	24" STW Outlet Piping Fittings and Appurtenances (Buried)	2.00	LS	\$ 1,000	\$ 2,000	1	\$ -	\$ 2,000		
	24" STW Outlet Pipe Trench	300.00	EA	\$ 100	\$ 30,000	1	\$ -	\$ 30,000		
	24" Precast Flow Control Vault	2.00	EA	\$ 50,000	\$ 100,000	1.3	\$ 30,000	\$ 130,000		
	24" Butterfly Control valve	2.00	EA	\$ 21,000	\$ 42,000	1.3	\$ 12,600	\$ 54,600		
Division 16 - Electrical	Electrical	1.00	LS	\$ 90,000	\$ 90,000	1	\$ -	\$ 90,000		Also see contingency below
Division 17 - Instrumentation	Programming	1.00	LS	\$ 40,000	\$ 40,000	1	\$ -	\$ 40,000		Also see contingency below
	24 inch flowmeters	2.00	EA	\$ 18,000	\$ 36,000	1.2	\$ 7,200	\$ 43,200		
	Subtotal Presedimentation Basins							\$ 3,526,100		
	New Lime System/Chem Bldg									
	Height	12.00	ft							Assumed building size for new lime and chemical systems
	Width	40.00	ft							
	Length	80.00	ft							
	Over Excav.	2.00	ft							Over Excavation (assumed)
	H:V = 1:	1.00								Horizontal to vertical slope
	D	1.00	ft							Distance from grade to top of structure
	Exc. Depth	13.00	ft							Total Excavation Depth
	Added W/L	6.50	ft							Based on side slope
Division 2 - Sitework	Excavation	2373.22	cu yd	\$ 15	\$ 35,600	1	\$ -	\$ 35,600		Doesn't account for sloped sides of excavation
	Hauling	1295.41	cu yd	\$ 2	\$ 2,600	1	\$ -	\$ 2,600		25% Swell Factor



Estimate Level:
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By: R Rossell
Date: 11/15/2012
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DIV	Description	Quantity	Units	Unit Cost	Material Cost	Install Factor	Install Cost	Total Cost	Cost w/ Global Markups	Comments
	Backfill	1336.90	cu yd	\$ 10	\$ 13,400	1	\$ -	\$ 13,400		25% Swell Factor
	Drilled Piers	45.00	EA	\$ 3,000	\$ 135,000	1	\$ -	\$ 135,000		
Division 3 - Concrete										
	Concrete - 12" Base Slab	118.52	cu yd	\$ 350	\$ 41,500	1	\$ -	\$ 41,500		Assumes 12" thick slab on grade, cost from CCES 12" thick wall, cost from CCES for straight 12" wall, >8' tall
	Concrete Walls - Exterior	106.67	cu yd	\$ 840	\$ 89,600	1	\$ -	\$ 89,600		
	Concrete Walls - Interior Baffle walls	88.89	cu yd	\$ 840	\$ 74,700	1	\$ -	\$ 74,700		12" thick baffle walls spaced at 8', cost from CCES for 8" straight wall >8' tall, assumes flow depth = 3' lower than total wall height
	Roof	118.52	cu yd	\$ 404	\$ 47,900	1	\$ -	\$ 47,900		
Division 8 - Doors and Windows										
	Doors and Windows	1.00	LS	\$ 5,000	\$ 5,000	1	\$ -	\$ 5,000		Elevated Slab - 12" thick, cost from CCES
Division 11 - Equipment										
	New Coagulant Polymer Feed System	2.00	EA	\$ 35,000	\$ 70,000	1	\$ -	\$ 70,000		Based on quote from Prominent Fluid Controls 7/18/13, for ProMix-M with "C" controls, model M_0-1500x2-5.0PB @ \$35,000 (most expensive)
	New Coagulant Alum Feed System	2.00	EA	\$ 10,000	\$ 20,000	1	\$ -	\$ 20,000		
	New Lime System/Silos	1.00	LS	\$ 1,750,000	\$ 1,750,000	1.5	\$ 875,000	\$ 2,625,000		Assumed similar to Phos. Acid feed
	New CO2 System (3 vaporizers @ 5,900 lb/day)	1.00	LS	\$ 912,290	\$ 912,300	1.2	\$ 182,460	\$ 1,094,760		TOC Estimate (2-14-13) Based on quote from TOMCO2 for Norman WTP, using 2/3 rule for 1920 lb/d system
	New Filter Aid Polymer Feed System	2.00	EA	\$ 35,000	\$ 70,000	1	\$ -	\$ 70,000		Based on quote from Prominent Fluid Controls 7/18/13, for ProMix-M with "C" controls, model M_0-1500x2-5.0PB @ \$35,000 (most expensive)
	New Phosphoric Acid Feed System	3.00	EA	\$ 10,000	\$ 30,000	1	\$ -	\$ 30,000		Based on quote from EI2 6/18/13
	New LAS Feed System	1.00	EA	\$ 19,079	\$ 19,100	1	\$ -	\$ 19,100		2/3 rule based on quote from macaulay control company, for a three ducoflex dfb pump skid
	New OSHG System (3 generators @ 1,000 ppd)	1.00	LS	\$ 1,012,486	\$ 1,012,500	1.5	\$ 506,250	\$ 1,518,750		2/3 rule based on quote from PSI for 2x1600 ppd generator system
	New Chemical Tanks	2.00	EA	\$ 28,000	\$ 56,000	1	\$ -	\$ 56,000		Bulk tank for LAS and Alum coagulant (cost is for a 6,500 gallon FRP tank) Assumed Installation Cost
Division 15 - Piping										
	Piping	1.00	LS	\$ 350,000	\$ 350,000	1	\$ -	\$ 350,000		Assumption
Division 16 - Electrical										
	Electrical	1.00	LS	\$ 500,000	\$ 500,000	1	\$ -	\$ 500,000		Also see contingency below
Division 17 - Instrumentation										
	Instrumentation	1.00	LS	\$ 150,000	\$ 150,000	1	\$ -	\$ 150,000		Also see contingency below
Subtotal for New Chem/RM Building								\$ 6,948,910		
Solids Contact Clarifiers										
	Quantity	2	ea							
	Diameter, ft	100	ft							
	SWD, ft	15	ft							
	Exc Depth, ft	12	ft							
Division 2 - Sitework										
	Excavation	10585.07	cu yd	\$ 15	\$ 158,800	1	\$ -	\$ 158,800		
	Hauling	7600.47	cu yd	\$ 2	\$ 15,300	1	\$ -	\$ 15,300		
	Backfill	4504.69	cu yd	\$ 10	\$ 45,100	1	\$ -	\$ 45,100		



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DIV	Description	Quantity	Units	Unit Cost	Material Cost	Install Factor	Install Cost	Total Cost	Cost w/ Global Markups	Comments
Division 3 - Concrete	Drilled Piers	10000.00	VLF	\$ 50	\$ 500,000	1	\$ -	\$ 500,000		
	Concrete - Base Slab	1258.50	cu yd	\$ 500	\$ 629,300	1	\$ -	\$ 629,300		
	Concrete - Curved Walls	593.41	cu yd	\$ 750	\$ 445,100	1	\$ -	\$ 445,100		
	Floor Grout	193.93	cu yd	\$ 400	\$ 77,600	1	\$ -	\$ 77,600		
Division 5 - Metals	Misc Metals	2.00	LS	\$ 50,000	\$ 100,000	1	\$ -	\$ 100,000		
Division 11 - Equipment	Sludge Collector Mechanism	2.00	EA	\$ 551,769	\$ 1,103,600	1.5	\$ 551,800	\$ 1,655,400		
	Sludge Collector Mechanism - Installation	1.00	LS	\$ 55,177	\$ 55,200	1	\$ -	\$ 55,200		
Division 15 - Piping	Piping	1.00	LS	\$ 30,000	\$ 30,000	1	\$ -	\$ 30,000		
	24" STW Inlet Piping (Buried)	300	LF	\$100	\$ 30,000	1	\$ -	\$ 30,000		
	24" STW Inlet Wall Pipe	2	EA	\$2,500	\$ 5,000	1	\$ -	\$ 5,000		
	24" STW Inlet Elbow (Buried)	2	EA	\$2,500	\$ 5,000	1	\$ -	\$ 5,000		
	24" STW Inlet Pipe Coupling (Buried)	2	EA	\$1,000	\$ 2,000	1	\$ -	\$ 2,000		
	24" STW Inlet Piping Fittings and Appurtenances (Buried)	2	LS	\$1,000	\$ 2,000	1	\$ -	\$ 2,000		
	24" STW Inlet Pipe Trench	300	EA	\$100	\$ 30,000	1	\$ -	\$ 30,000		
	24" STW Outlet Piping (Buried)	300	LF	\$100	\$ 30,000	1	\$ -	\$ 30,000		
	24" STW Outlet Wall Pipe	2	EA	\$2,500	\$ 5,000	1	\$ -	\$ 5,000		
	24" STW Outlet Elbow (Buried)	2	EA	\$2,500	\$ 5,000	1	\$ -	\$ 5,000		
	24" STW Outlet Pipe Coupling (Buried)	2	EA	\$1,000	\$ 2,000	1	\$ -	\$ 2,000		
	24" STW Outlet Piping Fittings and Appurtenances (Buried)	2	LS	\$1,000	\$ 2,000	1	\$ -	\$ 2,000		
	24" STW Outlet Pipe Trench	300	EA	\$100	\$ 30,000	1	\$ -	\$ 30,000		
	Valve Replacements/Improvements	1	LS	\$75,000	\$ 75,000	1	\$ -	\$ 75,000		
Division 16 - Electrical	Electrical	1.00	LS	\$ 150,000	\$ 150,000	1	\$ -	\$ 150,000		
Division 17 - Instrumentation	Instrumentation	1.00	LS	\$ 100,000	\$ 100,000	1	\$ -	\$ 100,000		
	Solids Contact Clarifier(s) Cost							\$ 4,184,800		
	New Post-Ozone Contactor									
	Height	21.00								2 Parallel Trains @ 15 mgd each
	Width	65.00								18' min depth and 3' freeboard, and min contact time = 10 minutes (per O
	Length	65.00								Includes space for 10' access hatch
	Over Excav.	2.00								
	H:V = 1:	1.00								Over Excavation (assumed)
	D	1.00								Horizontal to vertical slope
	Exc. Depth	22.00								Distance from grade to top of structure
	Added W/L	11.00								Total Excavation Depth
										Based on side slope
Division 2 - Sitework	Excavation	6167.333333	cu yd	\$ 15	\$ 92,600	1	\$ -	\$ 92,600		Doesn't account for sloped sides of excavation
	Hauling	2962.75463	cu yd	\$ 2	\$ 6,000	1	\$ -	\$ 6,000		25% Swell Factor



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	Backfill	3797.12963	cu yd	\$ 10	\$ 38,000	1	\$ -	\$ 38,000		25% Swell Factor
	Drilled Piers	64	EA	\$ 3,000	\$ 192,000	1	\$ -	\$ 192,000		
Division 3 - Concrete										
	Concrete - 20" Base Slab	260.8024691	cu yd	\$ 500	\$ 130,500	1	\$ -	\$ 130,500		Assumes 20" thick slab on grade 12" thick wall, cost from CCES for straight 12" wall, >8' tall and 10' access corridor), cost from CCES for 8" straight wall >8' tall, assumes flow depth = 3' lower than total wall height Elevated Slab - 12" thick, cost from CCES
	Concrete Walls - Exterior	202.2222222	cu yd	\$ 840	\$ 169,900	1	\$ -	\$ 169,900		
	Concrete Walls - Interior Baffle walls	36.66666667	cu yd	\$ 840	\$ 30,800	1	\$ -	\$ 30,800		
	Roof	156.4814815	cu yd	\$ 404	\$ 63,200	1	\$ -	\$ 63,200		
Division 5 Miscellaneous Metals										
	Miscellaneous Metals	1	LS	\$ 25,000	\$ 25,000	1	\$ -	\$ 25,000		
Division 11 - Equipment										
	Ozone Diffusers and Piping	1.00	LS	\$ 55,000	\$ 55,000	1.2	\$ 11,000	\$ 66,000		Assumption, similar to McBaine WTP estimate (accounts for LOX piping, and general piping) Estimated to route flow to filter building (adjacent to contactor)
	Ozone Destruct Units	2.00	EA	\$ 50,000	\$ 100,000	1.1	\$ 10,000	\$ 110,000		
	Nitrogen Purge System	1.00	EA	\$ 35,000	\$ 35,000	1.1	\$ 3,500	\$ 38,500		
Division 15 - Piping										
	Piping (Ozone)	1	LS	\$ 50,000	\$ 50,000	1	\$ -	\$ 50,000		Assumption, similar to McBaine WTP estimate (accounts for LOX piping, and general piping) Estimated to route flow to filter building (adjacent to contactor)
	Piping (Process)	1	LS	\$ 100,000	\$ 100,000	1	\$ -	\$ 100,000		
Division 16 - Electrical										
	Electrical	\$1	LS	\$ 120,000	\$ 120,000	1	\$ -	\$ 120,000		Similar to McBaine WTP est.
Division 17 - Instrumentation										
	Instrumentation	1	LS	\$ 60,000	\$ 60,000	1	\$ -	\$ 60,000		Similar to McBaine WTP est. Similar to McBaine WTP est.
	Subtotal							\$ 1,292,500		
	New Filters									
	Design Flow	20.00	MGD							
	Filter Rate	6.00	gpm/ft2							
	Price/ft2 of filter Area	\$2,654	\$/ft2							
	Required Active Filter Area	2315	ft2							
	Filter Banks	6.00								
	Filters off/BW	1.00								
	Required Area/Filter	463	ft2							
	Filter Width	15.00	ft							
	Filter Length	30.00	ft							
	Area/Filter	450	ft2							
	Total Filter Area	2700	ft2							
	Total Filter Area	2250	ft2							
	Filter MGD	20	mgd	\$ 0.4				\$ 7,000,000		



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Full Softening Alternative No. 2
Job Nu 8967A.00

By: R Rossell
Date: 11/15/2012
Checked: T Crowley
Date: 11/25/2013

DIV	Description	Quantity	Units	Unit Cost	Material Cost	Install Factor	Install Cost	Total Cost	Cost w/ Global Markups	Comments
New HSPS										
	Height	24.00	ft							15' min depth per ODEQ from New Req'd Lag. Space Tab from New Req'd Lag. Space Tab Over Excavation (assumed) Horizontal to vertical slope Distance from grade to top of structure Total Excavation Depth Based on side slope Doesn't account for sloped sides of excavation 25% Swell Factor 25% Swell Factor Assumes 12" thick slab on grade, cost from CCES 12" thick wall, cost from CCES for straight 12" wall, >8' tall One 12" Wall along entire length of building
	Width	25.00	ft							
	Length	35.00	ft							
	Over Excav.	2.00	ft							
	H:V = 1:	1.00								
	D	14.00	ft							
	Exc. Depth	12.00	ft							
	Added W/L	6.00	ft							
Division 2 - Sitework										
	Excavation	773	cu yd	\$ 15.00	\$ 11,600	1	\$ -	\$ 11,600		
	Hauling	265	cu yd	\$ 2.00	\$ 600	1	\$ -	\$ 600		
	Backfill	561.0185185	cu yd	\$ 10.00	\$ 5,700	1	\$ -	\$ 5,700		
	Drilled Piers	20	EA	\$ 3,000.00	\$ 60,000	1	\$ -	\$ 60,000		
Division 3 - Concrete										
	Concrete - 12" Base Slab	32.40740741	cu yd	\$ 350.00	\$ 11,400	1	\$ -	\$ 11,400		
	Concrete Walls - Exterior	106.6666667	cu yd	\$ 840.00	\$ 89,600	1	\$ -	\$ 89,600		
	Concrete Walls - Interior Walls	22	cu yd	\$ 840.00	\$ 18,700	1	\$ -	\$ 18,700		
Division 4 - 15 Building										
	HSPS Building	5,000	LS	\$ 300.00	\$ 1,500,000	1	\$ -	\$ 1,500,000		
Division 11 - Equipment										
	24 inch suction cans	4	EA	\$ 35,000.00	\$ 140,000	1.2	\$ 28,000	\$ 168,000		
	Vertical Turbine Pumps	4	EA	\$ 150,000.00	\$ 600,000	1.3	\$ 180,000	\$ 780,000		4 pumps 6 mgd at 125 psig
Division 13 Special Construction										
	14 inch ball control valves	4	EA	\$ 23,000.00	\$ 92,000	1.2	\$ 18,400	\$ 110,400		
Division 15 - Piping										
	24" STW Outlet Piping (Buried)	800	LF	\$ 100.00	\$ 80,000	1	\$ -	\$ 80,000		
	24" STW Outlet Wall Pipe	2	EA	\$ 2,500.00	\$ 5,000	1	\$ -	\$ 5,000		
	24" STW Outlet Elbow (Buried)	2.00	EA	\$ 2,500.00	\$ 5,000	1	\$ -	\$ 5,000		
	24" STW Outlet Pipe Coupling (Buried)	2.00	EA	\$ 1,000.00	\$ 2,000	1	\$ -	\$ 2,000		
	24" STW Outlet Piping Fittings and Appurtenances (Buried)	1.00	LS	\$ 1,000.00	\$ 1,000	1	\$ -	\$ 1,000		
	24" STW Outlet Pipe Trench	800.00	EA	\$ 100.00	\$ 80,000	1	\$ -	\$ 80,000		
Division 16 - Electrical										
	Electrical	1	LS	\$ 500,000.00	\$ 500,000	1	\$ -	\$ 500,000		
Division 17 - Instrumentation										
	Instrumentation	1	LS	\$ 200,000.00	\$ 200,000	1	\$ -	\$ 200,000		
	Subtotal							\$ 3,629,000		
New BW Tank and Pumps										
Division 2 Sitework										
	Excavation for Dry Well	\$385	cuyd	\$25	\$ 9,700	1	\$ -	\$ 9,700		



Estimate Level:
ENR (December 2013)

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Project Water & Wastewater System Master Plan
City of Edmond, OK
Cost Opinion Expansion of WTP From 10.5 to 30 mgd
Full Softening Alternative No. 2
Job Nu 8967A.00

By: R Russell
Date: 11/15/2012
Checked: T Crowley
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DIV	Description	Quantity	Units	Unit Cost	Material Cost	Install Factor	Install Cost	Total Cost	Cost w/ Global Markups	Comments
	Backfill for Dry Well	\$193	cuyd	\$15	\$ 2,900	1	\$ -	\$ 2,900		
	Drilled Pier foundation for Tank	1000	VLf	\$ 50.00	\$ 50,000	1	\$ -	\$ 50,000		
	Drilled Pier Foundation for Pump Station Building	500	VLf	\$ 50.00	\$ 25,000	1	\$ -	\$ 25,000		
Division 3	Concrete				\$ -	1	\$ -	\$ -		
	Base Slab for Pumps	55.55555556	cuyd	\$ 800.00	\$ 44,500	1	\$ -	\$ 44,500		
	Walls for Dry Well	195	cuyd	\$ 1,100.00	\$ 214,500	1	\$ -	\$ 214,500		
	Top Slab	34.72222222	cuyd	\$ 1,500.00	\$ 52,100	1	\$ -	\$ 52,100		
					\$ -	1	\$ -	\$ -		
					\$ -	1	\$ -	\$ -		
Division 4-15	Building				\$ -	1	\$ -	\$ -		
	New Pump Station building	750	sqft	\$ 350.00	\$ 262,500	1	\$ -	\$ 262,500		
Division 5	Metals				\$ -	1	\$ -	\$ -		
	New Elevated Backwash Storage Tank	350,000	gallon	\$ 1.25	\$ 437,500	1	\$ -	\$ 437,500		
Division 11	Equipment				\$ -	1	\$ -	\$ -		
	Pump Cans	2	Ea	\$ 10,000.00	\$ 20,000	1.2	\$ 4,000	\$ 24,000		
	New Backwash supply pumps	2	Eaa	\$ 50,000.00	\$ 100,000	1.2	\$ 20,000	\$ 120,000		
Division 15	Piping				\$ -	1	\$ -	\$ -		
	12 inch piping buried	500	LF	\$ 180.00	\$ 90,000	1	\$ -	\$ 90,000		
	12 inch shutoff valves	4	EA	\$ 8,000.00	\$ 32,000	1	\$ -	\$ 32,000		
	12 inch check valves	2	EA	\$ 8,000.00	\$ 16,000	1	\$ -	\$ 16,000		
	10 inch ball control valves	2	EA	\$ 15,000.00	\$ 30,000	1	\$ -	\$ 30,000		
	12 inch couplings	6	EA	\$ 2,500.00	\$ 15,000	1	\$ -	\$ 15,000		
Division 16	Electrical				\$ -	1	\$ -	\$ -		
		1	LS	\$ 40,000.00	\$ 40,000	1	\$ -	\$ 40,000		
Division 17	Controls				\$ -	1	\$ -	\$ -		
		1	LS	\$ 20,000.00	\$ 20,000	1	\$ -	\$ 20,000		
	Subtotal							\$ 1,485,700		
NEW BACKWASH WASTEWATER HOLDING TANK										
	Concrete partially buried tank	610,000	gallons	\$ 1.25	\$ 762,500	1	\$ -	\$ 762,500		
	Number of tanks	2	Ea					\$ 1,525,000		
	Subtotal							\$ 1,525,000		
								\$ 37,933,110		
SUBTOTAL TREATMENT										
				\$ -		1	\$ -	\$ 37,933,110		
	General Conditions		3%				\$ 1,138,090	\$ 39,071,200		
	Overhead and Profit		7%				\$ 2,735,000	\$ 41,806,200		
	Taxes		0%				\$ -	\$ 41,806,200		
	Contingency		20%				\$ 8,361,300	\$ 50,167,500		
	Engineering and Admin		15%				\$ 7,525,200	\$ 57,692,700		
	Allowance during construction		2%							



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City of Edmond, OK
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Job Nu 8967A.00

By: R Rossell
Date: 11/15/2012
Checked: T Crowley
Date: 11/25/2013

DIV	Description	Quantity	Units	Unit Cost	Material Cost	Install Factor	Install Cost	Total Cost	Cost w/ Global Markups	Comments
Total							\$ 1,153,900	\$ 58,846,600		
NEW SLUDGE THICKENERS										
	Quantity	2	Ea							
	Diameter	50	ft							
	SWD	20	ft							
	Design Loading Rate	25	drylbs/sqft							
Division 2 Excavation										
	Excavate for Thickeners and Pump Station	10000	cuyd	\$ 15.00	\$ 150,000	1	\$ -	\$ 150,000		
	Backfill for Thickeners and pump station	3333.333333	cuyd	\$ 25.00	\$ 83,400	1	\$ -	\$ 83,400		
	Drilled Piers	7500	VLF	\$ 50.00	\$ 375,000	1	\$ -	\$ 375,000		
	Base Slab	479.3510016	cuyd	\$ 800.00	\$ 383,500	1	\$ -	\$ 383,500		
	Concrete Walls	575.2212019	cuyd	\$ 900.00	\$ 517,700	1	\$ -	\$ 517,700		
	Concrete Top Slab Pump Station	57.87037037	cuyd	\$ 1,200.00	\$ 69,500	1	\$ -	\$ 69,500		
	Mexanine Concrete	46.2962963	cuyd	\$ 1,500.00	\$ 69,500	1	\$ -	\$ 69,500		
	Tank Concrete	50		\$ 800.00	\$ 40,000	1	\$ -	\$ 40,000		
Division 4-15 Pump Station Building										
	Building	1250	sqft	\$ 200.00	\$ 250,000	1	\$ -	\$ 250,000		
Division 5 Metals										
	Miscellaneous Metals	1	LS	\$ 50,000	\$ 50,000	1	\$ -	\$ 50,000		
	Solids Storage Tank	100000	gal	\$ 2	\$ 175,000	1	\$ -	\$ 175,000		
Division 11 Equipment										
	Solids Handling Pumps	6	Ea	\$ 20,000	\$ 120,000	1.3	\$ 36,000	\$ 156,000		
	Thickener Mechanism	2	Ea	\$ 250,000	\$ 500,000	1.2	\$ 100,000	\$ 600,000		
	Tank Mixing System	1	LS	\$ 40,000	\$ 40,000	1.2	\$ 8,000	\$ 48,000		
Division 13 Special Construction										
	Electric Monorail	1	LS	\$ 15,000	\$ 15,000	1.2	\$ 3,000	\$ 18,000		
Division 15 Piping										
	Piping	1	LS	\$ 120,000.00	\$ 120,000	1.2	\$ 24,000	\$ 144,000		
Division 16 Electrical										
	Electrical	1	LS	\$ 150,000.00	\$ 150,000	1.2	\$ 30,000	\$ 180,000		
Division 17 Instrumentation and Control										
	Instrumentation	1	LS	\$ 25,000.00	\$ 25,000	1.2	\$ 5,000	\$ 30,000		
	Controls	1	LS	\$ 50,000.00	\$ 50,000	1.2	\$ 10,000	\$ 60,000		
	Subtotal							\$ 3,399,600		
New Lagoons										
	Quantity	8.00								Assumed
	Water Depth	5.30	ft							(assumed, from CDM O&M)
	Width	80.00	ft							(assumed, same as other lagoons)
	Length	115.00	ft							(assumed, same as other lagoons)
	Free Board	3.00	ft							User Input
	Over Excav.	2.00	ft							Over Excavation (assumed)
	H:V = 1:	1.00								Horizontal to vertical slope



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By: R Rossell
Date: 11/15/2012
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DIV	Description	Quantity	Units	Unit Cost	Material Cost	Install Factor	Install Cost	Total Cost	Cost w/ Global Markups	Comments
	Exc. Depth	1.00	ft							Distance from grade to top of structure
		9.30	ft							Total Excavation Depth
	Added W/L	9.30	ft							Based on side slope
Division 2 - Sitework										
	Excavation	4537.352889	cu yd	\$ 15.00	\$ 68,100	1.2	\$ 13,620	\$ 81,720		Doesn't account for sloped sides of excavation
	Hauling	2468.651296	cu yd	\$ 2.00	\$ 5,000	1.2	\$ 1,000	\$ 6,000		25% Swell Factor
	Backfill	2562.431852	cu yd	\$ 10.00	\$ 25,700	1.2	\$ 5,140	\$ 30,840		25% Swell Factor
Division 3 - Concrete										
	Concrete - 12" Base Slab	340.7407407	cu yd	\$ 350.00	\$ 119,300	1.2	\$ 23,860	\$ 143,160		Assumes 12" thick slab
	Concrete - 12" Straight Walls	119.8888889	cu yd	\$ 840.00	\$ 100,800	1.2	\$ 20,160	\$ 120,960		Assumes 12" thick walls,
	Concrete Ramp	25.82222222	cu yd	\$ 840.00	\$ 21,700	1.2	\$ 4,340	\$ 26,040		Assumes 12'wide, 14' long, 8.3' tall access ramp (est. concrete cost)
Division 5 - Metals										
	Misc Metals	1	LS	\$ 10,000.00	\$ 10,000	1.2	\$ 2,000	\$ 12,000		Estimated
Division 11 - Equipment										
	Sluice Gate, Stainless Steel, 24" x 24"	1	EA	\$ 1,925.00	\$ 2,000	1.2	\$ 400	\$ 2,400		Use CCES estimate, assumes material cost = 40%
Division 15 - Piping										
	24" DI Piping	40	LF	\$ 14.00	\$ 600	1.2	\$ 120	\$ 720		Assumes DI piping spans length of lagoon, divided by 2 because each line services 2 lags. (multiplied by two for exc/bf)
	12" DI Piping	10	LF	\$ 27.00	\$ 300	1.2	\$ 60	\$ 360		Assumes DI piping spans from road to each lagoon, divided by 2 because each line services 2 lags.
	Fittings	1	LS	\$ 5,000.00	\$ 5,000	1.2	\$ 1,000	\$ 6,000		
	24" STW Inlet Piping (Buried)	0				1.2	\$ -	\$ -		
	24" STW Outlet Piping (Buried)	640	LF	\$ 100.00	\$ 64,000	1.2	\$ 12,800	\$ 76,800		Assumes decant line runs along entire width of each lagoon
	24" STW Outlet Wall Pipe	8	EA	\$ 1,750.00	\$ 14,000	1.2	\$ 2,800	\$ 16,800		Assumed 1 per lagoon
	24" STW Outlet Elbow (Buried)	8	EA	\$ 1,750.00	\$ 14,000	1.2	\$ 2,800	\$ 16,800		Assumed 1 per lagoon
	24" STW Outlet Pipe Coupling (Buried)	8	EA	\$ 750.00	\$ 6,000	1.2	\$ 1,200	\$ 7,200		Assumed 1 per lagoon
	24" STW Outlet Piping Fittings and Appurtenances (Buried)	1	LS	\$ 5,000.00	\$ 5,000	1.2	\$ 1,000	\$ 6,000		Assumed 1 per lagoon
	24" STW Outlet Pipe Trench	640	EA	\$ 100.00	\$ 64,000	1.2	\$ 12,800	\$ 76,800		
Division 16 - Electrical										
	Electrical	1	LS	\$ 20,000.00	\$ 20,000	1.2	\$ 4,000	\$ 24,000		Also see contingency below
Division 17 - Instrumentation										
	Instrumentation	1	LS	\$ 15,000.00	\$ 15,000	1.2	\$ 3,000	\$ 18,000		Also see contingency below
	Sub Total per Lagoon							\$ 672,600		
Other	Stormwater Diversion	1	LS	\$ 65,000.00	\$ 65,000	1	\$ -	\$ 65,000		
	Total Lagoon Cost	10	Ea					\$ 6,791,000		
	Subtotal Lagoon Dewatering							\$ 6,791,000		
	General Conditions		10%			1	\$ -	\$ 10,190,600		
	Overhead and Profit		7%				\$ 784,700	\$ 11,209,700		
	Taxes		0%				\$ -	\$ 11,994,400		
	Subtotal							\$ 11,994,400		



Project Water & Wastewater System Master Plan
 City of Edmond, OK
 Cost Opinion Expansion of WTP From 10.5 to 30 mgd
 Full Softening Alternative No. 2
 Job Nu 8967A.00

Estimate Level:
 ENR (December 2013)

Class 4
 9667

By: R Rossell
 Date: 11/15/2012

Checked: T Crowley
 Date: 11/25/2013

DIV	Description	Quantity	Units	Unit Cost	Material Cost	Install Factor	Install Cost	Total Cost	Cost w/ Global Markups			Comments
	Contingency		20%				\$ 2,398,900					
	Subtotal							\$ 14,393,300				
	Engineering and Admin		24%				\$ 3,454,400					
	Subtotal							\$ 17,847,700				
	Allowance during construction		3%				\$ 535,500					
	Total							\$ 18,383,200				



Project Water & Wastewater System Master Plan
 City of Edmond, OK
 Cost Opinion Expansion of WTP From 30 to 40 mgd
 Full Softening Alternative No. 2
 Job Nu 8967A.00

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 ENF

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By: R Rossell
 Date: 11/15/2012

CheT Crowley
 Date: 11/25/2013

DIV	Description	Quantity	Units	Unit Cost	Material Cost	Install Factor	Install Cost	Total Cost	Cost w/ Global Markups	Comments
	New Fine Screening (1 screens at 10 mgd each)									
	Quantity	2.00								
	Height	32.00	ft							
	Width	20.00	ft							
	Length	20.00	ft							
	Over Excav.	2.00	ft							
	H:V = 1:	1.00								
	D	25.00	ft							
	Exc. Depth	9.00	ft							
	Added W/L	4.50	ft							
Division 2 - Sitework										
2	Excavation	280	cu yd	\$15	\$ 4,300	1	\$ -	\$ 4,300		screens)
2	Hauling	74	cu yd	\$2	\$ 200	1	\$ -	\$ 200		20' per screen (similar to other screens)
2	Backfill	221	cu yd	\$10	\$ 2,300	1	\$ -	\$ 2,300		20' per screen (similar to other screens)
2	Drilled Piers	9	EA	\$3,000	\$ 27,000	1	\$ -	\$ 27,000		Over Excavation (assumed)
					\$ -	1	\$ -	\$ -		Horizontal to vertical slope
					\$ -	1	\$ -	\$ -		Distance from grade to top of structure (estimated)
Division 3 - Concrete										
	Concrete - 20" Base Slab	25	cu yd	\$500	\$ 12,400	1	\$ -	\$ 12,400		Total Excavation Depth
	Concrete Walls - Exterior	95	cu yd	\$840	\$ 79,700	1	\$ -	\$ 79,700		Based on side slope
	Concrete Walls - Interior walls	22	cu yd	\$840	\$ 18,700	1	\$ -	\$ 18,700		
	Operating Floor	15	cu yd	\$404	\$ 6,000	1	\$ -	\$ 6,000		
	Roof	15	cu yd	\$404	\$ 6,000	1	\$ -	\$ 6,000		Doesn't account for sloped sides of excavation
					\$ -	1	\$ -	\$ -		25% Swell Factor, hauling to or from site
					\$ -	1	\$ -	\$ -		25% Swell Factor
Division 11 - Equipment										
	Screen Mechanism	1	EA	\$190,000	\$ 190,000	1.2	\$ 38,000	\$ 228,000		
					\$ -	1	\$ -	\$ -		
					\$ -	1	\$ -	\$ -		
Division 15 - Piping										
	36" STW Inlet Piping (Buried)	20	LF	\$200	\$ 4,000	1	\$ -	\$ 4,000		Assumes 20" thick slab on grade
	36" STW Inlet Wall Pipe	1	EA	\$3,500	\$ 3,500	1	\$ -	\$ 3,500		12" thick wall, cost from CCES for straight 12" wall, >8' tall
	36" STW Inlet Elbow (Buried)	1	EA	\$3,500	\$ 3,500	1	\$ -	\$ 3,500		12" thick interior wall running along the width of each screen
	36" STW Inlet Pipe Coupling (Buried)	1	EA	\$2,000	\$ 2,000	1	\$ -	\$ 2,000		Elevated Slab - 12" thick, cost from CCES
	36" STW Inlet Piping Fittings and Appurtenances (Buried)	1	LS	\$2,000	\$ 2,000	1	\$ -	\$ 2,000		Elevated Slab - 12" thick, cost from CCES
	36" STW Inlet Pipe Trench	20	EA	\$150	\$ 3,000	1	\$ -	\$ 3,000		
					\$ -	1	\$ -	\$ -		
					\$ -	1	\$ -	\$ -		Estimated
Division 16 - Electrical										
	Electrical	1	LS	\$50,000	\$ 50,000	1	\$ -	\$ 50,000		
Division 17 - Instrumentation										
	Instrumentation	1	LS	\$25,000	\$ 25,000	1	\$ -	\$ 25,000		Estimated per Figure 7.1
	Total for New Intake Screen(s)							\$ 477,600		
	New Pre-Ozone Contactor (additional train at 15 mgd)									
	Height	21.00	ft							1 Train @ 15 mgd ODEQ)



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DIV	Description	Quantity	Units	Unit Cost	Material Cost	Install Factor	Install Cost	Total Cost	Cost w/ Global Markups	Comments
	Width	65.00	ft							Includes space for 10' access hatch Includes space for 6' influent/effluent chambers Over Excavation (assumed) Horizontal to vertical slope Distance from grade to top of structure Total Excavation Depth Based on side slope
	Length	65.00	ft							
	Over Excav.	2.00	ft							
		H:V = 1:	1.00							
		D	1.00							
	Exc. Depth	22.00	ft							
		Added W/L	11.00							
Division 2 - Sitework										
	Excavation	4040.67	cu yd	\$ 15	\$ 60,700	1	\$ -	\$ 60,700		Doesn't account for sloped sides of excavation 25% Swell Factor 25% Swell Factor
	Hauling	1370.39	cu yd	\$ 2	\$ 2,800	1	\$ -	\$ 2,800		
	Backfill	2944.35	cu yd	\$ 10	\$ 29,500	1	\$ -	\$ 29,500		
	Drilled Piers	40.00	EA	\$ 3,000	\$ 120,000	1	\$ -	\$ 120,000		
Division 3 - Concrete										
	Concrete - 20" Base Slab	140.43	cu yd	\$ 500	\$ 70,300	1	\$ -	\$ 70,300		Assumes 20" thick slab on grade 12" thick wall, cost from CCES for straight 12" wall, >8' tall 12" thick baffle walls spaced at 5' (less influent and effluent channels, and 10' access corridor), cost from CCES for 8" straight wall >8' tall, assumes flow depth = 3' lower than total wall height Elevated Slab - 12" thick, cost from CCES
	Concrete Walls - Exterior	155.56	cu yd	\$ 840	\$ 130,700	1	\$ -	\$ 130,700		
		16.67								
	Concrete Walls - Interior Baffle walls		cu yd	\$ 840	\$ 14,000	1	\$ -	\$ 14,000		
	Roof	84.26	cu yd	\$ 404	\$ 34,100	1	\$ -	\$ 34,100		
Division 8 - Doors and Windows										
	Doors and Windows	1.00	LS	\$ 5,000	\$ 5,000	1	\$ -	\$ 5,000		
Division 11 - Equipment										
	Ozone Diffusers and Piping	1.00	LS	\$ 35,000	\$ 35,000	1.2	\$ 7,000	\$ 42,000		
	Ozone Destruct Units	2.00	EA	\$ 25,000	\$ 50,000	1.1	\$ 5,000	\$ 55,000		
	Nitrogen Purge System	1.00	EA	\$ 35,000	\$ 35,000	1.1	\$ 3,500	\$ 38,500		
Division 15 - Piping										
	Piping	1.00	LS	\$ 30,000	\$ 30,000	1	\$ -	\$ 30,000		su
Division 16 - Electrical										
	Electrical	1.00	LS	\$ 25,000	\$ 25,000	1	\$ -	\$ 25,000		mil
Division 17 - Instrumentation										
	Instrumentation	1.00	LS	\$ 25,000	\$ 25,000	1	\$ -	\$ 25,000		mil
	Subtotal for New Pre-Ozone Contactor							\$ 682,600		
New Pre-Ozone Generation Building and LOX Storage (expansion from 20 to 30 within existing building)										
Division 11 - Equipment										
	650 lb/d Ozone Generator and Power Supply Unit	1.00	EA	\$ 1,119,186	\$ 1,119,200	1	\$ -	\$ 1,119,200		Using 2/3 Rule on \$1,013,333 per 560 lb/day Generator Using 2/3 Rule on \$460,000 for 15,000 gal tanks and vaporizers from McBaine WTP estimate, transformed to 2013 dollars @ 3%
	LOX Storage Tanks - 10,000 gal and Vaporizers	1.00	EA	\$ 351,046	\$ 351,100	1	\$ -	\$ 351,100		
	Destruct Unit	1	LS	\$ 50,000	\$ 50,000	1	\$ -	\$ 50,000		
	Installation of Equipment (% of total equipment cost)	0.2	%	\$ 1	\$ 100	1	\$ -	\$ 100		
Division 15 - Piping										
	Piping	1	LS	\$ 80,000	\$ 80,000	1	\$ -	\$ 80,000		and general piping)



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CheT Crowley
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DIV	Description	Quantity	Units	Unit Cost	Material Cost	Install Factor	Install Cost	Total Cost	Cost w/ Global Markups	Comments
Division 16 - Electrical	Electrical	1	LS	80000	\$ 80,000	1	\$ -	\$ 80,000		Similar to McBaine WTP est.
Division 17 - Instrumentation	Instrumentation	1	LS	40000	\$ 40,000	1	\$ -	\$ 40,000		Similar to McBaine WTP est.
Subtotal for Generation Building								\$ 1,720,400		
New Presed Basins (1@10 mgd)										
	Quantity	1								Each rated at 10 MGD
	Diameter, ft	100								
	SWD, ft	16								
	Exc Depth, ft	12								
Division 2 - Sitework	Excavation	5292.54	cu yd	\$ 15	\$ 79,400	1	\$ -	\$ 79,400		Assumes excavation at 1:1 slope, 2 foot overexcavation
	Hauling	3800.24	cu yd	\$ 2	\$ 7,700	1	\$ -	\$ 7,700		25% Swell Factor
	Backfill	2252.35	cu yd	\$ 10	\$ 22,600	1	\$ -	\$ 22,600		
	Drilled Piers	121.00	VLF	\$ 50	\$ 6,100	1	\$ -	\$ 6,100		
Division 3 - Concrete	Concrete - Base Slab	629.25	cu yd	\$ 500	\$ 314,700	1	\$ -	\$ 314,700		Assumes 24" thick slab
	Concrete - Curved Walls	314.16	cu yd	\$ 750	\$ 235,700	1	\$ -	\$ 235,700		Assumes 18" thick walls, 2' freeboard
	Floor Grout	96.96	cu yd	\$ 400	\$ 38,800	1	\$ -	\$ 38,800		
Division 5 - Metals	Misc Metals	1.00	LS	\$ 30,000	\$ 30,000	1	\$ -	\$ 30,000		
Division 11 - Equipment	Clarifier Mechanism	1.00	EA	\$ 350,000	\$ 350,000	1.5	\$ 175,000	\$ 525,000		Per CCES for 100' diameter clarifier mechanism
Division 15 - Piping	Misc Piping	1.00	LS	\$ 30,000	\$ 30,000	1	\$ -	\$ 30,000		
	24" STW Inlet Piping (Buried)	50.00	LF	\$ 100	\$ 5,000	1	\$ -	\$ 5,000		
	24" STW Inlet Wall Pipe	1.00	EA	\$ 2,500	\$ 2,500	1	\$ -	\$ 2,500		
	24" STW Inlet Elbow (Buried)	1.00	EA	\$ 2,500	\$ 2,500	1	\$ -	\$ 2,500		
	24" STW Inlet Pipe Coupling (Buried)	1.00	EA	\$ 1,000	\$ 1,000	1	\$ -	\$ 1,000		
	24" STW Inlet Piping Fittings and Appurtenances (Buried)	1.00	LS	\$ 1,000	\$ 1,000	1	\$ -	\$ 1,000		
	24" STW Inlet Pipe Trench	50.00	EA	\$ 100	\$ 5,000	1	\$ -	\$ 5,000		
	24" STW Outlet Piping (Buried)	50.00	LF	\$ 100	\$ 5,000	1	\$ -	\$ 5,000		
	24" STW Outlet Wall Pipe	1.00	EA	\$ 2,500	\$ 2,500	1	\$ -	\$ 2,500		
	24" STW Outlet Elbow (Buried)	1.00	EA	\$ 2,500	\$ 2,500	1	\$ -	\$ 2,500		
	24" STW Outlet Pipe Coupling (Buried)	1.00	EA	\$ 1,000	\$ 1,000	1	\$ -	\$ 1,000		
	24" STW Outlet Piping Fittings and Appurtenances (Buried)	1.00	LS	\$ 1,000	\$ 1,000	1	\$ -	\$ 1,000		
	24" STW Outlet Pipe Trench	50.00	EA	\$ 100	\$ 5,000	1	\$ -	\$ 5,000		
	24" Precast Flow Control Vault	1.00	EA	\$ 50,000	\$ 50,000	1.3	\$ 15,000	\$ 65,000		
	24" Butterfly Control valve	1.00	EA	\$ 21,000	\$ 21,000	1.3	\$ 6,300	\$ 27,300		
Division 16 - Electrical	Electrical	1.00	LS	\$ 45,000	\$ 45,000	1	\$ -	\$ 45,000		Also see contingency below
Division 17 - Instrumentation	Programming	1.00	LS	\$ 20,000	\$ 20,000	1	\$ -	\$ 20,000		Also see contingency below



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DIV	Description	Quantity	Units	Unit Cost	Material Cost	Install Factor	Install Cost	Total Cost	Cost w/ Global Markups	Comments
	24 inch flowmeters	1.00	EA	\$ 18,000	\$ 18,000	1.2	\$ 3,600	\$ 21,600		
	Subtotal Presedimentation Basins							\$ 1,502,900		
	Expansion of Existing Chemical Building									
	Division 8 - Doors and Windows									
	Doors and Windows Replacement	1.00	LS	\$ 25,000	\$ 25,000	1	\$ -	\$ 25,000		
	Division 11 - Equipment									
	New Coagulant Alum Feed System	2.00	EA	\$10,000	\$ 20,000	1.5	\$ 10,000	\$ 30,000		
	Lime System Expansion	2.00	EA	\$583,333	\$ 1,166,700	1.2	\$ 233,340	\$ 1,400,040		
	New CO2 System (1 vaporizer @ 5,900 lb/day)	1.00	LS	\$438,583	\$ 438,600	1.5	\$ 219,300	\$ 657,900		with "C" controls, model M_0-1500x2-5.0PB @ \$35,000 (most Assumed similar to Phos. Acid feed TOC Estimate (2-14-13)
	New Filter Aid Polymer Feed System	1.00	LS	\$25,000	\$ 25,000	1.4	\$ 10,000	\$ 35,000		lb/d system
	New Phosphoric Acid Feed System	1.00	EA	\$10,000	\$ 10,000	1.3	\$ 3,000	\$ 13,000		with "C" controls, model M_0-1500x2-5.0PB @ \$35,000 (most
	New LAS Feed System	1.00	EA	\$12,019	\$ 12,100	1.4	\$ 4,840	\$ 16,940		Based on quote from E12 6/18/13
	Replacement of Softeners	1.00	LS	\$500,000	\$ 500,000	1.1	\$ 50,000	\$ 550,000		2/3 rule based on quote from PSI for 2x1600 ppd generator system
	Division 15 - Piping									
	Piping	1.00	LS	\$ 100,000	\$ 100,000	1	\$ -	\$ 100,000		Assumption
	Division 16 - Electrical									
	Electrical	1.00	LS	\$ 75,000	\$ 75,000	1	\$ -	\$ 75,000		Also see contingency below
	Division 17 - Instrumentation									
	Instrumentation	1.00	LS	\$ 80,000	\$ 80,000	1	\$ -	\$ 80,000		Also see contingency below
	Subtotal for New Chem/RM Building							\$ 2,982,880		
	Solids Contact Clarifiers									
	Quantity	1	ea							
	Diameter, ft	100	ft							
	SWD, ft	15	ft							
	Exc Depth, ft	12	ft							
	Division 2 - Sitework									
	Excavation	5292.54	cu yd	\$ 15	\$ 79,400	1	\$ -	\$ 79,400		
	Hauling	3800.24	cu yd	\$ 2	\$ 7,700	1	\$ -	\$ 7,700		
	Backfill	2252.35	cu yd	\$ 10	\$ 22,600	1	\$ -	\$ 22,600		
	Drilled Piers	5000.00	VLF	\$ 50	\$ 250,000	1	\$ -	\$ 250,000		
	Division 3 - Concrete									
	Concrete - Base Slab	629.25	cu yd	\$ 500	\$ 314,700	1	\$ -	\$ 314,700		
	Concrete - Curved Walls	296.71	cu yd	\$ 750	\$ 222,600	1	\$ -	\$ 222,600		
	Floor Grout	96.96	cu yd	\$ 400	\$ 38,800	1	\$ -	\$ 38,800		
	Division 5 - Metals									
	Misc Metals	1.00	LS	\$ 50,000	\$ 50,000	1	\$ -	\$ 50,000		
	Division 11 - Equipment									
	Sludge Collector Mechanism	1.00	EA	\$ 551,769	\$ 551,800	1.5	\$ 275,900	\$ 827,700		
	Division 15 - Piping									



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DIV	Description	Quantity	Units	Unit Cost	Material Cost	Install Factor	Install Cost	Total Cost	Cost w/ Global Markups	Comments
	Piping	1.00	LS	\$ 30,000	\$ 30,000	1	\$ -	\$ 30,000		
	24" STW Inlet Piping (Buried)	100	LF	\$360	\$ 36,000	1	\$ -	\$ 36,000		100 feet from each SCC inlet to existing SCC outlet pipe (estimated)
	24" STW Inlet Wall Pipe	1	EA	\$2,500	\$ 2,500	1	\$ -	\$ 2,500		
	24" STW Inlet Elbow (Buried)	1	EA	\$2,500	\$ 2,500	1	\$ -	\$ 2,500		
	24" STW Inlet Pipe Coupling (Buried)	1	EA	\$1,000	\$ 1,000	1	\$ -	\$ 1,000		
	24" STW Inlet Piping Fittings and Appurtenances (Buried)	1	LS	\$1,000	\$ 1,000	1	\$ -	\$ 1,000		
	24" STW Inlet Pipe Trench	100	EA	\$360	\$ 36,000	1	\$ -	\$ 36,000		
	24" STW Outlet Piping (Buried)	100	LF	\$360	\$ 36,000	1	\$ -	\$ 36,000		(estimated)
	24" STW Outlet Wall Pipe	1	EA	\$2,500	\$ 2,500	1	\$ -	\$ 2,500		
	24" STW Outlet Elbow (Buried)	1	EA	\$2,500	\$ 2,500	1	\$ -	\$ 2,500		
	24" STW Outlet Pipe Coupling (Buried)	1	EA	\$1,000	\$ 1,000	1	\$ -	\$ 1,000		
	24" STW Outlet Piping Fittings and Appurtenances (Buried)	1	LS	\$1,000	\$ 1,000	1	\$ -	\$ 1,000		
	24" STW Outlet Pipe Trench	100	EA	\$360	\$ 36,000	1	\$ -	\$ 36,000		
	Valve Replacements/Improvements		LS	\$75,000	\$ -	1	\$ -	\$ -		
Division 16 - Electrical	Electrical	1	LS	\$ 80,000	\$ 80,000	1	\$ -	\$ 80,000		Also see contingency below
Division 17 - Instrumentation	Instrumentation	1.00	LS	\$ 40,000	\$ 40,000	1	\$ -	\$ 40,000		Also see contingency below
	Solids Contact Clarifier(s) Cost							\$ 2,121,500		
	New Post-Ozone Contactor (1 @ 10 mgd)									
	Height	21.00								1 Train @ .15 mgd
	Width	65.00								ODEQ)
	Length	65.00								Includes space for 10' access hatch
	Over Excav.	2.00								Includes space for 6' influent/effluent chambers
	H:V = 1:	1.00								Over Excavation (assumed)
	D	1.00								Horizontal to vertical slope
	Exc. Depth	22.00								Distance from grade to top of structure
	Added W/L	11.00								Total Excavation Depth
										Based on side slope
Division 2 - Sitework	Excavation	4040.666667	cu yd	\$ 15	\$ 60,700	1	\$ -	\$ 60,700		Doesn't account for sloped sides of excavation
	Hauling	1370.393519	cu yd	\$ 2	\$ 2,800	1	\$ -	\$ 2,800		25% Swell Factor
	Backfill	2944.351852	cu yd	\$ 10	\$ 29,500	1	\$ -	\$ 29,500		25% Swell Factor
	Drilled Piers	40	EA	\$ 3,000	\$ 120,000	1	\$ -	\$ 120,000		
				\$ -	\$ -	1	\$ -	\$ -		
				\$ -	\$ -	1	\$ -	\$ -		
Division 3 - Concrete	Concrete - 20" Base Slab	140.4320988	cu yd	\$ 500	\$ 70,300	1	\$ -	\$ 70,300		Assumes 20" thick slab on grade
	Concrete Walls - Exterior	155.5555556	cu yd	\$ 840	\$ 130,700	1	\$ -	\$ 130,700		12" thick wall, cost from CCES for straight 12" wall, >8' tall
	Concrete Walls - Interior Baffle walls	16.66666667	cu yd	\$ 840	\$ 14,000	1	\$ -	\$ 14,000		12" thick baffle walls spaced at 5' (less influent and effluent channels, and 10' access corridor), cost from CCES for 8" straight wall >8' tall, assumes flow depth = 3' lower than total wall height



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DIV	Description	Quantity	Units	Unit Cost	Material Cost	Install Factor	Install Cost	Total Cost	Cost w/ Global Markups	Comments
	Roof	84.25925926	cu yd	\$ 404	\$ 34,100	1	\$ -	\$ 34,100		Elevated Slab - 12" thick, cost from CCES
					\$ -	1	\$ -	\$ -		
Division 5	Miscellaneous Metals				\$ -	1	\$ -	\$ -		
	Miscellaneous Metasl	1	LS	\$ 25,000	\$ 25,000	1	\$ -	\$ 25,000		
Division 11	- Equipment									
	Ozone Diffusers and Piping	1.00	LS	\$ 55,000	\$ 55,000	1.2	\$ 11,000	\$ 66,000		
	Ozone Destruct Units	2.00	EA	\$ 50,000	\$ 100,000	1.1	\$ 10,000	\$ 110,000		
	Nitrogen Purge System	1.00	EA	\$ 35,000	\$ 35,000	1.1	\$ 3,500	\$ 38,500		
					\$ -	1	\$ -	\$ -		
					\$ -	1	\$ -	\$ -		
Division 15	- Piping									
	Piping (Ozone)	1	LS	\$ 25,000	\$ 25,000	1	\$ -	\$ 25,000	Assumption, similar to McBaine WTP estimate (accounts for LOX piping, and general piping)	
	Piping (Process)	1	LS	\$ 50,000	\$ 50,000	1	\$ -	\$ 50,000	Estimated to route flow to filter building (adjacent to contactor)	
Division 16	- Electrical									
	Electrical	\$1	LS	\$ 100,000	\$ 100,000	1	\$ -	\$ 100,000	Similar to McBaine WTP est.	
Division 17	- Instrumentation									
	Instrumentation	1	LS	\$ 40,000	\$ 40,000	1	\$ -	\$ 40,000	Similar to McBaine WTP est.	
									Similar to McBaine WTP est.	
	Subtotal							\$ 916,600		
	New Filters									
	Design Flow	10.00	MGD							
	Filter Rate	6.00	gpm/ft2							
	Price/ft2 of filter Area	\$3,618	\$/ft2							
	Required Active Filter Area	1157	ft2							
	Filter Banks	6.00								
	Filters off/BW	1.00								
	Required Area/Filter	231	ft2							
	Filter Width	15.00	ft							
	Filter Length	30.00	ft							
	Area/Filter	450	ft2							
	Total Filter Area	2700	ft2							
	Total Filter Area	2250	ft2							
	Filter MGD	10	mgd	\$ 0.5				\$ 5,000,000		
	Expand HSPS from 20 to 30 mgd									
	Height	24.00	ft						15' min depth per ODEQ	
	Width	25.00	ft						from New Req'd Lag. Space Tab	
	Length	35.00	ft						from New Req'd Lag. Space Tab	
	Over Excav.	2.00	ft						Over Excavation (assumed)	
		H:V = 1:							Horizontal to vertical slope	
		D							Distance from grade to top of structure	
	Exc. Depth	14.00	ft						Total Excavation Depth	
		Added W/L							Based on side slope	
		12.00	ft							
		6.00	ft							
Division 2	- Sitework									
	Excavation	65	cu yd	\$ 15,000	\$ 1,000	1	\$ -	\$ 1,000	Doesn't account for sloped sides of excavation	
	Hauling	45	cu yd	\$ 2,000	\$ 100	1	\$ -	\$ 100	25% Swell Factor	



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DIV	Description	Quantity	Units	Unit Cost	Material Cost	Install Factor	Install Cost	Total Cost	Cost w/ Global Markups	Comments
	Backfill	35	cu yd	\$ 10.00	\$ 400	1	\$ -	\$ 400		25% Swell Factor
	Drilled Piers	1250	VLF	\$ 50.00	\$ 62,500	1	\$ -	\$ 62,500		
Division 3 - Concrete	Concrete - 24" Base Slab	133.3333333	cu yd	\$ 900.00	\$ 120,000	1	\$ -	\$ 120,000		Assumes 24 thick slab on grade, cost from CCES
Division 4 -15 Building	Generation Building	1,800	LS	\$ 300.00	\$ 540,000	1	\$ -	\$ 540,000		
Division 5 - Metals	Miscellaneous Metals	1	LS	\$ 50,000.00	\$ 50,000	1	\$ -	\$ 50,000		
Division 11 - Equipment	24 inch suction cans	2	EA	\$ 35,000.00	\$ 70,000	1.2	\$ 14,000	\$ 84,000		
	Vertical Turbine Pumps	2	EA	\$ 150,000.00	\$ 300,000	1.3	\$ 90,000	\$ 390,000		2 pumps 6 mgd at 125 psig
	Emergency Generator	1	EA	\$ 1,500,000	\$ 1,500,000	1.1	\$ 150,000	\$ 1,650,000		2 MW Generator for emergency services
Division 13 Special Construction	14 inch ball control valves	2	EA	\$ 23,000.00	\$ 46,000	1.2	\$ 9,200	\$ 55,200		
	Fuel Storage Tank	1	EA	\$ 100,000.00	\$ 100,000	1.2	\$ 20,000	\$ 120,000		10,000 gallon double contained
Division 15 - Piping	Fuel Storage Piping	1	LS	\$ 30,000.00	\$ 30,000	1	\$ -	\$ 30,000		
	14 -inch discharge piping	60	LF	\$ 140.00	\$ 8,400	1	\$ -	\$ 8,400		
	14 -inch butterfly isolation	2	EA	\$ 8,500.00	\$ 17,000	1	\$ -	\$ 17,000		
	14-inch check valves	2.00	EA	\$ 10,000.00	\$ 20,000	1	\$ -	\$ 20,000		
	14 inch 90 elbows	2.00	EA	\$ 6,000.00	\$ 12,000	1	\$ -	\$ 12,000		
	14 inch DMJ	2.00	LS	\$ 4,500.00	\$ 9,000	1	\$ -	\$ 9,000		
Division 16 - Electrical	Electrical	1	LS	\$ 350,000.00	\$ 350,000	1	\$ -	\$ 350,000		
Division 17 - Instrumentation	Instrumentation	1	LS	\$ 100,000.00	\$ 100,000	1	\$ -	\$ 100,000		
	Subtotal							\$ 3,619,600		
	New Clearwells									
	Quantity	1								
	Diameter	190	ft							
	SWD	19	ft							
	Exc Depth	10	ft							
	Volume/clearwell	538704	ft3							
	Volume/clearwell	4029507	gal							
	Total Storage	4,029,507	gal							need 15-20% of plant capacity for storage (add one in the future) currently have 8 MG of storage
Division 2 - Sitework	Excavation	14243.28296	cu yd	\$15	\$ 213,700	1	\$ -	\$ 213,700		
	Hauling	11956.8871	cu yd	\$2	\$ 24,000	1	\$ -	\$ 24,000		
	Backfill	4677.773284	cu yd	\$10	\$ 46,800	1	\$ -	\$ 46,800		
	Drilled Piers	20000	VLF	\$50	\$ 1,000,000	1	\$ -	\$ 1,000,000		
Division 3 - Concrete	Concrete - Base Slab	2189.573724	cu yd	\$650	\$ 1,423,300	1	\$ -	\$ 1,423,300		
	Concrete - Curved Walls	696.3863715	cu yd	\$900	\$ 626,800	1	\$ -	\$ 626,800		
	Floor Grout	350.0354778	cu yd	\$400	\$ 140,100	1	\$ -	\$ 140,100		
Division 5 - Metals	Misc Metals	1	LS	\$50,000	\$ 50,000	1	\$ -	\$ 50,000		
	Baffle Walls	1	ls	\$250,000	\$ 250,000	1.2	\$ 50,000	\$ 300,000		
Division 15 - Piping	36" STW Clearwell Inlet Pipe (Buried)	50	LF	\$540	\$ 27,000	1.2	\$ 5,400	\$ 32,400		
	36" STW Inlet Wall Pipe	1	EA	\$3,500	\$ 3,500	1.2	\$ 700	\$ 4,200		
	36" STW Inlet Elbow (Buried)	1	EA	\$3,500	\$ 3,500	1.2	\$ 700	\$ 4,200		



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DIV	Description	Quantity	Units	Unit Cost	Material Cost	Install Factor	Install Cost	Total Cost	Cost w/ Global Markups	Comments
	36" STW Inlet Pipe Coupling (Buried)	1	EA	\$2,000	\$ 2,000	1.2	\$ 400	\$ 2,400		
	36" STW Inlet Pipe Trench	50	EA	\$100	\$ 5,000	1.2	\$ 1,000	\$ 6,000		
	36" STW Clearwell Outlet Piping (Buried)	50	LF	\$540	\$ 27,000	1.2	\$ 5,400	\$ 32,400		
	36" STW Outlet Wall Pipe	1	EA	\$3,500	\$ 3,500	1.2	\$ 700	\$ 4,200		
	36" STW Outlet Elbow (Buried)	1	EA	\$3,500	\$ 3,500	1.2	\$ 700	\$ 4,200		
	36" STW Outlet Pipe Coupling (Buried)	1	EA	\$2,000	\$ 2,000	1.2	\$ 400	\$ 2,400		
	36" STW Outlet Piping Fittings and Appurtenances (Buried)	1	LS	\$2,000	\$ 2,000	1.2	\$ 400	\$ 2,400		
	36" STW Outlet Pipe Trench	50	EA	\$100	\$ 5,000	1.2	\$ 1,000	\$ 6,000		
Division 16 - Electrical	Electrical	1	LS	\$75,000	\$ 75,000	1	\$ -	\$ 75,000		
Division 17 - Instrumentation	Instrumentation	1	LS	\$150,000	\$ 150,000	1	\$ -	\$ 150,000		
	Subtotal Clearwell Cost							\$ 4,150,500		
NEW BACKWASH WASTEWATER HOLDING TANK										
	Concrete partially buried tank	610,000	gallons	\$ 1.25	\$ 762,500	1	\$ -	\$ 762,500		
	Number of tanks	1	Ea					\$ 762,500		
	Subtotal							\$ 762,500		
	SUBTOTAL TREATMENT				\$ -	1	\$ -	\$ 23,937,080		
	General Conditions		5%				\$ 1,196,920	\$ 25,134,000		
	Overhead and Profit	Subtotal	7%				\$ 1,759,400	\$ 26,893,400		
	Taxes	Subtotal	0%				\$ -	\$ 26,893,400		
	Contingency	Subtotal	20%				\$ 5,378,700	\$ 32,272,100		
	Engineering and Admin	Subtotal	15%				\$ 4,840,900	\$ 37,113,000		
	Allowance during construction	Subtotal	2%				\$ 742,300	\$ 37,855,300		
	Total									
	New Lagoons									
	Quantity	8.00								Assumed
	Water Depth	5.30	ft							(assumed, from CDM O&M)
	Width	80.00	ft							(assumed, same as other lagoons)
	Length	115.00	ft							(assumed, same as other lagoons)
	Free Board	3.00	ft							User Input
	Over Excav.	2.00	ft							Over Excavation (assumed)
	H:V = 1:	1.00								Horizontal to vertical slope
	D	1.00	ft							Distance from grade to top of structure
	Exc. Depth	9.30	ft							Total Excavation Depth



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	Added W/L	9.30	ft							Based on side slope
Division 2 - Sitework										
	Excavation	4537.352889	cu yd	\$ 15.00	\$ 68,100	1.2	\$ 13,620	\$ 81,720		Doesn't account for sloped sides of excavation
	Hauling	2468.651296	cu yd	\$ 2.00	\$ 5,000	1.2	\$ 1,000	\$ 6,000		25% Swell Factor
	Backfill	2562.431852	cu yd	\$ 10.00	\$ 25,700	1.2	\$ 5,140	\$ 30,840		25% Swell Factor
Division 3 - Concrete										
	Concrete - 12" Base Slab	340.7407407	cu yd	\$ 350.00	\$ 119,300	1.2	\$ 23,860	\$ 143,160		Assumes 12" thick slab
	Concrete - 12" Straight Walls	119.8888889	cu yd	\$ 840.00	\$ 100,800	1.2	\$ 20,160	\$ 120,960		Assumes 12" thick walls,
	Concrete Ramp	25.82222222	cu yd	\$ 840.00	\$ 21,700	1.2	\$ 4,340	\$ 26,040		Assumes 12' wide, 14' long, 8.3' tall access ramp (est. concrete cost)
Division 5 - Metals										
	Misc Metals	1	LS	\$ 10,000.00	\$ 10,000	1.2	\$ 2,000	\$ 12,000		Estimated
Division 11 - Equipment										
	Sluice Gate, Stainless Steel, 24" x 24"	1	EA	\$ 1,925.00	\$ 2,000	1.2	\$ 400	\$ 2,400		Use CCES estimate, assumes material cost = 40%
Division 15 - Piping										
	24" DI Piping	40	LF	\$ 14.00	\$ 600	1.2	\$ 120	\$ 720		Assumes DI piping spans length of lagoon, divided by 2 because each
	12" DI Piping	10	LF	\$ 27.00	\$ 300	1.2	\$ 60	\$ 360		Assumes DI piping spans from road to each lagoon, divided by 2
	Fittings	1	LS	\$ 5,000.00	\$ 5,000	1.2	\$ 1,000	\$ 6,000		
	24" STW Inlet Piping (Buried)	0				1.2				
	24" STW Outlet Piping (Buried)	640	LF	\$ 100.00	\$ 64,000	1.2	\$ 12,800	\$ 76,800		Assumes decant line runs along entire width of each lagoon
	24" STW Outlet Wall Pipe	8	EA	\$ 1,750.00	\$ 14,000	1.2	\$ 2,800	\$ 16,800		Assumed 1 per lagoon
	24" STW Outlet Elbow (Buried)	8	EA	\$ 1,750.00	\$ 14,000	1.2	\$ 2,800	\$ 16,800		Assumed 1 per lagoon
	24" STW Outlet Pipe Coupling (Buried)	8	EA	\$ 750.00	\$ 6,000	1.2	\$ 1,200	\$ 7,200		Assumed 1 per lagoon
	24" STW Outlet Piping Fittings and Appurtenances (Buried)	1	LS	\$ 5,000.00	\$ 5,000	1.2	\$ 1,000	\$ 6,000		Assumed 1 per lagoon
	24" STW Outlet Pipe Trench	640	EA	\$ 100.00	\$ 64,000	1.2	\$ 12,800	\$ 76,800		
Division 16 - Electrical										
	Electrical	1	LS	\$ 20,000.00	\$ 20,000	1.2	\$ 4,000	\$ 24,000		Also see contingency below
Division 17 - Instrumentation										
	Instrumentation	1	LS	\$ 15,000.00	\$ 15,000	1.2	\$ 3,000	\$ 18,000		Also see contingency below
Sub Total per Lagoon								\$ 672,600		
Other	Stormwater Diversion	1	LS	\$ 65,000.00	\$ 65,000	1	\$ -	\$ 65,000		
Total Lagoon Cost		6	Ea					\$ 4,100,600		
Subtotal Lagoon Dewatering								\$ 4,100,600		
					\$ -	1	\$ -	\$ 4,100,600		
	General Conditions		10%				\$ 410,100	\$ 4,510,700		
	Overhead and Profit		7%				\$ 315,800	\$ 4,826,500		
	Taxes	Subtotal	0%				\$ -	\$ 4,826,500		
	Contingency	Subtotal	20%				\$ 965,300	\$ 5,791,800		
	Engineering and Admin	Subtotal	24%				\$ 1,390,100	\$ 7,181,900		
	Allowance during construction	Subtotal	3%				\$ 215,500	\$ 7,397,400		
	Total							\$ 7,397,400		



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 Checked: T Crowley
 Date: 11/25/2013

DIV	Description	Quantity	Units	Unit Cost	Material Cost	Install Factor	Install Cost	Total Cost	Cost w/ Global Markups	Comments
	New Fine Screening (2 screens at 7 mgd each)									
	Quantity	2.00								
	Height	32.00	ft							
	Width	20.00	ft							
	Length	20.00	ft							
	Over Excav.	2.00	ft							
	H:V = 1:	1.00								
	Exc. Depth	25.00	ft							
	Added W/L	9.00	ft							
		4.50	ft							
Division 2 - Sitework										
2	Excavation	280	cu yd	\$15	\$ 4,300	1	\$ -	\$ 4,300		18' SWD + 2' Freeboard (Assumed) + 12' (operating floor above screens)
2	Hauling	74	cu yd	\$2	\$ 200	1	\$ -	\$ 200		20' per screen (similar to other screens)
2	Backfill	221	cu yd	\$10	\$ 2,300	1	\$ -	\$ 2,300		20' per screen (similar to other screens)
2	Drilled Piers	9	EA	\$3,000	\$ 27,000	1	\$ -	\$ 27,000		Over Excavation (assumed)
					\$ -	1	\$ -	\$ -		Horizontal to vertical slope
					\$ -	1	\$ -	\$ -		Distance from grade to top of structure (estimated)
Division 3 - Concrete										
	Concrete - 20" Base Slab	25	cu yd	\$500	\$ 12,400	1	\$ -	\$ 12,400		Total Excavation Depth
	Concrete Walls - Exterior	95	cu yd	\$840	\$ 79,700	1	\$ -	\$ 79,700		Based on side slope
	Concrete Walls - Interior walls	22	cu yd	\$840	\$ 18,700	1	\$ -	\$ 18,700		
	Operating Floor	15	cu yd	\$404	\$ 6,000	1	\$ -	\$ 6,000		
	Roof	15	cu yd	\$404	\$ 6,000	1	\$ -	\$ 6,000		Doesn't account for sloped sides of excavation
					\$ -	1	\$ -	\$ -		25% Swell Factor, hauling to or from site
					\$ -	1	\$ -	\$ -		25% Swell Factor
Division 11 - Equipment										
	Screen Mechanism	2	EA	\$190,000	\$ 380,000	1.2	\$ 76,000	\$ 456,000		
					\$ -	1	\$ -	\$ -		
Division 15 - Piping										
	36" STW Inlet Piping (Buried)	120	LF	\$200	\$ 24,000	1	\$ -	\$ 24,000		Assumes 20" thick slab on grade
	36" STW Inlet Wall Pipe	2	EA	\$3,500	\$ 7,000	1	\$ -	\$ 7,000		12" thick wall, cost from CCES for straight 12" wall, >8' tall
	36" STW Inlet Elbow (Buried)	2	EA	\$3,500	\$ 7,000	1	\$ -	\$ 7,000		12" thick interior wall running along the width of each screen
	36" STW Inlet Pipe Coupling (Buried)	2	EA	\$2,000	\$ 4,000	1	\$ -	\$ 4,000		Elevated Slab - 12" thick, cost from CCES
	36" STW Inlet Piping Fittings and Appurtenances (Buried)	2	LS	\$2,000	\$ 4,000	1	\$ -	\$ 4,000		Elevated Slab - 12" thick, cost from CCES
	36" STW Inlet Pipe Trench	120	EA	\$150	\$ 18,000	1	\$ -	\$ 18,000		
					\$ -	1	\$ -	\$ -		
Division 16 - Electrical										
	Electrical	1	LS	\$50,000	\$ 50,000	1	\$ -	\$ 50,000		Estimated
Division 17 - Instrumentation										
	Instrumentation	1	LS	\$25,000	\$ 25,000	1	\$ -	\$ 25,000		Estimated per Figure 7.1
					\$612,000					
	Subtotal for New Intake Screen(s)				\$612,000					
	Intake Screen(s) Cost		#	2	\$1,224,000			\$ 1,224,000		
								\$ -		
	Piping Subtotal				\$64,000			\$ 64,000		



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DIV	Description	Quantity	Units	Unit Cost	Material Cost	Install Factor	Install Cost	Total Cost	Cost w/ Global Markups	Comments	
Total for New Intake Screen(s)					\$1,288,000	1	\$ -	\$ 1,288,000			
New Pre-Ozone Contactor (additional train at 15 mgd)											
	Height	21.00	ft							1 Train @ 15 mgd 18' min depth and 3' freeboard, and min contact time = 10 minutes (per O Includes space for 10' access hatch Includes space for 6' influent/effluent chambers Over Excavation (assumed) Horizontal to vertical slope Distance from grade to top of structure Total Excavation Depth Based on side slope	
	Width	65.00	ft								
	Length	65.00	ft								
	Over Excav.	2.00	ft								
	H:V = 1:	1.00									
	D	1.00	ft								
	Exc. Depth	22.00	ft								
	Added W/L	11.00	ft								
Division 2 - Sitework											
	Excavation	4040.67	cu yd	\$ 15	\$ 60,700	1	\$ -	\$ 60,700			Doesn't account for sloped sides of excavation 25% Swell Factor 25% Swell Factor
	Hauling	1370.39	cu yd	\$ 2	\$ 2,800	1	\$ -	\$ 2,800			
	Backfill	2944.35	cu yd	\$ 10	\$ 29,500	1	\$ -	\$ 29,500			
	Drilled Piers	40.00	EA	\$ 3,000	\$ 120,000	1	\$ -	\$ 120,000			
Division 3 - Concrete											
	Concrete - 20" Base Slab	140.43	cu yd	\$ 500	\$ 70,300	1	\$ -	\$ 70,300		Assumes 20" thick slab on grade 12" thick wall, cost from CCES for straight 12" wall, >8' tall 12" thick baffle walls spaced at 5' (less influent and effluent channels, and 10' access corridor), cost from CCES for 8" straight wall >8' tall, assumes flow depth = 3' lower than total wall height Elevated Slab - 12" thick, cost from CCES	
	Concrete Walls - Exterior	155.56	cu yd	\$ 840	\$ 130,700	1	\$ -	\$ 130,700			
	Concrete Walls - Interior Baffle walls	16.67	cu yd	\$ 840	\$ 14,000	1	\$ -	\$ 14,000			
	Roof	84.26	cu yd	\$ 404	\$ 34,100	1	\$ -	\$ 34,100			
Division 8 - Doors and Windows											
	Doors and Windows	1.00	LS	\$ 5,000	\$ 5,000	1	\$ -	\$ 5,000			
Division 11 - Equipment											
	Ozone Diffusers and Piping	1.00	LS	\$ 35,000	\$ 35,000	1.2	\$ 7,000	\$ 42,000			
	Ozone Destruct Units	2.00	EA	\$ 25,000	\$ 50,000	1.1	\$ 5,000	\$ 55,000			
	Nitrogen Purge System	1.00	EA	\$ 35,000	\$ 35,000	1.1	\$ 3,500	\$ 38,500			
Division 15 - Piping											
	Piping	1.00	LS	\$ 30,000	\$ 30,000	1	\$ -	\$ 30,000		Assumption, similar to McBaine WTP estimate (accounts for LOX piping, and general piping)	
Division 16 - Electrical											
	Electrical	1.00	LS	\$ 25,000	\$ 25,000	1	\$ -	\$ 25,000		Similar to McBaine WTP est.	
Division 17 - Instrumentation											
	Instrumentation	1.00	LS	\$ 25,000	\$ 25,000	1	\$ -	\$ 25,000		Similar to McBaine WTP est.	
Subtotal for New Pre-Ozone Contactor								\$ 682,600			
New Pre-Ozone Generation Building and LOX Storage 15 mgd											
	Height	12.00	ft							Assumed building size for new ozone generation system	
	Width	30.00	ft								



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DIV	Description	Quantity	Units	Unit Cost	Material Cost	Install Factor	Install Cost	Total Cost	Cost w/ Global Markups	Comments
	Length	65.00	ft							
	Over Excav.	2.00	ft							Over Excavation (assumed)
		1.00								Horizontal to vertical slope
		H:V = 1: D 10.00	ft							Distance from grade to top of structure
	Exc. Depth	4.00	ft							Total Excavation Depth
		Added W/L 2.00	ft							Based on side slope
Division 2 - Sitework	Excavation	347.56	cu yd	\$ 15	\$ 5,300	1	\$ -	\$ 5,300		Doesn't account for sloped sides of excavation
	Hauling	117.08	cu yd	\$ 2	\$ 300	1	\$ -	\$ 300		25% Swell Factor
	Backfill	253.89	cu yd	\$ 10	\$ 2,600	1	\$ -	\$ 2,600		25% Swell Factor
	Drilled Piers	32.00	EA	\$ 3,000	\$ 96,000	1	\$ -	\$ 96,000		
Division 3 - Concrete				\$ -	\$ -	1	\$ -	\$ -		
	Concrete - 12" Base Slab	72.22	cu yd	\$ 350	\$ 25,300	1	\$ -	\$ 25,300		Assumes 12" thick slab on grade, cost from CCES
	Concrete Walls - Exterior	84.44	cu yd	\$ 840	\$ 71,000	1	\$ -	\$ 71,000		12" thick wall, cost from CCES for straight 12" wall, >8' tall
Division 8 - Doors and Windows				\$ -	\$ -	1	\$ -	\$ -		
	Doors and Windows	1.00	LS	\$ 15,000	\$ 15,000	1	\$ -	\$ 15,000		
Division 11 - Equipment				\$ -	\$ -	1	\$ -	\$ -		
	650 lb/d Ozone Generator and Power Supply Unit	1.00	EA	\$ 1,119,186	\$ 1,119,200	1	\$ -	\$ 1,119,200		Using 2/3 Rule on \$1,013,333 per 560 lb/day Generator
	LOX Storage Tanks - 10,000 gal and Vaporizers	1.00	EA	\$ 351,046	\$ 351,100	1	\$ -	\$ 351,100		Using 2/3 Rule on \$460,000 for 15,000 gal tanks and vaporizers
	Diffusers	1.00	LS	\$ 100,000	\$ 100,000	1	\$ -	\$ 100,000		from McBaine WTP estimate, transformed to 2013 dollars @ 3%
	Destruct Unit	1	LS	\$ 50,000	\$ 50,000	1	\$ -	\$ 50,000		from McBaine WTP estimate, transformed to 2013 dollars @ 3%
	Installation of Equipment (% of total equipment cost)	0.2	%	\$ 1	\$ 100	1	\$ -	\$ 100		
Division 15 - Piping				\$ -	\$ -	1	\$ -	\$ -		
	Piping	1	LS	\$ 185,000	\$ 185,000	1	\$ -	\$ 185,000		Assumption, similar to McBaine WTP estimate (accounts for LOX piping, and general piping)
Division 16 - Electrical				\$ -	\$ -	1	\$ -	\$ -		
	Electrical	1	LS	160000	\$ 160,000	1	\$ -	\$ 160,000		Similar to McBaine WTP est.
Division 17 - Instrumentation				\$ -	\$ -	1	\$ -	\$ -		
	Instrumentation	1	LS	160000	\$ 160,000	1	\$ -	\$ 160,000		Similar to McBaine WTP est.
Subtotal for Generation Building								\$ 2,340,900		
New RM Basins (1@15 mgd)										
	Quantity	2.00								24' SWD + 2' Freeboard
	Height	26.00	ft							7.45' square basin with 12" weir wall and 24" effluent chamber
	Width	7.45	ft							
	Length	10.45	ft							
	Over Excav.	2.00	ft							Over Excavation (assumed)
		1.00								Horizontal to vertical slope
		H:V = 1: D 8.00	ft							Distance from grade to top of structure (estimated)
	Exc. Depth	20.00	ft							Total Excavation Depth
		Added W/L 10.00	ft							Based on side slope
Division 2 - Sitework	Excavation	619.15	cu yd	\$ 15	\$ 9,300	1	\$ -	\$ 9,300		Doesn't account for sloped sides of excavation
	Hauling	112.39	cu yd	\$ 2	\$ 300	1	\$ -	\$ 300		25% Swell Factor, hauling to or from site



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DIV	Description	Quantity	Units	Unit Cost	Material Cost	Install Factor	Install Cost	Total Cost	Cost w/ Global Markups	Comments
	Backfill	709.06	cu yd	\$ 10	\$ 7,100	1	\$ -	\$ 7,100		
	Drilled Piers	6.00	EA	\$ 3,000	\$ 18,000	1	\$ -	\$ 18,000		
					\$ -	1	\$ -	\$ -		
					\$ -	1	\$ -	\$ -		
Division 3 - Concrete	Concrete - 20" Base Slab	4.81	cu yd	\$ 500	\$ 2,500	1	\$ -	\$ 2,500		Assumes 20" thick slab on grade
	Concrete Walls - Exterior	34.47	cu yd	\$ 840	\$ 29,000	1	\$ -	\$ 29,000		12" thick wall, cost from CCES for straight 12" wall, >8' tall
	Concrete Walls - Interior Baffle walls	6.62	cu yd	\$ 840	\$ 5,600	1	\$ -	\$ 5,600		12" thick weir wall
Division 5 Metals	Miscellaneous Metals	1.00	LS	\$ 20,000	\$ 20,000	1	\$ -	\$ 20,000		Estimated per Figure 7.1
Division 11 - Equipment	Rapid Mix Devices	1.00	Ea	\$ 90,000	\$ 90,000	1.2	\$ 18,000	\$ 108,000		
	Automated Wier Gates	2.00	ea	\$ 23,000	\$ 46,000	1.2	\$ 9,200	\$ 55,200		
Division 15 - Piping	24" STW Inlet Piping (Buried)	120.00	LF	\$ 100	\$ 12,000	1	\$ -	\$ 12,000		Estimated per Figure 7.1
	24" STW Inlet Wall Pipe	2.00	EA	\$ 2,500	\$ 5,000	1	\$ -	\$ 5,000		
	24" STW Inlet Elbow (Buried)	2.00	EA	\$ 2,500	\$ 5,000	1	\$ -	\$ 5,000		
	24" STW Inlet Pipe Coupling (Buried)	2.00	EA	\$ 1,000	\$ 2,000	1	\$ -	\$ 2,000		
	24" STW Inlet Piping Fittings and Appurtenances (Buried)	2.00	LS	\$ 1,000	\$ 2,000	1	\$ -	\$ 2,000		
	24" STW Inlet Pipe Trench	120.00	EA	\$ 100	\$ 12,000	1	\$ -	\$ 12,000		
	24" STW Outlet Piping (Buried)	170.00	LF	\$ 100	\$ 17,000	1	\$ -	\$ 17,000		
	24" STW Outlet Wall Pipe	2.00	EA	\$ 2,500	\$ 5,000	1	\$ -	\$ 5,000		Estimated for each RM Basin
	24" STW Outlet Elbow (Buried)	2.00	EA	\$ 2,500	\$ 5,000	1	\$ -	\$ 5,000		
	24" STW Outlet Pipe Coupling (Buried)	2.00	EA	\$ 1,000	\$ 2,000	1	\$ -	\$ 2,000		Estimated for each RM Basin
	24" STW Outlet Piping Fittings and Appurtenances (Buried)	2.00	LS	\$ 1,000	\$ 2,000	1	\$ -	\$ 2,000		
	24" STW Outlet Pipe Trench	170.00	EA	\$ 100	\$ 17,000	1	\$ -	\$ 17,000		
Division 16 - Electrical	Electrical	1.00	LS	\$ 50,000	\$ 50,000	1	\$ -	\$ 50,000		
Division 17 - Instrumentation	Instrumentation	1.00	LS	\$ 15,000	\$ 15,000	1	\$ -	\$ 15,000		
Subtotal for New RM Basin								\$ 406,000		
New Presed Basins (2@7 mgd)										
	Quantity	2								Each rated at 10 MGD
	Diameter, ft	80								
	SWD, ft	16								
	Exc Depth, ft	12								
		0.64								
Division 2 - Sitework	Excavation	6784.00	cu yd	\$ 15	\$ 101,800	1	\$ -	\$ 101,800		Assumes excavation at 1:1 slope, 2 foot overexcavation
	Hauling	4864.00	cu yd	\$ 2	\$ 9,800	1	\$ -	\$ 9,800		25% Swell Factor
	Backfill	2944.00	cu yd	\$ 10	\$ 29,500	1	\$ -	\$ 29,500		
	Drilled Piers	6144.00	VLF	\$ 50	\$ 307,200	1	\$ -	\$ 307,200		
Division 3 - Concrete	Concrete - Base Slab	806.40	cu yd	\$ 500	\$ 403,200	1	\$ -	\$ 403,200		Assumes 24" thick slab



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DIV	Description	Quantity	Units	Unit Cost	Material Cost	Install Factor	Install Cost	Total Cost	Cost w/ Global Markups	Comments
	Concrete - Curved Walls	504.00	cu yd	\$ 750	\$ 378,000	1	\$ -	\$ 378,000		Assumes 18" thick walls, 2' freeboard
	Floor Grout	124.16	cu yd	\$ 400	\$ 49,700	1	\$ -	\$ 49,700		
Division 5 - Metals	Misc Metals	2.00	LS	\$ 30,000	\$ 60,000	1	\$ -	\$ 60,000		
Division 11 - Equipment	Clarifier Mechanism	2.00	EA	\$ 300,000	\$ 600,000	1.5	\$ 300,000	\$ 900,000		Per CCES for 100' diameter clarifier mechanism
Division 15 - Piping	Misc Piping	1.00	LS	\$ 30,000	\$ 30,000	1	\$ -	\$ 30,000		
	24" STW Inlet Piping (Buried)	300.00	LF	\$ 100	\$ 30,000	1	\$ -	\$ 30,000		
	24" STW Inlet Wall Pipe	2.00	EA	\$ 2,500	\$ 5,000	1	\$ -	\$ 5,000		
	24" STW Inlet Elbow (Buried)	2.00	EA	\$ 2,500	\$ 5,000	1	\$ -	\$ 5,000		
	24" STW Inlet Pipe Coupling (Buried)	2.00	EA	\$ 1,000	\$ 2,000	1	\$ -	\$ 2,000		
	24" STW Inlet Piping Fittings and Appurtenances (Buried)	2.00	LS	\$ 1,000	\$ 2,000	1	\$ -	\$ 2,000		
	24" STW Inlet Pipe Trench	300.00	EA	\$ 100	\$ 30,000	1	\$ -	\$ 30,000		
	24" STW Outlet Piping (Buried)	300.00	LF	\$ 100	\$ 30,000	1	\$ -	\$ 30,000		
	24" STW Outlet Wall Pipe	2.00	EA	\$ 2,500	\$ 5,000	1	\$ -	\$ 5,000		
	24" STW Outlet Elbow (Buried)	2.00	EA	\$ 2,500	\$ 5,000	1	\$ -	\$ 5,000		
	24" STW Outlet Pipe Coupling (Buried)	2.00	EA	\$ 1,000	\$ 2,000	1	\$ -	\$ 2,000		
	24" STW Outlet Piping Fittings and Appurtenances (Buried)	2.00	LS	\$ 1,000	\$ 2,000	1	\$ -	\$ 2,000		
	24" STW Outlet Pipe Trench	300.00	EA	\$ 100	\$ 30,000	1	\$ -	\$ 30,000		
	24" Precast Flow Control Vault	2.00	EA	\$ 50,000	\$ 100,000	1.3	\$ 30,000	\$ 130,000		
	24" Butterfly Control valve	2.00	EA	\$ 21,000	\$ 42,000	1.3	\$ 12,600	\$ 54,600		
Division 16 - Electrical	Electrical	1.00	LS	\$ 90,000	\$ 90,000	1	\$ -	\$ 90,000		Also see contingency below
Division 17 - Instrumentation	Programming	1.00	LS	\$ 40,000	\$ 40,000	1	\$ -	\$ 40,000		Also see contingency below
	24 inch flowmeters	2.00	EA	\$ 18,000	\$ 36,000	1.2	\$ 7,200	\$ 43,200		
	Subtotal Presedimentation Basins							\$ 2,775,000		
	New Lime System/Chem Bldg									
	Height	12.00	ft							Assumed building size for new lime and chemical systems
	Width	40.00	ft							
	Length	80.00	ft							
	Over Excav.	2.00	ft							
	H:V = 1:	1.00								Over Excavation (assumed)
	D	1.00	ft							Horizontal to vertical slope
	Exc. Depth	13.00	ft							Distance from grade to top of structure
	Added W/L	6.50	ft							Total Excavation Depth
										Based on side slope
Division 2 - Sitework	Excavation	2373.22	cu yd	\$ 15	\$ 35,600	1	\$ -	\$ 35,600		Doesn't account for sloped sides of excavation
	Hauling	1295.41	cu yd	\$ 2	\$ 2,600	1	\$ -	\$ 2,600		25% Swell Factor
	Backfill	1336.90	cu yd	\$ 10	\$ 13,400	1	\$ -	\$ 13,400		25% Swell Factor
	Drilled Piers	45.00	EA	\$ 3,000	\$ 135,000	1	\$ -	\$ 135,000		
Division 3 - Concrete										



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DIV	Description	Quantity	Units	Unit Cost	Material Cost	Install Factor	Install Cost	Total Cost	Cost w/ Global Markups	Comments
	Concrete - 12" Base Slab	118.52	cu yd	\$ 350	\$ 41,500	1	\$ -	\$ 41,500		Assumes 12" thick slab on grade, cost from CCES 12" thick wall, cost from CCES for straight 12" wall, >8' tall 12" thick baffle walls spaced at 8', cost from CCES for 8" straight wall >8' tall, assumes flow depth = 3' lower than total wall height Elevated Slab - 12" thick, cost from CCES
	Concrete Walls - Exterior	106.67	cu yd	\$ 840	\$ 89,600	1	\$ -	\$ 89,600		
	Concrete Walls - Interior Baffle walls	88.89	cu yd	\$ 840	\$ 74,700	1	\$ -	\$ 74,700		
	Roof	118.52	cu yd	\$ 404	\$ 47,900	1	\$ -	\$ 47,900		
Division 8 - Doors and Windows	Doors and Windows	1.00	LS	\$ 5,000	\$ 5,000	1	\$ -	\$ 5,000		
Division 11 - Equipment		1.00								Based on quote from Prominent Fluid Controls 7/18/13, for ProMix-M with "C" controls, model M_0-1500x2-5.0PB @ \$35,000 (most expensive)
	New Coagulant Polymer Feed System	1.00	EA	\$ 35,000	\$ 35,000	1	\$ -	\$ 35,000		Assumed similar to Phos. Acid feed
	New Coagulant Alum Feed System	1.00	EA	\$ 10,000	\$ 10,000	1	\$ -	\$ 10,000		TOC Estimate (2-14-13)
	New Lime System/Silos	1.00	LS	\$ 1,750,000	\$ 1,750,000	1.5	\$ 875,000	\$ 2,625,000		Based on quote from TOMCO2 for Norman WTP, using 2/3 rule for 1920
	New CO2 System (3 vaporizers @ 5,900 lb/day)	1.00	LS	\$ 912,290	\$ 912,300	1.2	\$ 182,460	\$ 1,094,760		with "C" controls, model M_0-1500x2-5.0PB @ \$35,000 (most expensive)
	New Filter Aid Polymer Feed System	1.00	EA	\$ 35,000	\$ 35,000	1	\$ -	\$ 35,000		Based on quote from EI2 6/18/13
	New Phosphoric Acid Feed System	1.00	EA	\$ 10,000	\$ 10,000	1	\$ -	\$ 10,000		2/3 rule based on quote from macaulay control company, for a three duco
	New LAS Feed System	1.00	EA	\$ 19,079	\$ 19,100	1	\$ -	\$ 19,100		2/3 rule based on quote from PSI for 2x1600 ppd generator system
	New OSHG System (3 generators @ 1,000 ppd)	0.50	LS	\$ 1,012,486	\$ 506,300	1.5	\$ 253,150	\$ 759,450		Bulk tank for LAS and Alum coagulant (cost is for a 6,500 gallon FRP tank)
	New Chemical Tanks	1.00	EA	\$ 28,000	\$ 28,000	1	\$ -	\$ 28,000		Assumed Installation Cost
Division 15 - Piping	Piping	1.00	LS	\$ 350,000	\$ 350,000	1	\$ -	\$ 350,000		Assumption
Division 16 - Electrical	Electrical	1.00	LS	\$ 200,000	\$ 200,000	1	\$ -	\$ 200,000		Also see contingency below
Division 17 - Instrumentation	Instrumentation	1.00	LS	\$ 100,000	\$ 100,000	1	\$ -	\$ 100,000		Also see contingency below
Subtotal for New Chem/RM Building								\$ 5,711,610		
Solids Contact Clarifiers										
	Quantity	2	ea							
	Diameter, ft	80	ft							
	SWD, ft	15	ft							
	Exc Depth, ft	12	ft							
		0.64								
Division 2 - Sitework	Excavation	6774.45	cu yd	\$ 15	\$ 101,700	1	\$ -	\$ 101,700		
	Hauling	4864.30	cu yd	\$ 2	\$ 9,800	1	\$ -	\$ 9,800		
	Backfill	2883.00	cu yd	\$ 10	\$ 28,900	1	\$ -	\$ 28,900		
	Drilled Piers	6400.00	VLF	\$ 50	\$ 320,000	1	\$ -	\$ 320,000		
Division 3 - Concrete	Concrete - Base Slab	805.44	cu yd	\$ 500	\$ 402,800	1	\$ -	\$ 402,800		
	Concrete - Curved Walls	474.73	cu yd	\$ 750	\$ 356,100	1	\$ -	\$ 356,100		
	Floor Grout	124.11	cu yd	\$ 400	\$ 49,700	1	\$ -	\$ 49,700		
Division 5 - Metals	Misc Metals	2.00	LS	\$ 40,000	\$ 80,000	1	\$ -	\$ 80,000		
Division 11 - Equipment										



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DIV	Description	Quantity	Units	Unit Cost	Material Cost	Install Factor	Install Cost	Total Cost	Cost w/ Global Markups	Comments
	Sludge Collector Mechanism	2.00	EA	\$ 551,769	\$ 1,103,600	1.5	\$ 551,800	\$ 1,655,400		
	Sludge Collector Mechanism - Installation	1.00	LS	\$ 55,177	\$ 55,200	1	\$ -	\$ 55,200		
Division 15 - Piping	Piping	1.00	LS	\$ 30,000	\$ 30,000	1	\$ -	\$ 30,000		
	24" STW Inlet Piping (Buried)	300	LF	\$100	\$ 30,000	1	\$ -	\$ 30,000		
	24" STW Inlet Wall Pipe	2	EA	\$2,500	\$ 5,000	1	\$ -	\$ 5,000		
	24" STW Inlet Elbow (Buried)	2	EA	\$2,500	\$ 5,000	1	\$ -	\$ 5,000		
	24" STW Inlet Pipe Coupling (Buried)	2	EA	\$1,000	\$ 2,000	1	\$ -	\$ 2,000		
	24" STW Inlet Piping Fittings and Appurtenances (Buried)	2	LS	\$1,000	\$ 2,000	1	\$ -	\$ 2,000		
	24" STW Inlet Pipe Trench	300	EA	\$100	\$ 30,000	1	\$ -	\$ 30,000		
	24" STW Outlet Piping (Buried)	300	LF	\$100	\$ 30,000	1	\$ -	\$ 30,000		
	24" STW Outlet Wall Pipe	2	EA	\$2,500	\$ 5,000	1	\$ -	\$ 5,000		
	24" STW Outlet Elbow (Buried)	2	EA	\$2,500	\$ 5,000	1	\$ -	\$ 5,000		
	24" STW Outlet Pipe Coupling (Buried)	2	EA	\$1,000	\$ 2,000	1	\$ -	\$ 2,000		
	24" STW Outlet Piping Fittings and Appurtenances (Buried)	2	LS	\$1,000	\$ 2,000	1	\$ -	\$ 2,000		
	24" STW Outlet Pipe Trench	300	EA	\$100	\$ 30,000	1	\$ -	\$ 30,000		
	Valve Replacements/Improvements	1	LS	\$75,000	\$ 75,000	1	\$ -	\$ 75,000		
Division 16 - Electrical	Electrical	1.00	LS	\$ 125,000	\$ 125,000	1	\$ -	\$ 125,000		
Division 17 - Instrumentation	Instrumentation	1.00	LS	\$ 80,000	\$ 80,000	1	\$ -	\$ 80,000		
	Solids Contact Clarifier(s) Cost							\$ 3,517,600		
	New Post-Ozone Contactor (1 @ 15 mgd)									
	Height	21.00								1 Train @ 15 mgd
	Width	65.00								18' min depth and 3' freeboard, and min contact time = 10 minutes (per O
	Length	65.00								Includes space for 10' access hatch
	Over Excav.	2.00								Includes space for 6' influent/effluent chambers
	H:V = 1:	1.00								Over Excavation (assumed)
	D	1.00								Horizontal to vertical slope
	Exc. Depth	22.00								Distance from grade to top of structure
	Added W/L	11.00								Total Excavation Depth
										Based on side slope
Division 2 - Sitework	Excavation	4040.666667	cu yd	\$ 15	\$ 60,700	1	\$ -	\$ 60,700		Doesn't account for sloped sides of excavation
	Hauling	1370.393519	cu yd	\$ 2	\$ 2,800	1	\$ -	\$ 2,800		25% Swell Factor
	Backfill	2944.351852	cu yd	\$ 10	\$ 29,500	1	\$ -	\$ 29,500		25% Swell Factor
	Drilled Piers	40	EA	\$ 3,000	\$ 120,000	1	\$ -	\$ 120,000		
				\$ -	\$ -	1	\$ -	\$ -		
				\$ -	\$ -	1	\$ -	\$ -		
Division 3 - Concrete	Concrete - 20" Base Slab	140.4320988	cu yd	\$ 500	\$ 70,300	1	\$ -	\$ 70,300		Assumes 20" thick slab on grade
	Concrete Walls - Exterior	155.5555556	cu yd	\$ 840	\$ 130,700	1	\$ -	\$ 130,700		12" thick wall, cost from CCES for straight 12" wall, >8' tall
	Concrete Walls - Interior Baffle walls	16.66666667	cu yd	\$ 840	\$ 14,000	1	\$ -	\$ 14,000		12" thick baffle walls spaced at 5' (less influent and effluent channels, and 10' access corridor), cost from CCES for 8" straight wall >8' tall, assumes flow depth = 3' lower than total wall height



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DIV	Description	Quantity	Units	Unit Cost	Material Cost	Install Factor	Install Cost	Total Cost	Cost w/ Global Markups	Comments
	Roof	84.25925926	cu yd	\$ 404	\$ 34,100	1	\$ -	\$ 34,100		Elevated Slab - 12" thick, cost from CCES
Division 5	Miscellaneous Metals									
	Miscellaneous Metals	1	LS	\$ 25,000	\$ 25,000	1	\$ -	\$ 25,000		
Division 11	Equipment									
	Ozone Diffusers and Piping	1.00	LS	\$ 55,000	\$ 55,000	1.2	\$ 11,000	\$ 66,000		
	Ozone Destruct Units	2.00	EA	\$ 50,000	\$ 100,000	1.1	\$ 10,000	\$ 110,000		
	Nitrogen Purge System	1.00	EA	\$ 35,000	\$ 35,000	1.1	\$ 3,500	\$ 38,500		
Division 15	Piping									
	Piping (Ozone)	1	LS	\$ 25,000	\$ 25,000	1	\$ -	\$ 25,000		Assumption, similar to McBaine WTP estimate (accounts for LOX piping, Estimated to route flow to filter building (adjacent to contactor)
	Piping (Process)	1	LS	\$ 50,000	\$ 50,000	1	\$ -	\$ 50,000		
Division 16	Electrical									
	Electrical	\$1	LS	\$ 100,000	\$ 100,000	1	\$ -	\$ 100,000		Similar to McBaine WTP est.
Division 17	Instrumentation									
	Instrumentation	1	LS	\$ 40,000	\$ 40,000	1	\$ -	\$ 40,000		Similar to McBaine WTP est. Similar to McBaine WTP est.
	Subtotal							\$ 916,600		
	New Filters (15 mgd)									
	Design Flow	15.00	MGD							
	Filter Rate	6.00	gpm/ft2							
	Price/ft2 of filter Area	\$3,136	\$/ft2							
	Required Active Filter Area	1736	ft2							
	Filter Banks	6.00								
	Filters off/BW	1.00								
	Required Area/Filter	347	ft2							
	Filter Width	15.00	ft							
	Filter Length	30.00	ft							
	Area/Filter	450	ft2							
	Total Filter Area	2700	ft2							
	Total Filter Area	2250	ft2							
	Filter MGD	15	mgd	\$ 0.5				\$ 7,500,000		
	Expand HSPS from 30 to 54 mgd									
	Height	24.00	ft							15' min depth per ODEQ
	Width	25.00	ft							from New Req'd Lag. Space Tab
	Length	35.00	ft							from New Req'd Lag. Space Tab
	Over Excav.	2.00	ft							Over Excavation (assumed)
	H:V = 1:	1.00								Horizontal to vertical slope
	D	14.00	ft							Distance from grade to top of structure
	Exc. Depth	12.00	ft							Total Excavation Depth
	Added W/L	6.00	ft							Based on side slope



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Division 2 - Sitework										
	Excavation	65	cu yd	\$ 15.00	\$ 1,000	1	\$ -	\$ 1,000		Doesn't account for sloped sides of excavation 25% Swell Factor 25% Swell Factor
	Hauling	45	cu yd	\$ 2.00	\$ 100	1	\$ -	\$ 100		
	Backfill	35	cu yd	\$ 10.00	\$ 400	1	\$ -	\$ 400		
	Drilled Piers	1250	VLF	\$ 50.00	\$ 62,500	1	\$ -	\$ 62,500		
Division 3 - Concrete										
	Concrete - 24" Base Slab	133.3333333	cu yd	\$ 900.00	\$ 120,000	1	\$ -	\$ 120,000		Assumes 24 thick slab on grade, cost from CCES
Division 4 -15 Building										
	Generation Building	1,800	LS	\$ 300.00	\$ 540,000	1	\$ -	\$ 540,000		
Division 5 - Metals										
	Miscellaneous Metals	1	LS	\$ 75,000.00	\$ 75,000	1	\$ -	\$ 75,000		
Division 11 - Equipment										
	24 inch suction cans	3	EA	\$ 35,000.00	\$ 105,000	1.2	\$ 21,000	\$ 126,000		2 pumps 6 mgd at 125 psig 2 MW Generator for emergency services
	Vertical Turbine Pumps	3	EA	\$ 150,000.00	\$ 450,000	1.3	\$ 135,000	\$ 585,000		
	Emergency Generator	0	EA	\$ 1,500,000	\$ -	1.1	\$ -	\$ -		
Division 13 Special Construction										
	14 inch ball control valves	3	EA	\$ 23,000.00	\$ 69,000	1.2	\$ 13,800	\$ 82,800		10,000 gallon double contained
	Fuel Storage Tank	0	EA	\$ 100,000.00	\$ -	1.2	\$ -	\$ -		
Division 15 - Piping										
	Fuel Storage Piping	0	LS	\$ 30,000.00	\$ -	1	\$ -	\$ -		
	14 -inch discharge piping	90	LF	\$ 140.00	\$ 12,600	1	\$ -	\$ 12,600		
	14 -inch butterfly isolation	3	EA	\$ 8,500.00	\$ 25,500	1	\$ -	\$ 25,500		
	14-inch check valves	3.00	EA	\$ 10,000.00	\$ 30,000	1	\$ -	\$ 30,000		
	14 inch 90 elbows	3.00	EA	\$ 6,000.00	\$ 18,000	1	\$ -	\$ 18,000		
	14 inch DMJ	3.00	LS	\$ 4,500.00	\$ 13,500	1	\$ -	\$ 13,500		
Division 16 - Electrical										
	Electrical	1	LS	\$ 190,000.00	\$ 190,000	1	\$ -	\$ 190,000		
Division 17 - Instrumentation										
	Instrumentation	1	LS	\$ 50,000.00	\$ 50,000	1	\$ -	\$ 50,000		
	Subtotal							\$ 1,932,400		
New Clearwells										
	Quantity	2								need 15-20% of plant capacity for storage (add one in the future) currently have 8 MG of storage
	Diameter	100	ft							
	SWD	19	ft							
	Exc Depth	10	ft							
	Volume/clearwell	149226	ft3							
	Volume/clearwell	1116207	gal							
	Total Storage	2,232,414	gal							



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DIV	Description	Quantity	Units	Unit Cost	Material Cost	Install Factor	Install Cost	Total Cost	Cost w/ Global Markups	Comments
Division 2 - Sitework										
	Excavation	14243.28296	cu yd	\$15	\$ 213,700	1	\$ -	\$ 213,700		
	Hauling	11956.8871	cu yd	\$2	\$ 24,000	1	\$ -	\$ 24,000		
	Backfill	4677.773284	cu yd	\$10	\$ 46,800	1	\$ -	\$ 46,800		
	Drilled Piers	20000	VLF	\$50	\$ 1,000,000	1	\$ -	\$ 1,000,000		
Division 3 - Concrete										
	Concrete - Base Slab	2189.573724	cu yd	\$650	\$ 1,423,300	1	\$ -	\$ 1,423,300		
	Concrete - Curved Walls	696.3863715	cu yd	\$900	\$ 626,800	1	\$ -	\$ 626,800		
	Floor Grout	350.0354778	cu yd	\$400	\$ 140,100	1	\$ -	\$ 140,100		
Division 5 - Metals										
	Misc Metals	1	LS	\$50,000	\$ 50,000	1	\$ -	\$ 50,000		
	Baffle Walls	1	ls	\$250,000	\$ 250,000	1.2	\$ 50,000	\$ 300,000		
Division 15 - Piping										
	36" STW Clearwell Inlet Pipe (Buried)	50	LF	\$540	\$ 27,000	1.2	\$ 5,400	\$ 32,400		
	36" STW Inlet Wall Pipe	1	EA	\$3,500	\$ 3,500	1.2	\$ 700	\$ 4,200		
	36" STW Inlet Elbow (Buried)	1	EA	\$3,500	\$ 3,500	1.2	\$ 700	\$ 4,200		
	36" STW Inlet Pipe Coupling (Buried)	1	EA	\$2,000	\$ 2,000	1.2	\$ 400	\$ 2,400		
	36" STW Inlet Pipe Trench	50	EA	\$100	\$ 5,000	1.2	\$ 1,000	\$ 6,000		
	36" STW Clearwell Outlet Piping (Buried)	50	LF	\$540	\$ 27,000	1.2	\$ 5,400	\$ 32,400		
	36" STW Outlet Wall Pipe	1	EA	\$3,500	\$ 3,500	1.2	\$ 700	\$ 4,200		
	36" STW Outlet Elbow (Buried)	1	EA	\$3,500	\$ 3,500	1.2	\$ 700	\$ 4,200		
	36" STW Outlet Pipe Coupling (Buried)	1	EA	\$2,000	\$ 2,000	1.2	\$ 400	\$ 2,400		
	36" STW Outlet Piping Fittings and Appurtenances (Buried)	1	LS	\$2,000	\$ 2,000	1.2	\$ 400	\$ 2,400		
	36" STW Outlet Pipe Trench	50	EA	\$100	\$ 5,000	1.2	\$ 1,000	\$ 6,000		
Division 16 - Electrical										
	Electrical	1	LS	\$75,000	\$ 75,000	1	\$ -	\$ 75,000		
Division 17 - Instrumentation										
	Instrumentation	1	LS	\$150,000	\$ 150,000	1	\$ -	\$ 150,000		
	Subtotal Clearwell Cost							\$ 4,150,500		
	New Elevated Backwash Storage Tank	350,000	gallon	\$ 1.25	\$ 437,500	1	\$ -	\$ 437,500		
Division 11 Equipment										
	Pump Cans	2	Ea	\$ 10,000.00	\$ 20,000	1.2	\$ 4,000	\$ 24,000		
	New Backwash supply pumps	2	Eaa	\$ 50,000.00	\$ 100,000	1.2	\$ 20,000	\$ 120,000		
Division 15 Piping										
	12 inch piping buried	500	LF	\$ 180.00	\$ 90,000	1	\$ -	\$ 90,000		
	12 inch shutoff valves	4	EA	\$ 8,000.00	\$ 32,000	1	\$ -	\$ 32,000		
	12 inch check valves	2	EA	\$ 8,000.00	\$ 16,000	1	\$ -	\$ 16,000		
	10 inch ball control valves	2	EA	\$ 15,000.00	\$ 30,000	1	\$ -	\$ 30,000		
	12 inch couplings	6	EA	\$ 2,500.00	\$ 15,000	1	\$ -	\$ 15,000		
Division 16 Electrical										
		1	LS	\$ 40,000.00	\$ 40,000	1	\$ -	\$ 40,000		
Division 17 Controls										
		1	LS	\$ 20,000.00	\$ 20,000	1	\$ -	\$ 20,000		



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DIV	Description	Quantity	Units	Unit Cost	Material Cost	Install Factor	Install Cost	Total Cost	Cost w/ Global Markups	Comments
	Subtotal							\$ 5,251,600		
	NEW BACKWASH WASTEWATER HOLDING TANK									
	Concrete partially buried tank	610,000	gallons	\$ 1.25	\$ 762,500	1	\$ -	\$ 762,500		
	Number of tanks	2	Ea					\$ 1,525,000		
	Subtotal							\$ 1,525,000		
								\$ 33,847,310		
	SUBTOTAL TREATMENT				\$ -	1	\$ -	\$ 33,847,310		
	General Conditions		3%				\$ 1,015,490	\$ 34,862,800		
	Overhead and Profit		7%				\$ 2,440,400	\$ 37,303,200		
	Taxes		0%				\$ -	\$ 37,303,200		
	Contingency		20%				\$ 7,460,700	\$ 44,763,900		
	Engineering and Admin		15%				\$ 6,714,600	\$ 51,478,500		
	Allowance during construction		2%				\$ 1,029,600	\$ 52,508,100		
	NEW SLUDGE THICKENERS									
	Quantity	1	Ea							
	Diameter	50	ft							
	SWD	20	ft							
	Design Loading Rate	25	drylbs/sqft							
	Division 2 Excavation									
	Excavate for Thickeners and Pump Station	127.2635913	cuyd	\$ 15.00	\$ 2,000	1	\$ -	\$ 2,000		
	Backfill for Thickeners and pump station	42.4211971	cuyd	\$ 25.00	\$ 1,100	1	\$ -	\$ 1,100		
	Drilled Piers	2500	VLF	\$ 50.00	\$ 125,000	1	\$ -	\$ 125,000		
	Base Slab	181.8051304	cuyd	\$ 800.00	\$ 145,500	1	\$ -	\$ 145,500		
	Concrete Walls	174.5329252	cuyd	\$ 900.00	\$ 157,100	1	\$ -	\$ 157,100		
	Concrete Top Slab Pump Station connection	9.259259259	cuyd	\$ 1,200.00	\$ 11,200	1	\$ -	\$ 11,200		
	Division 4-15 Pump Station Building									
	Building	0	sqft	\$ 200.00	\$ -	1	\$ -	\$ -		
	Division 5 Metals									
	Miscellaneous Metals	1	LS	\$ 30,000	\$ 30,000	1	\$ -	\$ 30,000		
	Solids Storage Tank	100000	gal	\$ 2	\$ 175,000	1	\$ -	\$ 175,000		
	Division 11 Equipment									



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	Solids Handling Pumps	2	Ea	\$ 20,000	\$ 40,000	1.3	\$ 12,000	\$ 52,000		
	Thickener Mechanism	1	Ea	\$ 250,000	\$ 250,000	1.2	\$ 50,000	\$ 300,000		
	Tank Mixing System	0	LS	\$ 40,000	\$ -	1.2	\$ -	\$ -		
Division 13	Special Construction									
	Electric Monorail	0	LS	\$ 15,000	\$ -	1.2	\$ -	\$ -		
Division 15	Piping									
	Piping	1	LS	\$ 50,000.00	\$ 50,000	1.2	\$ 10,000	\$ 60,000		
Division 16	Electrical									
	Electrical	1	LS	\$ 800,000.00	\$ 800,000	1.2	\$ 160,000	\$ 960,000		
Division 17	Instrumentation and Control									
	Instrumentation	1	LS	\$ 25,000.00	\$ 25,000	1.2	\$ 5,000	\$ 30,000		
	Controls	1	LS	\$ 25,000.00	\$ 25,000	1.2	\$ 5,000	\$ 30,000		
	Subtotal							\$ 2,078,900		
	New Lagoons									
	Quantity	8.00								Assumed
	Water Depth	5.30	ft							(assumed, from CDM O&M)
	Width	80.00	ft							(assumed, same as other lagoons)
	Length	115.00	ft							(assumed, same as other lagoons)
	Free Board	3.00	ft							User Input
	Over Excav.	2.00	ft							Over Excavation (assumed)
	H:V = 1:	1.00								Horizontal to vertical slope
	D	1.00	ft							Distance from grade to top of structure
	Exc. Depth	9.30	ft							Total Excavation Depth
	Added W/L	9.30	ft							Based on side slope
Division 2 -	Sitework									
	Excavation	4537.352889	cu yd	\$ 15.00	\$ 68,100	1.2	\$ 13,620	\$ 81,720		Doesn't account for sloped sides of excavation
	Hauling	2468.651296	cu yd	\$ 2.00	\$ 5,000	1.2	\$ 1,000	\$ 6,000		25% Swell Factor
	Backfill	2562.431852	cu yd	\$ 10.00	\$ 25,700	1.2	\$ 5,140	\$ 30,840		25% Swell Factor
Division 3 -	Concrete									
	Concrete - 12" Base Slab	340.7407407	cu yd	\$ 350.00	\$ 119,300	1.2	\$ 23,860	\$ 143,160		Assumes 12" thick slab
	Concrete - 12" Straight Walls	119.8888889	cu yd	\$ 840.00	\$ 100,800	1.2	\$ 20,160	\$ 120,960		Assumes 12" thick walls,
	Concrete Ramp	25.82222222	cu yd	\$ 840.00	\$ 21,700	1.2	\$ 4,340	\$ 26,040		Assumes 12'wide, 14' long, 8.3' tall access ramp (est. concrete cost)
Division 5 -	Metals									
	Misc Metals	1	LS	\$ 10,000.00	\$ 10,000	1.2	\$ 2,000	\$ 12,000		Estimated
Division 11 -	Equipment									
	Sluice Gate, Stainless Steel, 24" x 24"	1	EA	\$ 1,925.00	\$ 2,000	1.2	\$ 400	\$ 2,400		Use CCES estimate, assumes material cost = 40%
Division 15 -	Piping									
	24" DI Piping	40	LF	\$ 14.00	\$ 600	1.2	\$ 120	\$ 720		Assumes DI piping spans length of lagoon, divided by 2 because each line services 2 lags. (multiplied by two for exc/bf)
	12" DI Piping	10	LF	\$ 27.00	\$ 300	1.2	\$ 60	\$ 360		Assumes DI piping spans from road to each lagoon, divided by 2 because each line services 2 lags.
	Fittings	1	LS	\$ 5,000.00	\$ 5,000	1.2	\$ 1,000	\$ 6,000		



Project Water & Wastewater System Master Plan
 City of Edmond, OK
 Cost Opinion Expansion from 40 to 54 mgd
 Full Softening Alternative No. 2
 Job Nu 8967A.00

Estimate Level:
 ENR (December 2013)

Class 4
 9667

By: R Rossell
 Date: 11/15/2012
 Checked: T Crowley
 Date: 11/25/2013

DIV	Description	Quantity	Units	Unit Cost	Material Cost	Install Factor	Install Cost	Total Cost	Cost w/ Global Markups	Comments
	24" STW Inlet Piping (Buried)	0			\$ -	1.2	\$ -	\$ -		
	24" STW Outlet Piping (Buried)	640	LF	\$ 100.00	\$ 64,000	1.2	\$ 12,800	\$ 76,800		Assumes decant line runs along entire width of each lagoon
	24" STW Outlet Wall Pipe	8	EA	\$ 1,750.00	\$ 14,000	1.2	\$ 2,800	\$ 16,800		Assumed 1 per lagoon
	24" STW Outlet Elbow (Buried)	8	EA	\$ 1,750.00	\$ 14,000	1.2	\$ 2,800	\$ 16,800		Assumed 1 per lagoon
	24" STW Outlet Pipe Coupling (Buried)	8	EA	\$ 750.00	\$ 6,000	1.2	\$ 1,200	\$ 7,200		Assumed 1 per lagoon
	24" STW Outlet Piping Fittings and Appurtenances (Buried)	1	LS	\$ 5,000.00	\$ 5,000	1.2	\$ 1,000	\$ 6,000		Assumed 1 per lagoon
	24" STW Outlet Pipe Trench	640	EA	\$ 100.00	\$ 64,000	1.2	\$ 12,800	\$ 76,800		
Division 16 - Electrical					\$ -	1.2	\$ -	\$ -		
	Electrical	1	LS	\$ 20,000.00	\$ 20,000	1.2	\$ 4,000	\$ 24,000		Also see contingency below
Division 17 - Instrumentation					\$ -	1.2	\$ -	\$ -		
	Instrumentation	1	LS	\$ 15,000.00	\$ 15,000	1.2	\$ 3,000	\$ 18,000		Also see contingency below
	Sub Total per Lagoon							\$ 672,600		
	Other Stormwater Diversion	1	LS	\$ 65,000.00	\$ 65,000	1	\$ -	\$ 65,000		
	Total Lagoon Cost	4	Ea					\$ 2,755,400		
	Subtotal Lagoon Dewatering							\$ 2,755,400		
					\$ -	1	\$ -	\$ 4,834,300		
	General Conditions		10%				\$ 483,500	\$ 5,317,800		
	Overhead and Profit		7%				\$ 372,300	\$ 5,690,100		
	Taxes		0%				\$ -	\$ 5,690,100		
	Contingency		20%				\$ 1,138,100	\$ 6,828,200		
	Engineering and Admin		24%				\$ 1,638,800	\$ 8,467,000		
	Allowance during construction		3%				\$ 254,100	\$ 8,721,100		
	Total							\$ 8,721,100		



Estimate Level:
ENR (December 2013)

Class 4
9667

Proje Water & Wastewater System Master Plan
City of Edmond, OK
Cost Estimate - Alternative No. 3 New 45 mgd Intake and 20 mgd Low Lift Pump Station

By: G. Sheehan
Date: 11/15/2012

Checked: T Crowley
Date: 11/25/2013

Job #8967A.00

DIV	Description	Quantity	Units	Unit Cost	Material Cost	Install Factor	Install Cost	Total Cost	Cost w/ Global Markups		Comments
2	Excavate for the Wet WellRock	1822.91667	cuyd	\$ 50	\$ 91,146	1	\$ -	\$ 91,146			
2	Backfill for the Wet Well	607.638889	cuyd	\$ 25	\$ 15,191	1	\$ -	\$ 15,191			
2	Drilled Piers for Pipe Foundation	3750	LF	\$ 50	\$ 187,500	1	\$ -	\$ 187,500			
2	Pile Load Testing	1	LS	\$ 10,000	\$ 10,000	1	\$ -	\$ 10,000			
	Concrete Base Slab	69.4444444	cuyd	\$ 550	\$ 38,194	1	\$ -	\$ 38,194			
	Concrete walls	291.666667	cuyd	\$ 900	\$ 262,500	1	\$ -	\$ 262,500			
	Concrete Top Slab	34.7222222	cuyd	\$ 1,100	\$ 38,194	1	\$ -	\$ 38,194			
3	Baffle Walls	12.5	cuyd	\$ 1,000	\$ 12,500	1.5	\$ 6,250	\$ 18,750			
3	Intermediate walls	5	cuyf	\$ 1,000	\$ 5,000	1.5	\$ 2,500	\$ 7,500			
3	Mezannie Floor and walls	20.8333333	cuyd	\$ 1,100	\$ 22,917	1.5	\$ 11,458	\$ 34,375			
	New Pump Station Building	1225	sf	\$ 300	\$ 367,500	1.2	\$ 73,500	\$ 441,000			
11	New Pumps 350 HP	4	Ea	\$ 60,000	\$ 240,000	1.1	\$ 24,000	\$ 264,000			
	Tee Screen	2	Ea	\$ 50,000	\$ 100,000	2	\$ 100,000	\$ 200,000			
	Tee Screen Equipment	1	LS	\$ 80,000	\$ 80,000	1.2	\$ 16,000	\$ 96,000			
13	30 inch automated valves	2	Ea	\$ 17,000	\$ 34,000	1.1	\$ 3,400	\$ 37,400			
13	18 inch automated ball valves	4	ea	\$ 12,000	\$ 48,000	1.1	\$ 4,800	\$ 52,800			
15	18 inch check valves	4	Ea	\$ 5,000	\$ 20,000	1	\$ -	\$ 20,000			
15	18 inch DMJ	4	ea	\$ 5,000	\$ 20,000	1	\$ -	\$ 20,000			
15	30 inch tees	4	ea	\$ 14,000	\$ 56,000	1	\$ -	\$ 56,000			
15	30 inch 90 elbow	4	Ea	\$ 9,000	\$ 36,000	1	\$ -	\$ 36,000			
15	30 inch buried pipe	200	LF	\$ 300	\$ 60,000	1	\$ -	\$ 60,000			
15	30 inch DMJ	4	ea	\$ 5,500	\$ 22,000	1	\$ -	\$ 22,000			
15	36 inch pipe for siphon	900	LF	\$ 500	\$ 450,000	1	\$ -	\$ 450,000			
16	New 250 HP VFD's	4	Ea	\$ 69,000	\$ 276,000	1.1	\$ 27,600	\$ 303,600			
16	New Electrical MCC	1	LS	\$ 80,000	\$ 80,000	1.2	\$ 16,000	\$ 96,000			
16	Conduit and Wire	1	LS	\$ 35,000	\$ 35,000	1.2	\$ 7,000	\$ 42,000			
17	PCM Panle	1	LS	\$ 50,000	\$ 50,000	1.2	\$ 10,000	\$ 60,000			
	Programming	1		\$ 25,000	\$ 25,000	1.2	\$ 5,000	\$ 30,000			
	Subtotal							\$ 2,990,200			
	General Conditions		15%								
	Subtotal							\$ 3,438,800			
	Overhead and Profit		7%								
	Subtotal							\$ 3,679,600			
	Taxes		7%								
	Subtotal							\$ 3,946,400			
	Contingency		50%								
	Subtotal							\$ 5,919,600			
	Engineering and Admin		25%								
	Subtotal							\$ 7,399,500			
	Allowance during construction		5%								
	Total							\$ 7,769,500			

Collection System CIP Costs

Subbasin	PROBLEM_ID	Existing Size (in.)	New_size (in.)	Length (ft)	Comment	Project Date	Demo Costs	Install Costs	Subtotal
Priority Level A									
E1	E1-1	24	36	15174.314	UPSIZE	2015	\$ 330,199.14	\$ 5,462,753.04	\$ 5,792,952.18
E3	E3-3	21	24	2365.636	PARALLEL	2020	\$ -	\$ 567,752.64	\$ 567,752.64
E3	E3-2	18	30	2080	UPSIZE	2017	\$ 18,104.74	\$ 624,000.00	\$ 642,104.74
E3	E3-4	24	24	4101.301	PARALLEL	2022	\$ -	\$ 984,312.24	\$ 984,312.24
E4	E4-1	24	36	2073.662	UPSIZE	2017	\$ 45,123.71	\$ 746,518.32	\$ 791,642.03
E4	E4-2	24	36	878	UPSIZE	2017	\$ 19,105.63	\$ 316,080.00	\$ 335,185.63
E4	E4-3	24	36	1378.401	PARALLEL	2017	\$ -	\$ 496,224.36	\$ 496,224.36
E4	E4-4	24	36	3424	UPSIZE	2017	\$ 74,507.61	\$ 1,232,640.00	\$ 1,307,147.61
E4	E4-5	30	24	538.775	PARALLEL	2017	\$ -	\$ 129,306.00	\$ 129,306.00
E5	E5-1	10	18	3382.495	UPSIZE	2013	\$ 29,441.91	\$ 608,849.10	\$ 638,291.01
E5	E5-2	15	24	3503.427	UPSIZE	2013	\$ 30,494.53	\$ 840,822.48	\$ 871,317.01
E5	E5-3	18/24	36	5770.302	UPSIZE	2013	\$ 125,564.08	\$ 2,077,308.72	\$ 2,202,872.80
E6	E6-1	15	21	2825	UPSIZE	2013	\$ 24,589.37	\$ 593,250.00	\$ 617,839.37
E6	E6-2	8	12	2667.67	UPSIZE	2013	\$ 23,219.93	\$ 320,120.40	\$ 343,340.33
E6	E6-3	8	15	1829	UPSIZE	2013	\$ 15,919.98	\$ 274,350.00	\$ 290,269.98
E6	E6-4	18	15	6264.68	PARALLEL	2017	\$ -	\$ 939,702.00	\$ 939,702.00
EW1	EW1-1	10"/12"	15	3069.956	UPSIZE	2020	\$ 26,721.51	\$ 460,493.40	\$ 487,214.91
W2	W2-1	8"/10"	18	4907.409	UPSIZE	2017	\$ 42,715.07	\$ 883,333.62	\$ 926,048.69
W2	W2-2	12	18	3415.647	UPSIZE	2017	\$ 29,730.47	\$ 614,816.46	\$ 644,546.93
W2	W2-3	21/24/30	30	3737.821	UPSIZE	2017	\$ 81,336.48	\$ 1,121,346.30	\$ 1,202,682.78
W2	W2-4	8"/10"	15	7381.936	UPSIZE	2017	\$ 64,253.85	\$ 1,107,290.40	\$ 1,171,544.25
W2	W2-5	10	15	3776.319	UPSIZE	2017	\$ 32,869.84	\$ 566,447.85	\$ 599,317.69
			15						
Priority Level B									
E1	E1-2	24"	48	7333.443	UPSIZE	2027	\$ 159,578.65	\$ 3,520,052.64	\$ 3,679,631.29
E3	E3-1	18"	15	1290	PARALLEL	2027	\$ -	\$ 193,500.00	\$ 193,500.00
EW1	EW1-2	12"-15"	21	2146.187	UPSIZE	2027	\$ 18,680.84	\$ 450,699.27	\$ 469,380.11
W1	W1-1	10"	15	715.248	UPSIZE	2027	\$ 6,225.66	\$ 107,287.20	\$ 113,512.86
W1	W1-2	18"	24	1343.06	UPSIZE	2032	\$ 11,690.26	\$ 322,334.40	\$ 334,024.66
Priority Level C									
1ST EAST	1ST-1		8	3463.447	83			\$ 221,660.61	\$ 221,660.61
1ST EAST	1ST-2		8	4024.866	97			\$ 257,591.42	\$ 257,591.42
1ST EAST	1ST-3		8	1839.629	153			\$ 117,736.26	\$ 117,736.26
1ST EAST	1ST-4		10	7868.648	174			\$ 629,491.84	\$ 629,491.84
2ND EAST	2ND-1		10	6194.43	695			\$ 495,554.40	\$ 495,554.40

2ND EAST	2ND-2		12	7097.484	333			\$ 681,358.46	\$ 681,358.46
2ND EAST	2ND-3		8	4932.721	83			\$ 315,694.14	\$ 315,694.14
2ND EAST	2ND-4		8	7302.894	132			\$ 467,385.22	\$ 467,385.22
2ND EAST	2ND-5		8	5271.393	187			\$ 337,369.15	\$ 337,369.15
2ND EAST	2ND-6		10	7710.487	222			\$ 616,838.96	\$ 616,838.96
3RD EAST	3RD-1		12	5627.733	356			\$ 540,262.37	\$ 540,262.37
3RD EAST	3RD-2		12	3398.251	696			\$ 326,232.10	\$ 326,232.10
3RD EAST	3RD-3		10	9365.173	441			\$ 749,213.84	\$ 749,213.84
3RD EAST	3RD-4		8	8160.163	104			\$ 522,250.43	\$ 522,250.43
3RD EAST	3RD-5		10	4524.33	215			\$ 361,946.40	\$ 361,946.40
3RD EAST	3RD-6		12	4362.7	321			\$ 418,819.20	\$ 418,819.20
3RD EAST	3RD-7		12	119.908	321			\$ 11,511.17	\$ 11,511.17
3RD EAST	3RD-8		12	2282.433	441			\$ 219,113.57	\$ 219,113.57
COFFEE CREEK	CC-1		8	6189.207	111			\$ 396,109.25	\$ 396,109.25
COFFEE CREEK	CC-2		10	8034.704	215			\$ 642,776.32	\$ 642,776.32
COFFEE CREEK	CC-3		10	4811.175	371			\$ 384,894.00	\$ 384,894.00
COFFEE CREEK	CC-4		8	4492.214	111			\$ 287,501.70	\$ 287,501.70
COFFEE CREEK	CC-5		8	6338.339	104			\$ 405,653.70	\$ 405,653.70
E1	E1-4		8	6544.954	118			\$ 418,877.06	\$ 418,877.06
E1	E1-5		10	7199.943	496			\$ 575,995.44	\$ 575,995.44
E1	E1-6		8	5900.755	88			\$ 377,648.32	\$ 377,648.32
E1	E1-7		8	4209.159	125			\$ 269,386.18	\$ 269,386.18
E1	E1-8		10	364.054	227			\$ 29,124.32	\$ 29,124.32
E2	E2-3		8	5927.641	133			\$ 379,369.02	\$ 379,369.02

Collection System - Lift Station Costs

Description	Units	Quantity	Unit Cost	Cost	Power Consumpt ion (hp)	Daily Operating Hours	Power (kWh/yr)	Daily Labor Hours	Comments
LS-1: New Spring Creek LS & FM									
Force Main Modifications	LS	1	\$5,500,000	\$5,500,000	0	0	0	0.0	Reference costs from Section 3.5 of <i>Spring Creek Lift Station Rehabilitation and Parallel Force Main Project CD07-0015</i> (SRB/Carollo, 2010) Costs inflated to 2013 dollars LS report states 400 hp pumps; assuming 4+1 pumps based on Carollo UPC for Hypalon Liner, with 25% install adder
New Lift Station	LS	1	\$9,900,000	\$9,900,000	1,200	24	7,831,440	1.0	
Re-lining of Overflow Storage Pond	SF	264,992	\$1.88	\$500,000	0	0	0	0	
Subtotal - LS & FM Improvements				\$ 15,900,000	1,200	24	7,831,440	1	
Subtotal 1				\$ 15,900,000					
Yard Piping		0.5%		\$ 80,000					
Paving/Grading		0.1%		\$ 16,000					
Coatings		0.2%		\$ 32,000					
Electrical		1.0%		\$ 159,000					
Instrumentation		0.6%		\$ 95,000					
Total Direct Cost				\$ 16,282,000					
ANNUAL O&M COSTS									
Power		7,831,440 kWh/yr	\$ 0.07 \$/kWhr	\$ 548,000					
Labor		260 labor hours/yr	\$ 40.00 \$/hour	\$ 10,000					
Total Annual O&M Costs				\$ 558,000					
LS-2 (New Subbasin E6 Lift Station)									
Demo of 2 existing lift stations	LS	2	\$75,000	\$150,000	0	0	0	0.0	
New Lift Station Facility	LS	1	\$1,800,000	\$1,800,000	75				
200-gpm Pumps	EA	3	\$25,000	\$75,000					
New Gravity and 6" Force Main Piping	LF	8,000	\$75	\$600,000					
Subtotal - New LS & FM				\$ 2,625,000	75	0	0	0	
Subtotal 1				\$ 2,625,000					
Yard Piping		2.0%		\$ 16,000					
Paving/Grading		3.0%		\$ 24,000					
Coatings		1.5%		\$ 12,000					
Electrical		10.0%		\$ 81,000					
Instrumentation		7.0%		\$ 57,000					
Total Direct Cost				\$ 2,815,000					
ANNUAL O&M COSTS									
Power		0,000 kWh/yr	\$ 0.07 \$/kWhr	\$ -					
Labor		0 labor hours/yr	\$ 40.00 \$/hour	\$ -					
Total Annual O&M Costs				\$ -					
LS-3 (Chisholm Creek LS Upgrades)									
New 18" Overflow Lines (to/from pond)	LF	1,000	\$150	\$150,000	0	0	0	0.0	Carollo UPC 300 ft TDH
New 2700 gpm submersible pumps	EA	3	\$70,000	\$210,000					
Lift Station Mods (i.e. weir & install of grit b	LS	1	\$10,000	\$10,000					
New, Lined 4-MG Holding Pond	SF	55,000	\$20	\$1,100,000					
Subtotal - New LS & FM				\$ 1,470,000	0	0	0	0	
Subtotal 1				\$ 1,470,000					
Yard Piping		5.0%		\$ 41,000					

Paving/Grading		3.0%		\$	24,000				
Coatings		1.5%		\$	12,000				
Electrical		0.0%		\$	-				
Instrumentation		0.0%		\$	-				
Total Direct Cost					\$ 1,547,000				
ANNUAL O&M COSTS									
Power	0,000 kWh/yr		\$ 0.07 \$/kWhr		\$ -				
Labor	0 labor hours/yr		\$ 40.00 \$/hour		\$ -				
Total Annual O&M Costs					\$ -				
LS-4(Equipment Replacement of Oak Tree West)									
Removal of Existing Pumps		LS	1	\$20,000	\$20,000				
Install of new 1100-gpm submersible pump		EA	2	\$50,000	\$100,000	40	0	0	0.0
Misc. Modifications		LS	1	\$10,000	\$10,000				
Subtotal - New LS & FM				\$	130,000	0	0	0	0
Subtotal 1					\$ 130,000				
Yard Piping		1.5%		\$	12,000				
Paving/Grading		0.8%		\$	6,000				
Coatings		1.0%		\$	8,000				
Electrical		8.0%		\$	65,000				
Instrumentation		5.0%		\$	41,000				
Total Direct Cost					\$ 262,000				
ANNUAL O&M COSTS									
Power	0,000 kWh/yr		\$ 0.07 \$/kWhr		\$ -				
Labor	0 labor hours/yr		\$ 40.00 \$/hour		\$ -				
Total Annual O&M Costs					\$ -				
LS-5 (Equipment Replacement of Oak Tree Reserve)									
Removal of Existing Pumps		LS	1	\$20,000	\$20,000				
Install of new 400-gpm submersible pumps		EA	2	\$50,000	\$100,000	50	0	0	0.0
Misc. Modifications		LS	1	\$10,000	\$10,000				
Subtotal - New LS & FM				\$	130,000	90	0	0	0
Subtotal 1					\$ 130,000				
Yard Piping		1.5%		\$	12,000				
Paving/Grading		0.8%		\$	6,000				
Coatings		1.0%		\$	8,000				
Electrical		8.0%		\$	65,000				
Instrumentation		5.0%		\$	41,000				
Total Direct Cost					\$ 262,000				
ANNUAL O&M COSTS									
Power	0,000 kWh/yr		\$ 0.07 \$/kWhr		\$ -				
Labor	0 labor hours/yr		\$ 40.00 \$/hour		\$ -				
Total Annual O&M Costs					\$ -				
LS-6 (Equipment Replacement of Memorial Rd LS)									
Removal of Existing Pumps		LS	1	\$10,000	\$10,000				

	Install of new 80-gpm submersible pumps	EA	2	\$15,000	\$30,000	20	0	0	0.0	
	Site Modifications (i.e. new fence)	LS	1	\$25,000	\$25,000					
	New Standby Generator	LS	1	\$45,000	\$45,000					
	Subtotal - New LS & FM				\$ 110,000	110	0	0	0	
Subtotal 1					\$ 110,000					
Yard Piping			2.0%		\$ 16,000					
Paving/Grading			1.0%		\$ 8,000					
Coatings			1.0%		\$ 8,000					
Electrical			5.0%		\$ 41,000					
Instrumentation			3.0%		\$ 24,000					
Total Direct Cost					\$ 207,000					
ANNUAL O&M COSTS										
Power	0,000 kWh/yr	\$	0.07 \$/kWhr		\$ -					
Labor	0 labor hours/yr	\$	40.00 \$/hour		\$ -					
Total Annual O&M Costs					\$ -					
LS-7 (1ST EAST)										
	New Force Main - 10" dia.	LF	6,000	\$19	\$116,000	0	0	0	0.0	
	New Lift Station - 650 gpm	LS	1	\$693,838	\$694,000	50	24	326,310	1.0	Based on estimate in 2004 LS report for the Oak Tree East LS (320 gpm)
	Subtotal - New LS & FM				\$ 810,000	160	24	326,310	1	
Subtotal 1					\$ 810,000					
Yard Piping			2.0%		\$ 16,000					
Paving/Grading			5.0%		\$ 41,000					
Coatings			1.5%		\$ 12,000					
Electrical			10.0%		\$ 81,000					
Instrumentation			7.0%		\$ 57,000					
Total Direct Cost					\$ 1,017,000					
ANNUAL O&M COSTS										
Power	326,310 kWh/yr	\$	0.07 \$/kWhr		\$ 23,000					
Labor	260 labor hours/yr	\$	40.00 \$/hour		\$ 10,000					
Total Annual O&M Costs					\$ 33,000					
LS-8 (2ND EAST)										
	New Force Main - 8" dia.	LF	6,200	\$15	\$96,000	0	0	0	0.0	Carollo UPC
	New Lift Station - 550 gpm	LS	1	\$620,713	\$621,000	40	24	261,048	1.0	
	Subtotal - LS & FM Improvements				\$ 717,000	40	24	261,048	1	
Subtotal 1					\$ 717,000					
Yard Piping			2.0%		\$ 14,000					
Paving/Grading			5.0%		\$ 36,000					
Coatings			1.5%		\$ 11,000					
Electrical			10.0%		\$ 72,000					
Instrumentation			7.0%		\$ 50,000					
Total Direct Cost					\$ 900,000					
ANNUAL O&M COSTS										
Power	261,048 kWh/yr	\$	0.07 \$/kWhr		\$ 18,000					
Labor	260 labor hours/yr	\$	40.00 \$/hour		\$ 10,000					
Total Annual O&M Costs					\$ 28,000					

CIP PROJECT - Distribution System, Wells	Proj ID	New Pumping Capacity (gpm)	Depth of Pump Set (ft)	Well Costs	Install Adder	Easement Costs	Total Well Costs:	Annual O&M Costs
WEL-1	W-1	150	500	\$ 491,500	\$ 98,300	\$ 25,000.00	\$ 614,800	\$ 6,876.01
	W-2	150	500	\$ 436,500	\$ 87,300	\$ 11,250.00	\$ 535,050	\$ 6,876.01
	W-3	150	500	\$ 411,500	\$ 82,300	\$ 5,000.00	\$ 498,800	\$ 6,876.01
	W-4	150	500	\$ 416,500	\$ 83,300	\$ 6,250.00	\$ 506,050	\$ 6,876.01
	W-5	150	500	\$ 416,500	\$ 83,300	\$ 6,250.00	\$ 506,050	\$ 6,876.01
	W-6	150	500	\$ 416,500	\$ 83,300	\$ 6,250.00	\$ 506,050	\$ 6,876.01
	W-7	150	500	\$ 444,000	\$ 88,800	\$ 13,125.00	\$ 545,925	\$ 6,876.01
WEL-2	Existing Well	140	400	\$ 415,000	\$ 83,000	\$ 6,250.00	\$ 504,250	\$ 5,134.09
	Existing Well	225	527	\$ 460,000	\$ 92,000	\$ 6,250.00	\$ 558,250	\$ 10,870.97
	Existing Well	181	585	\$ 445,000	\$ 89,000	\$ 6,250.00	\$ 540,250	\$ 9,707.55
	Existing Well	190	640	\$ 450,000	\$ 90,000	\$ 6,250.00	\$ 546,250	\$ 11,148.30
	Existing Well	119	625	\$ 413,000	\$ 82,600	\$ 6,250.00	\$ 501,850	\$ 6,818.71
	Existing Well	268	660	\$ 475,000	\$ 95,000	\$ 6,250.00	\$ 576,250	\$ 16,216.38
WEL-3	W-8	150	500	\$ 496,500	\$ 99,300	\$ 26,250.00	\$ 622,050	\$ 6,876.01
	W-9	150	500	\$ 436,500	\$ 87,300	\$ 11,250.00	\$ 535,050	\$ 6,876.01
	W-10	150	500	\$ 461,500	\$ 92,300	\$ 17,500.00	\$ 571,300	\$ 6,876.01
	W-11	150	500	\$ 471,500	\$ 94,300	\$ 20,000.00	\$ 585,800	\$ 6,876.01
	W-12	150	500	\$ 421,500	\$ 84,300	\$ 7,500.00	\$ 513,300	\$ 6,876.01
	W-13	150	500	\$ 455,000	\$ 91,000	\$ 6,250.00	\$ 552,250	\$ 6,876.01
	W-14	150	500	\$ 455,000	\$ 91,000	\$ 6,250.00	\$ 552,250	\$ 6,876.01
	W-15	150	500	\$ 416,500	\$ 83,300	\$ 6,250.00	\$ 506,050	\$ 6,876.01
WEL-4	Existing Well	176	620	\$ 445,000	\$ 89,000	\$ 6,250.00	\$ 540,250	\$ 10,004.14
	Existing Well	180	550	\$ 445,000	\$ 89,000	\$ 6,250.00	\$ 540,250	\$ 9,076.33
	Existing Well	117	567	\$ 413,000	\$ 82,600	\$ 6,250.00	\$ 501,850	\$ 6,081.97
	Existing Well	200	602	\$ 450,000	\$ 90,000	\$ 6,250.00	\$ 546,250	\$ 11,038.29
	Existing Well	235	623	\$ 460,000	\$ 92,000	\$ 6,250.00	\$ 558,250	\$ 13,422.43
	Existing Well	205	540	\$ 450,000	\$ 90,000	\$ 6,250.00	\$ 546,250	\$ 10,148.99
	Existing Well	180	483	\$ 445,000	\$ 89,000	\$ 6,250.00	\$ 540,250	\$ 7,970.67
WEL-5	Existing Well	173	600	\$ 445,000	\$ 89,000	\$ 6,250.00	\$ 540,250	\$ 9,516.40
	Existing Well	268	361	\$ 475,000	\$ 95,000	\$ 6,250.00	\$ 576,250	\$ 8,869.87
	Existing Well	201	550	\$ 450,000	\$ 90,000	\$ 6,250.00	\$ 546,250	\$ 10,135.24
	Existing Well	187	400	\$ 447,000	\$ 89,400	\$ 6,250.00	\$ 542,650	\$ 6,857.67
	Existing Well	203	420	\$ 450,000	\$ 90,000	\$ 6,250.00	\$ 546,250	\$ 7,816.65
	Existing Well	250	448	\$ 470,000	\$ 94,000	\$ 6,250.00	\$ 570,250	\$ 10,268.18
	Existing Well	100	525	\$ 410,000	\$ 82,000	\$ 6,250.00	\$ 498,250	\$ 4,813.21
	Existing Well	275	588	\$ 480,000	\$ 96,000	\$ 6,250.00	\$ 582,250	\$ 14,824.68

WELL-5	Existing Well	200	462	\$ 450,000	\$ 90,000	\$ 6,250.00	\$ 546,250	\$ 8,471.24
	Existing Well	265	407	\$ 475,000	\$ 95,000	\$ 6,250.00	\$ 576,250	\$ 9,888.16
	Existing Well	189	475	\$ 450,000	\$ 90,000	\$ 6,250.00	\$ 546,250	\$ 8,230.58
	Existing Well	169	507	\$ 445,000	\$ 89,000	\$ 6,250.00	\$ 540,250	\$ 7,855.43
	Existing Well	340	603	\$ 550,000	\$ 110,000	\$ 6,250.00	\$ 666,250	\$ 18,796.26
	Existing Well	162	636	\$ 443,000	\$ 88,600	\$ 6,250.00	\$ 537,850	\$ 9,445.99
	Existing Well	256	404	\$ 473,000	\$ 94,600	\$ 6,250.00	\$ 573,850	\$ 9,481.93
	Existing Well	225	340	\$ 460,000	\$ 92,000	\$ 6,250.00	\$ 558,250	\$ 7,013.53
WEL-6	Existing Well	80	465	\$ 400,000	\$ 80,000	\$ 6,250.00	\$ 486,250	\$ 3,410.50
	Existing Well	150	600	\$ 445,000	\$ 89,000	\$ 6,250.00	\$ 540,250	\$ 8,251.21
	Existing Well	185	560	\$ 510,000	\$ 102,000	\$ 6,250.00	\$ 618,250	\$ 9,498.06
	Existing Well	133	490	\$ 425,000	\$ 85,000	\$ 6,250.00	\$ 516,250	\$ 5,974.79
	Existing Well	207	525	\$ 445,000	\$ 89,000	\$ 6,250.00	\$ 540,250	\$ 9,963.34
	Existing Well	150	550	\$ 445,000	\$ 89,000	\$ 6,250.00	\$ 540,250	\$ 7,563.61
	Existing Well	175	471	\$ 475,000	\$ 95,000	\$ 6,250.00	\$ 576,250	\$ 7,556.74
	Existing Well	170	529	\$ 470,000	\$ 94,000	\$ 6,250.00	\$ 570,250	\$ 8,244.79
	Existing Well	120	515	\$ 425,000	\$ 85,000	\$ 6,250.00	\$ 516,250	\$ 5,665.83
	Existing Well	188	610	\$ 475,000	\$ 95,000	\$ 6,250.00	\$ 576,250	\$ 10,513.88
	Existing Well	140	483	\$ 445,000	\$ 89,000	\$ 6,250.00	\$ 540,250	\$ 6,199.41
	Existing Well	216	490	\$ 445,000	\$ 89,000	\$ 6,250.00	\$ 540,250	\$ 9,703.43
WEL-7	Existing Well	175	652	\$ 465,000	\$ 93,000	\$ 6,250.00	\$ 564,250	\$ 10,460.70
	Existing Well	246	650	\$ 500,000	\$ 100,000	\$ 6,250.00	\$ 606,250	\$ 14,659.65
	Existing Well	304	625	\$ 500,000	\$ 100,000	\$ 6,250.00	\$ 606,250	\$ 17,419.23
	Existing Well	200	475	\$ 440,000	\$ 88,000	\$ 6,250.00	\$ 534,250	\$ 8,709.61
	Existing Well	150	385	\$ 425,000	\$ 85,000	\$ 6,250.00	\$ 516,250	\$ 5,294.53
	Existing Well	120	387	\$ 420,000	\$ 84,000	\$ 6,250.00	\$ 510,250	\$ 4,257.63
	Existing Well	171	320	\$ 430,000	\$ 86,000	\$ 6,250.00	\$ 522,250	\$ 5,016.74
	Existing Well	200	360	\$ 440,000	\$ 88,000	\$ 6,250.00	\$ 534,250	\$ 6,600.97
	Existing Well	100	330	\$ 420,000	\$ 84,000	\$ 6,250.00	\$ 510,250	\$ 3,025.44
	Existing Well	90	330	\$ 420,000	\$ 84,000	\$ 6,250.00	\$ 510,250	\$ 2,722.90
NEW WELLS ON NEW TRANSMISSION MAIN	NEW-1	300	340	\$ 475,000	\$ 95,000	\$ 6,250.00	\$ 576,250	\$ 9,351.37
	NEW-1	150	500	\$ 450,000	\$ 90,000	\$ 6,250.00	\$ 546,250	\$ 6,876.01
	NEW-2	150	500	\$ 450,000	\$ 90,000	\$ 6,250.00	\$ 546,250	
	NEW-3	150	500	\$ 450,000	\$ 90,000	\$ 6,250.00	\$ 546,250	
	NEW-4	150	500	\$ 450,000	\$ 90,000	\$ 6,250.00	\$ 546,250	
	NEW-5	150	500	\$ 450,000	\$ 90,000	\$ 6,250.00	\$ 546,250	
NEW-6	150	500	\$ 450,000	\$ 90,000	\$ 6,250.00	\$ 546,250		

Project ID - Distribution System, Storage Tanks/Towers	Project Description	Tank/Tower Size	Year	Materials	Install	No. of Pumps	Pump Flow (gpm)	Pump Head (TDH, ft)	Pump Station/Site/Valve Automation Cost	Subtotal	Annual O&M Costs
TWR-1 (incl. valve automation)	New 2 MG elevated tower; automation of existing pumps tation valves at NW Complex	2,000,000	2014	\$ 4,500,000	\$ 900,000	--	--	--	\$ 60,000	\$ 5,460,000	
TWR-2	New 2 MG elevated tower at College Complex	2,000,000	2016	\$ 4,500,000	\$ 900,000	--	--	--	\$ -	\$ 5,400,000	
TWR-3 (incl new site)	New 2 MG elevated tower on new storage site referred to as NE complex	2,000,000	2016	\$ 4,500,000	\$ 900,000	--	--	--	\$ 200,000	\$ 5,600,000	
TANK-1 (incl new pump sta.)	New GST with associated pump station at I-35 Station; incl. new piping from the pump station of 18" of 280 lf	4,000,000	2021	\$ 5,000,000	\$ 1,000,000	2	1,500	250	\$ 616,000	\$ 6,616,000	\$ 69,000
TANK-2 (incl new pump sta)	New GST with associated pump station at NE Complex, incl. 1000 lf of 24-inch pipe	2,000,000	2021	\$ 2,000,000	\$ 400,000	2	1,500	230	\$ 766,000	\$ 3,166,000	\$ 64,000
PS-1	Replacement of existing 3600 pump station at College Complex; and installation of new 2 MG GST	2,000,000	2023	\$ 2,000,000	\$ 400,000	3	1,200	150	\$ 600,000	\$ 3,000,000	\$ 50,000
TWR-4 (incl. valve automation)	New elevated tower at 33rd St Complex and automation of existing valves	2,000,000	2027	\$ 4,500,000	\$ 900,000	--	--	--	\$ 60,000	\$ 5,460,000	

CIP ID - Distribution System, Piping	Location	Improvement Project	EXISTING PIPE DIAMETER	NEW Pipe Diameter	Pipe Length	CIP Year (DESIGN)	Demo Costs	Install Costs**	Adder for Fittings	Subtotal
UPSZ-1	ALONG WYNN DR, BTW 33RD & BONAIRE	UPSIZE	6	12	1830	2013	\$ 73,200	\$ 285,480	\$ 915	\$ 360,000
UPSZ-2	E. 33RD, BTW KELLY & BROADWAY	UPSIZE	10	18	2610	2015	\$ 104,400	\$ 610,740	\$ 1,305	\$ 717,000
UPSZ-3	33RD, BTW BDWY & BLVD	UPSIZE	8	18	2400	2015	\$ 96,000	\$ 561,600	\$ 1,200	\$ 659,000
NEW-1	SOUTH CITY LIMITS, BTW KELLY & BDWY	NEW	--	12	920	2015	\$ -	\$ 143,520	\$ 460	\$ 144,000
PARL-1	ALONG KELLY AVE, FROM 33RD TO 15TH	Parallel	12	12	5400	2025	\$ -	\$ 842,400	\$ 2,700	\$ 846,000
UPSZ-4	DANFORTH, FROM KELLY TO BRYANT	UPSIZE	12	16	13050	2020	\$ 522,000	\$ 2,714,400	\$ 6,525	\$ 3,243,000
MAIN-1	ALONG POST RD, JUST SOUTH OF WTP TO JUST SOUTH OF COFFEE CREEK RD	NEW MAIN	--	18	21800	2020	\$ -	\$ 3,531,600	\$ 10,900	\$ 3,543,000
UPSZ-5	ALONG 33RD, FROM BROADWAY TO BRYANT, THEN NORTH ALONG BRYANT TO 2ND ST	UPSIZE	8/12	18	15800	2025	\$ 395,000	\$ 3,697,200	\$ 7,900	\$ 4,101,000
UPSZ-6	KELLY FROM 15TH TO DANFORTH	UPSIZE	12	18	10600	2025	\$ 265,000	\$ 2,480,400	\$ 5,300	\$ 2,751,000
MAIN-2	FROM NEW NE COMPLEX, SW OF POST RD & COFFEE CREEK RD, WEST & NORTH ACROSS COFFEE CRK RD THEN BACK EAST TO POST RD, NORTH TO NEW TOWER NE OF POST RD & SORGHUM MILL RD	NEW MAIN FOR DISTN	--	18	11500		\$ 287,500	\$ 2,691,000	\$ 5,750	\$ 2,985,000
MAIN-3	FROM THE WTP, NORTH ALONG POST, THEN WEST ALONG 2ND ST TO I-35 COMPLEX	NEW MAIN, FOR IPR	--	36	24700	2043/2045	\$ 617,500	\$ 11,559,600	\$ 12,350	\$ 12,190,000
NEW-4	ALONG BRYANT, FROM 2ND STREET, NORTH TO DANFORTH	NEW	--	18	5200		\$ 130,000	\$ 1,216,800	\$ 2,600	\$ 1,350,000
NEW-5	ALONG 2ND STREET, FROM BRYANT, EAST TO SOONER RD	NEW	--	16	10500		\$ 262,500	\$ 2,184,000	\$ 5,250	\$ 2,452,000
NEW-3	ALONG COVELL, NEAR LAMOND HILL, EAST TO SOONER, NORTH (MIDWAY BTW COVELL & COFFEE CREEK RD), AND EAST ACROSS I-35 TO AIR DEPOT	NEW	--	12	9700		\$ 242,500	\$ 1,513,200	\$ 4,850	\$ 1,761,000
NEW-2	SOUTH ALONG BRYANT AVE, BETWEEN DANFORTH AND 2ND STREET	NEW	--	16	22400		\$ 560,000	\$ 4,659,200	\$ 11,200	\$ 5,231,000
FUT-1	ALONG 2ND STREET, EAST TO DOUGLAS. THEN NORTH ALONG DOUGLAS TO SORGHUM MILL	FUTURE	--	12	31400	2017	\$ -	\$ 3,391,200	\$ 15,700	\$ 3,407,000
FUT-2	ALONG COVELL, FROM DOUGLAS, EAST TO POST. THEN NORTH ALONG POST RD TO SORGHUM MILL, AND WEST TO CONNECT WITH NEW-4	FUTURE	--	12	17350	2022	\$ -	\$ 1,873,800	\$ 8,675	\$ 1,883,000
FUT-3	ALONG MIDWEST BLVD, FROM COVELL, NORTH TO SORGHUM MILL	FUTURE	--	10	10500	2022	\$ -	\$ 945,000	\$ 5,250	\$ 951,000



Water & Wastewater System Master Plan

Job Number: 8967A00

Date: 10/15/2013
 By: MJT
 Checked:
 Date:

Conventional Activated Sludge with Brush Rotors

Existing Plant Flow, AAD = MGD
 New Plant Flow - Phase I, AAD = MGD
 New Plant Flow - Phase I, MMAD =

Description	Units	Quantity	Unit Cost	Cost	Power Consumption (hp)	Daily Operating Hours	Power (kWh/yr)	Daily Labor Hours	Comments
CONSTRUCTION COSTS									
New Headworks Facility									
New Facility	LS	1	\$ 4,503,000.00	\$4,503,000	0	0	130,000	0	As estimated in previous HW Eval Rpt (Carollo) of \$4.4M incl. OH&P; escalated from 2010 to 2014 at 3%
Subtotal - New Headworks Facility				\$ 4,503,000	0	0	130,000	0	
New Aeration Basin Splitter Structure									
Excavation	cu yd	400	\$ 15.00	\$6,000	0	0	0	0	Will include 4 slide gates Includes 25% swell factor
Hauling	cu yd	500	\$ 3.00	\$1,500	0	0	0	0	
Backfill	cu yd	300	\$ 10.00	\$3,000	0	0	0	0	
Concrete Structure	gal	225,000	\$ 2.00	\$450,000	0	0	0	0	
Slide Gates	ea	4	\$ 6,500	\$26,000	0	0	0	0	
Subtotal - Aeration Basin Splitter Structure				\$ 486,500	0	0	0	0	
Additional Rotors in Existing Basins									
# of Basins	<input type="text" value="4"/>								
# of Add'l Rotors per basin	<input type="text" value="3"/>								
Miscellaneous Metals (grating, supports, etc.)	LS	1	\$45,000	\$45,000	0	0	0	0	Need total of 6 per basin; 3 existing for Lakeside mfr; quote provided by Kent Miller 11/14/12 (with markup)
Rotors	EA	12	\$90,000	\$1,080,000	360	24	2,349,432	0	
Rotor Installation	LS	1	\$50,000	\$50,000	0	0	0	0	
Misc. Equipment	LS	1	\$50,000	\$50,000	0	0	0	0	
Subtotal - Aeration Basin Rotor Addition				\$ 1,225,000	360	24	2,349,432	0	
New Final Clarifier Splitter Structure (50' x 30', assumed to be 8 ft deep, 15 ft high)									
Excavation	cu yd	800	\$ 15.00	\$12,000	0	0	0	0	Will ultimately split flow between 12 basins
Hauling	cu yd	1,000	\$ 3.00	\$3,000	0	0	0	0	
Backfill	cu yd	400	\$ 10.00	\$4,000	0	0	0	0	
Concrete Structure	gal	169,000	\$ 2.00	\$338,000	0	0	0	0	
Closure Plates	ea	4	\$ 3,500.00	\$14,000	0	0	0	0	
Slide Gates	ea	8	\$ 6,500	\$52,000	0	0	0	0	
Subtotal - Clarifier Splitter Structure				\$ 423,000	0	0	0	0	
New Secondary Clarifiers									
Quantity	<input type="text" value="4"/>								
Diameter, ft	<input type="text" value="95"/>								
SWD, ft	<input type="text" value="12"/>								
Exc Depth, ft	<input type="text" value="15"/>								
Per Basin:									
Earthwork	cu yd	6,300	\$15	\$94,500	0	0	0	0	Assumes excavation at 1:1 slope, 2 foot overexcavation 25% Swell Factor
Hauling	cu yd	4,200	\$3	\$12,600	0	0	0	0	
Backfill	cu yd	3,000	\$10	\$30,000	0	0	0	0	
Concrete - Base Slab	cu yd	600	\$1,350	\$810,000	0	0	0	0	Assumes 24" thick slab, 50% adder for curved Assumes 18" thick walls, 2' freeboard, 50% adder for curved
Concrete - Curved Walls	cu yd	300	\$1,125	\$337,500	0	0	0	0	
Floor Grout	cu yd	90	\$250	\$22,500	0	0	0	0	
Sludge Collector Mechanism	EA	1	\$120,000	\$120,000	1	24	6,526	0	
Lauder Covers & Density Baffles	EA	1	\$88,000	\$88,000	0	0	0	0	
Scum Pumps	EA	1	\$37,500	\$37,500	0	0	0	0	
Slide Gates/Valves	LS	1	\$35,000	\$35,000	0	0	0	0	Add to Clarifier Splitter
Piping	LS	1	\$25,000	\$25,000	0	0	0	0	
Demolition of Existing 2nd Stg Basins	LS	2	\$60,000	\$120,000	0	0	0	0	
Misc. Equipment	LS	1	\$20,000	\$20,000	0	0	0	0	
Sub Total per Clarifier				\$1,752,600	1	24	6,526	0	



Water & Wastewater System Master Plan

Job Number: 8967A00

Date: 10/15/2013
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Conventional Activated Sludge with Brush Rotors

Existing Plant Flow, AAD =

7.0	MGD
-----	-----

 New Plant Flow - Phase I, AAD =

10.0	MGD
------	-----

 New Plant Flow - Phase I, MMAD =

12.0	MGD
------	-----

Secondary Clarifier(s) Cost		#	4	\$1,752,600	\$7,011,000	4	96	26,105	0
New Associated RAS/WAS Pump Station Nos. 2 and 3									
Quantity	2								
Length, ft	80								
Width, ft	55								
Height, ft	15								
Exc Depth, ft	5								
Elec Room									
Length, ft	35								
Width, ft	17								
Height, ft	15								
Earthwork	LS	1		\$5,000	\$5,000				
Hauling	LS	1		\$5,000	\$5,000				
Backfill	LS	1		\$5,000	\$5,000				
Concrete - Base Slab	cu yd	200		\$900	\$180,000				
Concrete - Walls	cu yd	92		\$750	\$69,000	0	0	0	0
Concrete - Elevated Slab	cu yd	300		\$1,080	\$324,000	0	0	0	0
Elec Bldg- Masonry	sq ft	1,600		\$55	\$88,000	0	0	0	0
Elec Bldg- Roofing/Structural Deck	sq ft	600		\$45	\$27,000	0	0	0	0
Miscellaneous Metals (stairs, grating, doors, etc.)	LS	1		\$125,000	\$125,000	0	0	0	0
RAS Pumps	ea	3		\$17,000	\$51,000	75	24	489,465	0
WAS Pumps	ea	3		\$18,000	\$54,000	45	12	146,840	0
Piping / Valves / Appurtenances	LS	1		\$300,000	\$300,000	0	0	0	0
HVAC	LS	1		\$275,000	\$275,000	15	24	97,893	0
Misc. Equipment	LS	1		\$50,000	\$50,000	0	0	0	0
Sub Total - RAS/WAS Pump Station					\$1,558,000	135	60	734,198	0
Total New RAS/WAS Pump Station Cost					\$3,116,000	270	120	1,468,395	0
New RAS/WAS Pump Station No. 1									
Quantity	1								
Length, ft	70								
Width, ft	45								
Height, ft	15								
Exc Depth, ft	20								
Elec Room									
Length, ft	45								
Width, ft	20								
Height, ft	15								
Earthwork	cu yd	3,600		\$15	\$54,000				
Hauling	cu yd	4,500		\$3	\$13,500				
Backfill	cu yd	2,000		\$10	\$20,000				
Concrete - Base Slab	cu yd	200		\$900	\$180,000				
Concrete - Walls	cu yd	192		\$750	\$144,000				
Concrete - Elevated Slab	cu yd	200		\$1,080	\$216,000				
Elec Bldg- Masonry	sq ft	2,000		\$55	\$110,000				
Elec Bldg- Roofing/Structural Deck	sq ft	900		\$45	\$40,500				
Miscellaneous Metals (stairs, grating, doors, etc.)	LS	1		\$125,000	\$125,000				
RAS Pumps	ea	7		\$17,000	\$119,000	175	24	1,142,085	0
WAS Pumps	ea	2		\$18,000	\$36,000	30	12	97,893	0
Piping / Valves / Appurtenances	LS	2		\$300,000	\$600,000	0	0	0	0
HVAC	LS	1		\$275,000	\$275,000	15	24	97,893	0
Misc. Equipment	LS	1		\$75,000	\$75,000	0	0	0	0
Sub Total - RAS/WAS Pump Station					\$2,008,000	220	60	1,337,871	0
Chlorine Basin Modifications to UV Disinfection									
Basin Demo/Modifications, incl. Canopy	LS	1		\$300,000	\$300,000	kw	0	0	0
New UV Equipment & Instrumentation	LS	1		\$400,000	\$400,000	36	24	315,360	1

Integral to each Clarifier Pair

Elec Rm located on top of each station

Assumes most of the excavation/Backfill included with Clarifier excavation

Assumes 12" thick slab

Assumes 18" thick walls

20% adder for elevated

Assumes CMU

Integral to each Clarifier Pair

Based on depth of existing sludge p.s.

Elec Rm located on top of each station

Assumes 12" thick slab

Assumes 18" thick walls

20% adder for elevated

Assumes CMU



Water & Wastewater System Master Plan

Job Number: 8967A00

Date: 10/15/2013
 By: MJT
 Checked: _____
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Conventional Activated Sludge with Brush Rotors

Existing Plant Flow, AAD =

7.0

 MGD
 New Plant Flow - Phase I, AAD =

10.0

 MGD
 New Plant Flow - Phase I, MMAD =

12.0

 MGD

					0	0	0	0	
New UV Building					LS	1	\$300,000	\$300,000	
subtotal - Disinfection Modifications								\$1,000,000	
					36	24	315,360	1	
New Effluent Filter Splitter Structure									
Excavation	cu yd	400	\$ 15,000	\$6,000					
Hauling	cu yd	500	\$ 3,000	\$1,500					
Backfill	cu yd	300	\$ 10,000	\$3,000	0	0	0	0	
Concrete Structure	gal	225,000	\$ 2,000	\$450,000	0	0	0	0	
Slide Gates	ea	4	\$ 6,500	\$26,000	0	0	0	0	
Subtotal - Aeration Basin Splitter Structure								\$ 486,500	
New Effluent Flow Metering Structure with NPW Pumping									
Earthwork	LS	1	\$107,000	\$107,000					
Concrete	LS	1	\$199,000	\$199,000					
Piping	LS	1	\$50,000	\$50,000	0	0	0	0	
Flume Liner	LS	1	\$7,500	\$7,500	0	0	0	0	
Pumping Equipment	EA	2	\$25,000	\$50,000	50	8	108,770	0	
Subtotal								\$ 413,500	
New Aerated Solids Holding Basins									
Quantity	<table border="1" style="display: inline-table;"><tr><td>4</td></tr></table>				4				
4									
Diameter, ft	<table border="1" style="display: inline-table;"><tr><td>90</td></tr></table>				90				
90									
SWD, ft	<table border="1" style="display: inline-table;"><tr><td>15</td></tr></table>				15				
15									
Exc Depth, ft	<table border="1" style="display: inline-table;"><tr><td>10</td></tr></table>				10				
10									
Per Basin:									
Earthwork	cu yd	3,700	\$15	\$55,500	0	0	0	0	
Hauling	cu yd	2,500	\$3	\$7,500	0	0	0	0	
Backfill	cu yd	1,700	\$10	\$17,000	0	0	0	0	
Concrete - Base Slab	cu yd	600	\$1,350	\$810,000	0	0	0	0	
Concrete - Curved Walls	cu yd	300	\$1,125	\$337,500	0	0	0	0	
Floor Grout	cu yd	80	\$250	\$20,000	0	0	0	0	
Coarse Bubble Diffusers	LS	1	\$90,000	\$90,000	1	24	6,526	0	
Valves	LS	1	\$65,000	\$65,000	0	0	0	0	
Piping	LS	1	\$150,000	\$150,000	0	0	0	0	
Demolition of Existing 1st Stg Basins	LS	2	\$80,000	\$160,000					
Misc. Equipment	LS	1	\$40,000	\$40,000	0	0	0	0	
Sub Total per Holding Basin								\$1,742,500	
Solids Holding Basin(s) Cost	#	4	\$1,742,500	\$6,970,000	4	96	26,105	0	
BFP Facility (150' x 75') - to include PD Blowers in separate room									
Earthwork	cu yd	1,400	\$15	\$21,000	0	0	0	0	
Hauling	cu yd	1,750	\$3.0	\$5,250	0	0	0	0	
Backfill	cu yd	188	\$10	\$1,875	0	0	0	0	
Structure	sq ft	11,250	\$200	\$2,250,000	0	0	0	0	
BFP's	ea	3	\$250,000	\$750,000	30	8	65,262	0	
Piping/valving	LS	1	\$200,000	\$200,000	0	0	0	0	
Conveyor Belt	ea	1	\$80,000	\$80,000	5	8	10,877	0	
Sludge Pumps	ea	3	\$15,000	\$45,000	60	8	130,524	0	
Sludge Conditioning Equipment	LS	1	\$175,000	\$175,000	0	0	0	0	
PD Blowers - 200 HP each	EA	4	\$125,000	\$500,000					
Monorail System	LS	1	\$65,000	\$65,000					
HVAC	LS	1	\$80,000	\$80,000	10	24	65,262	0	
Misc. Equipment	LS	1	\$50,000	\$50,000	0	0	0	0	
BFP Facility								\$4,223,125	
					105	48	271,925		
New Maintenance Building (25' x 25' Pre-Fab Metal Building)									
Earthwork	cu yd	100	\$15	\$1,500	0	0	0	0	
Hauling	cu yd	125	\$3.0	\$375	0	0	0	0	

Will include 4 slide gates
 Includes 25% swell factor

For mod's to both existing 1st Stage Aerator Basins
 This will result in a total of 8 clarifiers

Based on existing
 Based on existing

Assumes excavation at 1:1 slope, 2 foot overexcavation
 25% Swell Factor

Assumes 24" thick slab, 50% adder for curved
 Assumes 18" thick walls, 2' freeboard, 50% adder for curved

Add to Clarifier Splitter



Water & Wastewater System Master Plan

Job Number: 8967A00

Date: 10/15/2013
 By: MJT
 Checked: _____
 Date: _____

Conventional Activated Sludge with Brush Rotors

Existing Plant Flow, AAD =

7.0	MGD
-----	-----

 New Plant Flow - Phase I, AAD =

10.0	MGD
------	-----

 New Plant Flow - Phase I, MMAD =

12.0	MGD
------	-----

Backfill	cu yd	67	\$10	\$671	0	0	0		
Structure	LS	1	\$200,000	\$200,000	0	0	0		
Misc. Equipment	LS	1	\$75,000	\$75,000	0	0	0		
New Maintenance Bldg				\$277,546	0	0	0		
Subtotal 1				\$32,143,171	1,049	476	6,033,963	1	
Yard Piping		<table border="1"><tr><td>9.0%</td></tr></table>	9.0%		\$2,893,000				
9.0%									
Paving/Grading		<table border="1"><tr><td>1.0%</td></tr></table>	1.0%		\$321,000				
1.0%									
Coatings		<table border="1"><tr><td>0.5%</td></tr></table>	0.5%		\$161,000				
0.5%									
Electrical		<table border="1"><tr><td>8.0%</td></tr></table>	8.0%		\$2,571,000				
8.0%									
Instrumentation		<table border="1"><tr><td>2.0%</td></tr></table>	2.0%		\$643,000				
2.0%									
Total Direct Cost				\$38,732,171					
ANNUAL O&M COSTS									
Power	6,033,963 kWh/yr		\$ 0.07 \$/kWhr	\$ 423,000.00					
Chemicals - Polymer	80 lbs/day		\$ 0.75 \$/lb polymer	\$ 22,000.00					
Labor	260 labor hours/yr		\$ 40.00 \$/hour	\$ 11,000.00					
Annual UV Labor O&M				\$ 13,000.00					
Annual UV Equipment O&M				\$ 22,300.00					
Total Annual O&M Costs				\$ 491,300.00					

for Dewatering
 UV System and BFP Operation
 For UV Equipment replacement: ballasts, lamps, cleaning soln
 For UV Equipment replacement: ballasts, lamps, cleaning soln



Water & Wastewater System Master Plan

Job Number: 8967A00

Date: 10/15/2013
 By: MJT
 Checked:
 Date:

Conventional Activated Sludge with Brush Rotors

Previous Plant Flow, AAD =	10.0	MGD
New Plant Flow - Phase I, AAD =	12.0	MGD
New Plant Flow - Phase I, MMAD =	16.0	MGD

Description	Units	Quantity	Unit Cost	Cost	Power Consumption (hp)	Daily Operating Hours	Power (kWh/yr)	Daily Labor Hours	Comments
CONSTRUCTION COSTS									
<u>New Aeration Basins</u>									
Quantity		1							This will result in a total of 10 clarifiers Based on existing Based on existing
Area, sq ft		17,000							
SWD, ft		12							
Exc Depth, ft		8							
Per Basin:									25% Swell Factor Assumes 18" thick slab Assumes 12" thick walls, 2' freeboard
Earthwork	cu yd	7,000	\$15	\$105,000					
Hauling	cu yd	5,700	\$3	\$17,100					
Backfill	cu yd	2,500	\$10	\$25,000					
Concrete - Base Slab	cu yd	1,000	\$1,350	\$1,350,000					
Concrete - Walls	cu yd	330	\$750	\$247,333					
Floor Grout	cu yd	320	\$250	\$80,000					
Rotors	EA	6	\$90,000	\$540,000	180	24	1,174,716	0	
Weirs	LS	1	\$25,000	\$25,000	0	0	0	0	
Misc. Equipment	LS	1	\$50,000	\$50,000	0	0	0	0	
Sub Total per Aeration Basin				\$2,439,433					
Aeration Basin Costs	#	1	\$2,439,433	\$2,440,000	180	24	1,174,716	0	
					0	0	0	0	
<u>Effluent Disk Cloth Filters</u>									
Removal of Existing Filtration Materials from Basin No. 1	LS	1	\$45,000	\$45,000					Assumes filters can be installed in existing concrete basins.
Basin Modifications	LS	1	\$100,000	\$100,000					
Filtration Equipment	LS	1	\$2,025,000	\$2,025,000	27	24	236,520	0	
Equipment Installation	LS	1	\$202,500	\$202,500	0	0	0	0	
Jib Crane	EA	1	\$100,000	\$100,000	0	0	0	0	
Filter Influent Gates	EA	4	\$12,000	\$48,000	0	0	0	0	
Metals (Stairs, grating, etc.)	LS	1	\$75,000	\$75,000	0	0	0	0	
Piping	LS	1	\$30,000	\$30,000	0	0	0	0	
Misc. Equipment	LS	1	\$25,000	\$25,000	0	0	0	0	
Subtotal - Cloth Disk Filtration				\$2,651,000	27	24	236,520	0	
<u>Chlorine Basin Modifications to UV Disinfection</u>									
New UV Equipment & Instrumentation	LS	1	\$350,000	\$350,000	12	24	105,120	1	Incr capacity from 14 to 16 mgd
Subtotal - Disinfection Modifications				\$350,000	12	24	105,120	1	
Subtotal 1				\$5,441,000	174	96	1,124,784	1	
Yard Piping		1.0%		\$54,000					
Paving/Grading		0.3%		\$16,000					
Coatings		0.5%		\$27,000					
Electrical		10.0%		\$544,000					
Instrumentation		5.0%		\$272,000					
Total Direct Cost				\$6,354,000					



Water & Wastewater System Master Plan

Job Number: 8967A00

Date: 10/15/2013

By: MJT

Checked: _____

Date: _____

Conventional Activated Sludge with Brush Rotors

Previous Plant Flow, AAD =

10.0 MGD

New Plant Flow - Phase I, AAD =

12.0 MGD

New Plant Flow - Phase I, MMAD =

16.0 MGD

ANNUAL O&M COSTS

Labor, Operation	260 labor hours/yr	\$ 40.00	\$/labor hour	\$	10,400.00
Chemicals - Algae Control	150 lbs/day	\$ 0.50	\$/lb chlorine	\$	28,000.00
Chemicals - Polymer	20 lbs/day	\$ 0.50	\$/lb polymer	\$	4,000.00
Chemicals - Alum	150 lbs/day	\$ 0.30	\$/lb alum	\$	17,000.00
Annual Filter Equipment O&M			2% of equipment cost	\$	41,000.00
Power	1,124,784 kWh/yr	\$ 0.07	\$/kWhr	\$	79,000.00
Annual UV Labor O&M				\$	10,000.00
Annual UV Equipment O&M				\$	8,000.00
Total Annual O&M Costs				\$	197,400.00



Water & Wastewater System Master Plan

Date: 10/14/2013
 By: MJT
 Checked:
 Date:

Job Number: 8967A00

Advanced Treatment for IPR - No capacity increase

Previous Plant Flow, AAD =	10.0	MGD
New Plant Flow - Phase I, AAD =	12.0	MGD
New Plant Flow - Phase I, MMAD =	16.0	MGD

Description	Units	Quantity	Unit Cost	Cost	Power Consumption (hp)	Daily Operating Hours	Power (kWh/yr)	Daily Labor Hours	Comments
CONSTRUCTION COSTS									
BNR Facilities (Assumes nutrient removal not implemented prior to)									
BNR Facilities (from BNR tab)	LS	1	\$5,450,000.00	\$5,450,000	0	0	0	0	Assumes this type of treatment will be req'd for IPR to remove EDCs and PCCPs
Subtotal - Flocculation Basin				\$5,450,000	0	0	0	0.0	
Biofiltration System									
Biofilters	GPD	16,000,000	\$0.88	\$14,080,000	0	0	0	0	Assumes this type of treatment will be req'd for IPR to remove EDCs and PCCPs
Subtotal - Flocculation Basin				\$14,080,000	0	0	0	0.0	
Ozone System									
Ozone System	GPD	16,000,000	\$0.88	\$14,080,000	0	0	0	0	Assumes this type of treatment will be req'd for IPR to remove EDCs and PCCPs
Subtotal - Flocculation Basin				\$14,080,000	0	0	0	0.0	
IPR Pumping Station									
Pump Station Facility	LS	1	\$619,000	\$619,000					
Pumping Equipment	LS	1	\$329,000	\$329,000	1200	6	482,760	0	
EI&C/Misc Instruments	LS	1	\$329,000	\$329,000	0	0	0	0	
Force Main to Arcadia Lake	LF	13,000	\$350	\$4,550,000					
Fittings/Valves	EA	65	\$5,000	\$325,000	0	0	0	0	
Sub Total - IPR Return Pump Station				\$6,152,000	1,200	6	482,760	0	
New Outfall Structure at Arcadia Lake (10' x 14' x 10')									
Earthwork	cu yd	100	\$15	\$1,500	0	0	0	0	
Hauling	cu yd	125	\$3.0	\$375	0	0	0	0	
Backfill	cu yd	73	\$10	\$731	0	0	0	0	
Structure	cu yd	100	\$900	\$90,000	0	0	0	0	
Diffuser	LS	1	\$50,000	\$50,000	0	0	0	0	
New Outfall Structure				\$142,606	0	0	0	0	
Subtotal 1				\$39,904,606	1,200	6	482,760	0	
Indirect Costs									
Yard Piping			8.0%	\$3,192,000					
Paving/Grading			1.0%	\$399,000					
Coatings			0.5%	\$200,000					
Electrical			10.0%	\$3,990,000					
Instrumentation			5.0%	\$1,995,000					
Total Direct Cost				\$49,680,606					
ANNUAL O&M COSTS									
Labor, Operation	0 labor hours/yr		\$ 40.00	\$/labor hour					\$ -
Chemicals - Algae Control	150 lbs/day		\$ 0.50	\$/lb chlorine					\$ 28,000.00
Chemicals - Polymer	20 lbs/day		\$ 0.50	\$/lb polymer					\$ 4,000.00
Chemicals - Alum	150 lbs/day		\$ 0.30	\$/lb alum					\$ 17,000.00
Annual Filter Equipment O&M				2% of equipment cost					\$ 282,000.00
Power	482,760 kWh/yr		\$ 0.07	\$/kWhr					\$ 34,000.00
Annual UV Labor O&M									\$ 10,000.00
Annual UV Equipment O&M									\$ 8,000.00
Total Annual O&M Costs				\$ 383,000.00					



Water & Wastewater System Master Plan

Job Number: 8967A00

Date: 10/15/2013
By: MJT

Checked: _____
Date: _____

Biological Nutrient Removal

Plant Flow, AAD =
MMAD=

14.0 MGD
16.0 MGD

Assumes BNR will be sized to accommodate buildout capacity.

Description	Units	Quantity	Unit Cost	Cost	Power Consumption (hp)	Daily Operating Hours	Power (kWh/yr)	Daily Labor Hours	Comments
CONSTRUCTION COSTS									
New Selector Basin									
Selector Basin - Structure	LS	1	\$2,349,000	\$2,349,000					
Selector Basin - Earthwork	LS	1	\$75,000	\$75,000	0	0	0	0	
Misc Metals	LS	1	\$50,000	\$50,000	0	0	0	0	
Equipment	LS	1	\$318,000	\$318,000	160	24	1,044,192	1	
Blower Building - In Place	LS	1	\$850,000	\$850,000	1,200	24	7,831,440	1	
Piping/Valves	LS	1	\$271,000	\$271,000	0	0	0	0	
EI&C	LS	1	\$165,000	\$165,000	0	0	0	0	
Subtotal - Selector Basin				\$4,078,000	1,360	48	8,875,632	1	
MLR Pump Station									
Pump Station Structure	LS	1	\$293,000	\$293,000	0	0	0	0	
Pumping Equipment	LS	1	\$439,000	\$439,000	180	0	0	1	
Piping / Valves / Appurtenances	LS	1	\$220,000	\$220,000	0	0	0	0	
EI&C	LS	1	\$220,000	\$220,000	0	0	0	0	
HVAC	LS	1	\$150,000	\$150,000	63	24	407,888	0	
Misc. Equipment	LS	1	\$50,000	\$50,000	0	0	0	0	
Sub Total - MLR Pump Station				\$1,372,000	243	24	407,888	1	
Subtotal 1				\$5,450,000	1,603	72	9,283,520	2	
Yard Piping		5.0%		\$273,000					
Paving/Grading		0.5%		\$27,000					
Coatings		1.5%		\$82,000					
Electrical		2.0%		\$109,000					
Instrumentation		3.0%		\$164,000					
Total Direct Cost				\$6,105,000					
ANNUAL O&M COSTS									
Labor, Operation	390 labor hours/yr		\$ 40.00 \$/labor hour	\$ 15,600.00					
Chemicals - Algae Control	150 lbs/day		\$ 0.50 \$/lb chlorine	\$ 28,000.00					
Chemicals - Polymer	20 lbs/day		\$ 0.50 \$/lb polymer	\$ 4,000.00					
Chemicals - Alum	150 lbs/day		\$ 0.30 \$/lb alum	\$ 17,000.00					
Annual Filter Equipment O&M			2% of equipment cost	\$ -					
Power	9,283,520 kWh/yr		\$ 0.07 \$/kWhr	\$ 650,000.00					
Total Annual O&M Costs				\$ 714,600.00					



Water & Wastewater System Master Plan

Job Number: 8967A00

Date: 10/15/2013
By: MJT

Checked: _____
Date: _____

Misc Improvements

Plant Flow, AAD =	14.0	MGD
MMAD=	16.0	MGD
PH=	31.0	MGD

Description	Units	Quantity	Unit Cost	Cost	Power Consumption (hp)	Daily Operating Hours	Power (kWh/yr)	Daily Labor Hours	Comments
CONSTRUCTION COSTS									
Sludge Dewatering Odor Control Facilities (MISC-1)									
Concrete	LS	1	\$26,000	\$26,000					
Equipment - Carbon System	LS	1	\$197,000	\$197,000	30	24	195,786	0.5	
Ductwork	LS	1	\$26,000	\$26,000	0	0	0	0	
Electrical	LS	1	\$146,000	\$146,000	0	0	0	0	
Misc Materials	LS	1	\$50,000	\$50,000	0	0	0	0	
Subtotal -Odor Control Facility				\$445,000	30	24	195,786	0.5	
Subtotal 1				\$445,000					
Yard Piping		5.0%		\$163,000					
Paving/Grading		1.0%		\$33,000					
Coatings		1.5%		\$49,000					
Electrical		2.0%		\$65,000					
Instrumentation		1.0%		\$33,000					
Total Direct Cost				\$788,000					
ANNUAL O&M COSTS									
Labor, Operation	1 labor hours/yr		\$ 40.00 \$/labor hour	\$ 20.00					
Carbon Replacement				\$ 7,500.00					Bi-annually, so \$15,000/yr
Power	195,786 kWh/yr		\$ 0.07 \$/kWhr	\$ 14,000.00					
Total Annual O&M Costs				\$ 21,520.00					
Standby Power Generation (MISC-2)									
Generator Unit Equipment	LS	1	\$3,207,000	\$3,207,000	0	0	0	0	Includes conc pad.
Fuel Storage Tank	LS	1	\$55,000	\$55,000	0	0	0	0	Includes conc pad.
Sub Total - Standby Power Generation				\$3,262,000	0	0	0	0	
Subtotal 1				\$3,262,000					
Yard Piping		5.0%		\$163,000					
Paving/Grading		1.0%		\$33,000					
Coatings		1.5%		\$49,000					
Electrical		2.0%		\$65,000					
Instrumentation		1.0%		\$33,000					
Total Direct Cost				\$3,605,000					
ANNUAL O&M COSTS									
Labor, Operation	0 labor hours/yr		\$ 40.00 \$/labor hour	\$ -					
Diesel Fuel Costs	100 gal/hr		\$ 5.00 \$/gallon	\$ 24,000.00					Assumes unit will run for a maximum total of 48 hrs
Power	0,000 kWh/yr		\$ 0.07 \$/kWhr	\$ -					
Total Annual O&M Costs				\$ 24,000.00					



Water & Wastewater System Master Plan

Date: 10/15/2013
By: MJT

Job Number: 8967A00

Checked: _____
Date: _____

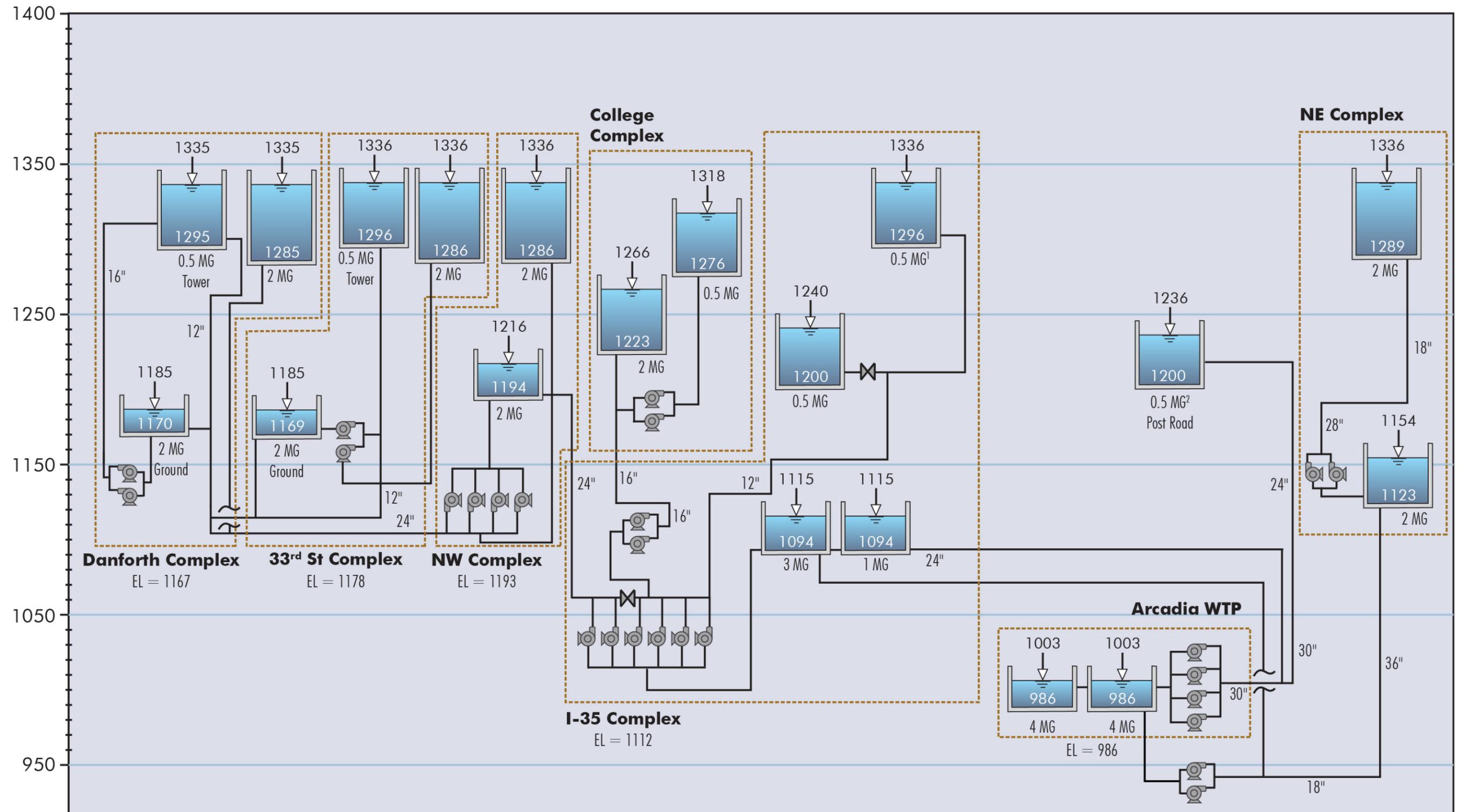
Category 2 Reuse Facilities

Plant Flow, AAD = 14.0 MGD
MMAD= 16.0 MGD

Cat 2 Reuse Facilities sized to accommodate total average flow capacity

Description	Units	Quantity	Unit Cost	Cost	Power Consumption (hp)	Daily Operating Hours	Power (kWh/yr)	Daily Labor Hours	Comments
CONSTRUCTION COSTS									
<u>Flocculation Basin</u>									
Inline Static Mixer	LS	1	\$20,000	\$20,000	5	24	32,631	0	
Flocculation Basins	LS	1	\$800,000	\$800,000	40	24	261,048	0.5	
Chemical Facilities	LS	1	\$1,338,000	\$1,338,000	0	0	0	0	
Add'l Piping/Valves	LS	1	\$100,000	\$100,000	0	0	0	0	
Misc Equipment/Instruments	LS	1	\$25,000	\$25,000	0	0	0	0	
Subtotal - Flocculation Basin				\$2,283,000	40	24	261,048	0.5	
<u>Reuse Pumping Station</u>									
Pump Station Facility	LS	1	\$500,000	\$500,000					Designed to pump max of 4.5 mgd of Cat 2 water to storage facilities at center of Edmond Parks Sized for 1,050 gpm each (3+1 standby)
Pumping Equipment	LS	1	\$220,000	\$220,000					
EI&C/Misc Instruments	LS	1	\$220,000	\$220,000	0	0	0	0	
Piping/Valves	LS	1	\$50,000	\$50,000	0	0	0	0	
Sub Total - MLR Pump Station				\$990,000	0	0	0	0	
Subtotal 1				\$3,273,000	40	24	261,048	0.5	
Yard Piping			5.0%	\$164,000					
Paving/Grading			0.5%	\$16,000					
Coatings			1.5%	\$49,000					
Electrical			2.0%	\$65,000					
Instrumentation			1.0%	\$33,000					
Total Direct Cost				\$3,600,000					

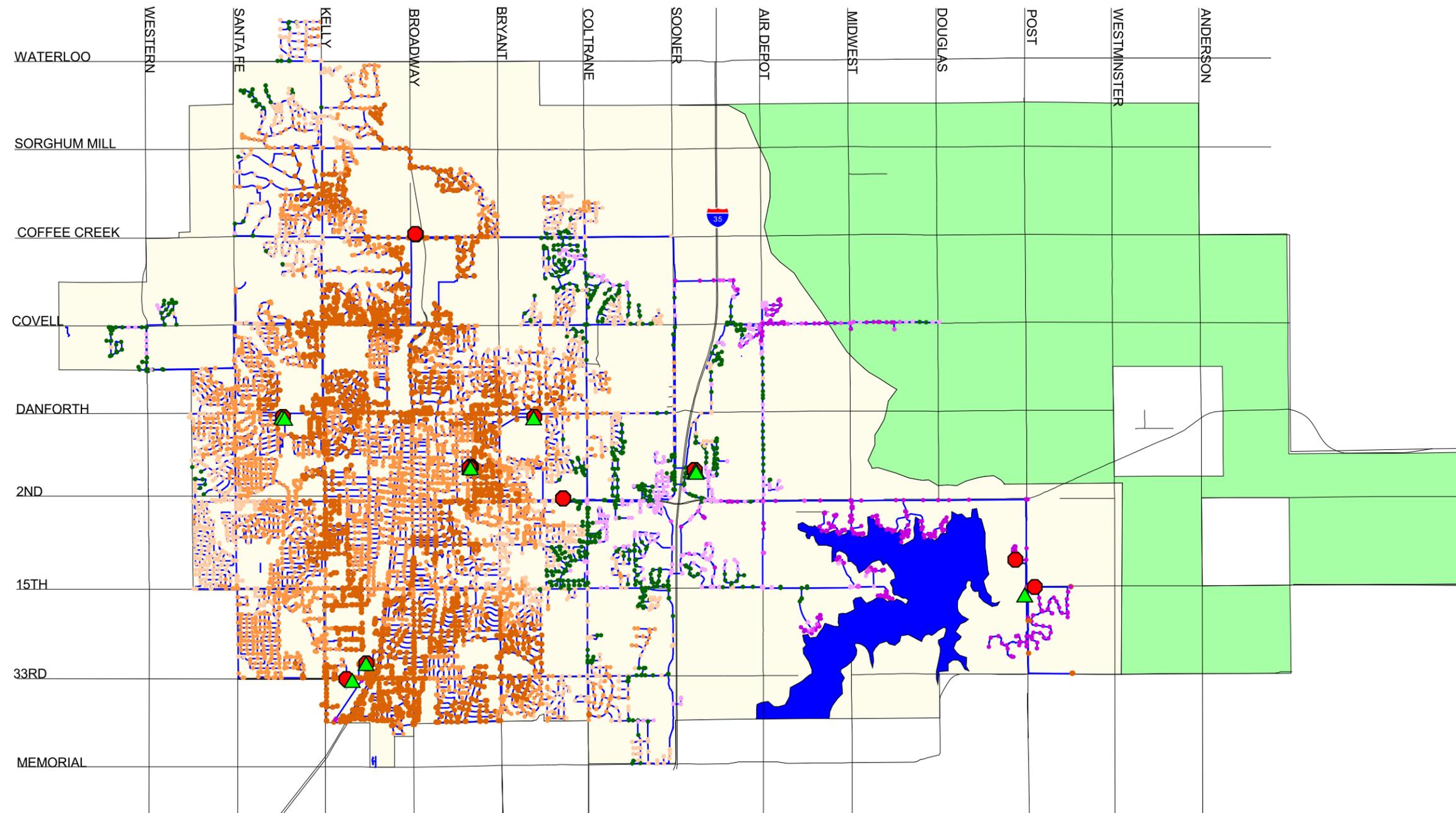
**APPENDIX F – DISTRIBUTION SYSTEM MODELING INPUT
DATA AND RESULTS**



1. I-35 Tank #2 feeds the pressure zone east of I-35.
2. Post Road Tank feeds a separate pressure zone along Arcadia Lake.

FUTURE HYDRAULIC PROFILE

Water and Wastewater Systems
Master Plan
City of Edmond, OK



- ▲ Tank
- Pump
- Pressure (psi)
 - < 35
 - 35 - 50
 - 50 - 65
 - 65 - 80
 - 80 - 95
 - 95 - 100
 - > 100
- Pipe
- Street figures.shp
- City Limit
- Arcadia Lake
- Future Service Area
- Service Area



0 2 Miles

Figure F1
2017 Max Day Pressure Distribution



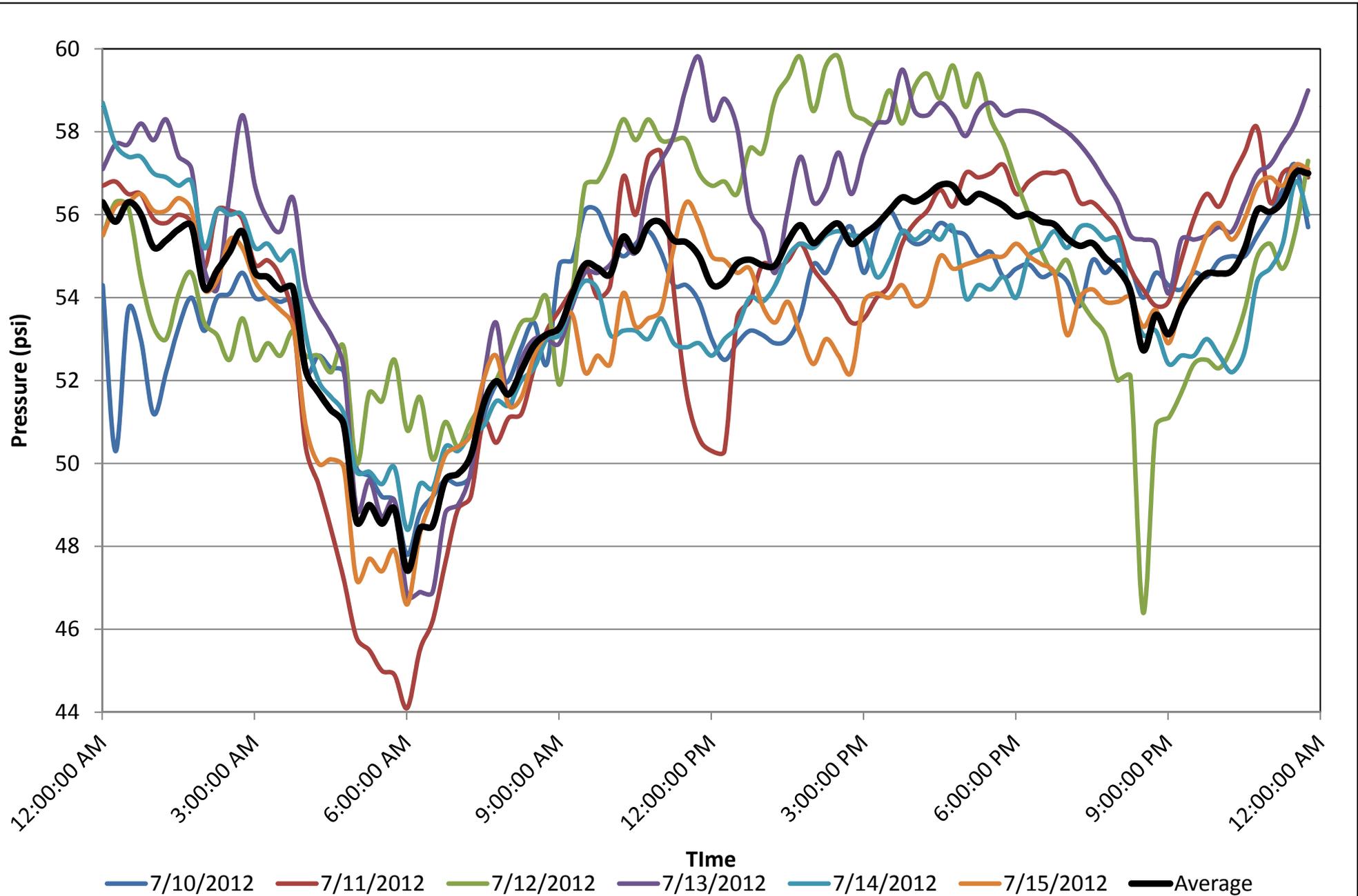


FIGURE F1a- Telelogger ID 36845 Pressure Plot
 WATER & WASTEWATER SYSTEM MASTER PLAN
 CITY OF EDMOND, OKLAHOMA

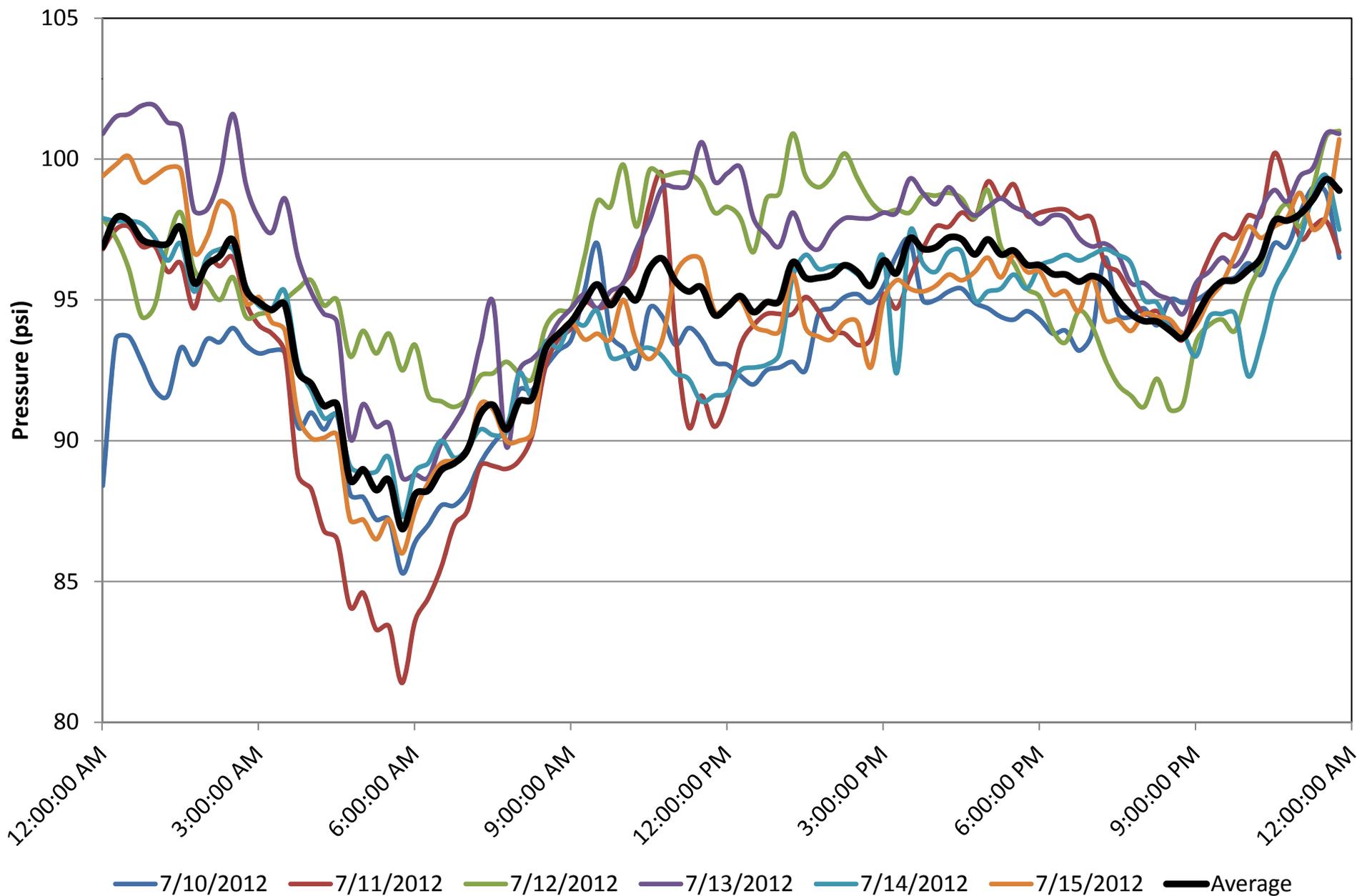


FIGURE F1b- Telelogger ID 38830 Pressure Plot
 WATER & WASTEWATER SYSTEM MASTER PLAN
 CITY OF EDMOND, OKLAHOMA

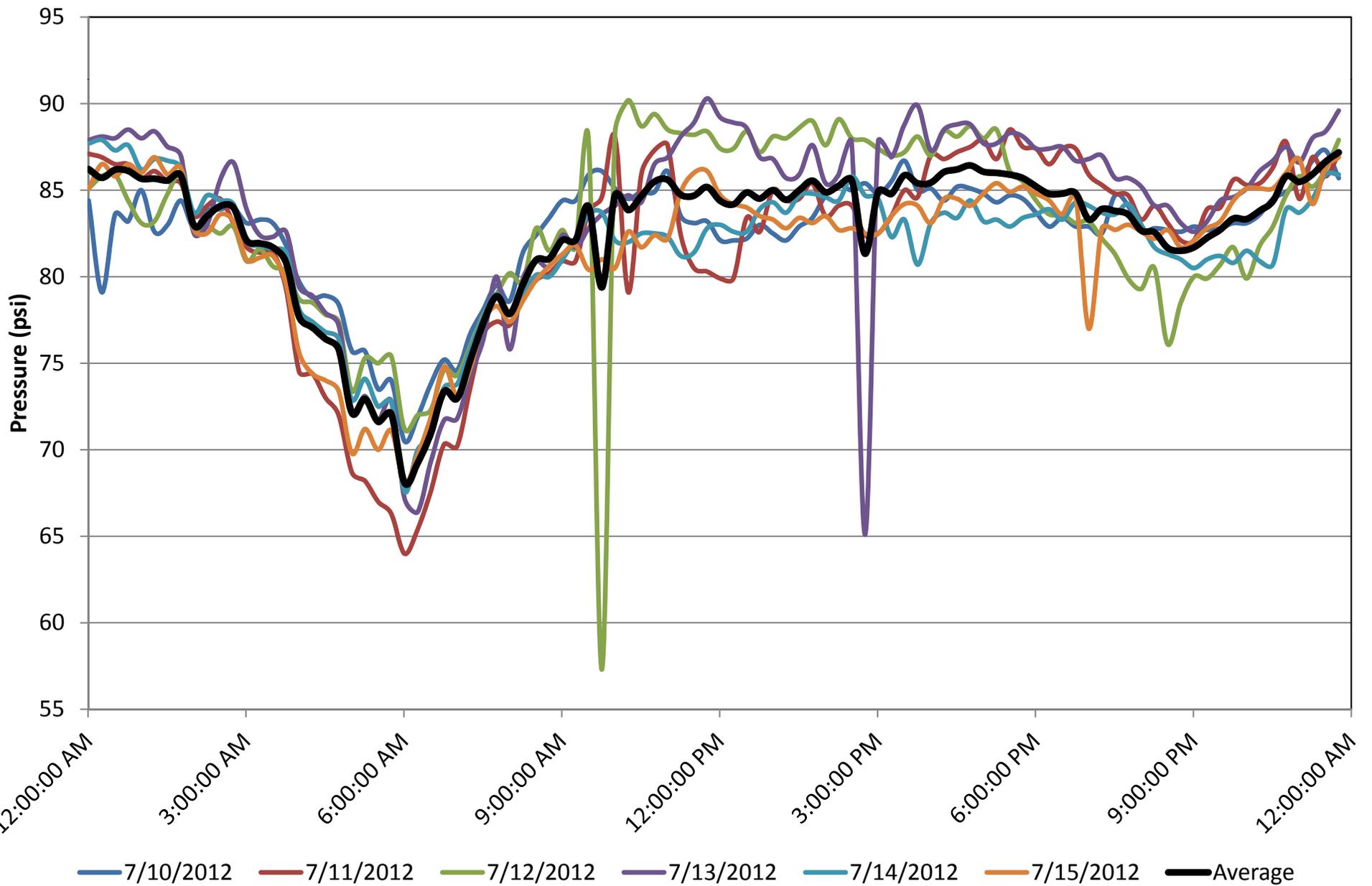


FIGURE F1c– Telelogger ID 34040 Pressure Plot
 WATER & WASTEWATER SYSTEM MASTER PLAN
 CITY OF EDMOND, OKLAHOMA

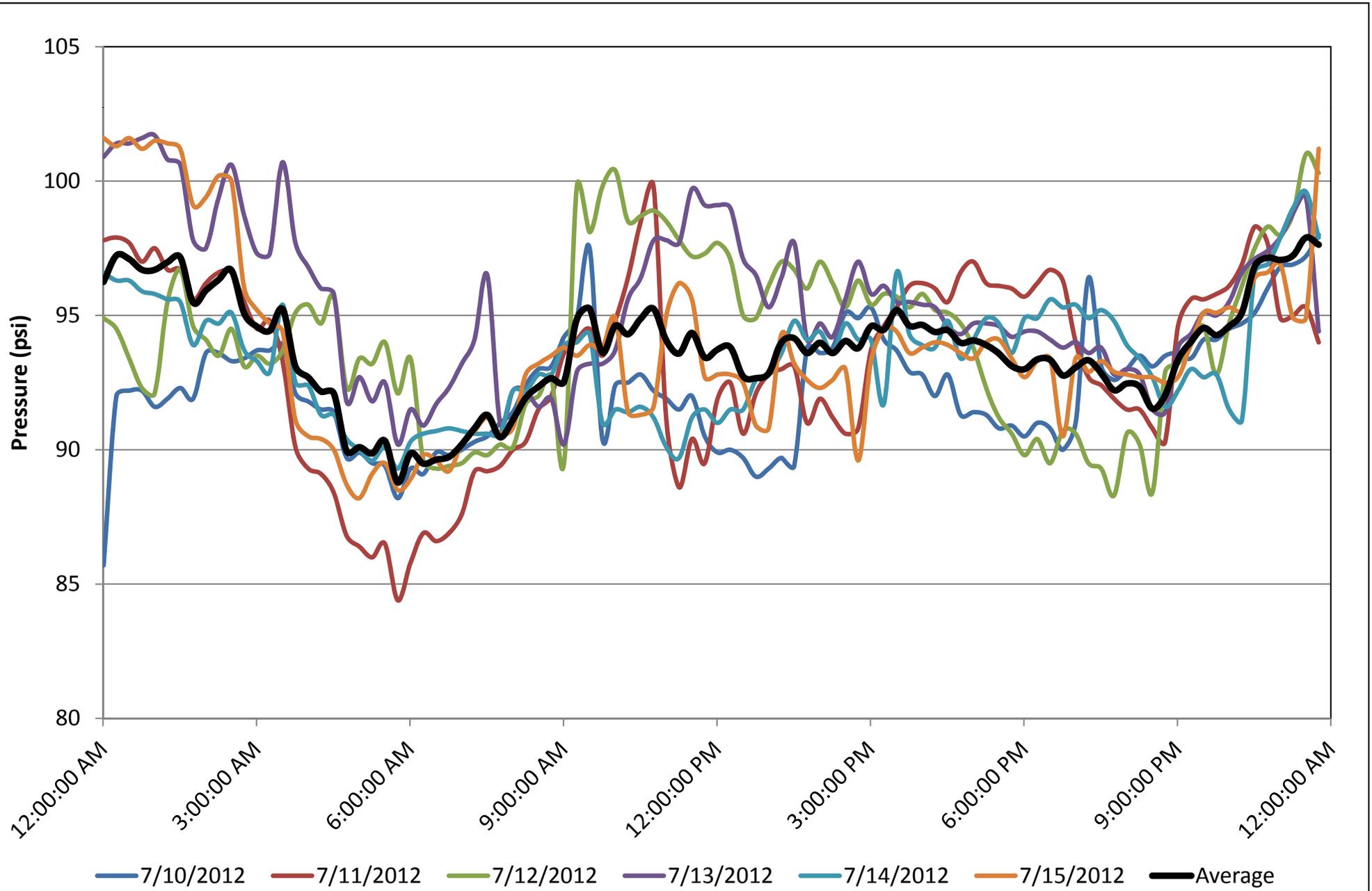


FIGURE F1d- Telelogger ID 32461 Pressure Plot
 WATER & WASTEWATER SYSTEM MASTER PLAN
 CITY OF EDMOND, OKLAHOMA

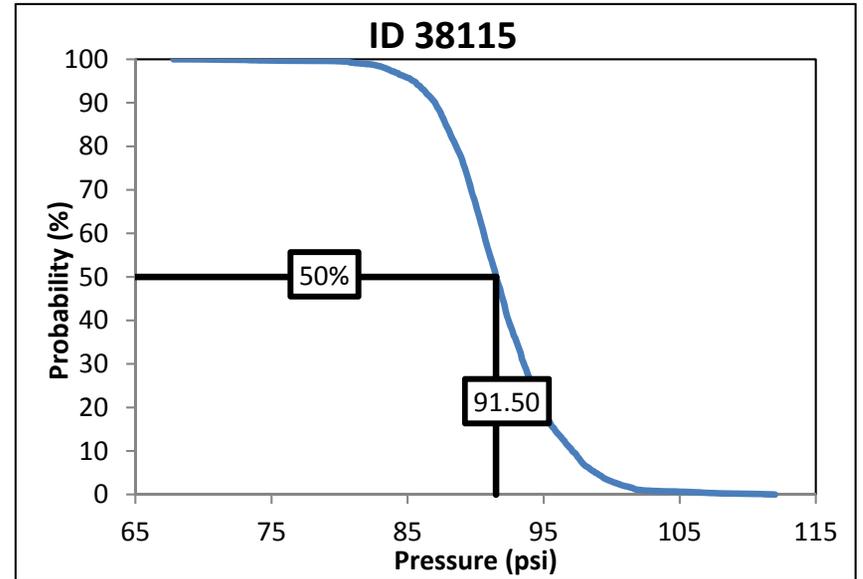
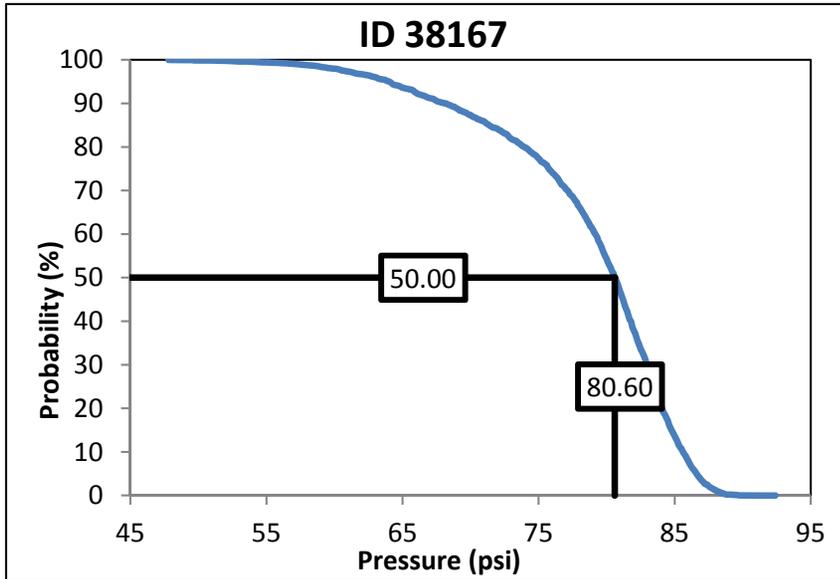
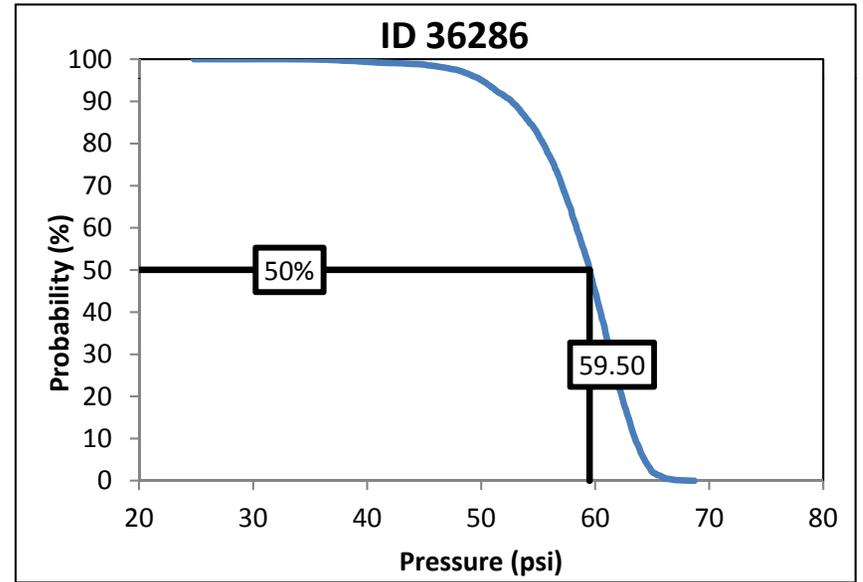
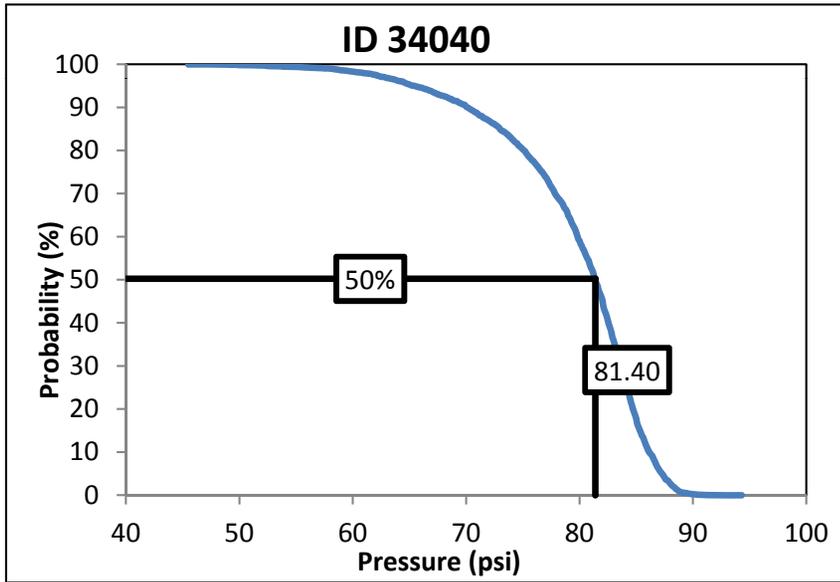


FIGURE F2a– Telelogger ID Probability Plots
 WATER & WASTEWATER SYSTEM MASTER PLAN
 CITY OF EDMOND, OKLAHOMA

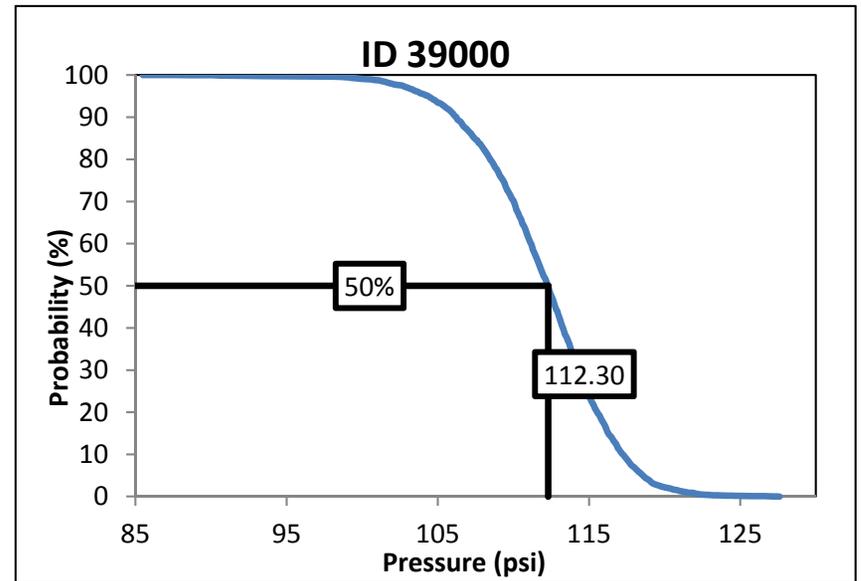
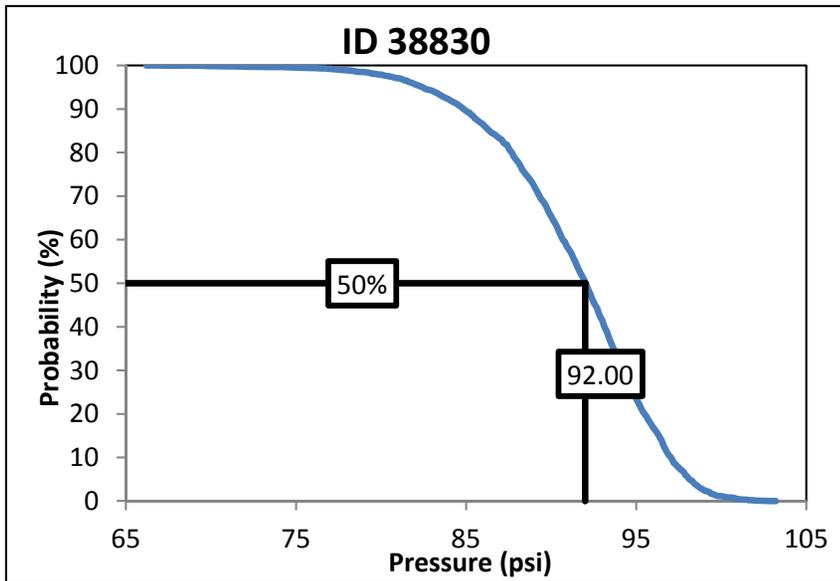
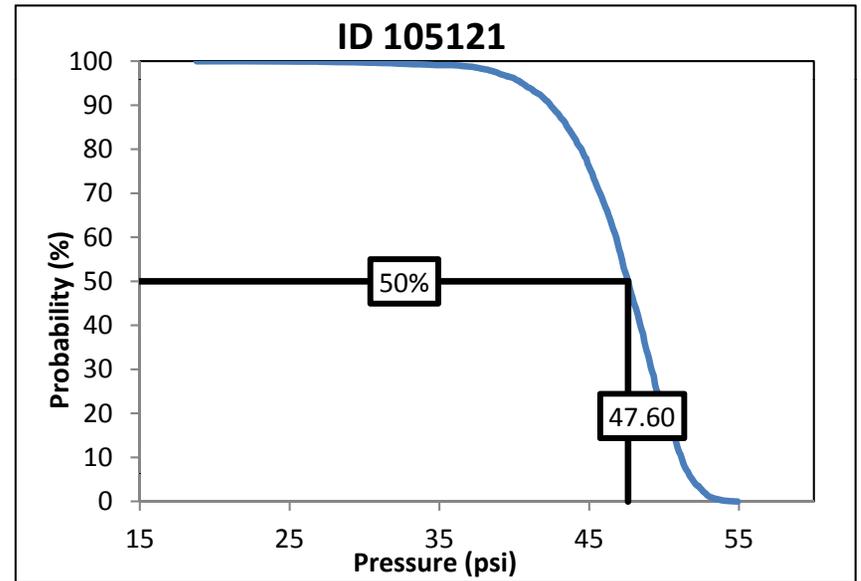
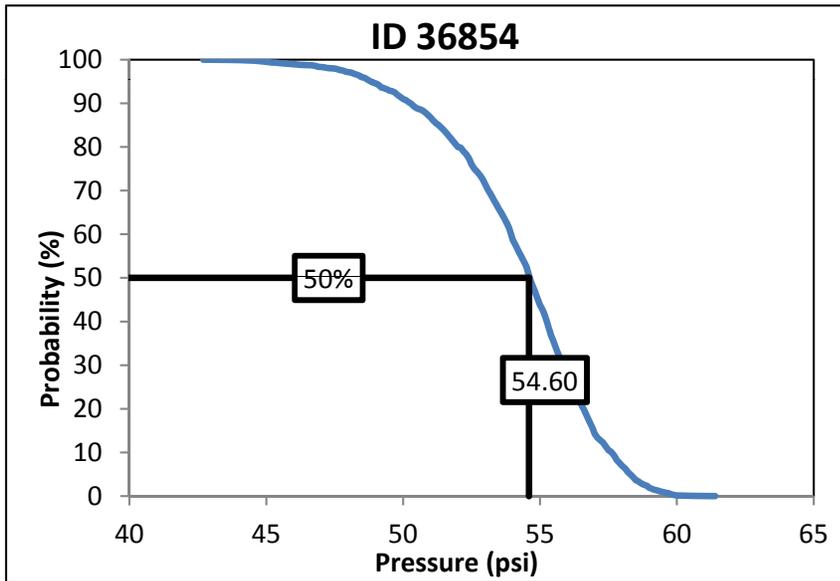


FIGURE F2b– Telelogger Pressure Probability Plots
 WATER & WASTEWATER SYSTEM MASTER PLAN
 CITY OF EDMOND, OKLAHOMA

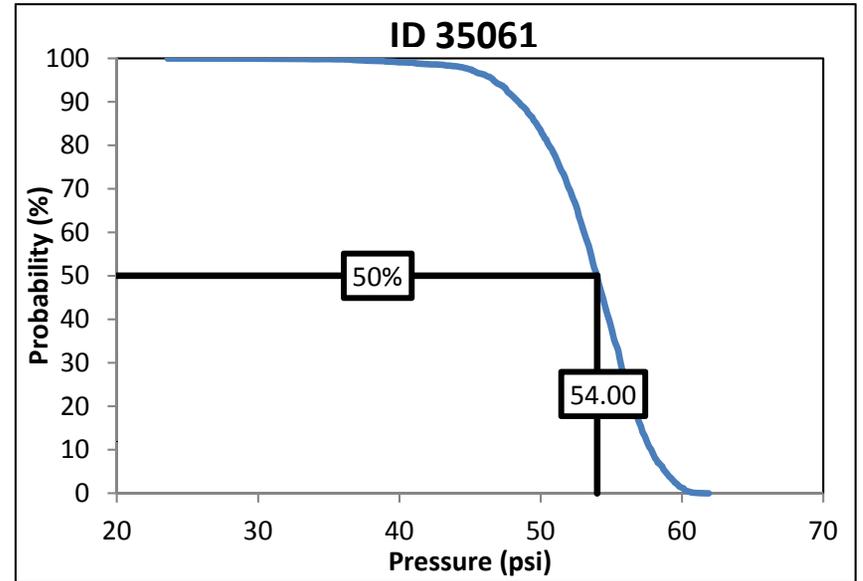
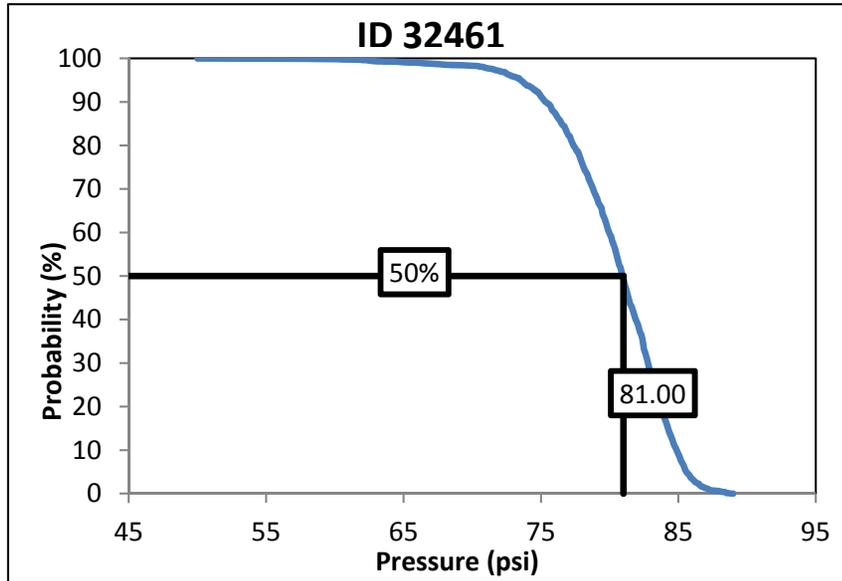
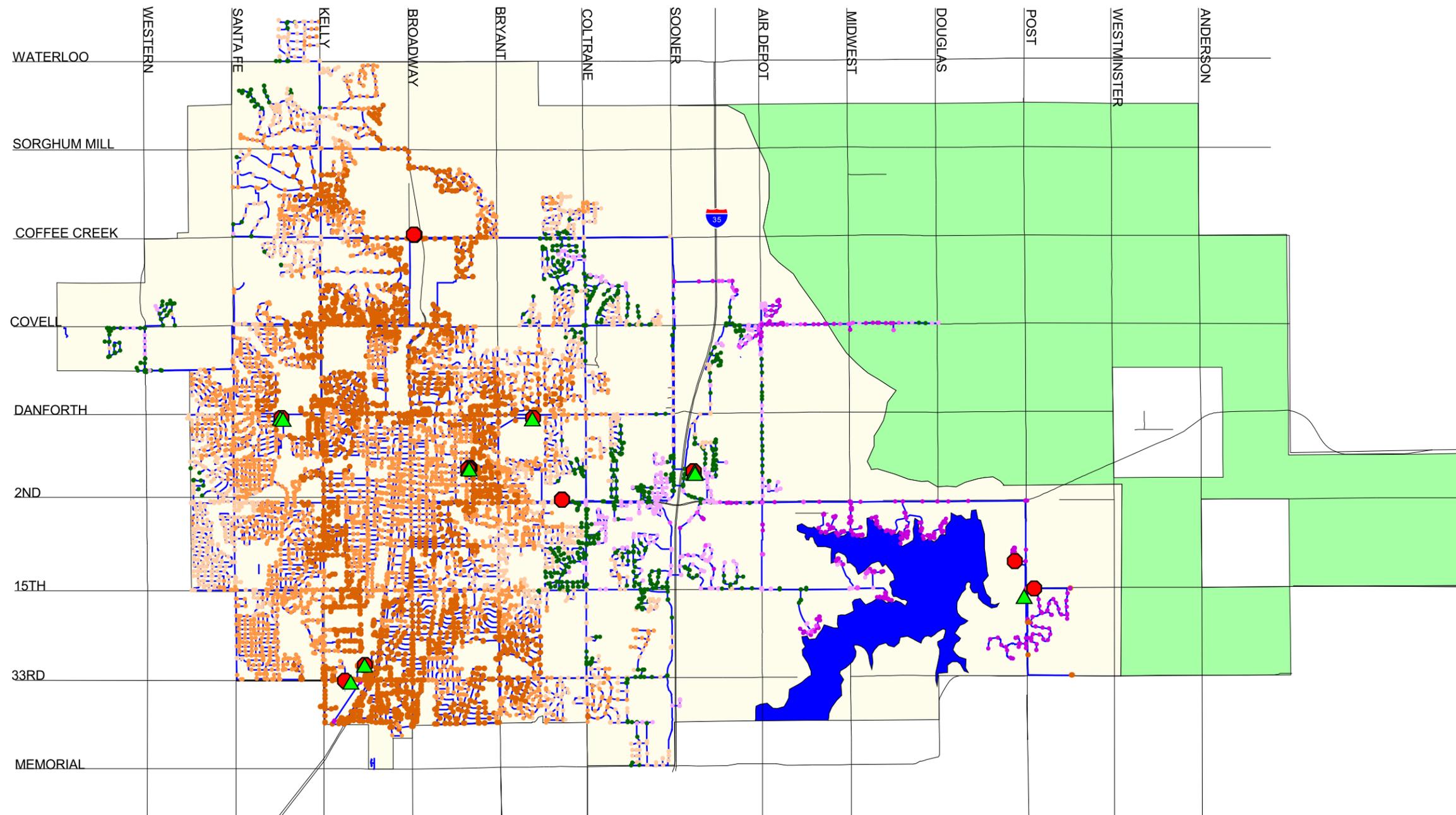


FIGURE F2c– Telelogger Pressure Probability Plots
 WATER & WASTEWATER SYSTEM MASTER PLAN
 CITY OF EDMOND, OKLAHOMA

Water and Wastewater Systems
Master Plan
City of Edmond, OK



- ▲ Tank
- Pump
- Pressure (psi)
 - < 35
 - 35 - 50
 - 50 - 65
 - 65 - 80
 - 80 - 95
 - 95 - 100
 - > 100
- Pipe
- Street figures.shp
- City Limit
- Arcadia Lake
- Future Service Area
- Service Area

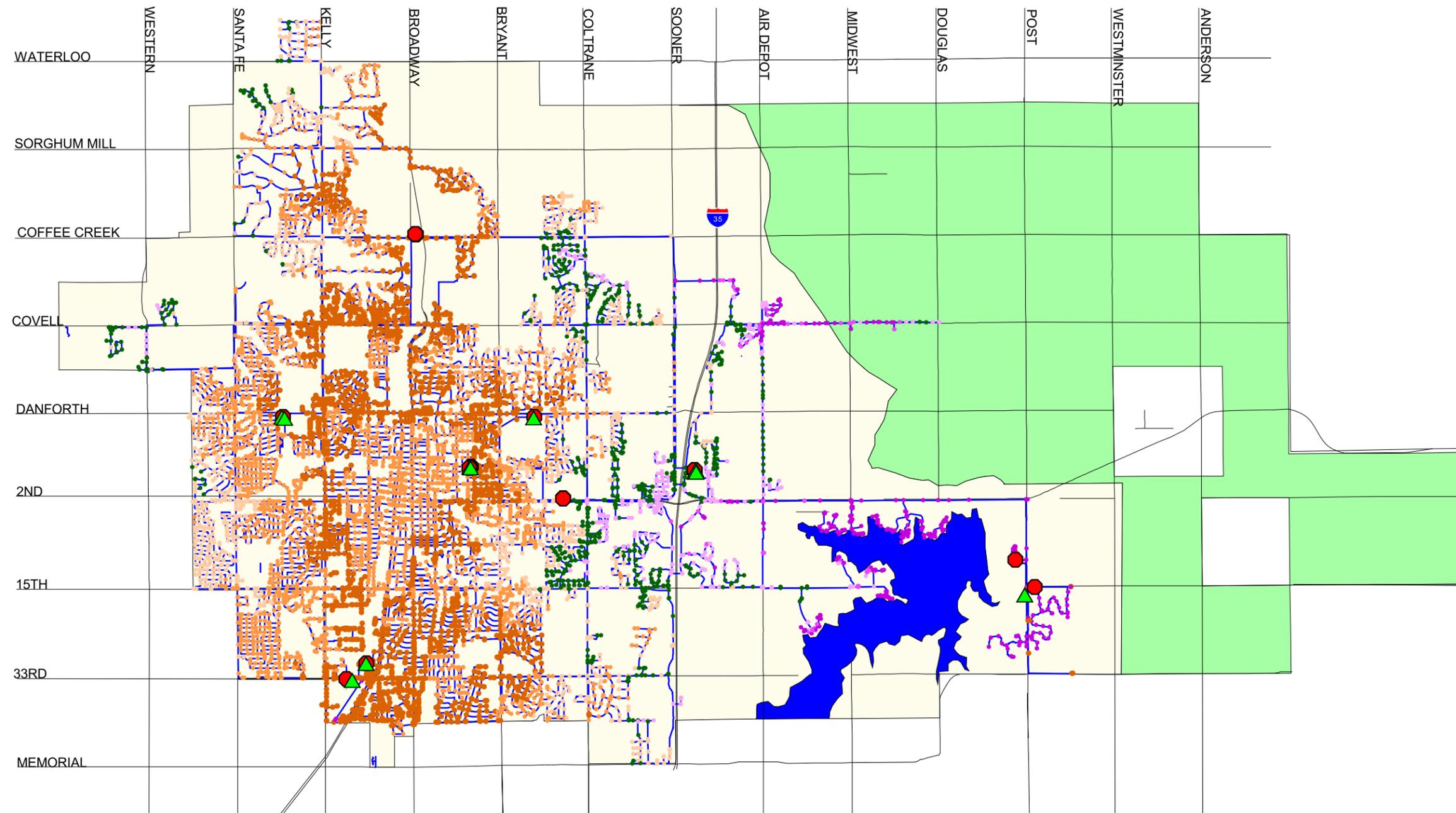


0 2 Miles

Figure F2
2022 Max Day Pressure Distribution



Water and Wastewater Systems
Master Plan
City of Edmond, OK



- ▲ Tank
- Pump
- Pressure (psi)
 - < 35
 - 35 - 50
 - 50 - 65
 - 65 - 80
 - 80 - 95
 - 95 - 100
 - > 100
- Pipe
- Street figures.shp
- City Limit
- Arcadia Lake
- Future Service Area
- Service Area

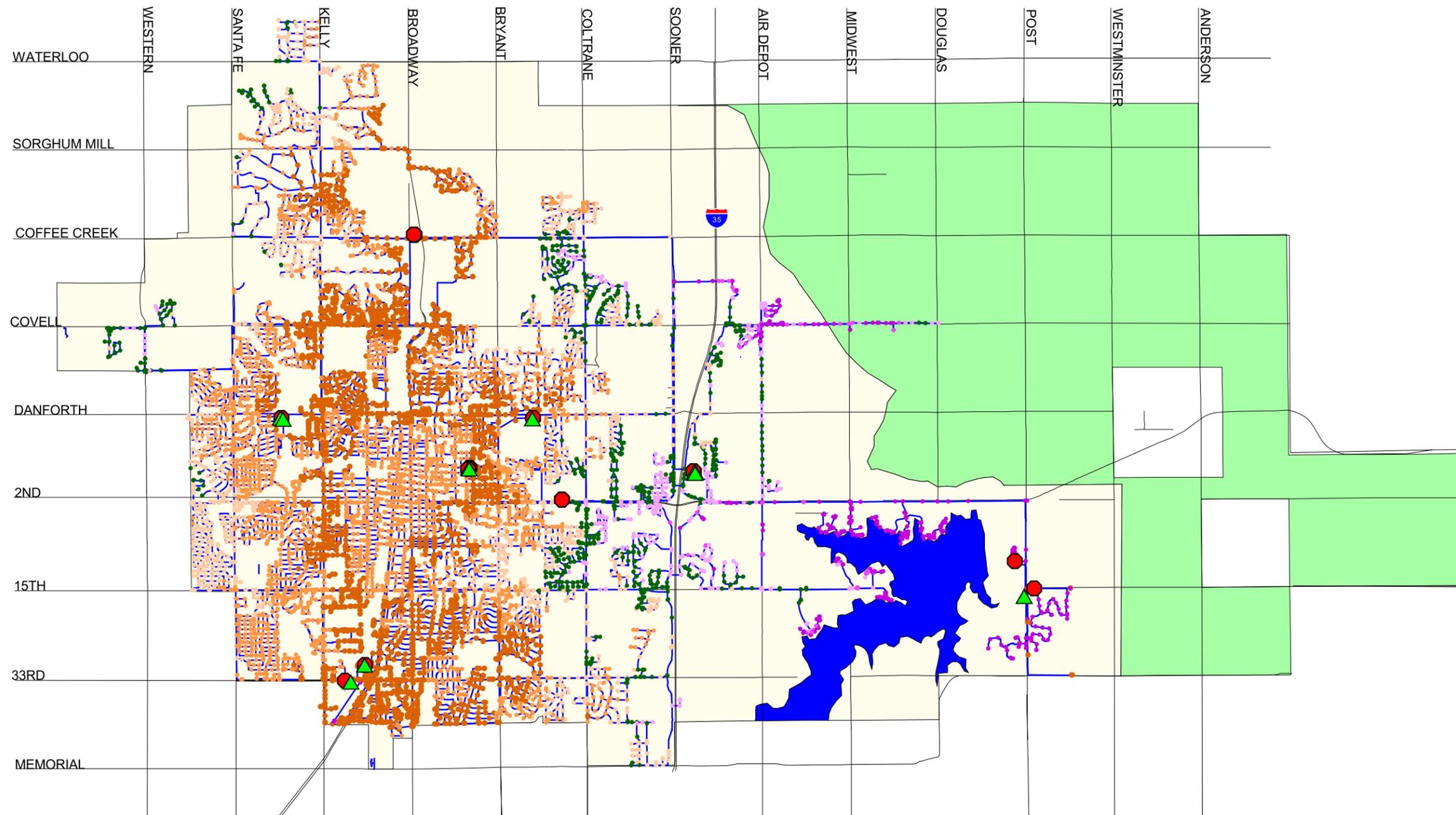


0 2 Miles

Figure F3
2027 Max Day Pressure Distribution



Water and Wastewater Systems
Master Plan
City of Edmond, OK



- ▲ Tank
- Pump
- Pressure (psi)
 - < 35
 - 35 - 50
 - 50 - 65
 - 65 - 80
 - 80 - 95
 - 95 - 100
 - > 100
- Pipe
- Street figures.shp
- City Limit
- Arcadia Lake
- Future Service Area
- Service Area

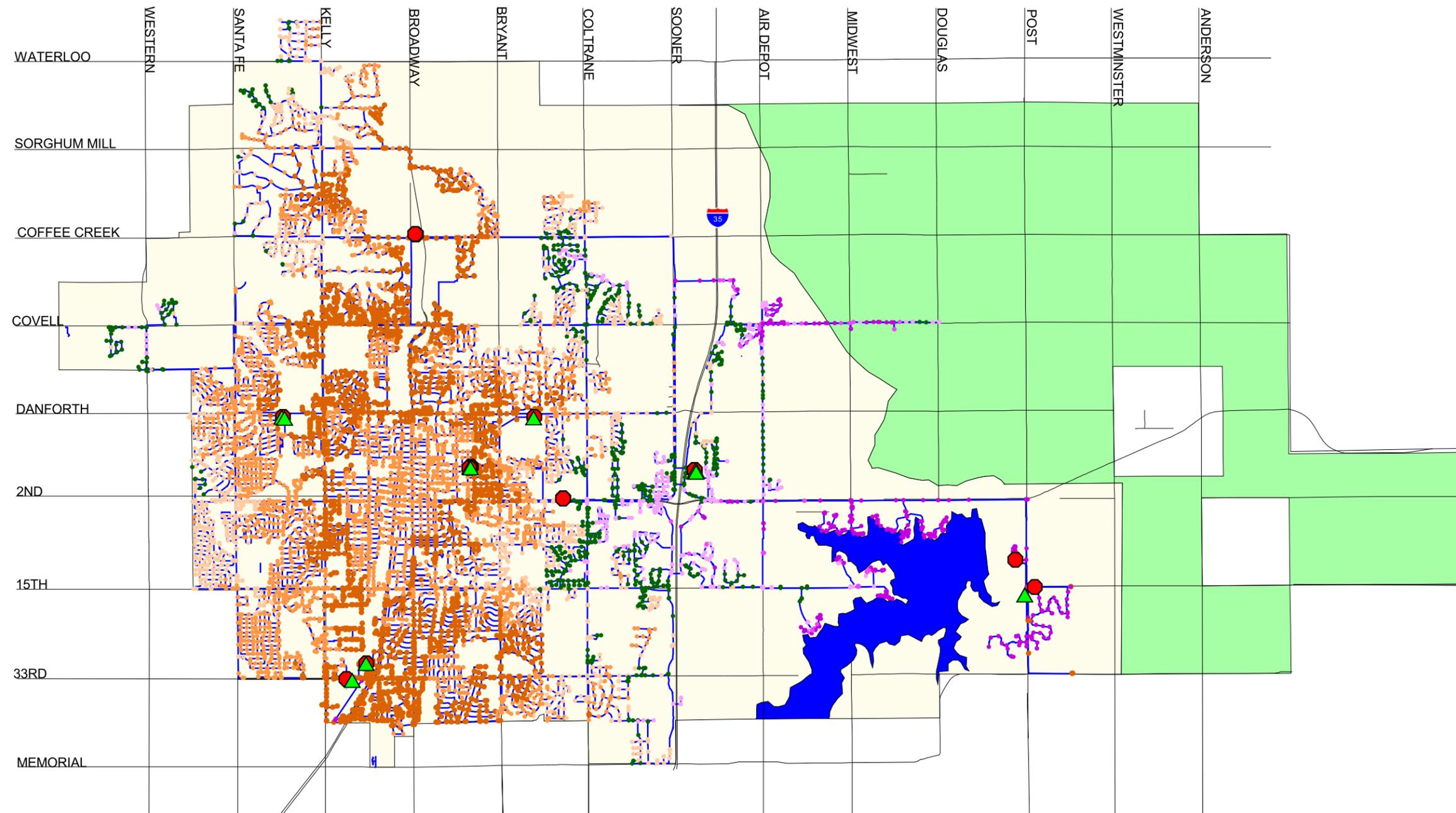


0 2 Miles

Figure F4
2032 Max Day Pressure Distribution



Water and Wastewater Systems
Master Plan
City of Edmond, OK



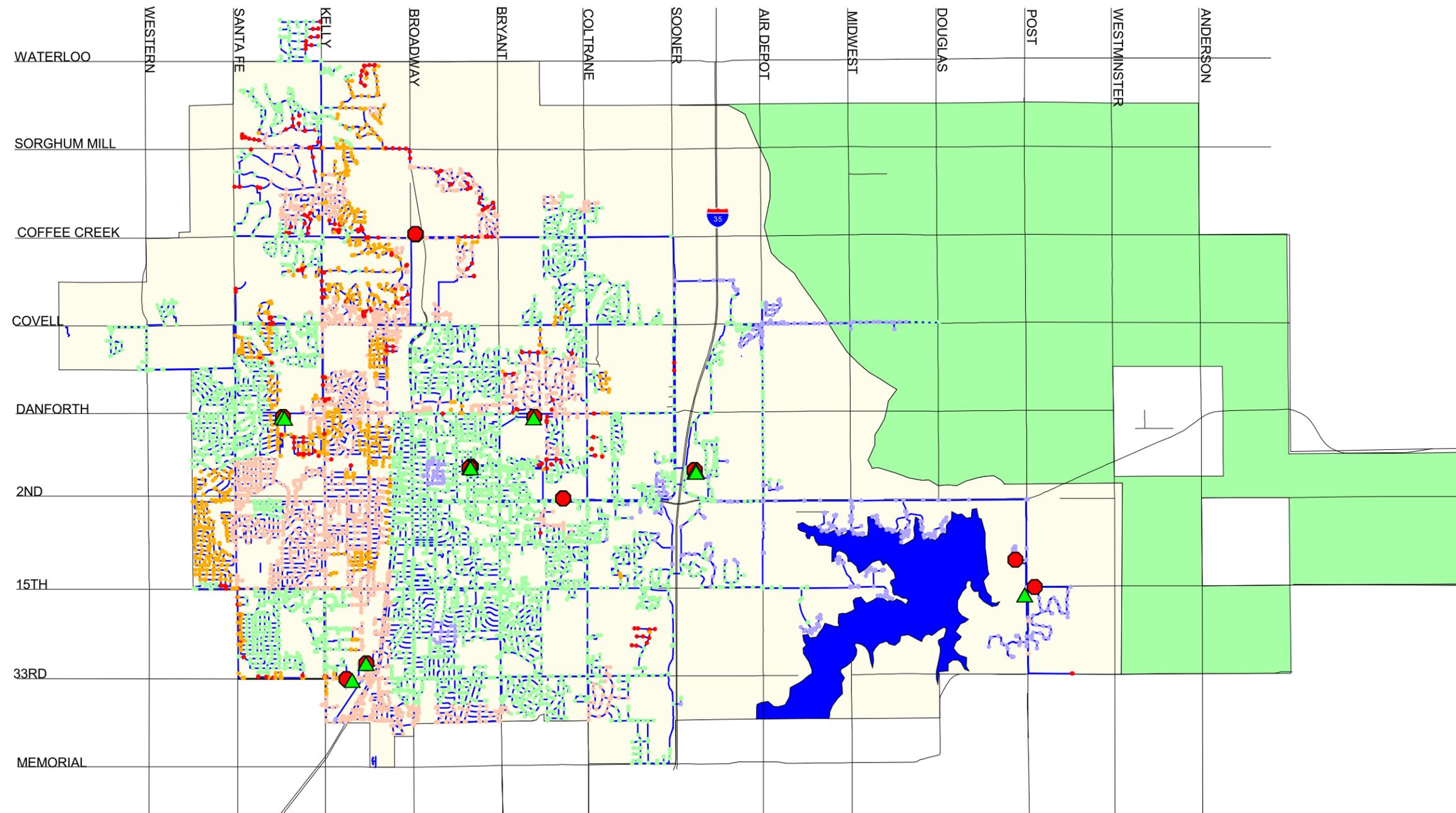
- ▲ Tank
- Pump
- Pressure (psi)
 - < 35
 - 35 - 50
 - 50 - 65
 - 65 - 80
 - 80 - 95
 - 95 - 100
 - > 100
- Pipe
- Street figures.shp
- City Limit
- Arcadia Lake
- Future Service Area
- Service Area



Figure F5
2042 Max Day Pressure Distribution



Water and Wastewater Systems
Master Plan
City of Edmond, OK



- ▲ Tank
- Pump
- Water Age (days)
 - 1
 - 2
 - 3
 - 4
 - >= 5
- Pipe
- Street figures.shp
- City Limit
- Arcadia Lake
- Future Service Area
- Service Area

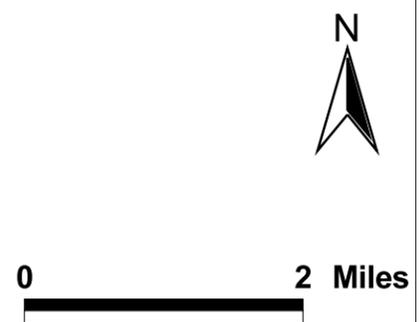
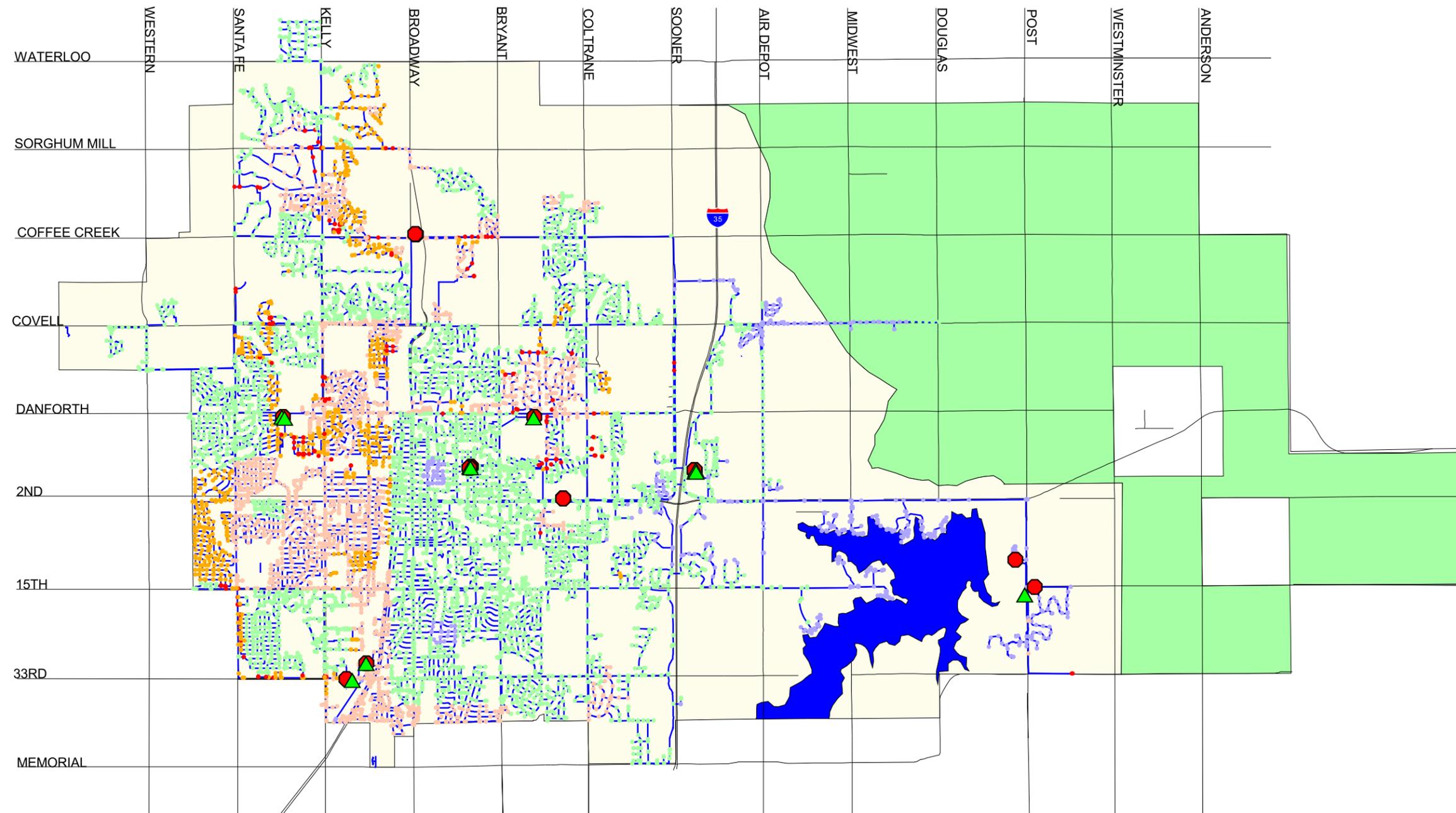


Figure F6
2017 Water Age



Water and Wastewater Systems
Master Plan
City of Edmond, OK



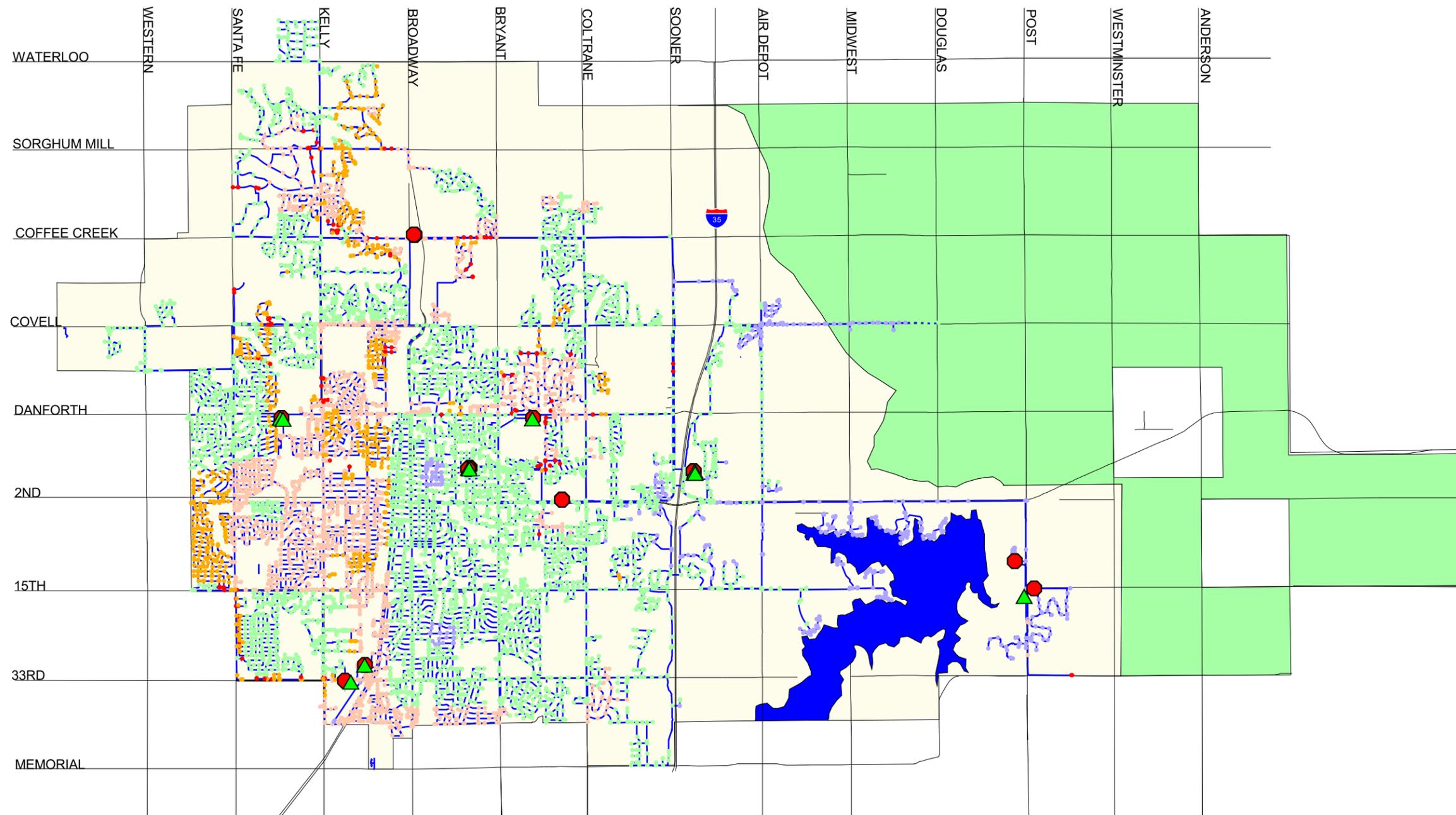
- ▲ Tank
- Pump
- Water Age (days)**
- 1
- 2
- 3
- 4
- >= 5
- Pipe
- Street figures.shp
- City Limit
- Arcadia Lake
- Future Service Area
- Service Area



Figure F7
2032 Water Age



Water and Wastewater Systems
Master Plan
City of Edmond, OK



- ▲ Tank
- Pump
- Water Age (days)**
- 1
- 2
- 3
- 4
- >= 5
- Pipe
- Street figures.shp
- City Limit
- Arcadia Lake
- Future Service Area
- Service Area

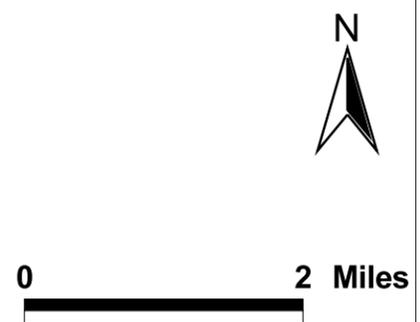


Figure F8
Buildout Water Age



**APPENDIX G – COLLECTION SYSTEM MODELING INPUT
DATA AND RESULTS**

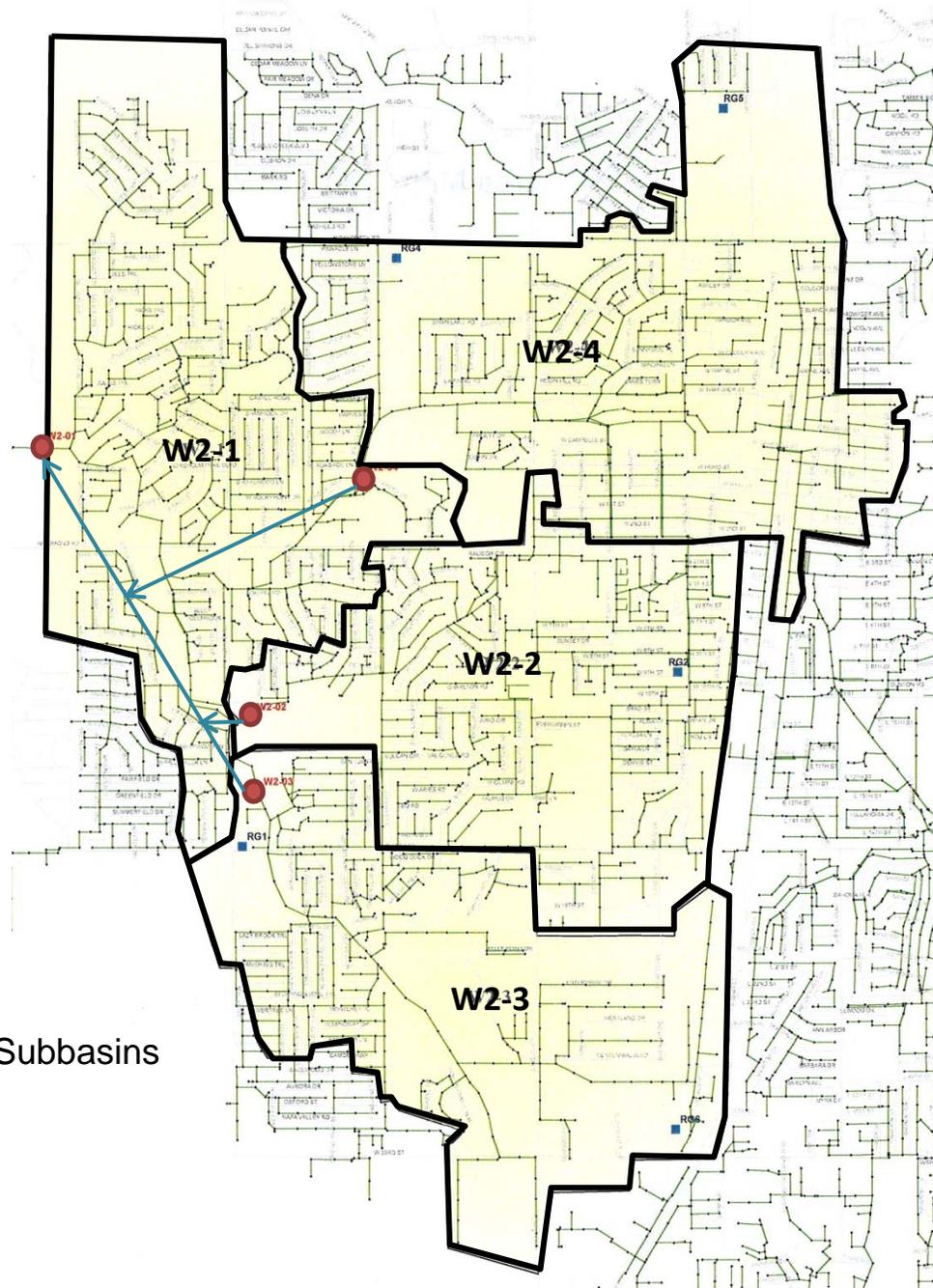


Figure G1 Subsystem W2- Flow Meter Subbasins

Table G1 Overflow or Deficient Manholes - 10 Year storm Event

Manhole ID	Coordinates		Invert Elevation (ft)	Depth (ft)	Freeboard (ft)	Head Class
	Northern	Eastern				
FIT-189	2107179.1	249521.2	1038.87	3.13	0.00	Below Maximum Depth
FIT-2	2118166.9	232828.3	1137.25	7.95	-0.45	Surcharged
FIT-2695	2118318.6	232691.7	1138.25	7.75	0.03	Below Maximum Depth
FIT-2710	2118311.1	232698.5	1134.00	12.02	0.05	Below Maximum Depth
FIT-2711	2118171.3	232824.3	1133.10	12.11	-0.45	Surcharged
LS-3424FM	2118103.3	263389.2	1087.00	4.00	-2.25	Surcharged
LS-6268	2137360.3	222314.3	1093.50	14.50	0.16	Below Maximum Depth
MH-1	2117774.4	232825.8	1135.62	7.88	0.00	Below Maximum Depth
MH-10254	2109761.7	232530.9	1076.00	10.00	0.00	Surcharged
MH-10414	2119978.0	232825.8	1158.61	8.09	0.00	Below Maximum Depth
MH-10564	2117991.9	232827.2	1136.55	8.55	0.07	Below Maximum Depth
MH-10624	2122873.2	239504.9	1185.78	9.70	0.00	Below Maximum Depth
MH-10644	2122510.5	239764.9	1183.23	7.70	0.00	Surcharged
MH-10713	2113613.9	228007.1	1110.73	7.85	0.00	Below Maximum Depth
MH-10719	2115100.5	227861.0	1126.12	7.14	0.00	Surcharged
MH-10790	2127880.9	236723.4	1105.00	13.00	0.00	Below Maximum Depth
MH-10791	2127878.0	236487.9	1099.80	12.05	0.00	Below Maximum Depth
MH-10798	2127999.9	237709.8	1127.10	17.90	0.00	Below Maximum Depth
MH-10860	2119567.8	238215.3	1165.45	7.57	0.00	Surcharged
MH-11018	2131438.5	238789.7	1082.08	9.92	0.10	Below Maximum Depth
MH-11021	2135669.7	236235.2	1037.80	10.73	0.00	Surcharged
MH-1104	2109754.8	232730.8	1076.29	9.71	0.00	Surcharged
MH-11157	2126974.8	236691.9	1117.48	2.38	0.00	Below Maximum Depth
MH-11269	2119597.8	228714.2	1147.80	8.20	0.00	Below Maximum Depth
MH-11332	2125286.2	245372.5	1148.78	3.47	0.00	Below Maximum Depth
MH-11333	2125265.8	245329.4	1148.91	3.63	0.00	Surcharged
MH-11336	2125206.7	245328.6	1149.37	3.70	0.00	Below Maximum Depth
MH-11459	2129690.0	240071.1	1100.58	12.38	0.14	Below Maximum Depth
MH-11557	2120428.0	232824.2	1165.08	5.75	0.00	Below Maximum Depth

MH-11627	2115180.8	227860.4	1127.52	5.98	0.00	Below Maximum Depth
MH-11671	2134127.9	227461.5	1104.63	6.62	0.01	Below Maximum Depth
MH-11707	2144561.1	251689.0	1011.76	6.64	0.00	Surcharged
MH-11709	2144287.0	251348.2	1013.11	5.89	0.00	Below Maximum Depth
MH-11762	2135366.1	251175.6	1046.77	8.83	0.00	Below Maximum Depth
MH-1187	2117391.8	261445.0	1082.85	5.65	0.00	Below Maximum Depth
MH-11989	2120830.9	251302.4	1109.27	7.89	0.00	Surcharged
MH-12114	2123916.5	232464.7	1124.69	7.17	0.04	Below Maximum Depth
MH-12143	2120562.3	249432.1	1143.47	9.30	0.00	Surcharged
MH-12147	2120506.9	250239.6	1128.15	8.00	0.00	Surcharged
MH-12181	2129166.7	240481.9	1105.89	9.05	0.11	Below Maximum Depth
MH-12209	2120809.5	248692.6	1164.80	9.50	0.00	Surcharged
MH-12210	2120833.5	248692.5	1164.40	9.10	0.00	Below Maximum Depth
MH-12211	2120840.2	249044.6	1157.05	6.85	0.00	Surcharged
MH-12212	2120813.9	249141.9	1155.55	6.45	0.00	Below Maximum Depth
MH-123	2115579.9	235039.0	1118.99	10.60	0.00	Below Maximum Depth
MH-12306	2120309.6	250900.1	1120.03	8.80	0.00	Below Maximum Depth
MH-12317	2120486.5	249962.3	1131.72	11.28	0.04	Below Maximum Depth
MH-12320	2120505.3	249759.0	1137.92	8.16	0.00	Below Maximum Depth
MH-124	2115577.9	235374.9	1117.16	17.14	0.00	Surcharged
MH-12426	2125796.5	237720.8	1136.00	12.00	0.00	Below Maximum Depth
MH-12551	2129170.5	248263.9	1082.35	11.51	0.00	Below Maximum Depth
MH-12552	2128955.5	248005.9	1084.98	10.32	0.00	Surcharged
MH-12555	2129244.6	247552.8	1089.10	11.98	0.00	Below Maximum Depth
MH-12556	2129474.5	247287.3	1090.50	14.80	0.00	Surcharged
MH-12559	2129589.1	246993.3	1092.60	15.20	0.00	Surcharged
MH-12560	2129578.0	246794.2	1096.00	14.55	0.00	Surcharged
MH-12589	2117037.2	228823.4	1127.23	10.71	0.00	Below Maximum Depth
MH-12985	2122989.3	224876.3	1129.03	12.35	0.00	Surcharged
MH-12986	2122900.3	224746.6	1128.38	11.17	0.00	Surcharged
MH-13183	2126071.6	236953.1	1147.40	5.10	0.00	Below Maximum Depth
MH-13184	2126105.1	236877.2	1141.50	9.01	0.01	Below Maximum Depth
MH-13197	2107991.4	249212.3	1041.79	6.00	0.00	Surcharged
MH-13198	2108025.5	249461.0	1043.42	5.00	0.00	Surcharged

MH-13199	2108211.6	249417.5	1043.97	4.86	0.00	Below Maximum Depth
MH-13224	2108232.6	249414.6	1044.03	4.96	0.00	Surcharged
MH-1361	2114965.0	261917.0	1069.50	4.48	0.00	Surcharged
MH-1380	2114604.7	262329.5	1059.50	4.20	0.00	Surcharged
MH-1522	2114590.6	252727.3	1046.62	7.18	0.00	Below Maximum Depth
MH-1523	2114794.6	252426.2	1048.26	5.99	0.00	Below Maximum Depth
MH-1524	2115019.1	252332.3	1051.40	7.81	0.00	Below Maximum Depth
MH-1579	2116154.5	252825.5	1070.52	7.78	0.00	Surcharged
MH-1582	2115746.4	252532.7	1065.61	6.49	0.00	Below Maximum Depth
MH-1586	2116278.4	252634.6	1069.15	4.55	0.00	Below Maximum Depth
MH-1592	2116465.1	253353.6	1074.54	7.96	0.00	Below Maximum Depth
MH-1593	2116655.6	253433.6	1075.35	8.02	0.00	Below Maximum Depth
MH-1615	2117147.3	253246.0	1077.04	7.25	0.00	Surcharged
MH-1617	2117455.9	252894.5	1078.30	7.50	0.00	Surcharged
MH-1619	2117841.5	252924.2	1079.31	10.45	0.00	Surcharged
MH-1628	2119867.9	252133.3	1094.10	6.72	0.00	Below Maximum Depth
MH-1629	2119959.4	252018.0	1094.69	7.78	0.00	Below Maximum Depth
MH-1633	2120323.0	251677.8	1102.58	6.57	0.00	Surcharged
MH-1682	2113087.9	248680.5	1078.66	7.34	0.00	Below Maximum Depth
MH-1685	2113717.3	248266.6	1083.73	14.77	0.00	Below Maximum Depth
MH-1688	2114429.4	247646.2	1092.84	15.66	0.00	Below Maximum Depth
MH-1692	2115323.9	246692.3	1098.90	14.10	0.00	Below Maximum Depth
MH-2172	2113909.7	231805.2	1099.14	7.46	0.00	Below Maximum Depth
MH-2173	2114281.2	231627.1	1100.36	8.97	0.00	Below Maximum Depth
MH-2175	2115072.1	231266.0	1104.00	11.59	0.00	Below Maximum Depth
MH-2177	2115566.3	230699.0	1111.96	6.84	0.00	Surcharged
MH-2178	2115784.4	230433.6	1114.76	6.74	0.00	Below Maximum Depth
MH-2181	2116556.0	229599.6	1122.67	7.33	0.00	Below Maximum Depth
MH-2183	2116901.6	229040.5	1125.96	9.04	0.00	Below Maximum Depth
MH-2194	2117191.2	229040.1	1129.41	7.59	0.00	Below Maximum Depth
MH-2197	2118205.9	229033.0	1137.37	8.10	0.00	Below Maximum Depth
MH-2198	2118603.5	229031.5	1141.21	10.53	0.00	Below Maximum Depth
MH-2201	2119626.5	228714.0	1147.91	8.49	0.11	Below Maximum Depth
MH-2204	2120461.2	228712.1	1155.02	7.38	0.00	Surcharged

MH-232	2111543.8	248059.2	1064.45	6.55	0.00	Below Maximum Depth
MH-2423	2115067.0	231843.0	1107.12	9.48	0.00	Below Maximum Depth
MH-2428	2115086.4	231962.5	1107.58	10.42	0.00	Below Maximum Depth
MH-2441	2115599.9	232097.4	1115.14	7.36	0.00	Below Maximum Depth
MH-2442	2115601.0	231899.0	1109.91	8.89	0.00	Surcharged
MH-2458	2115507.6	230766.4	1110.95	8.15	0.00	Below Maximum Depth
MH-2495	2116474.1	232452.3	1119.42	11.38	0.00	Surcharged
MH-2496	2116207.1	232451.8	1118.20	11.20	0.22	Below Maximum Depth
MH-2499	2116732.3	232452.9	1121.23	11.87	0.00	Below Maximum Depth
MH-250	2110504.0	243270.7	1105.70	4.00	0.00	Below Maximum Depth
MH-2508	2115600.4	232084.5	1114.58	7.97	0.04	Below Maximum Depth
MH-2682	2119372.2	231774.6	1146.46	10.14	0.00	Below Maximum Depth
MH-2699	2119019.3	232176.5	1143.47	6.03	0.00	Below Maximum Depth
MH-2704	2119368.8	232500.4	1146.22	10.00	0.00	Below Maximum Depth
MH-2706	2119591.8	232713.6	1147.70	9.80	0.00	Below Maximum Depth
MH-2707	2119594.2	232826.6	1145.85	14.15	0.01	Below Maximum Depth
MH-2815	2121082.6	229217.8	1163.00	5.73	0.00	Below Maximum Depth
MH-2817	2121061.9	229019.0	1162.20	6.37	0.00	Below Maximum Depth
MH-2885	2118322.7	229032.7	1139.13	9.87	0.00	Below Maximum Depth
MH-2954	2118318.5	232543.0	1138.82	7.18	0.00	Below Maximum Depth
MH-3073	2118832.2	252882.4	1088.72	12.48	0.00	Below Maximum Depth
MH-313	2110504.7	243390.7	1106.05	3.53	0.00	Below Maximum Depth
MH-3147	2119214.2	250748.8	1137.77	16.30	0.00	Below Maximum Depth
MH-3148	2119294.7	250874.6	1135.11	14.70	0.00	Surcharged
MH-315	2110713.9	243705.6	1107.00	2.00	0.00	Below Maximum Depth
MH-316	2110810.2	243886.1	1107.45	2.82	0.00	Surcharged
MH-3168	2119522.7	251316.3	1121.64	9.20	0.00	Below Maximum Depth
MH-317	2110953.6	244024.1	1107.72	10.70	0.00	Surcharged
MH-318	2111002.9	243974.3	1108.00	10.20	0.00	Below Maximum Depth
MH-3349	2118212.6	261179.6	1089.02	3.98	0.00	Below Maximum Depth
MH-3409	2118127.1	261515.9	1090.00	3.25	0.00	Below Maximum Depth
MH-3418	2119038.2	263235.8	1092.06	9.04	0.00	Below Maximum Depth
MH-3517	2119237.3	243410.1	1183.09	3.69	0.00	Surcharged
MH-3536	2120713.4	243374.8	1178.84	11.16	0.02	Below Maximum Depth

MH-3542	2119992.7	243379.5	1174.44	12.16	0.00	Below Maximum Depth
MH-3587	2120857.1	244572.0	1182.95	7.65	0.00	Below Maximum Depth
MH-3615	2117733.2	236063.7	1139.84	10.41	0.00	Below Maximum Depth
MH-3632	2117062.7	236843.1	1129.78	7.62	0.00	Surcharged
MH-3657	2117148.2	236890.8	1130.00	10.71	0.00	Below Maximum Depth
MH-3680	2116902.3	236756.7	1128.94	5.26	0.00	Below Maximum Depth
MH-3681	2116943.9	236779.5	1129.08	6.10	0.07	Below Maximum Depth
MH-3695	2118282.6	236471.4	1150.30	3.13	0.00	Surcharged
MH-3701	2115809.6	235862.7	1115.98	7.02	0.00	Below Maximum Depth
MH-3972	2118300.4	240248.9	1134.83	11.29	0.09	Below Maximum Depth
MH-3978	2118527.4	240248.0	1135.96	10.06	0.00	Surcharged
MH-4	2116975.2	232825.7	1132.32	5.43	0.00	Below Maximum Depth
MH-4031	2122338.4	240147.3	1180.28	9.72	0.00	Below Maximum Depth
MH-4145	2119796.9	242070.0	1169.37	8.13	0.00	Below Maximum Depth
MH-4177	2120205.9	242328.9	1170.86	14.87	0.00	Below Maximum Depth
MH-4194	2119594.1	241036.9	1157.85	6.61	0.00	Below Maximum Depth
MH-4232	2119401.4	240711.8	1152.83	10.87	0.00	Below Maximum Depth
MH-425	2110249.7	241660.7	1091.59	13.91	0.00	Below Maximum Depth
MH-426	2110245.1	241590.1	1091.31	10.89	0.00	Below Maximum Depth
MH-4288	2119660.5	241696.9	1168.19	6.81	0.19	Below Maximum Depth
MH-4290	2119756.8	241164.6	1160.33	5.81	0.00	Below Maximum Depth
MH-4291	2119401.6	240834.1	1154.35	9.14	0.00	Surcharged
MH-4292	2119474.0	240942.0	1155.95	8.10	0.06	Below Maximum Depth
MH-4332	2120551.8	237396.2	1173.12	4.97	0.00	Below Maximum Depth
MH-4345	2122754.7	238351.7	1189.56	8.60	0.00	Surcharged
MH-4386	2122993.8	240625.7	1191.69	4.78	0.00	Below Maximum Depth
MH-4387	2123009.7	240844.0	1192.64	3.54	0.00	Below Maximum Depth
MH-4493	2119583.9	233822.9	1150.25	15.75	0.11	Below Maximum Depth
MH-4494	2119582.9	234100.9	1151.55	14.85	0.00	Surcharged
MH-4495	2119692.4	232826.1	1154.60	7.40	0.08	Below Maximum Depth
MH-4496	2120191.1	232825.1	1162.80	6.00	0.00	Surcharged
MH-4502	2119587.5	234346.8	1152.74	13.06	0.00	Surcharged
MH-4503	2119580.1	234582.8	1153.85	10.95	0.00	Surcharged
MH-4504	2119578.5	234821.8	1155.00	8.00	0.00	Below Maximum Depth

MH-4505	2119578.4	235049.8	1156.00	8.20	0.00	Below Maximum Depth
MH-4507	2120224.3	235283.6	1161.20	4.80	0.02	Below Maximum Depth
MH-4552	2119901.5	237291.7	1170.73	6.99	0.00	Below Maximum Depth
MH-4572	2120076.8	237335.2	1171.45	5.95	0.00	Surcharged
MH-4580	2120446.3	235284.3	1163.14	2.86	0.00	Below Maximum Depth
MH-4595	2119611.6	236735.5	1167.01	6.99	0.22	Below Maximum Depth
MH-4645	2118283.1	236212.0	1146.26	7.38	-0.01	Surcharged
MH-4695	2118282.2	236737.4	1152.33	1.10	0.00	Surcharged
MH-4696	2118566.2	236737.8	1153.54	1.78	0.00	Below Maximum Depth
MH-4697	2118865.9	236736.7	1157.80	2.56	0.00	Surcharged
MH-4726	2119667.5	236945.6	1168.21	6.88	0.00	Surcharged
MH-4727	2119667.3	237134.0	1168.94	7.77	0.00	Surcharged
MH-4742	2119666.3	236735.4	1167.25	6.93	0.00	Surcharged
MH-4754	2123545.3	235484.6	1142.45	12.40	0.00	Below Maximum Depth
MH-4771	2124883.2	232969.1	1117.46	4.76	0.00	Below Maximum Depth
MH-4794	2119667.0	237224.6	1169.28	8.10	0.00	Surcharged
MH-4838	2119960.2	240223.7	1164.43	5.57	0.00	Below Maximum Depth
MH-4859	2122938.6	240071.2	1189.38	4.40	0.00	Surcharged
MH-4865	2122833.5	239127.1	1187.02	9.20	0.00	Below Maximum Depth
MH-4866	2122874.1	239513.6	1185.65	10.00	0.22	Below Maximum Depth
MH-4872	2122591.0	236757.6	1195.08	3.03	0.00	Below Maximum Depth
MH-4881	2122472.0	239754.4	1184.77	5.63	0.00	Surcharged
MH-4898	2123449.1	235744.3	1144.30	11.15	0.00	Surcharged
MH-4954	2128398.5	256184.3	1100.90	8.10	0.00	Below Maximum Depth
MH-4955	2128147.4	256294.3	1101.08	9.84	0.00	Surcharged
MH-5039	2118180.3	253032.0	1084.39	10.77	0.00	Below Maximum Depth
MH-5054	2120282.1	251303.7	1105.91	15.00	0.00	Surcharged
MH-5055	2120519.0	251301.0	1104.09	9.80	0.00	Surcharged
MH-5058	2121193.0	251283.0	1117.19	8.70	0.06	Below Maximum Depth
MH-5061	2121565.9	250702.7	1128.92	6.00	0.00	Surcharged
MH-5062	2121894.9	250575.6	1135.48	6.20	0.00	Surcharged
MH-5064	2122468.0	250614.6	1142.81	10.65	0.00	Below Maximum Depth
MH-5106	2120293.3	243376.4	1177.06	10.94	0.11	Below Maximum Depth
MH-5109	2122093.5	243363.3	1186.91	8.15	0.00	Surcharged

MH-5249	2149707.7	246467.9	987.10	6.90	0.00	Below Maximum Depth
MH-5300	2144331.8	251838.8	1010.03	9.90	0.13	Below Maximum Depth
MH-5301	2144068.8	251685.3	1010.63	9.96	0.02	Below Maximum Depth
MH-5302	2143771.9	251660.9	1011.50	9.73	0.00	Surcharged
MH-5304	2143004.2	251808.7	1013.10	10.46	0.00	Below Maximum Depth
MH-532	2111725.6	237893.1	1078.50	8.70	0.00	Below Maximum Depth
MH-5322	2136497.6	251406.7	1035.97	13.92	0.00	Surcharged
MH-5329	2133854.4	252387.7	1049.09	11.71	-0.01	Below Maximum Depth
MH-533	2111823.8	237556.0	1079.90	8.70	0.00	Below Maximum Depth
MH-5330	2135945.0	251630.9	1037.12	15.48	0.12	Below Maximum Depth
MH-5331	2135716.3	251537.6	1042.74	9.86	0.00	Below Maximum Depth
MH-5340	2134359.2	249779.3	1064.41	9.09	0.00	Below Maximum Depth
MH-5342	2134778.8	250439.5	1053.87	12.13	0.15	Below Maximum Depth
MH-5343	2134590.7	250095.5	1056.80	12.70	0.00	Below Maximum Depth
MH-5344	2134026.2	249053.3	1070.61	10.64	0.00	Below Maximum Depth
MH-5346	2134196.2	249413.5	1067.61	8.89	0.00	Below Maximum Depth
MH-537	2111125.4	239589.7	1064.04	7.56	0.00	Below Maximum Depth
MH-5373	2133951.5	249050.7	1071.25	11.00	0.00	Below Maximum Depth
MH-5404	2130288.7	250023.9	1068.27	17.42	0.00	Below Maximum Depth
MH-5405	2130250.5	249664.2	1071.77	14.73	0.00	Below Maximum Depth
MH-5410	2129348.7	248727.3	1080.54	11.46	0.08	Below Maximum Depth
MH-5420	2127244.1	247157.5	1092.56	10.39	0.00	Below Maximum Depth
MH-5421	2126945.6	247005.6	1093.57	10.19	0.00	Surcharged
MH-5427	2126799.2	245492.5	1112.20	7.30	0.00	Below Maximum Depth
MH-5430	2126555.1	244782.3	1120.60	8.15	0.00	Below Maximum Depth
MH-5447	2133315.3	252176.1	1053.46	11.44	0.00	Surcharged
MH-5461	2132657.5	252790.2	1059.80	6.08	0.00	Surcharged
MH-5754	2133835.7	238274.3	1059.33	6.24	0.00	Below Maximum Depth
MH-5759	2135167.9	236651.3	1040.59	11.36	0.00	Below Maximum Depth
MH-5771	2130555.9	239382.7	1092.80	13.20	0.09	Below Maximum Depth
MH-5772	2130290.5	239572.8	1096.07	9.93	0.00	Below Maximum Depth
MH-5773	2130060.8	239859.0	1098.28	10.53	0.00	Below Maximum Depth
MH-5774	2129937.0	239924.6	1098.96	11.11	0.04	Below Maximum Depth
MH-5776	2129674.5	240085.0	1100.68	12.32	0.00	Below Maximum Depth

MH-5779	2128931.1	240700.4	1109.11	10.89	0.00	Below Maximum Depth
MH-5785	2128292.7	240998.2	1118.65	10.86	0.00	Surcharged
MH-58	2112989.6	234844.9	1090.50	7.90	0.00	Surcharged
MH-5808	2135359.8	235319.9	1038.92	11.58	0.00	Below Maximum Depth
MH-5813	2134042.0	234237.5	1044.37	14.63	0.14	Below Maximum Depth
MH-5814	2133752.5	233866.3	1045.80	13.70	0.00	Below Maximum Depth
MH-5816	2133067.5	233694.0	1048.16	13.67	0.00	Below Maximum Depth
MH-5818	2132524.5	233645.8	1050.36	16.22	0.00	Below Maximum Depth
MH-5822	2131085.4	233707.2	1059.54	14.46	0.18	Below Maximum Depth
MH-5824	2130665.9	234017.0	1064.44	13.47	0.00	Surcharged
MH-5834	2134820.9	233120.3	1049.34	8.71	0.18	Below Maximum Depth
MH-5835	2134915.3	232732.0	1051.56	6.61	0.00	Below Maximum Depth
MH-5836	2134946.5	232433.2	1053.19	6.45	0.00	Below Maximum Depth
MH-5843	2134935.8	229830.2	1067.88	11.17	0.00	Surcharged
MH-5861	2131717.4	225601.9	1098.57	7.90	-0.01	Surcharged
MH-5863	2131213.8	225309.3	1101.60	20.40	0.00	Below Maximum Depth
MH-5865	2130981.3	225044.6	1103.41	21.42	0.00	Below Maximum Depth
MH-5869	2129534.3	225478.6	1112.89	32.36	0.00	Below Maximum Depth
MH-5871	2129361.1	225911.4	1121.28	28.72	0.00	Below Maximum Depth
MH-5874	2128741.1	226310.5	1132.94	32.38	0.00	Below Maximum Depth
MH-5880	2127816.3	226920.1	1168.08	15.45	0.00	Surcharged
MH-5883	2138332.2	235508.9	1028.53	14.47	0.00	Below Maximum Depth
MH-5884	2138419.5	235641.2	1027.60	11.90	0.00	Below Maximum Depth
MH-5897	2137570.6	233833.0	1050.98	11.52	0.00	Below Maximum Depth
MH-5898	2137477.3	233745.2	1051.69	10.81	0.00	Below Maximum Depth
MH-5899	2137523.0	233633.1	1052.38	10.12	0.00	Below Maximum Depth
MH-5900	2137611.8	233454.1	1053.59	8.91	0.00	Below Maximum Depth
MH-5901	2137579.8	233166.7	1055.83	6.67	0.00	Below Maximum Depth
MH-5902	2137510.3	232990.4	1056.80	5.70	0.00	Below Maximum Depth
MH-6	2116740.2	232834.4	1130.81	7.19	0.00	Below Maximum Depth
MH-60	2113319.0	234226.5	1093.07	7.43	0.00	Below Maximum Depth
MH-61	2113643.5	233292.1	1095.07	11.13	0.08	Below Maximum Depth
MH-6102	2137425.7	236388.1	1028.89	10.11	0.00	Below Maximum Depth
MH-62	2113619.1	232987.8	1095.67	10.33	0.00	Below Maximum Depth

MH-6217	2134142.1	228483.3	1081.19	9.51	0.00	Below Maximum Depth
MH-6218	2134141.2	228336.8	1088.06	5.44	0.00	Below Maximum Depth
MH-6219	2134142.0	228057.0	1093.24	4.96	0.00	Below Maximum Depth
MH-6220	2134142.2	227778.4	1098.61	8.54	0.00	Surcharged
MH-626	2110251.8	240676.8	1087.25	7.25	0.00	Below Maximum Depth
MH-6343	2136655.2	227484.2	1096.10	8.22	0.00	Below Maximum Depth
MH-6388	2134127.3	227440.4	1102.50	9.75	0.00	Below Maximum Depth
MH-6438	2132548.5	251256.0	1055.57	12.56	0.00	Surcharged
MH-6468	2130061.7	245967.4	1108.50	13.50	0.00	Below Maximum Depth
MH-656	2110255.7	240054.9	1067.43	8.57	0.00	Below Maximum Depth
MH-66	2115588.7	233174.8	1125.96	8.45	0.00	Surcharged
MH-665	2110254.6	240280.5	1077.90	6.30	0.00	Below Maximum Depth
MH-6686	2133906.7	252367.7	1048.63	11.62	0.00	Below Maximum Depth
MH-68	2115589.7	232823.1	1126.92	7.08	0.00	Below Maximum Depth
MH-6998	2129276.3	240400.7	1104.53	8.47	0.00	Below Maximum Depth
MH-7001	2129081.6	240557.8	1107.03	9.27	0.00	Surcharged
MH-7026	2133706.0	239614.8	1070.30	9.70	0.21	Below Maximum Depth
MH-7027	2133684.3	239673.2	1070.75	9.25	0.00	Below Maximum Depth
MH-7055	2131425.4	238798.0	1082.24	9.76	0.00	Below Maximum Depth
MH-7060	2132395.6	239158.5	1090.66	7.59	0.00	Below Maximum Depth
MH-7062	2132446.8	239367.6	1092.04	7.21	0.00	Below Maximum Depth
MH-7167	2129029.7	235386.3	1087.82	4.18	0.18	Below Maximum Depth
MH-7168	2129066.7	235300.5	1086.59	4.30	0.00	Surcharged
MH-7265	2132572.2	233643.0	1050.16	16.34	0.00	Below Maximum Depth
MH-7329	2132439.9	233651.5	1050.84	15.86	0.00	Below Maximum Depth
MH-7391	2133985.8	234166.9	1044.81	14.06	0.00	Below Maximum Depth
MH-7397	2133142.8	233711.1	1047.97	13.24	0.00	Below Maximum Depth
MH-7405	2131765.9	233479.7	1054.36	15.14	0.00	Below Maximum Depth
MH-7407	2132110.0	233635.3	1052.45	15.05	0.00	Below Maximum Depth
MH-7462	2129456.6	230999.2	1096.00	7.00	0.00	Below Maximum Depth
MH-7463	2129583.0	231213.6	1093.78	6.72	0.00	Below Maximum Depth
MH-7464	2129746.4	231331.1	1091.40	6.10	0.00	Below Maximum Depth
MH-7465	2129837.9	231476.0	1089.65	6.85	0.00	Below Maximum Depth
MH-7466	2129981.3	231668.0	1087.00	8.00	0.04	Below Maximum Depth

MH-7467	2130030.7	231688.2	1086.49	8.01	0.00	Below Maximum Depth
MH-7469	2130293.2	231928.0	1084.00	7.50	0.00	Below Maximum Depth
MH-7470	2130401.6	231942.1	1081.50	9.50	0.00	Below Maximum Depth
MH-7471	2130458.6	232167.4	1080.20	9.30	0.00	Below Maximum Depth
MH-7477	2131377.4	233422.2	1059.20	12.30	0.00	Below Maximum Depth
MH-7483	2128104.7	236181.5	1090.73	15.54	0.00	Below Maximum Depth
MH-7485	2128598.8	236040.4	1087.84	13.60	0.00	Below Maximum Depth
MH-7486	2128752.0	235738.6	1086.59	11.83	0.00	Below Maximum Depth
MH-7487	2128890.8	235724.2	1085.92	12.50	0.00	Below Maximum Depth
MH-7494	2129120.0	235399.3	1082.11	9.13	0.00	Below Maximum Depth
MH-7496	2129185.8	234821.7	1078.83	10.35	0.00	Below Maximum Depth
MH-75	2116455.0	232824.9	1129.76	8.44	0.12	Below Maximum Depth
MH-7510	2129180.6	234789.8	1080.19	8.93	0.00	Below Maximum Depth
MH-7524	2128740.1	233319.9	1074.56	12.54	0.00	Below Maximum Depth
MH-7547	2125037.1	232617.9	1115.87	10.08	0.00	Below Maximum Depth
MH-7549	2125330.8	232741.1	1116.06	4.05	0.00	Below Maximum Depth
MH-7556	2134884.7	232862.3	1049.34	8.71	0.03	Below Maximum Depth
MH-7557	2134883.8	232784.6	1051.23	6.82	0.00	Surcharged
MH-7663	2130607.4	232274.5	1079.48	8.61	0.00	Surcharged
MH-7744	2131447.2	226637.4	1132.24	4.06	0.00	Below Link Crown
MH-7841	2129989.2	225054.3	1108.12	22.38	0.00	Below Maximum Depth
MH-7844	2131406.1	226735.1	1132.66	5.64	0.00	Surcharged
MH-7850	2129005.1	226311.6	1130.33	25.67	0.00	Below Maximum Depth
MH-7875	2132110.6	225895.4	1096.05	9.95	0.23	Below Maximum Depth
MH-7890	2131735.6	225613.4	1098.42	7.58	0.00	Below Maximum Depth
MH-7891	2133127.7	226460.1	1089.63	11.92	0.00	Surcharged
MH-7907	2132770.3	226283.5	1091.95	11.15	0.00	Below Maximum Depth
MH-792	2112657.4	237590.3	1085.72	7.58	0.00	Surcharged
MH-794	2113273.0	237319.0	1090.11	12.99	0.00	Below Maximum Depth
MH-7940	2132195.2	226014.7	1095.35	9.65	0.00	Below Maximum Depth
MH-796	2113645.9	237793.9	1094.45	8.05	0.00	Below Maximum Depth
MH-7973	2134140.1	228517.6	1081.00	9.00	0.00	Below Maximum Depth
MH-799	2114335.7	238366.8	1099.40	10.60	0.00	Below Maximum Depth
MH-800	2114563.5	238631.3	1101.29	11.71	0.00	Below Maximum Depth

MH-802	2115259.7	238968.8	1105.83	9.97	0.00	Surcharged
MH-8021	2127717.1	247253.8	1089.14	12.20	0.11	Below Maximum Depth
MH-8022	2127749.7	247229.4	1089.54	11.14	0.00	Surcharged
MH-8023	2127647.2	246906.1	1107.95	8.78	0.00	Below Maximum Depth
MH-806	2115396.2	240030.6	1111.73	10.67	0.00	Surcharged
MH-808	2115756.3	240403.6	1114.88	8.92	0.00	Surcharged
MH-809	2116056.2	240457.9	1116.06	9.54	0.00	Below Maximum Depth
MH-812	2116901.9	240526.1	1121.62	9.18	0.00	Surcharged
MH-815	2117902.0	240552.5	1128.51	10.79	0.00	Surcharged
MH-820	2119159.8	240234.5	1142.61	11.99	0.00	Below Maximum Depth
MH-821	2119382.9	240177.4	1146.06	14.34	0.02	Below Maximum Depth
MH-822	2119504.7	240146.1	1156.38	7.42	0.00	Surcharged
MH-823	2119515.0	240156.8	1160.20	3.80	0.00	Below Maximum Depth
MH-8239	2126102.7	246591.7	1106.18	27.74	0.00	Surcharged
MH-826	2112196.6	236511.7	1082.30	7.50	0.00	Surcharged
MH-8285	2126094.3	243745.7	1135.29	5.10	0.00	Surcharged
MH-8293	2126093.7	243940.9	1136.19	4.66	0.00	Below Maximum Depth
MH-8294	2126092.6	244219.0	1137.40	14.36	0.12	Below Maximum Depth
MH-831	2112717.9	235219.5	1088.70	9.10	0.00	Surcharged
MH-8329	2126104.1	244610.8	1139.88	12.12	0.00	Below Maximum Depth
MH-8330	2126103.0	244231.2	1138.32	13.44	0.08	Below Maximum Depth
MH-8331	2125448.7	245641.4	1148.03	4.67	0.00	Below Maximum Depth
MH-834	2113950.6	235356.7	1096.57	8.43	0.00	Below Maximum Depth
MH-837	2113950.7	235427.8	1097.29	10.41	0.00	Below Maximum Depth
MH-838	2114568.5	235792.1	1113.64	10.06	0.00	Below Maximum Depth
MH-8413	2120893.0	243373.5	1179.61	11.19	0.00	Surcharged
MH-8414	2120593.3	243375.2	1178.34	10.66	0.00	Below Maximum Depth
MH-8416	2126171.1	243012.2	1140.99	8.17	0.00	Below Maximum Depth
MH-8417	2126070.5	242991.6	1141.55	8.08	0.00	Surcharged
MH-8420	2124973.7	242852.1	1161.28	10.83	0.16	Below Maximum Depth
MH-8421	2124802.0	242847.8	1162.15	9.80	0.00	Surcharged
MH-8422	2124658.3	242702.3	1169.10	3.85	0.00	Surcharged
MH-847	2117171.0	236277.8	1133.90	7.30	0.00	Below Maximum Depth
MH-848	2117424.0	236061.3	1137.02	8.30	0.00	Below Maximum Depth

MH-849	2117790.6	236063.8	1140.37	10.13	0.00	Below Maximum Depth
MH-850	2118142.3	236065.4	1143.59	8.01	0.00	Below Maximum Depth
MH-8526	2126205.1	243834.8	1129.28	7.52	0.00	Surcharged
MH-8586	2125493.3	242548.0	1160.62	5.58	0.01	Surcharged
MH-8597	2125090.3	242880.5	1155.36	13.90	0.00	Below Maximum Depth
MH-8598	2125186.7	243026.8	1154.48	11.42	0.00	Surcharged
MH-8599	2125468.1	242881.9	1152.80	7.09	-0.01	Surcharged
MH-8759	2128426.8	240822.6	1114.15	12.95	0.00	Below Maximum Depth
MH-8847	2125872.3	238070.2	1163.86	7.89	0.01	Below Maximum Depth
MH-8848	2125874.0	238052.1	1162.49	9.22	0.00	Below Maximum Depth
MH-885	2112836.9	237388.8	1087.33	10.17	0.00	Below Maximum Depth
MH-8864	2125532.1	242332.2	1165.73	5.10	-0.01	Surcharged
MH-8979	2126824.3	236938.9	1119.62	5.46	0.00	Surcharged
MH-8987	2126380.1	237625.2	1146.23	4.16	0.00	Surcharged
MH-9005	2125023.1	232727.3	1097.12	15.56	0.00	Surcharged
MH-9012	2123794.6	232292.2	1125.56	9.76	0.00	Below Maximum Depth
MH-9013	2123795.0	232251.4	1125.76	10.66	0.00	Surcharged
MH-9014	2124045.4	232638.5	1123.77	4.37	0.00	Surcharged
MH-9028	2123426.2	235956.5	1150.43	6.57	0.00	Below Maximum Depth
MH-9031	2124355.5	234418.5	1130.00	10.00	0.00	Below Maximum Depth
MH-9064	2126090.6	233880.0	1108.68	8.30	0.04	Below Maximum Depth
MH-9065	2126068.9	233881.7	1108.79	8.18	0.00	Below Maximum Depth
MH-9074	2125438.5	233383.0	1111.50	3.50	0.00	Below Maximum Depth
MH-9088	2125931.8	233886.2	1109.54	6.45	0.00	Below Maximum Depth
MH-9093	2127675.7	233421.8	1096.11	1.65	0.00	Surcharged
MH-9099	2128787.2	233616.8	1088.49	6.38	0.00	Below Maximum Depth
MH-9126	2126096.8	236721.9	1140.87	9.13	0.00	Below Maximum Depth
MH-9127	2127052.9	236721.4	1113.03	6.19	0.00	Below Maximum Depth
MH-9128	2126807.5	236660.9	1118.11	6.89	0.00	Below Maximum Depth
MH-9169	2126846.9	236667.2	1117.95	6.05	0.00	Below Maximum Depth
MH-9172	2126378.9	236720.8	1126.94	13.06	0.00	Below Maximum Depth
MH-9202	2127662.3	234444.5	1127.34	10.53	0.00	Below Maximum Depth
MH-9252	2127508.8	233097.9	1094.70	4.05	0.00	Below Maximum Depth
MH-9265	2127509.8	233019.4	1095.06	5.06	0.14	Below Maximum Depth

MH-9268	2127481.0	232415.6	1097.28	6.12	0.00	Surcharged
MH-9314	2123633.5	235367.9	1137.00	15.00	0.00	Below Maximum Depth
MH-9893	2127581.7	224975.9	1173.84	11.70	0.00	Surcharged
MH-9903	2127883.4	225288.9	1172.37	5.06	0.00	Surcharged
MH-9909	2127718.1	226606.2	1168.82	14.43	0.01	Below Maximum Depth
NODE-10281	2120484.1	251301.4	1104.35	10.71	0.06	Below Maximum Depth
NODE-10356	2122977.2	240459.8	1191.07	4.18	-1.16	Surcharged
NODE-10357	2122971.2	240400.1	1190.83	4.39	-1.09	Surcharged
NODE-10358	2122970.2	240390.2	1190.79	4.43	-1.06	Surcharged
NODE-10359	2122941.5	240101.0	1189.50	4.36	-0.40	Surcharged
NODE-10634	2122737.6	238204.3	1190.11	7.89	-0.36	Surcharged
NODE-10635	2122771.2	238511.6	1189.08	8.92	-0.06	Surcharged
NODE-10636	2122777.4	238571.3	1188.90	9.10	0.00	Below Maximum Depth
NODE-10638	2122817.0	238962.7	1187.61	9.39	0.06	Below Maximum Depth
NODE-10639	2122850.5	239289.1	1186.53	9.47	0.03	Below Maximum Depth
NODE-10640	2122856.8	239348.8	1186.35	9.65	0.16	Below Maximum Depth
NODE-10642	2122645.6	239700.8	1184.10	8.17	0.12	Below Maximum Depth
NODE-11112	2125953.6	233887.0	1109.42	6.71	-0.15	Surcharged
NODE-11294	2129122.2	235312.3	1081.56	9.53	0.11	Below Maximum Depth
NODE-11295	2129121.2	235351.3	1081.80	9.35	0.07	Below Maximum Depth
NODE-11628	2115177.2	227860.4	1127.51	6.00	-0.13	Surcharged
NODE-11629	2115157.2	227860.6	1127.43	6.29	0.08	Below Maximum Depth
NODE-11693	2132690.0	252883.1	1061.82	4.54	0.13	Below Maximum Depth
NODE-11694	2132677.6	252848.1	1061.71	4.36	0.01	Below Maximum Depth
NODE-11695	2132674.3	252838.7	1061.69	4.39	0.06	Below Maximum Depth
NODE-11978	2140227.5	235984.4	1018.81	1.32	-3.89	Surcharged
NODE-11979	2140167.8	235978.2	1019.05	1.28	-4.09	Surcharged
NODE-11980	2140214.8	235998.2	1019.32	0.63	-3.35	Surcharged
NODE-11981	2140155.0	235993.8	1019.50	1.03	-3.49	Surcharged
NODE-12151	2120626.2	249376.5	1145.22	7.55	-1.91	Surcharged
NODE-12152	2120593.0	249405.3	1144.36	8.41	-0.96	Surcharged
NODE-12551	2126079.2	236935.9	1147.03	5.13	0.04	Below Maximum Depth
NODE-12552	2126103.4	236881.0	1145.83	4.67	-0.51	Surcharged
NODE-12566	2108022.0	249436.0	1043.26	5.30	0.21	Below Maximum Depth

NODE-12567	2108023.4	249446.1	1043.32	5.21	0.18	Below Maximum Depth
NODE-1527	2115028.0	252340.4	1057.22	2.07	-0.13	Surcharged
NODE-1635	2118173.7	253035.0	1084.30	10.86	0.12	Below Maximum Depth
NODE-208	2107200.0	249475.8	1039.16	3.28	0.10	Below Maximum Depth
NODE-2693	2119372.1	231789.4	1146.43	10.17	0.01	Below Maximum Depth
NODE-2694	2119371.9	231809.4	1146.37	10.23	0.04	Below Maximum Depth
NODE-2708	2118318.5	232564.9	1138.76	7.38	0.13	Below Maximum Depth
NODE-2712	2116795.2	232832.4	1131.60	6.39	0.00	Below Maximum Depth
NODE-2713	2116835.1	232830.9	1131.76	6.00	-0.18	Surcharged
NODE-2897	2116273.6	252622.5	1069.10	4.78	0.20	Below Maximum Depth
NODE-400	2110860.0	243934.0	1107.60	5.13	-0.39	Surcharged
NODE-4401	2122997.8	240679.6	1192.15	4.00	-0.25	Surcharged
NODE-4402	2122978.2	240469.8	1191.11	4.14	-1.16	Surcharged
NODE-450	2106909.3	249848.6	1032.25	3.75	-2.39	Surcharged
NODE-451	2106766.5	249732.5	1032.62	3.38	-2.40	Surcharged
NODE-4530	2120110.7	235283.5	1160.75	4.25	-0.91	Surcharged
NODE-4531	2120150.7	235283.6	1160.91	4.09	-0.95	Surcharged
NODE-454	2106480.1	248889.7	1034.68	2.82	-0.94	Surcharged
NODE-455	2106468.0	248768.3	1034.93	2.87	-0.64	Surcharged
NODE-4693	2118282.9	236319.0	1149.54	3.70	-0.36	Surcharged
NODE-4694	2118282.9	236337.0	1149.63	3.61	-0.36	Surcharged
NODE-4700	2118282.4	236581.4	1151.55	1.34	-0.55	Surcharged
NODE-4701	2118282.4	236599.4	1151.64	1.24	-0.57	Surcharged
NODE-4725	2119667.2	236896.0	1167.99	7.17	0.22	Below Maximum Depth
NODE-4728	2119667.0	237215.4	1169.26	8.13	0.15	Below Maximum Depth
NODE-5281	2140199.8	235996.8	1019.37	0.72	-3.40	Surcharged
NODE-5282	2140170.7	235995.0	1019.46	0.92	-3.44	Surcharged
NODE-5287	2140182.6	235980.0	1018.99	1.29	-4.02	Surcharged
NODE-5288	2140212.9	235982.9	1018.87	1.31	-3.95	Surcharged
NODE-534	2111775.1	237721.3	1079.10	4.40	-4.41	Surcharged
NODE-535	2111794.3	237656.1	1079.50	4.30	-4.36	Surcharged
NODE-7080	2132433.2	239382.3	1092.46	7.22	0.15	Below Maximum Depth
NODE-8311	2126093.5	243996.9	1136.52	5.24	-1.49	Surcharged
NODE-8312	2126093.4	244014.9	1136.59	5.24	-2.22	Surcharged

NODE-8682	2128183.1	256278.4	1100.96	9.24	-0.39	Surcharged
NODE-8683	2128379.4	256192.4	1100.33	8.72	-0.16	Surcharged
NODE-9134	2126959.3	236688.8	1117.48	2.36	-0.64	Surcharged
NODE-9136	2127018.2	236708.3	1117.21	2.32	-0.02	Surcharged
NODE-9226	2127278.7	234360.5	1123.87	10.68	-3.63	Surcharged
NODE-9227	2127293.4	234370.9	1123.94	10.60	-3.65	Surcharged
NODE-9228	2127661.8	234569.8	1134.55	1.59	-1.77	Surcharged
NODE-9229	2127661.7	234587.8	1135.19	0.98	-1.66	Surcharged

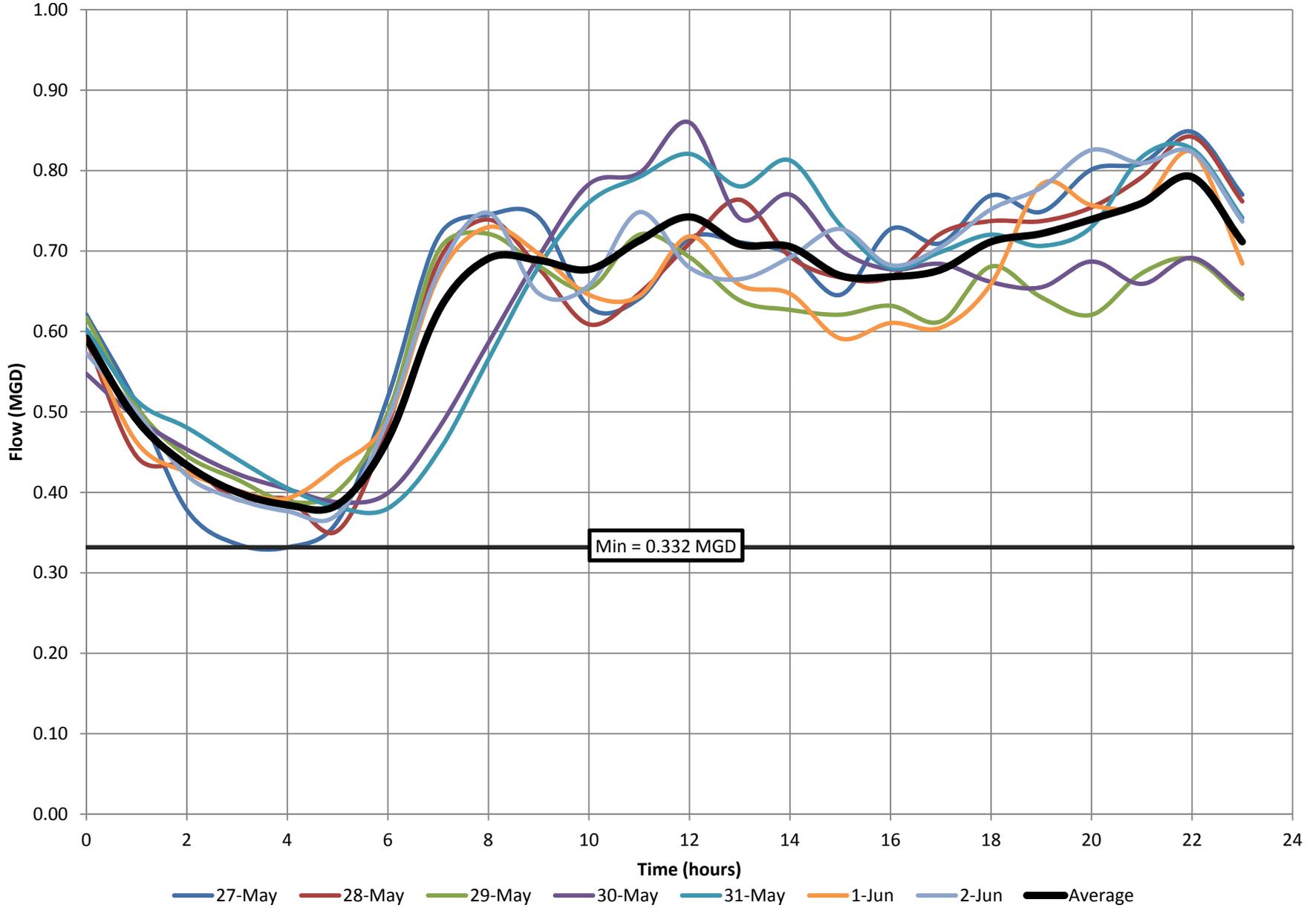


Figure G2 – Observed Dry Weather Flow for Subbasin W2-04

Table G2 Wastewater Collection System Watch List

Pipe ID	Manhole ID		Size	Length (ft)	Slope (ft/ft)	Dry Weather Flow Condition	
	Upstream	Downstream				Flow (gpm)	d/D
FIT-6240.1	FIT-6240	FIT-8009	8	130.00	0.000	151.3	1.00
FIT-6241.1	FIT-6241	FIT-6240	8	68.00	0.040	152.2	0.60
FIT-8009.1	FIT-8009	FIT-8010	8	63.00	0.033	152.2	0.71
FIT-8010.1	FIT-8010	MH-6216	8	20.86	0.001	150.8	0.41
MH-10581	MH-10581	NODE-10594	10	135.58	0.003	4.5	0.86
MH-10644	MH-10644	NODE-10646	12	245.52	0.002	38.2	0.63
MH-10972	MH-10972	LS-3424	8	11.80	0.007	2.2	0.03
MH-11155	MH-11155	MH-7500	12	220.67	0.019	0.0	0.01
MH-11238	MH-11238	NODE-11239	8	26.00	0.000	75.4	0.57
MH-11540	MH-11540	MH-5063	10	136.68	0.012	41.3	0.13
MH-12706	MH-12706	LS-10435	15	14.00	0.000	267.5	0.28
MH-2198.1	MH-2198	MH-2885	10	280.86	0.010	46.2	0.15
MH-2199.1	MH-2199	MH-2198	10	354.19	0.010	39.0	0.57
MH-2707.1	MH-2707	MH-2706	10	113.07	0.002	94.3	0.29
MH-3225.1	MH-3225	MH-3226	12	193.46	0.002	2.7	0.62
MH-3226.1	MH-3226	NODE-3264	12	226.97	0.002	1.3	1.00
MH-3227.1	MH-3227	MH-3228	12	341.15	0.002	10.3	0.08
MH-3315.1	MH-3315	MH-3314	10	305.35	0.006	28.7	0.15
MH-3316.1	MH-3316	MH-3315	10	321.15	0.003	28.7	0.61
MH-3410.1	MH-3410	LS-3424	8	41.42	0.013	40.4	0.14
MH-4345.1	MH-4345	NODE-10635	10	160.72	0.003	9.4	0.74
MH-4491.1	MH-4491	MH-2707	8	213.75	0.004	88.0	1.00
MH-4492.1	MH-4492	MH-4491	8	396.68	0.004	66.4	0.65
MH-4495.1	MH-4495	MH-2707	8	98.24	0.008	6.3	0.08
MH-4955.1	MH-4955	NODE-8682	15	39.07	0.001	328.5	0.97
MH-4956.1	MH-4956	MH-4955	15	245.13	0.040	329.4	0.31
MH-5331.1	MH-5331	MH-5330	10	246.98	0.007	99.6	0.24
MH-5419.1	MH-5419	MH-8021	18	259.96	0.004	288.1	0.22
MH-5753.1	MH-5753	MH-5752	12	364.58	0.005	459.2	0.55
MH-5784.1	MH-5784	MH-8759	10	90.57	0.025	64.2	0.56
MH-5848.1	MH-5848	MH-6216	18	111.63	0.012	382.0	0.22
MH-5849.1	MH-5849	MH-5848	15	298.57	0.004	382.0	0.62
MH-5859.1	MH-5859	MH-7915	12	239.89	0.007	335.3	0.62
MH-7487.1	MH-7487	MH-7493	10	238.94	0.010	361.3	0.71
MH-7493.1	MH-7493	MH-7494	10	212.98	0.016	361.3	0.45
MH-7494.1	MH-7494	NODE-11295	10	48.00	0.004	361.3	0.50
MH-7495.1	MH-7495	MH-7496	10	351.76	0.006	361.3	0.49
MH-7499.1	MH-7499	MH-11155	12	169.51	0.024	0.9	0.51
MH-7915.1	MH-7915	MH-5858	12	111.86	0.005	342.0	0.39
MH-8021.1	MH-8021	NODE-8929	18	31.85	0.001	308.3	0.22
MH-8022.1	MH-8022	MH-8021	8	40.74	0.005	20.2	1.00
MH-8023.1	MH-8023	MH-8022	8	339.14	0.050	19.7	0.10

MH-8759.1	MH-8759	MH-5780	10	219.43	0.010	96.5	0.22
NODE-103	NODE-10312	MH-11540	10	86.30	0.014	40.4	0.56
NODE-105	NODE-10594	NODE-10595	10	80.00	0.012	4.5	0.06
NODE-106	NODE-10635	NODE-10636	10	60.00	0.002	9.4	1.00
NODE-106	NODE-10636	MH-4342	10	156.83	0.009	9.4	0.07
NODE-106	NODE-10646	NODE-10647	12	80.00	0.002	38.2	0.95
NODE-106	NODE-10647	MH-10645	12	22.22	0.006	38.2	0.10
NODE-112	NODE-11239	NODE-11240	8	16.00	0.000	75.4	0.54
NODE-112	NODE-11294	MH-7495	10	144.04	0.006	361.3	0.66
NODE-326	NODE-3263	MH-3227	12	130.00	0.002	1.8	1.00
NODE-326	NODE-3264	NODE-3263	12	20.00	0.001	-4.5	1.00
NODE-868	NODE-8682	NODE-8683	15	214.26	0.008	327.6	0.50
NODE-868	NODE-8683	MH-4954	15	20.76	0.004	326.3	0.51

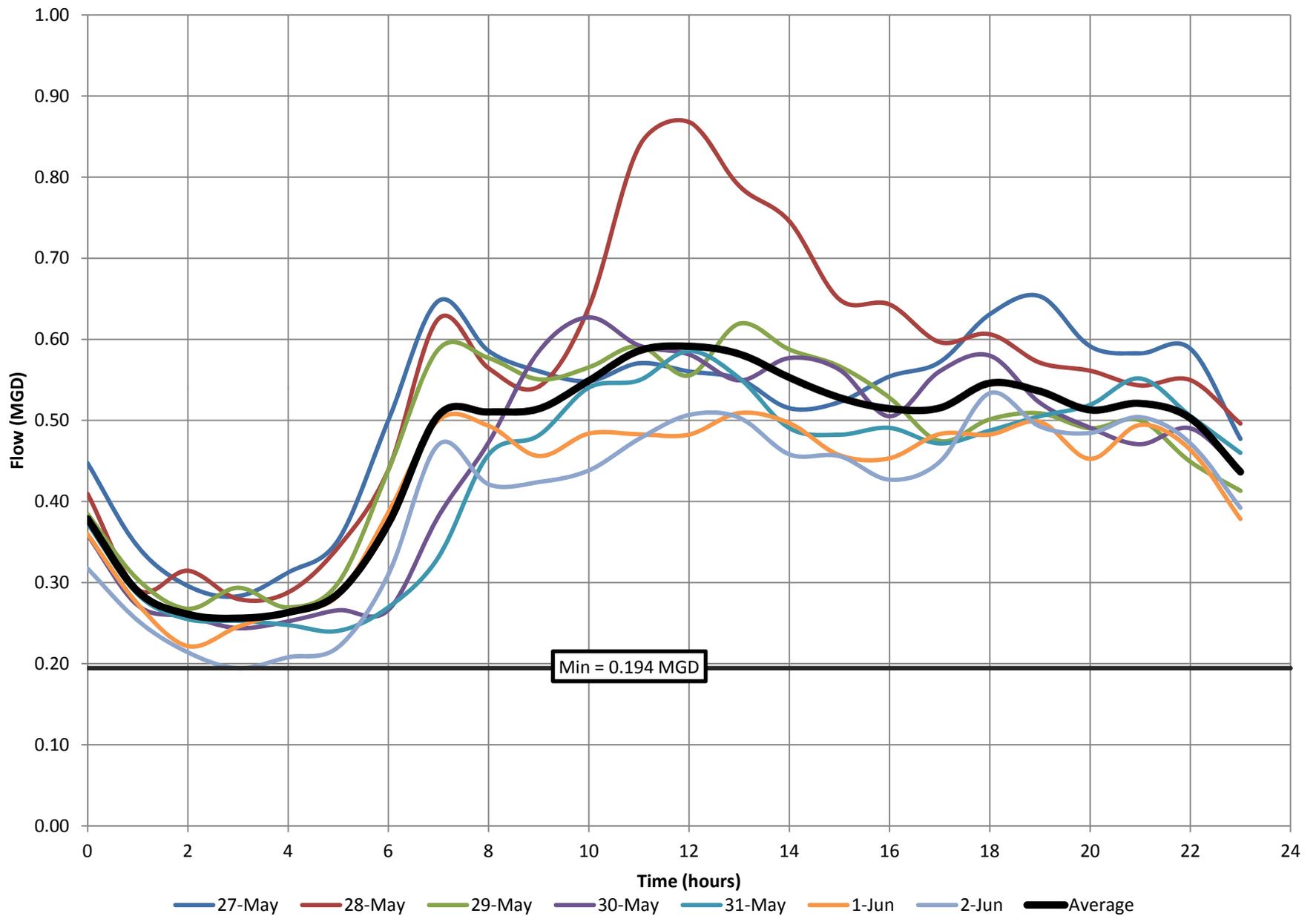


Figure G3 – Observed Dry Weather Flow for Subbasin W2-03

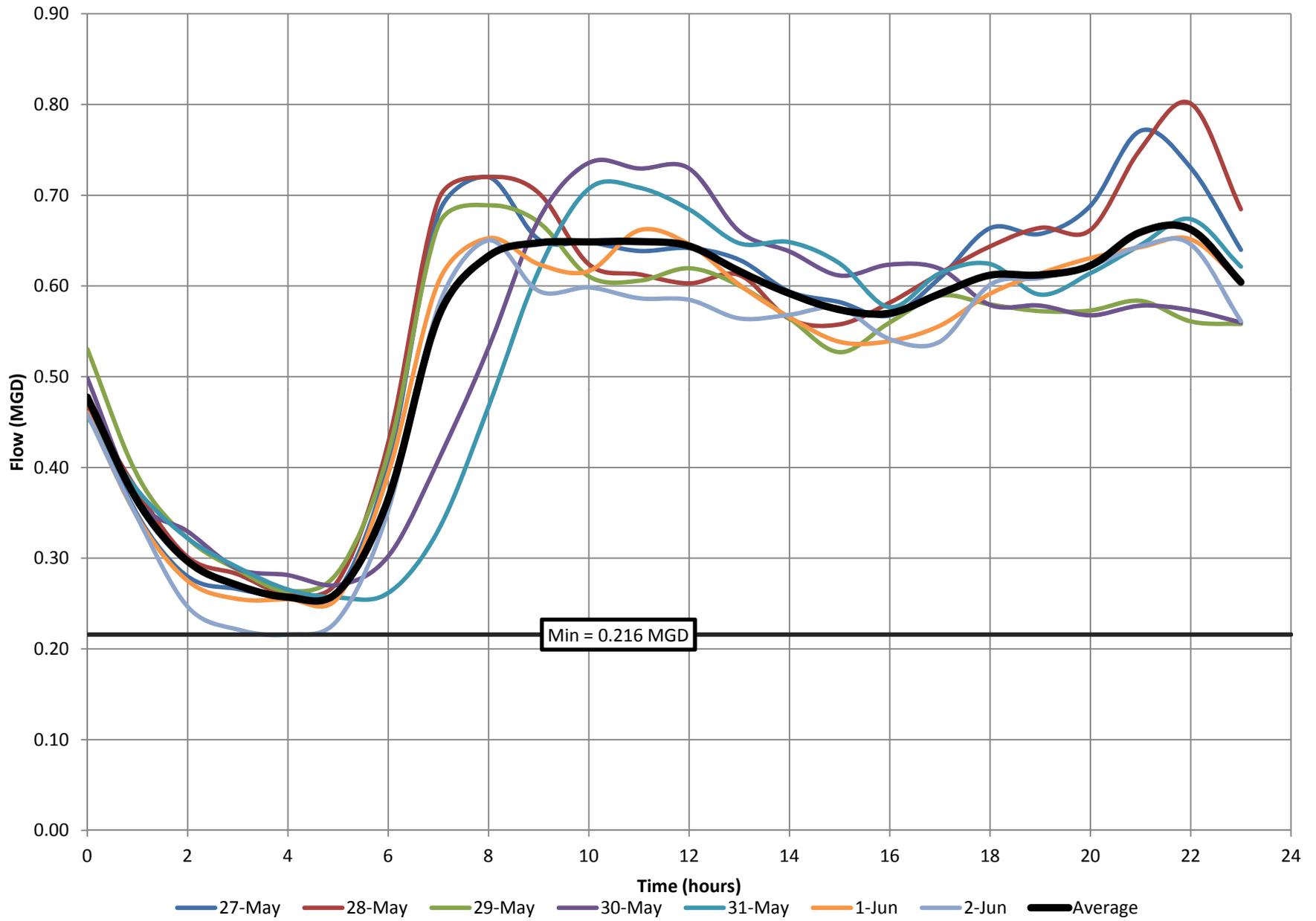


Figure G4 – Observed Dry Weather Flow for Subbasin W2-02

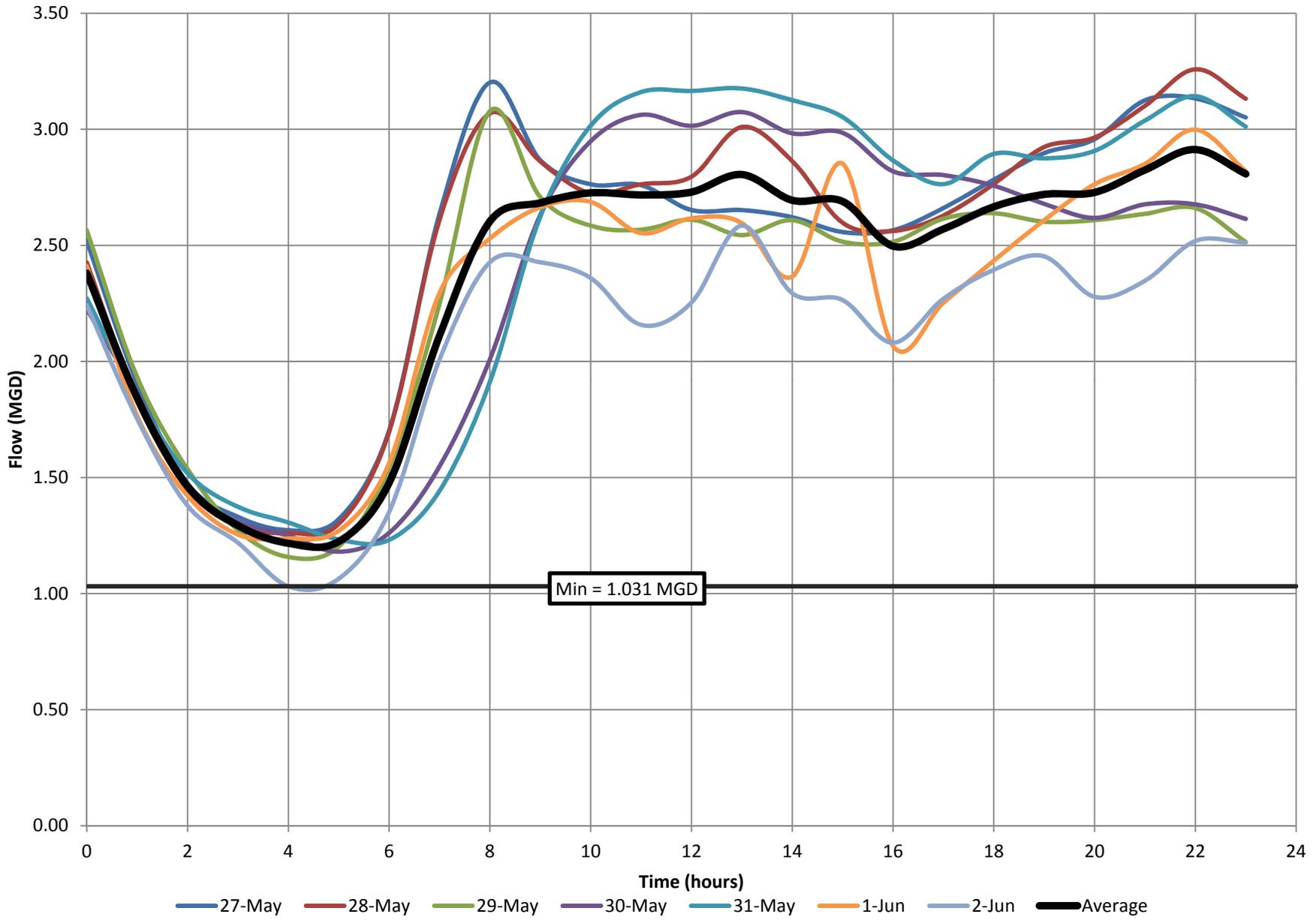


Figure G5 – Observed Dry Weather Flow for Subbasin W2-01

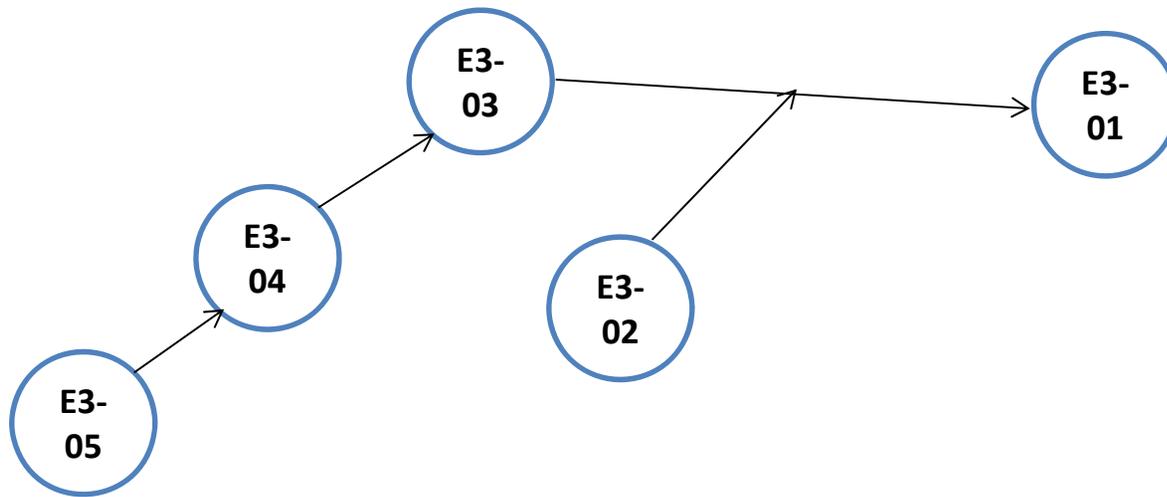


Figure G6 Flow Monitoring Analysis – Subsystem E3

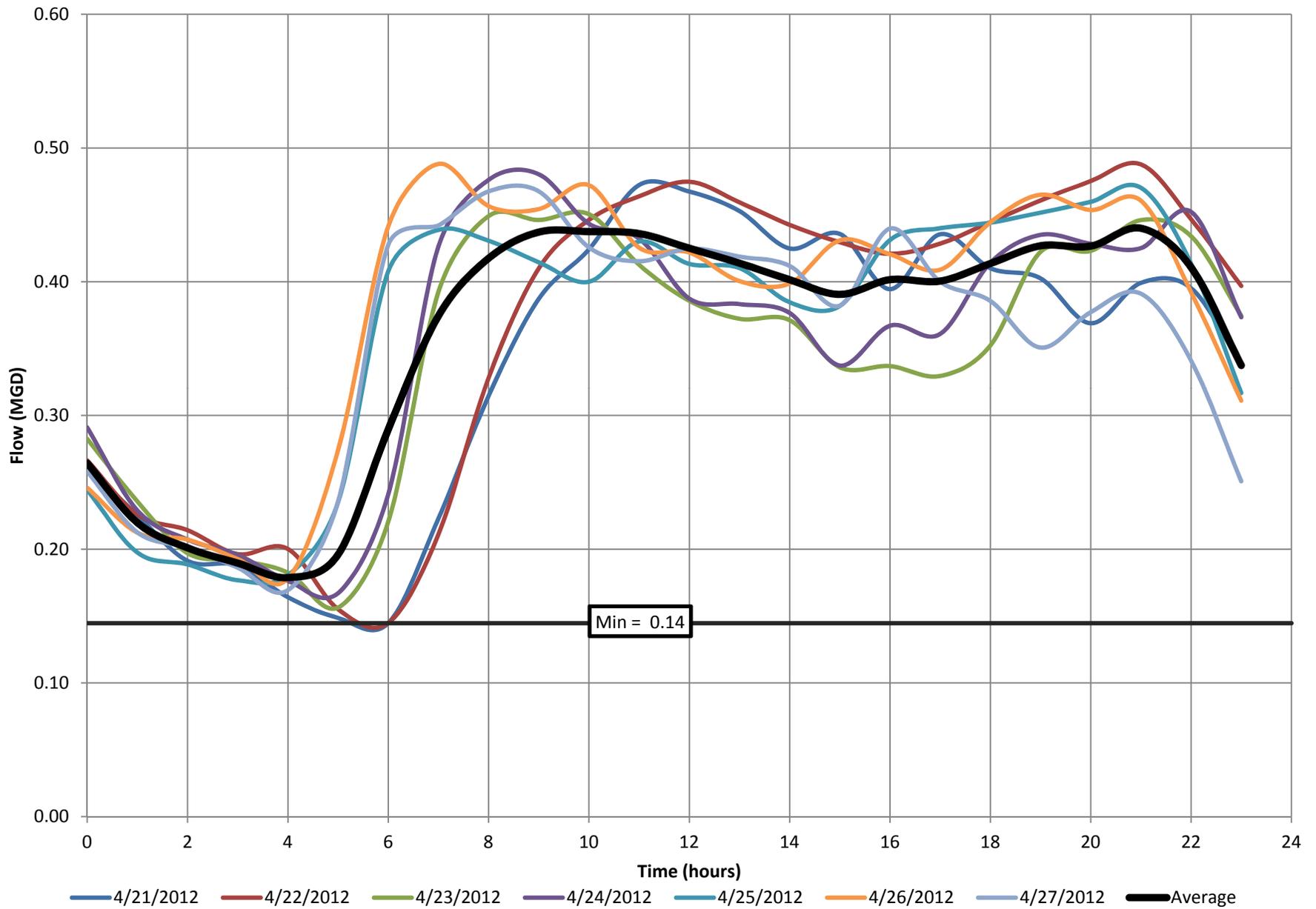


Figure G7 – Observed Dry Weather Flow for Subbasin EM05

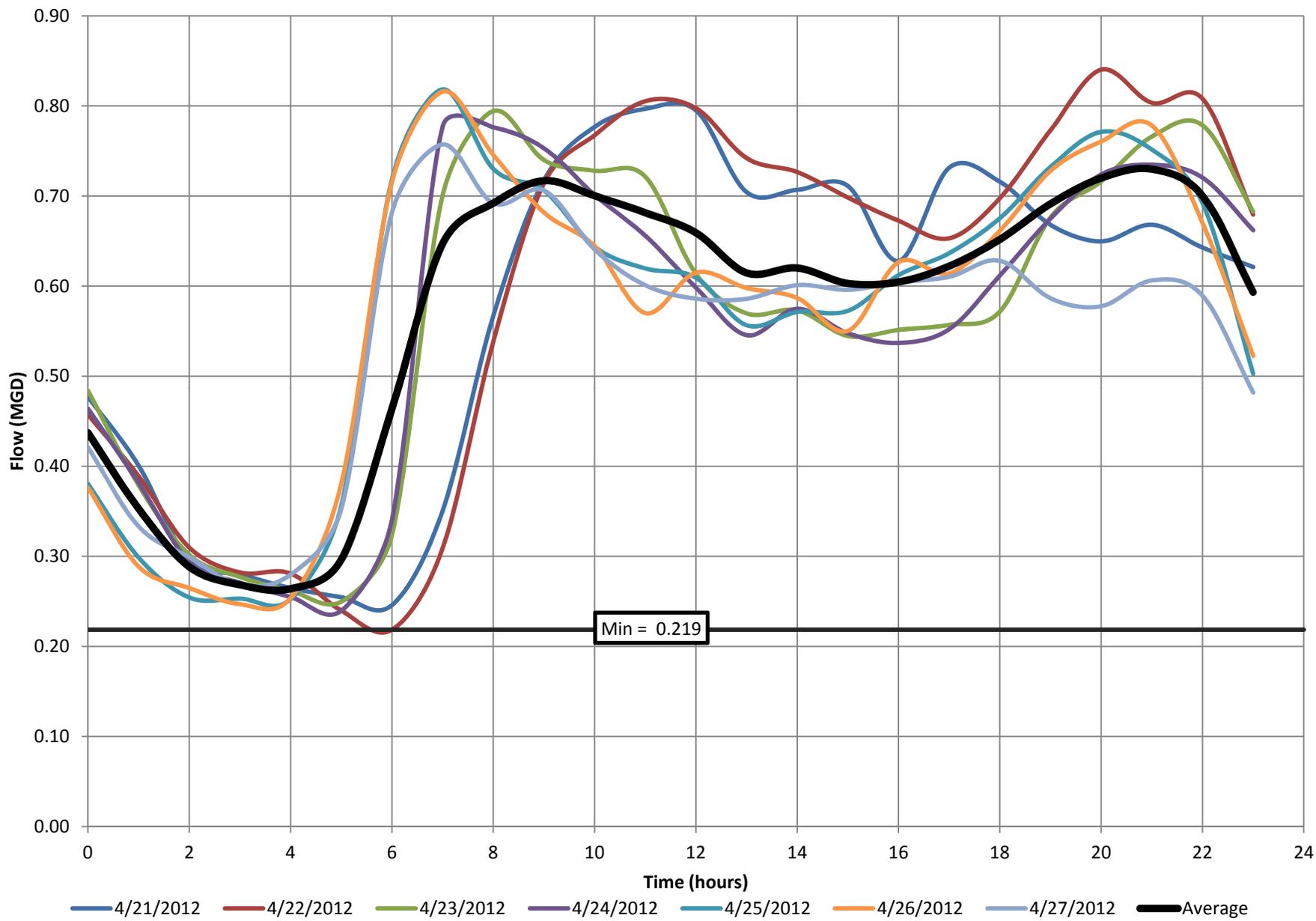


Figure G8 – Observed Dry Weather Flow for Subbasin EM04

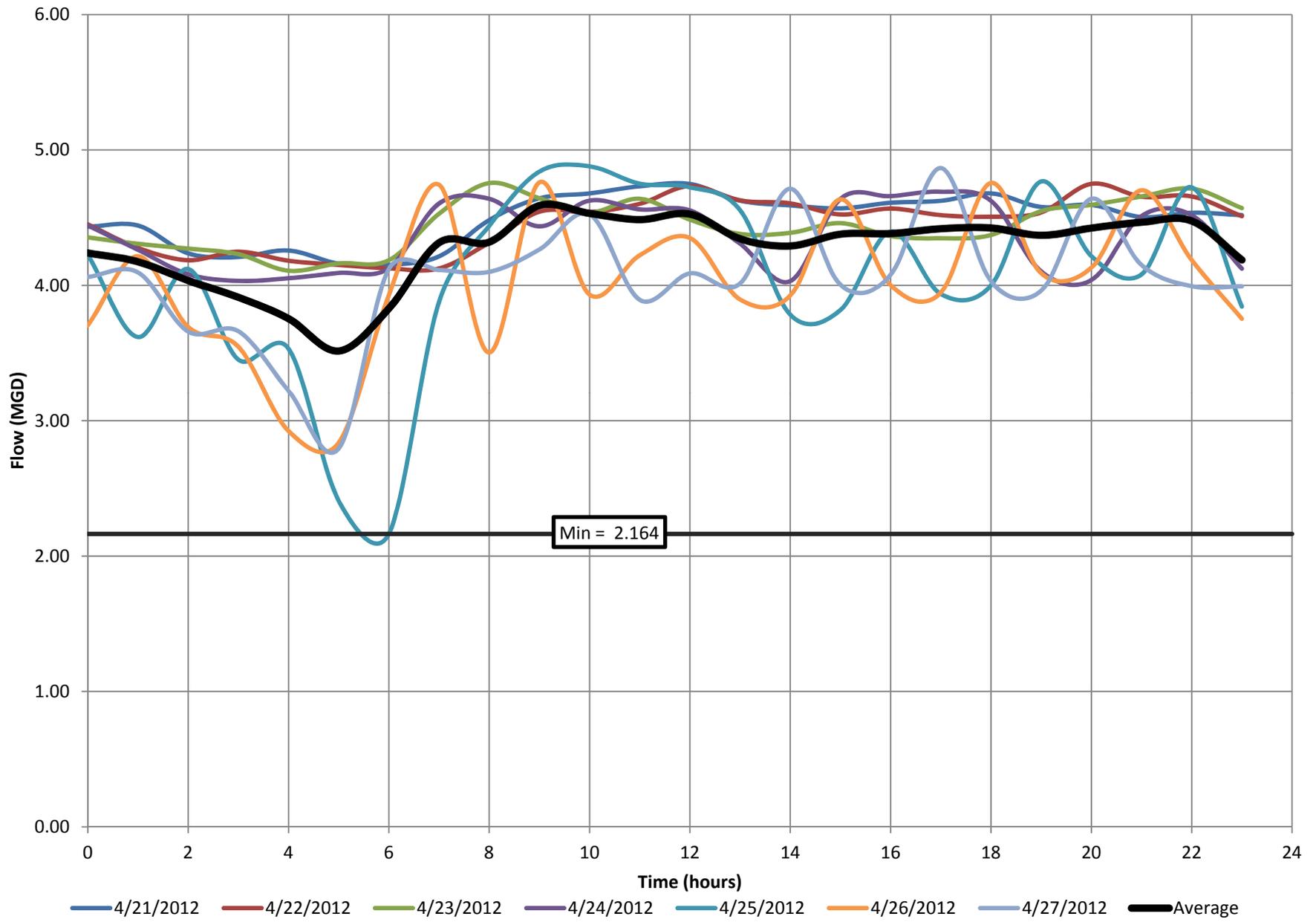


Figure G9 – Observed Dry Weather Flow for Subbasin EM03

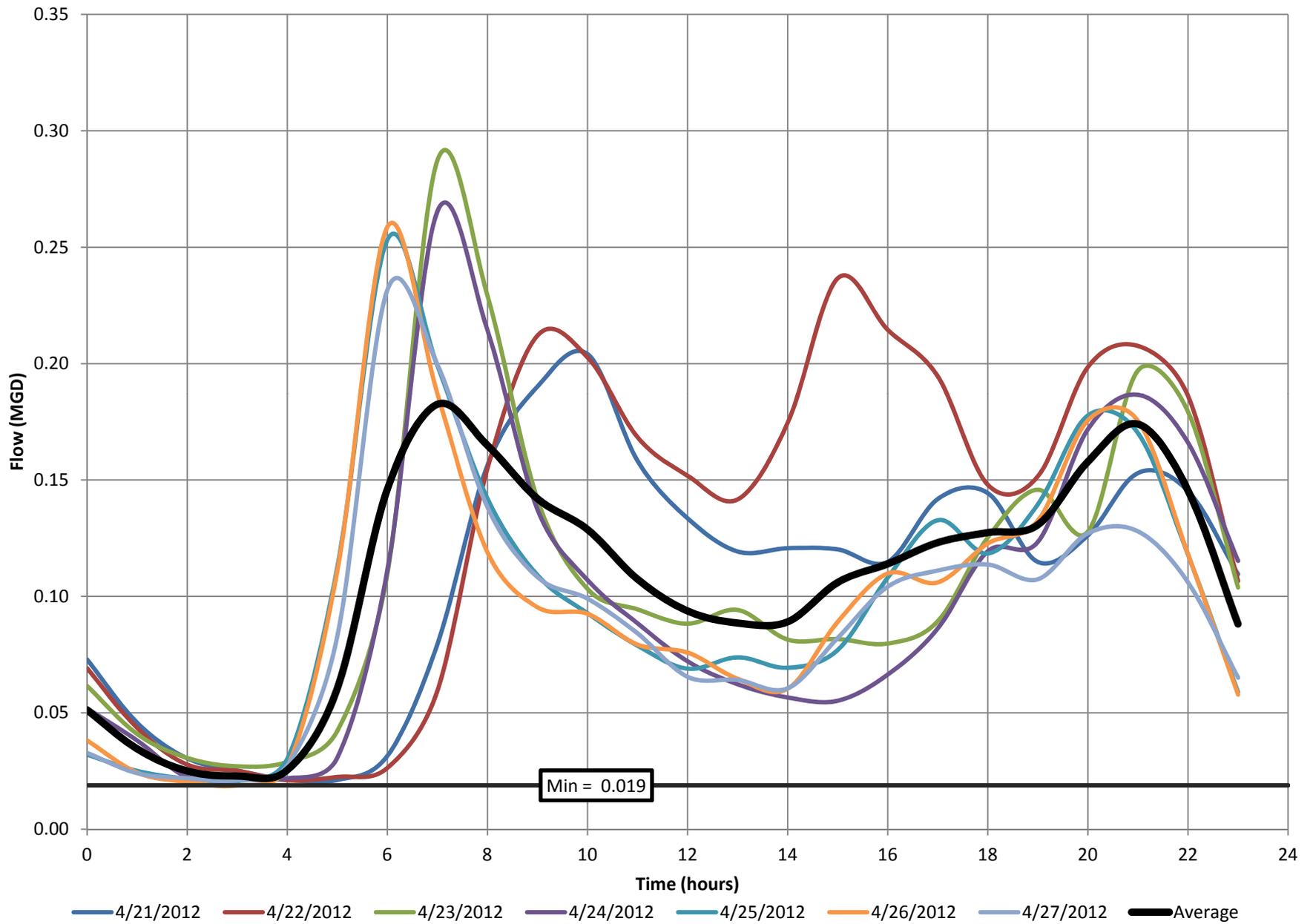


Figure G10 – Observed Dry Weather Flow for Subbasin EM02

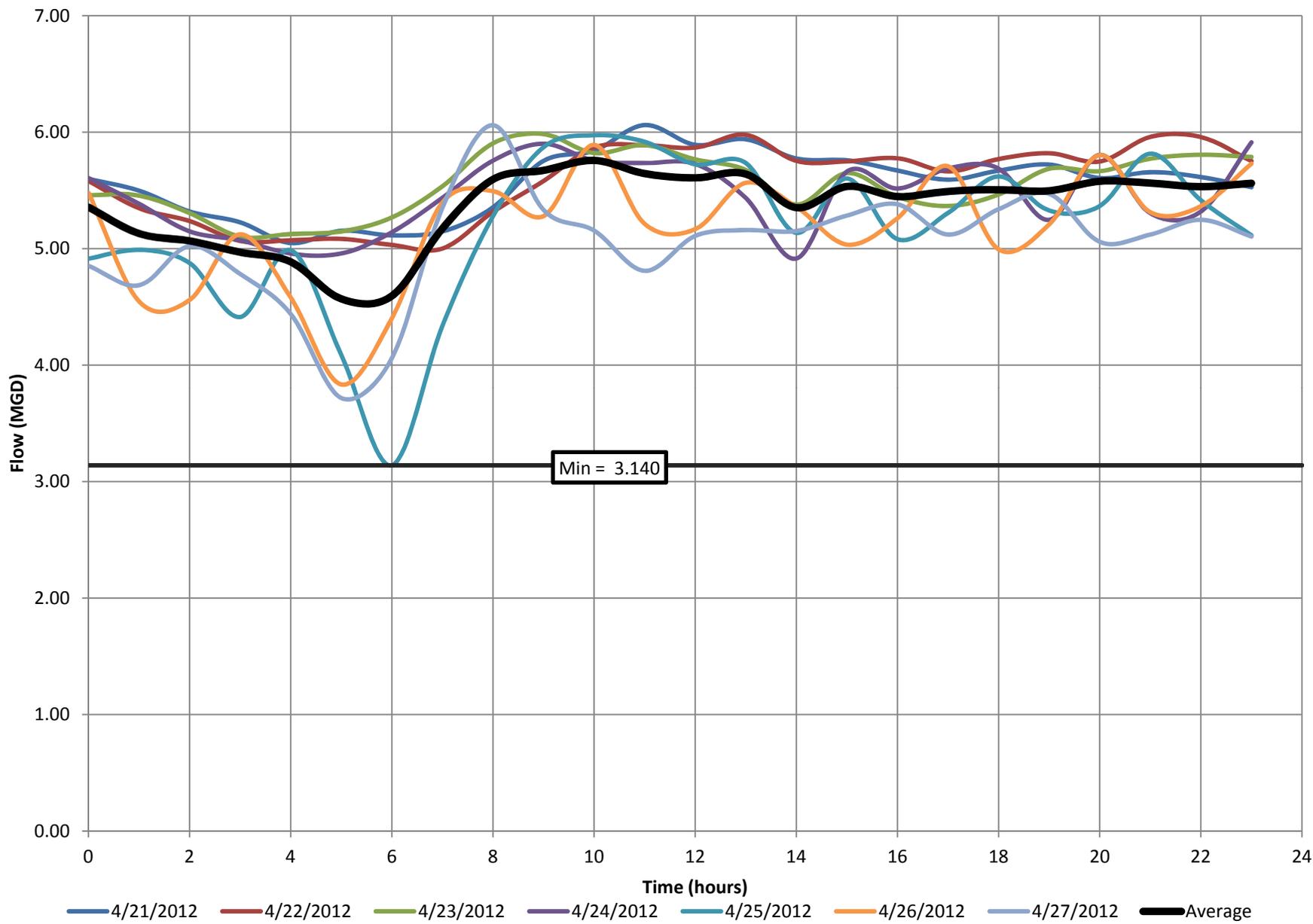


Figure G11 – Observed Dry Weather Flow for Subbasin EM01

**APPENDIX H – WATER TREATMENT PLANT ALTERNATIVE
COST OPINIONS**



Estimate Level:
ENR (December 2013)

Class 4
9667

Project: Water & Wastewater System Master Plan
City of Edmond, OK
Cost Estimate - Alternative No. 1 New 45 mgd Intake and 20 mgd Low Lift Pump Station

By: G. Sheehan
Date: 11/15/2012

Checked: T Crowley
Date: 11/25/2013

Job Nun 8967A.00

DIV	Description	Quantity	Units	Unit Cost	Material Cost	Install Factor	Install Cost	Total Cost	Cost w/ Global Markups		Comments
2	Saw Cut and Remove 18 inch pipe	610	LF	\$ 108	\$ 65,880	1	\$ -	\$ 65,880			
2	Saw Cut and Remove Intake Fillet	1	LS	\$ 20,000	\$ 20,000	1	\$ -	\$ 20,000			
2	Excavate for the Wet Well	1822.91667	cuyd	\$ 50	\$ 91,146	1	\$ -	\$ 91,146			
2	Backfill for the Wet Well	607.638889	cuyd	\$ 25	\$ 15,191	1	\$ -	\$ 15,191			
	Concrete Base Slab	69.4444444	cuyd	\$ 550	\$ 38,194	1	\$ -	\$ 38,194			
	Concrete walls	291.666667	cuyd	\$ 900	\$ 262,500	1	\$ -	\$ 262,500			
	Concrete Top Slab	34.7222222	cuyd	\$ 1,100	\$ 38,194	1	\$ -	\$ 38,194			
3	Baffle Walls	12.5	cuyd	\$ 1,000	\$ 12,500	1.5	\$ 6,250	\$ 18,750			
3	Intermediate walls	5	cuyf	\$ 1,000	\$ 5,000	1.5	\$ 2,500	\$ 7,500			
3	Mezannie Floor and walls	20.8333333	cuyd	\$ 1,100	\$ 22,917	1.5	\$ 11,458	\$ 34,375			
	Repair Concrete Fillet	5	cuyd	\$ 800	\$ 4,000	1.5	\$ 2,000	\$ 6,000			
	Repair Concrete Tunnel	159.697627	cuyd	\$ 500	\$ 79,849	1	\$ -	\$ 79,849			
	New Pump Station Building	1225	sf	\$ 300	\$ 367,500	1.2	\$ 73,500	\$ 441,000			
11	New Sluice Gates	2	EA	\$ 8,000	\$ 16,000	1.35	\$ 5,600	\$ 21,600			
11	New Pumps 350 HP	4	Ea	\$ 60,000	\$ 240,000	1.1	\$ 24,000	\$ 264,000			
13	30 inch automated valves	2	Ea	\$ 17,000	\$ 34,000	1.1	\$ 3,400	\$ 37,400			
13	18 inch automated ball valves	4	ea	\$ 12,000	\$ 48,000	1.1	\$ 4,800	\$ 52,800			
15	18 inch check valves	4	EA	\$ 5,000	\$ 20,000	1	\$ -	\$ 20,000			
15	18 inch DMJ	4	ea	\$ 5,000	\$ 20,000	1	\$ -	\$ 20,000			
15	30 inch tees	4	ea	\$ 14,000	\$ 56,000	1	\$ -	\$ 56,000			
15	30 inch 90 elbow	4	EA	\$ 9,000	\$ 36,000	1	\$ -	\$ 36,000			
15	30 inch buried pipe	200	LF	\$ 300	\$ 60,000	1	\$ -	\$ 60,000			
15	30 inch DMJ	4	ea	\$ 5,500	\$ 22,000	1	\$ -	\$ 22,000			
15	42 inch pipe in Tunnel	610	LF	\$ 840	\$ 512,400	1	\$ -	\$ 512,400			
15	42 inch tee	2	ea	\$ 22,000	\$ 44,000	1	\$ -	\$ 44,000			
15	42 inch coupling	6	ea	\$ 6,500	\$ 39,000	1	\$ -	\$ 39,000			One opening at each side of pre-ozone basin
16	New 350 HP VFD's	4	Ea	\$ 69,000	\$ 276,000	1.1	\$ 27,600	\$ 303,600			
16	New Electrical MCC	1	LS	\$ 100,000	\$ 100,000	1.2	\$ 20,000	\$ 120,000			
16	Conduit and Wire	1	LS	\$ 45,000	\$ 45,000	1.2	\$ 9,000	\$ 54,000			
17	PCM Panle	1	LS	\$ 50,000	\$ 50,000	1.2	\$ 10,000	\$ 60,000			
	Programming	1		\$ 25,000	\$ 25,000	1.2	\$ 5,000	\$ 30,000			
	Subtotal							\$ 2,871,380			
	General Conditions		15%					\$ 3,302,086			
	Overhead and Profit		7%					\$ 3,533,232			
	Taxes		7%					\$ 3,789,392			
	Contingency		50%					\$ 5,684,088			
	Engineering and Admin		25%					\$ 7,105,110			
	Allowance during construction		5%					\$ 7,460,365			
	Total							\$ 17,460,365			



Estimate Level:
ENR (December 2013)

Class 4
9667

Project Water & Wastewater System Master Plan
City of Edmond, OK
Cost Estimate - Alternative No. 2 New 45 mgd Intake and 20 mgd Low Lift Pump Station

By: G. Sheehan
Date: 11/15/2012

Checked: T Crowley
Date: 11/25/2013

Job No. 8967A.00

DIV	Description	Quantity	Units	Unit Cost	Material Cost	Install Factor	Install Cost	Total Cost	Cost w/ Global Markups	Comments
2	Excavate for the Wet WellRock	1822.91667	cuyd	\$ 50	\$ 91,146	1	\$ -	\$ 91,146	#REF!	
2	Backfill for the Wet Well	607.638889	cuyd	\$ 25	\$ 15,191	1	\$ -	\$ 15,191	#REF!	
	Concrete Base Slab	69.4444444	cuyd	\$ 550	\$ 38,194	1	\$ -	\$ 38,194	#REF!	
	Concrete walls	291.666667	cuyd	\$ 900	\$ 262,500	1	\$ -	\$ 262,500	#REF!	
	Concrete Top Slab	34.7222222	cuyd	\$ 1,100	\$ 38,194	1	\$ -	\$ 38,194	#REF!	
3	Baffle Walls	12.5	cuyd	\$ 1,000	\$ 12,500	1.5	\$ 6,250	\$ 18,750	#REF!	
3	Intermediate walls	5	cuyf	\$ 1,000	\$ 5,000	1.5	\$ 2,500	\$ 7,500	#REF!	
3	Mezannie Floor and walls	20.8333333	cuyd	\$ 1,100	\$ 22,917	1.5	\$ 11,458	\$ 34,375	#REF!	
	Repair Concrete Fillet	5	cuyd	\$ 800	\$ 4,000	1.5	\$ 2,000	\$ 6,000		
	New Pump Station Building	1225	sf	\$ 300	\$ 367,500	1.2	\$ 73,500	\$ 441,000		
11	New Sluice Gates	2	Ea	\$ 8,000	\$ 16,000	1.35	\$ 5,600	\$ 21,600		
11	New Pumps 350 HP	4	Ea	\$ 60,000	\$ 240,000	1.1	\$ 24,000	\$ 264,000		
13	30 inch automated valves	2	Ea	\$ 17,000	\$ 34,000	1.1	\$ 3,400	\$ 37,400		
13	18 inch automated ball valves	4	ea	\$ 12,000	\$ 48,000	1.1	\$ 4,800	\$ 52,800		
15	18 inch check valves	4	EA	\$ 5,000	\$ 20,000	1	\$ -	\$ 20,000		
15	18 inch DMJ	4	ea	\$ 5,000	\$ 20,000	1	\$ -	\$ 20,000		
15	30 inch tees	4	ea	\$ 14,000	\$ 56,000	1	\$ -	\$ 56,000		
15	30 inch 90 elbow	4	EA	\$ 9,000	\$ 36,000	1	\$ -	\$ 36,000		
15	30 inch buried pipe	200	LF	\$ 300	\$ 60,000	1	\$ -	\$ 60,000		
15	30 inch DMJ	4	ea	\$ 5,500	\$ 22,000	1	\$ -	\$ 22,000		
15	30 inch pipe in Tunnel	610	LF	\$ 600	\$ 366,000	1	\$ -	\$ 366,000		
16	New 250 HP VFD's	4	Ea	\$ 69,000	\$ 276,000	1.1	\$ 27,600	\$ 303,600		
16	New Electrical MCC	1	LS	\$ 100,000	\$ 100,000	1.2	\$ 20,000	\$ 120,000		
16	Conduit and Wire	1	LS	\$ 45,000	\$ 45,000	1.2	\$ 9,000	\$ 54,000		
17	PCM Panle	1	LS	\$ 50,000	\$ 50,000	1.2	\$ 10,000	\$ 60,000		
	Programming	1		\$ 25,000	\$ 25,000	1.2	\$ 5,000	\$ 30,000		
	Subtotal							\$ 2,476,251		
	General Conditions		15%							
	Subtotal							\$ 2,847,688		
	Overhead and Profit		7%							
	Subtotal							\$ 3,047,026		
	Taxes		7%							
	Subtotal							\$ 3,267,936		
	Contingency		50%							
	Subtotal							\$ 4,901,904		
	Engineering and Admin		25%							
	Subtotal							\$ 6,127,380		
	Allowance during construction		5%							
	Total							\$ 6,433,749		



Estimate Level:
ENR (December 2013)

Class 4
9667

Proje Water & Wastewater System Master Plan
City of Edmond, OK
Cost Estimate - Alternative No. 3 New 45 mgd Intake and 20 mgd Low Lift Pump Station

By: G. Sheehan
Date: 11/15/2012

Checked: T Crowley
Date: 11/25/2013

Job #8967A.00

DIV	Description	Quantity	Units	Unit Cost	Material Cost	Install Factor	Install Cost	Total Cost	Cost w/ Global Markups		Comments
2	Excavate for the Wet WellRock	1822.91667	cuyd	\$ 50	\$ 91,146	1	\$ -	\$ 91,146			
2	Backfill for the Wet Well	607.638889	cuyd	\$ 25	\$ 15,191	1	\$ -	\$ 15,191			
2	Drilled Piers for Pipe Foundation	3750	LF	\$ 50	\$ 187,500	1	\$ -	\$ 187,500			
2	Pile Load Testing	1	LS	\$ 10,000	\$ 10,000	1	\$ -	\$ 10,000			
	Concrete Base Slab	69.4444444	cuyd	\$ 550	\$ 38,194	1	\$ -	\$ 38,194			
	Concrete walls	291.666667	cuyd	\$ 900	\$ 262,500	1	\$ -	\$ 262,500			
	Concrete Top Slab	34.7222222	cuyd	\$ 1,100	\$ 38,194	1	\$ -	\$ 38,194			
3	Baffle Walls	12.5	cuyd	\$ 1,000	\$ 12,500	1.5	\$ 6,250	\$ 18,750			
3	Intermediate walls	5	cuyf	\$ 1,000	\$ 5,000	1.5	\$ 2,500	\$ 7,500			
3	Mezannie Floor and walls	20.8333333	cuyd	\$ 1,100	\$ 22,917	1.5	\$ 11,458	\$ 34,375			
	New Pump Station Building	1225	sf	\$ 300	\$ 367,500	1.2	\$ 73,500	\$ 441,000			
11	New Pumps 350 HP	4	Ea	\$ 60,000	\$ 240,000	1.1	\$ 24,000	\$ 264,000			
	Tee Screen	2	Ea	\$ 50,000	\$ 100,000	2	\$ 100,000	\$ 200,000			
	Tee Screen Equipment	1	LS	\$ 80,000	\$ 80,000	1.2	\$ 16,000	\$ 96,000			
13	30 inch automated valves	2	Ea	\$ 17,000	\$ 34,000	1.1	\$ 3,400	\$ 37,400			
13	18 inch automated ball valves	4	ea	\$ 12,000	\$ 48,000	1.1	\$ 4,800	\$ 52,800			
15	18 inch check valves	4	Ea	\$ 5,000	\$ 20,000	1	\$ -	\$ 20,000			
15	18 inch DMJ	4	ea	\$ 5,000	\$ 20,000	1	\$ -	\$ 20,000			
15	30 inch tees	4	ea	\$ 14,000	\$ 56,000	1	\$ -	\$ 56,000			
15	30 inch 90 elbow	4	Ea	\$ 9,000	\$ 36,000	1	\$ -	\$ 36,000			
15	30 inch buried pipe	200	LF	\$ 300	\$ 60,000	1	\$ -	\$ 60,000			
15	30 inch DMJ	4	ea	\$ 5,500	\$ 22,000	1	\$ -	\$ 22,000			
15	36 inch pipe for siphon	900	LF	\$ 500	\$ 450,000	1	\$ -	\$ 450,000			
16	New 250 HP VFD's	4	Ea	\$ 69,000	\$ 276,000	1.1	\$ 27,600	\$ 303,600			
16	New Electrical MCC	1	LS	\$ 80,000	\$ 80,000	1.2	\$ 16,000	\$ 96,000			
16	Conduit and Wire	1	LS	\$ 35,000	\$ 35,000	1.2	\$ 7,000	\$ 42,000			
17	PCM Panle	1	LS	\$ 50,000	\$ 50,000	1.2	\$ 10,000	\$ 60,000			
	Programming	1		\$ 25,000	\$ 25,000	1.2	\$ 5,000	\$ 30,000			
	Subtotal							\$ 2,990,200			
	General Conditions		15%								
	Subtotal							\$ 3,438,800			
	Overhead and Profit		7%								
	Subtotal							\$ 3,679,600			
	Taxes		7%								
	Subtotal							\$ 3,946,400			
	Contingency		50%								
	Subtotal							\$ 5,919,600			
	Engineering and Admin		25%								
	Subtotal							\$ 7,399,500			
	Allowance during construction		5%								
	Total							\$ 7,769,500			



Estimate Level:
ENR (December 2013)

Class 4
9667

Proj: Water & Wastewater System Master Plan
City of Edmond, OK
Cost Estimate - Alternative No. 4 New 45 mgd Intake and 20 mgd Low Lift Pump Station

By: G. Sheehan
Date: 11/15/2012

Checked: T Crowley
Date: 11/25/2013

Job 18967A.00

DIV	Description	Quantity	Units	Unit Cost	Material Cost	Install Factor	Install Cost	Total Cost	Cost w/ Global Markups		Comments
2	Excavate for Wet Well Caisson	581.776417	cuyd	\$ 100	\$ 58,178	1	\$ -	\$ 58,178			
	Caisson Cost	250	Cuyd	\$ 900	\$ 225,000	1	\$ -	\$ 225,000			
2	Backfill for the Wet Well	2	cuyd	\$ 25	\$ 50	1	\$ -	\$ 50			
	Concrete Base Slab	4	cuyd	\$ 550	\$ 2,200	1	\$ -	\$ 2,200			
	Concrete walls	4	cuyd	\$ 900	\$ 3,600	1	\$ -	\$ 3,600			
	Concrete Top Slab	4	cuyd	\$ 1,100	\$ 4,400	1	\$ -	\$ 4,400			
2	HDD 30 inch pipe	883.239492	LF	\$ 2,000	\$ 1,766,479	1	\$ -	\$ 1,766,479			
3	Baffle Walls	4	cuyd	\$ 1,000	\$ 4,000	1.5	\$ 2,000	\$ 6,000			
3	Intermediate walls	5	cuyf	\$ 1,000	\$ 5,000	1.5	\$ 2,500	\$ 7,500			
3	Mezannie Floor and walls	200	cuyd	\$ 1,100	\$ 220,000	1.5	\$ 110,000	\$ 330,000			
	New Pump Station Building	900	sf	\$ 300	\$ 270,000	1.2	\$ 54,000	\$ 324,000			
11	New Pumps 350 HP	4	Ea	\$ 100,000	\$ 400,000	1.1	\$ 40,000	\$ 440,000			
	Tee Screen	2	EA	\$ 50,000	\$ 100,000	2	\$ 100,000	\$ 200,000			
	Tee Screen Equipment	1	LS								
13	30 inch automated valves	2	Ea	\$ 17,000	\$ 34,000	1.1	\$ 3,400	\$ 37,400			
13	18 inch automated ball valves	4	ea	\$ 12,000	\$ 48,000	1.1	\$ 4,800	\$ 52,800			
15	18 inch check valves	4	EA	\$ 5,000	\$ 20,000	1	\$ -	\$ 20,000			
15	18 inch DMJ	4	ea	\$ 5,000	\$ 20,000	1	\$ -	\$ 20,000			
15	30 inch tees	4	ea	\$ 14,000	\$ 56,000	1	\$ -	\$ 56,000			
15	30 inch 90 elbow	4	EA	\$ 9,000	\$ 36,000	1	\$ -	\$ 36,000			
15	30 inch buried pipe	200	LF	\$ 300	\$ 60,000	1	\$ -	\$ 60,000			
15	30 inch DMJ	4	ea	\$ 5,500	\$ 22,000	1	\$ -	\$ 22,000			
16	New 250 HP VFD's	4	Ea	\$ 69,000	\$ 276,000	1.1	\$ 27,600	\$ 303,600			
16	New Electrical MCC	1	LS	\$ 100,000	\$ 100,000	1.2	\$ 20,000	\$ 120,000			
16	Conduit and Wire	1	LS	\$ 50,000	\$ 50,000	1.2	\$ 10,000	\$ 60,000			
17	PCM Panle	1	LS	\$ 50,000	\$ 50,000	1.2	\$ 10,000	\$ 60,000			
	Programming	1		\$ 35,000	\$ 35,000	1.2	\$ 7,000	\$ 42,000			
	Subtotal							\$ 4,257,207			
	General Conditions		15%								
	Subtotal							\$ 4,895,788			
	Overhead and Profit		7%								
	Subtotal							\$ 5,238,493			
	Taxes		7%								
	Subtotal							\$ 5,605,187			
	Contingency		50%								
	Subtotal							\$ 8,407,781			
	Engineering and Admin		25%								
	Subtotal							\$ 10,509,726			
	Allowance during construction		5%								
	Total							\$ 11,035,212			



Estimate Level:
ENR (December 2013)

Class 4
9667

Project: Water & Wastewater System Master Plan
City of Edmond, OK
Cost Opinion - Phase II Expansion of Low Lift Pump Station from 20 to 30 mgd (Buildout without IPR total 40 mgd)
Construct LLPS Addition and add 36-inch parallel RW Line
Job Number 8967A.00

By: G. Sheehan
Date: 11/15/2012
Checked: T Crowley
Date: 11/25/2013

DIV	Description	Quantity	Units	Unit Cost	Material Cost	Install Factor	Install Cost	Total Cost	Cost w/ Global Markups	Comments
2	Excavate for Wet Well addition	1059.02778	cuyd	\$ 50	\$ 53,000	1	\$ -	\$ 53,000		
2	Backfill for Wet Well addition	529.513889	cuyd	\$ 20	\$ 10,600	1	\$ -	\$ 10,600		
2	Pile Load Testing	1	LS	\$ 10,000	\$ 10,000	1	\$ -	\$ 10,000		
2	Pile Foundation for Building Extension	500	VLF	\$ 50	\$ 25,000	1	\$ -	\$ 25,000		
2	Finish Site Grading and Paving	1	LS	\$ 20,000	\$ 20,000	1	\$ -	\$ 20,000		
3	Concrete Base Slab	37.037037	cuyd	\$ 550	\$ 20,400	1.5	\$ 10,200	\$ 30,600		
3	Concrete Wet Well Walls	125	cuyd	\$ 900	\$ 112,500	1.5	\$ 56,250	\$ 168,750		
3	Concrete Wet Well Top Slab	27.7777778	cuyd	\$ 1,100	\$ 30,600	1.5	\$ 15,300	\$ 45,900		
3	Baffle Walls	4	cuyd	\$ 1,000	\$ 4,000	1.5	\$ 2,000	\$ 6,000		
3	Intermediate walls	5	cuyf	\$ 1,000	\$ 5,000	1.5	\$ 2,500	\$ 7,500		
3	Mezannie Floor and walls	30	cuyd	\$ 1,100	\$ 33,000	1.5	\$ 16,500	\$ 49,500		
4	building Extension	1250	sf	\$ 300	\$ 375,000	1.2	\$ 75,000	\$ 450,000		
11	New Pumps 350 HP	2	Ea	\$ 90,000	\$ 180,000	1.1	\$ 18,000	\$ 198,000		4 pumps at 50 ft tdh, 5 mgd
13	14 inch automated ball valves	2	ea	\$ 12,000	\$ 24,000	1.1	\$ 2,400	\$ 26,400		
13	Rehabilitate Existing Pumps	8	Es	\$ 18,000	\$ 144,000	1	\$ -	\$ 144,000		
13	Replace Actuators on Existing Pumps	8	Ea	\$ 6,500	\$ 52,000	1	\$ -	\$ 52,000		
15	14 inch check valves	2	EA	\$ 5,000	\$ 10,000	1	\$ -	\$ 10,000		
15	14 inch DMJ	2	ea	\$ 4,500	\$ 9,000	1	\$ -	\$ 9,000		
16	New 200 HP VFD's	2	Ea	\$ 55,000	\$ 110,000	1.1	\$ 11,000	\$ 121,000		
16	Replace Existing VFD's	8	EA	\$ 69,000	\$ 552,000	1.1	\$ 55,200	\$ 607,200		
16	New Electrical MCC	1	LS	\$ 150,000	\$ 150,000	1.2	\$ 30,000	\$ 180,000		
16	Conduit and Wire	1	LS	\$ 40,000	\$ 40,000	1.2	\$ 8,000	\$ 48,000		
17	PCM Panle	1	LS	\$ 50,000	\$ 50,000	1.2	\$ 10,000	\$ 60,000		
	Programming	1		\$ 35,000	\$ 35,000	1.2	\$ 7,000	\$ 42,000		
	Subtotal Low Lift Pump Station							\$ 2,374,450		
13	30 inch automated valves	2	Ea	\$ 17,000	\$ 34,000	1.1	\$ 3,400	\$ 37,400		
15	30 inch tees	2	ea	\$ 14,000	\$ 28,000	1	\$ -	\$ 28,000		
15	36 Inch tees	4	ea	\$ 18,000	\$ 72,000	1	\$ -	\$ 72,000		
15	36 inch DMJ's	4	Ea	\$ 6,000	\$ 24,000	1	\$ -	\$ 24,000		
13	36-inch automated vavles	4	Ea	\$ 20,000	\$ 80,000	1.2	\$ 16,000	\$ 96,000		
	36-inch isolation valves	6	Ea	\$ 15,000	\$ 90,000	1.2	\$ 18,000	\$ 108,000		
15	36 inch 90 elbow	12	EA	\$ 13,000	\$ 156,000	1	\$ -	\$ 156,000		
15	36inch buried pipe	1920	LF	\$ 432	\$ 829,440	1	\$ -	\$ 829,440		
15	30 inch DMJ	4	ea	\$ 5,500	\$ 22,000	1	\$ -	\$ 22,000		
	Subtotal 36 -inch pipe							\$ 1,372,840		
	Subtotal							\$ 3,747,290		
	General Conditions		15%					\$ 4,309,384		
	Subtotal							\$ 4,309,384		
	Overhead and Profit		7%					\$ 4,611,040		
	Subtotal							\$ 4,611,040		

Taxes		7%								
	Subtotal					\$ 4,933,813				
Contingency		30%								
	Subtotal					\$ 6,413,957				
Engineering and Admin		25%								
	Subtotal					\$ 8,017,446				
Allowance during construction		5%								
	Total					\$ 8,418,319				



Estimate Level:
ENR (December 2013)

Class 4
9667

Project Water & Wastewater System Master Plan
City of Edmond, OK
Cost Opinion - Phase II Expansion of Low Lift Pump Station from 30 to 40 mgd (Buildout with IPR total 54 mgd
Construct 12 mgd LLPS Addition
Job Nu 8967A.00

By: G. Sheehan
Date: 11/15/2012
Checked: T Crowley
Date: 11/25/2013

DIV	Description	Quantity	Units	Unit Cost	Material Cost	Install Factor	Install Cost	Total Cost	Cost w/ Global Markups		Comments
2	Excavate for Wet Well addition	1059.02778	cuyd	\$ 50	\$ 53,000	1	\$ -	\$ 53,000			
2	Backfill for Wet Well addition	529.513889	cuyd	\$ 20	\$ 10,600	1	\$ -	\$ 10,600			
2	Pile Load Testing	1	LS	\$ 10,000	\$ 10,000	1	\$ -	\$ 10,000			
2	Pile Foundation for Building Extension	500	VLF	\$ 50	\$ 25,000	1	\$ -	\$ 25,000			
2	Finish Site Grading and Paving	1	LS	\$ 20,000	\$ 20,000	1	\$ -	\$ 20,000			
3	Concrete Base Slab	37.037037	cuyd	\$ 550	\$ 20,400	1.5	\$ 10,200	\$ 30,600			
3	Concrete Wet Well Walls	125	cuyd	\$ 900	\$ 112,500	1.5	\$ 56,250	\$ 168,750			
3	Concrete Wet Well Top Slab	27.777778	cuyd	\$ 1,100	\$ 30,600	1.5	\$ 15,300	\$ 45,900			
3	Baffle Walls	4	cuyd	\$ 1,000	\$ 4,000	1.5	\$ 2,000	\$ 6,000			
3	Intermediate walls	5	cuyf	\$ 1,000	\$ 5,000	1.5	\$ 2,500	\$ 7,500			
3	Mezannie Floor and walls	30	cuyd	\$ 1,100	\$ 33,000	1.5	\$ 16,500	\$ 49,500			
4	building Extension	1250	sf	\$ 300	\$ 375,000	1.2	\$ 75,000	\$ 450,000			
11	New Pumps 350 HP	2	Ea	\$ 90,000	\$ 180,000	1.1	\$ 18,000	\$ 198,000			2 pumps at 50 ft tdh, 6 mgd
13	14 inch automated ball valves	2	ea	\$ 12,000	\$ 24,000	1.1	\$ 2,400	\$ 26,400			
13	Rehabilitate Existing Pumps	10	Es	\$ 18,000	\$ 180,000	1	\$ -	\$ 180,000			
13	Replace Actuators on Existing Pumps	10	Ea	\$ 6,500	\$ 65,000	1	\$ -	\$ 65,000			
15	14 inch check valves	2	EA	\$ 5,000	\$ 10,000	1	\$ -	\$ 10,000			
15	14 inch DMJ	2	ea	\$ 4,500	\$ 9,000	1	\$ -	\$ 9,000			
16	New 200 HP VFD's	2	Ea	\$ 55,000	\$ 110,000	1.1	\$ 11,000	\$ 121,000			
16	Replace Existing VFD's	10	EA	\$ 69,000	\$ 690,000	1.1	\$ 69,000	\$ 759,000			
16	New Electrical MCC	1	LS	\$ 150,000	\$ 150,000	1.2	\$ 30,000	\$ 180,000			
16	Conduit and Wire	1	LS	\$ 40,000	\$ 40,000	1.2	\$ 8,000	\$ 48,000			
17	PCM Panle	1	LS	\$ 50,000	\$ 50,000	1.2	\$ 10,000	\$ 60,000			
	Programming	1		\$ 35,000	\$ 35,000	1.2	\$ 7,000	\$ 42,000			
	Subtotal Low Lift Pump Station							\$ 2,575,250			
		Subtotal						\$ 2,575,250			
	General Conditions		15%								
		Subtotal						\$ 2,961,538			
	Overhead and Profit		7%								
		Subtotal						\$ 3,168,845			
	Taxes		7%								
		Subtotal						\$ 3,390,664			
	Contingency		30%								
		Subtotal						\$ 4,407,864			
	Engineering and Admin		25%								
		Subtotal						\$ 5,509,829			
	Allowance during construction		5%								
		Total						\$ 5,785,321			



Estimate Level:
ENR (December 2013)

Class 4
9667

Project Water & Wastewater System Master Plan
City of Edmond, OK
Cost Opinion Expansion of WTP From 10.5 to 30 mgd
Full Softening Alternative No. 2
Job Nu 8967A.00

By: R Rossell
Date: 11/15/2012
Checked: T Crowley
Date: 11/25/2013

DIV	Description	Quantity	Units	Unit Cost	Material Cost	Install Factor	Install Cost	Total Cost	Cost w/ Global Markups	Comments
	New Fine Screening (2 screens at 10 mgd each)									
	Quantity	2.00								
	Height	32.00	ft							
	Width	20.00	ft							
	Length	20.00	ft							
	Over Excav.	2.00	ft							
	H:V = 1:	1.00								
	D	25.00	ft							
	Exc. Depth	9.00	ft							
	Added W/L	4.50	ft							
Division 2 - Sitework										
2	Excavation	280	cu yd	\$15	\$ 4,300	1	\$ -	\$ 4,300		18' SWD + 2' Freeboard (Assumed) + 12' (operating floor above screens)
2	Hauling	74	cu yd	\$2	\$ 200	1	\$ -	\$ 200		20' per screen (similar to other screens)
2	Backfill	221	cu yd	\$10	\$ 2,300	1	\$ -	\$ 2,300		20' per screen (similar to other screens)
2	Drilled Piers	9	EA	\$3,000	\$ 27,000	1	\$ -	\$ 27,000		Over Excavation (assumed)
					\$ -	1	\$ -	\$ -		Horizontal to vertical slope
					\$ -	1	\$ -	\$ -		Distance from grade to top of structure (estimated)
Division 3 - Concrete										Total Excavation Depth
	Concrete - 20" Base Slab	25	cu yd	\$500	\$ 12,400	1	\$ -	\$ 12,400		Based on side slope
	Concrete Walls - Exterior	95	cu yd	\$840	\$ 79,700	1	\$ -	\$ 79,700		
	Concrete Walls - Interior walls	22	cu yd	\$840	\$ 18,700	1	\$ -	\$ 18,700		
	Operating Floor	15	cu yd	\$404	\$ 6,000	1	\$ -	\$ 6,000		
	Roof	15	cu yd	\$404	\$ 6,000	1	\$ -	\$ 6,000		Doesn't account for sloped sides of excavation
					\$ -	1	\$ -	\$ -		25% Swell Factor, hauling to or from site
Division 11 - Equipment										25% Swell Factor
	Screen Mechanism	2	EA	\$190,000	\$ 380,000	1.2	\$ 76,000	\$ 456,000		
					\$ -	1	\$ -	\$ -		
Division 15 - Piping										
	36" STW Inlet Piping (Buried)	120	LF	\$200	\$ 24,000	1	\$ -	\$ 24,000		Assumes 20" thick slab on grade
	36" STW Inlet Wall Pipe	2	EA	\$3,500	\$ 7,000	1	\$ -	\$ 7,000		12" thick wall, cost from CCES for straight 12" wall, >8' tall
	36" STW Inlet Elbow (Buried)	2	EA	\$3,500	\$ 7,000	1	\$ -	\$ 7,000		12" thick interior wall running along the width of each screen
	36" STW Inlet Pipe Coupling (Buried)	2	EA	\$2,000	\$ 4,000	1	\$ -	\$ 4,000		Elevated Slab - 12" thick, cost from CCES
	36" STW Inlet Piping Fittings and Appurtenances (Buried)	2	LS	\$2,000	\$ 4,000	1	\$ -	\$ 4,000		Elevated Slab - 12" thick, cost from CCES
	36" STW Inlet Pipe Trench	120	EA	\$150	\$ 18,000	1	\$ -	\$ 18,000		
					\$ -	1	\$ -	\$ -		
Division 16 - Electrical										Estimated
	Electrical	1	LS	\$50,000	\$ 50,000	1	\$ -	\$ 50,000		
Division 17 - Instrumentation										
	Instrumentation	1	LS	\$25,000	\$ 25,000	1	\$ -	\$ 25,000		Estimated per Figure 7.1
	Subtotal for New Intake Screen(s)				\$612,000					
	Intake Screen(s) Cost		#	2	\$1,224,000	1	\$ -	\$ 1,224,000		
						1	\$ -	\$ -		
	Piping Subtotal				\$64,000	1	\$ -	\$ 64,000		



Estimate Level:
ENR (December 2013)

Class 4
9667

Project Water & Wastewater System Master Plan
City of Edmond, OK
Cost Opinion Expansion of WTP From 10.5 to 30 mgd
Full Softening Alternative No. 2
Job Nu 8967A.00

By: R Rossell
Date: 11/15/2012
Checked: T Crowley
Date: 11/25/2013

DIV	Description	Quantity	Units	Unit Cost	Material Cost	Install Factor	Install Cost	Total Cost	Cost w/ Global Markups	Comments
	Total for New Intake Screen(s)				\$1,288,000	1	\$ -	\$ 1,288,000		
	New Pre-Ozone Contactor (2 parallel trains at 15 mgd each)									
	Height	21.00	ft							2 Parallel Trains @ 15 mgd each 18' min depth and 3' freeboard, and min contact time = 10 minutes (per O Includes space for 10' access hatch Includes space for 6' influent/effluent chambers Over Excavation (assumed) Horizontal to vertical slope Distance from grade to top of structure Total Excavation Depth Based on side slope
	Width	65.00	ft							
	Length	65.00	ft							
	Over Excav.	2.00	ft							
	H:V = 1:	1.00								
	D	1.00	ft							
	Exc. Depth	22.00	ft							
	Added W/L	11.00	ft							
	Division 2 - Sitework									Doesn't account for sloped sides of excavation 25% Swell Factor 25% Swell Factor
	Excavation	6167.33	cu yd	\$ 15	\$ 92,600	1	\$ -	\$ 92,600		
	Hauling	2962.75	cu yd	\$ 2	\$ 6,000	1	\$ -	\$ 6,000		
	Backfill	3797.13	cu yd	\$ 10	\$ 38,000	1	\$ -	\$ 38,000		
	Drilled Piers	64.00	EA	\$ 3,000	\$ 192,000	1	\$ -	\$ 192,000		
	Division 3 - Concrete									Assumes 20" thick slab on grade 12" thick wall, cost from CCES for straight 12" wall, >8' tall 12" thick walls spaced at 5' (resilient and smooth channels, and 10' access corridor), cost from CCES for 8" straight wall >8' tall, assumes flow depth = 3' lower than total wall height Elevated Slab - 12" thick, cost from CCES
	Concrete - 20" Base Slab	260.80	cu yd	\$ 500	\$ 130,500	1	\$ -	\$ 130,500		
	Concrete Walls - Exterior	202.22	cu yd	\$ 840	\$ 169,900	1	\$ -	\$ 169,900		
	Concrete Walls - Interior Baffle walls	36.67	cu yd	\$ 840	\$ 30,800	1	\$ -	\$ 30,800		
	Roof	156.48	cu yd	\$ 404	\$ 63,200	1	\$ -	\$ 63,200		
	Division 8 - Doors and Windows									
	Doors and Windows	1.00	LS	\$ 5,000	\$ 5,000	1	\$ -	\$ 5,000		
	Division 11 - Equipment									
	Ozone Diffusers and Piping	1.00	LS	\$ 55,000	\$ 55,000	1.2	\$ 11,000	\$ 66,000		
	Ozone Destruct Units	2.00	EA	\$ 50,000	\$ 100,000	1.1	\$ 10,000	\$ 110,000		
	Nitrogen Purge System	1.00	EA	\$ 35,000	\$ 35,000	1.1	\$ 3,500	\$ 38,500		
	Division 15 - Piping									Assumption, similar to McBaine WTP estimate (accounts for LOX piping, and general piping)
	Piping	1.00	LS	\$ 60,000	\$ 60,000	1	\$ -	\$ 60,000		
	Division 16 - Electrical									Similar to McBaine WTP est.
	Electrical	1.00	LS	\$ 25,000	\$ 25,000	1	\$ -	\$ 25,000		
	Division 17 - Instrumentation									Similar to McBaine WTP est.
	Instrumentation	1.00	LS	\$ 25,000	\$ 25,000	1	\$ -	\$ 25,000		
	Subtotal for New Pre-Ozone Contactor							\$ 1,052,500		
	New Pre-Ozone Generation Building and LOX Storage (20 mgd expandable to 30 mgd)									
	Height	12.00	ft							



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Full Softening Alternative No. 2
Job Nu 8967A.00

By: R Rossell
Date: 11/15/2012
Checked: T Crowley
Date: 11/25/2013

DIV	Description	Quantity	Units	Unit Cost	Material Cost	Install Factor	Install Cost	Total Cost	Cost w/ Global Markups	Comments
	Width	30.00	ft							Assumed building size for new ozone generation system Over Excavation (assumed) Horizontal to vertical slope Distance from grade to top of structure Total Excavation Depth Based on side slope Doesn't account for sloped sides of excavation 25% Swell Factor 25% Swell Factor Assumes 12" thick slab on grade, cost from CCES 12" thick wall, cost from CCES for straight 12" wall, >8' tall Using 2/3 Rule on \$1,013,333 per 560 lb/day Generator Using 2/3 Rule on \$460,000 for 15,000 gal tanks and vaporizers from McBaine WTP estimate, transformed to 2013 dollars @ 3% from McBaine WTP estimate, transformed to 2013 dollars @ 3% Assumption, similar to McBaine WTP estimate (accounts for LOX piping, and general piping) Similar to McBaine WTP est. Similar to McBaine WTP est. Subtotal for Generation Building \$ 5,431,400 New RM Basins (2@20 mgd) 24' SWD + 2' Freeboard 7.45' square basin with 12" weir wall and 24" effluent chamber Over Excavation (assumed) Horizontal to vertical slope Distance from grade to top of structure (estimated) Total Excavation Depth Based on side slope Doesn't account for sloped sides of excavation
	Length	65.00	ft							
	Over Excav.	2.00	ft							
		H:V = 1:								
		D	10.00	ft						
	Exc. Depth	4.00	ft							
		Added W/L	2.00	ft						
Division 2 - Sitework	Excavation	347.56	cu yd	\$ 15	\$ 5,300	1	\$ -	\$ 5,300		
	Hauling	117.08	cu yd	\$ 2	\$ 300	1	\$ -	\$ 300		
	Backfill	253.89	cu yd	\$ 10	\$ 2,600	1	\$ -	\$ 2,600		
	Drilled Piers	32.00	EA	\$ 3,000	\$ 96,000	1	\$ -	\$ 96,000		
Division 3 - Concrete				\$ -	\$ -	1	\$ -	\$ -		
	Concrete - 12" Base Slab	72.22	cu yd	\$ 350	\$ 25,300	1	\$ -	\$ 25,300		
	Concrete Walls - Exterior	84.44	cu yd	\$ 840	\$ 71,000	1	\$ -	\$ 71,000		
Division 8 - Doors and Windows				\$ -	\$ -	1	\$ -	\$ -		
	Doors and Windows	1.00	LS	\$ 15,000	\$ 15,000	1	\$ -	\$ 15,000		
Division 11 - Equipment				\$ -	\$ -	1	\$ -	\$ -		
	650 lb/d Ozone Generator and Power Supply Unit	3.00	EA	\$ 1,119,186	\$ 3,357,600	1	\$ -	\$ 3,357,600		
	LOX Storage Tanks - 10,000 gal and Vaporizers	3.00	EA	\$ 351,046	\$ 1,053,200	1	\$ -	\$ 1,053,200		
	Diffusers	1.00	LS	\$ 200,000	\$ 200,000	1	\$ -	\$ 200,000		
	Destruct Unit	1	LS	\$ 100,000	\$ 100,000	1	\$ -	\$ 100,000		
	Installation of Equipment (% of total equipment cost)	0.2	%	\$ 1	\$ 100	1	\$ -	\$ 100		
Division 15 - Piping				\$ -	\$ -	1	\$ -	\$ -		
	Piping	1	LS	\$ 185,000	\$ 185,000	1	\$ -	\$ 185,000		
Division 16 - Electrical				\$ -	\$ -	1	\$ -	\$ -		
	Electrical	1	LS	160000	\$ 160,000	1	\$ -	\$ 160,000		
Division 17 - Instrumentation				\$ -	\$ -	1	\$ -	\$ -		
	Instrumentation	1	LS	160000	\$ 160,000	1	\$ -	\$ 160,000		
Subtotal for Generation Building								\$ 5,431,400		
New RM Basins (2@20 mgd)										
	Quantity	2.00								
	Height	26.00	ft							
	Width	7.45	ft							
	Length	10.45	ft							
	Over Excav.	2.00	ft							
		H:V = 1:								
		D	8.00	ft						
	Exc. Depth	20.00	ft							
		Added W/L	10.00	ft						
Division 2 - Sitework										



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By: R Rossell
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DIV	Description	Quantity	Units	Unit Cost	Material Cost	Install Factor	Install Cost	Total Cost	Cost w/ Global Markups	Comments
	Excavation	619.15	cu yd	\$ 15	\$ 9,300	1	\$ -	\$ 9,300		25% Swell Factor, hauling to or from site
	Hauling	112.39	cu yd	\$ 2	\$ 300	1	\$ -	\$ 300		25% Swell Factor
	Backfill	709.06	cu yd	\$ 10	\$ 7,100	1	\$ -	\$ 7,100		
	Drilled Piers	6.00	EA	\$ 3,000	\$ 18,000	1	\$ -	\$ 18,000		
				\$ -	\$ -	1	\$ -	\$ -		
	Division 3 - Concrete			\$ -	\$ -	1	\$ -	\$ -		
	Concrete - 20" Base Slab	4.81	cu yd	\$ 500	\$ 2,500	1	\$ -	\$ 2,500		Assumes 20" thick slab on grade
	Concrete Walls - Exterior	34.47	cu yd	\$ 840	\$ 29,000	1	\$ -	\$ 29,000		12" thick wall, cost from CCES for straight 12" wall, >8' tall
	Concrete Walls - Interior Baffle walls	6.62	cu yd	\$ 840	\$ 5,600	1	\$ -	\$ 5,600		12" thick weir wall
	Division 5 Metals									
	Miscellaneous Metals	1.00	LS	\$ 20,000	\$ 20,000	1	\$ -	\$ 20,000		Estimated per Figure 7.1
	Division 11 - Equipment									
	Rapid Mix Devices	2.00	Ea	\$ 90,000	\$ 180,000	1.2	\$ 36,000	\$ 216,000		
	Automated Wier Gates	4.00	ea	\$ 23,000	\$ 92,000	1.2	\$ 18,400	\$ 110,400		
	Division 15 - Piping									
	24" STW Inlet Piping (Buried)	120.00	LF	\$ 100	\$ 12,000	1	\$ -	\$ 12,000		Estimated per Figure 7.1
	24" STW Inlet Wall Pipe	2.00	EA	\$ 2,500	\$ 5,000	1	\$ -	\$ 5,000		
	24" STW Inlet Elbow (Buried)	2.00	EA	\$ 2,500	\$ 5,000	1	\$ -	\$ 5,000		
	24" STW Inlet Pipe Coupling (Buried)	2.00	EA	\$ 1,000	\$ 2,000	1	\$ -	\$ 2,000		
	24" STW Inlet Piping Fittings and Appurtenances (Buried)	2.00	LS	\$ 1,000	\$ 2,000	1	\$ -	\$ 2,000		
	24" STW Inlet Pipe Trench	120.00	EA	\$ 100	\$ 12,000	1	\$ -	\$ 12,000		
	24" STW Outlet Piping (Buried)	170.00	LF	\$ 100	\$ 17,000	1	\$ -	\$ 17,000		
	24" STW Outlet Wall Pipe	2.00	EA	\$ 2,500	\$ 5,000	1	\$ -	\$ 5,000		Estimated for each RM Basin
	24" STW Outlet Elbow (Buried)	2.00	EA	\$ 2,500	\$ 5,000	1	\$ -	\$ 5,000		
	24" STW Outlet Pipe Coupling (Buried)	2.00	EA	\$ 1,000	\$ 2,000	1	\$ -	\$ 2,000		Estimated for each RM Basin
	24" STW Outlet Piping Fittings and Appurtenances (Buried)	2.00	LS	\$ 1,000	\$ 2,000	1	\$ -	\$ 2,000		
	24" STW Outlet Pipe Trench	170.00	EA	\$ 100	\$ 17,000	1	\$ -	\$ 17,000		
	Division 16 - Electrical									
	Electrical	1.00	LS	\$ 50,000	\$ 50,000	1	\$ -	\$ 50,000		
	Division 17 - Instrumentation									
	Instrumentation	1.00	LS	\$ 15,000	\$ 15,000	1	\$ -	\$ 15,000		
	Subtotal for New RM Basin							\$ 569,200		
	New Presed Basins (2@10 mgd)									
	Quantity	2								Each rated at 10 MGD
	Diameter, ft	100								
	SWD, ft	16								
	Exc Depth, ft	12								
	Division 2 - Sitework									
	Excavation	10600.00	cu yd	\$ 15	\$ 159,000	1	\$ -	\$ 159,000		Assumes excavation at 1:1 slope, 2 foot overexcavation
	Hauling	7600.00	cu yd	\$ 2	\$ 15,200	1	\$ -	\$ 15,200		25% Swell Factor
	Backfill	4600.00	cu yd	\$ 10	\$ 46,000	1	\$ -	\$ 46,000		



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By: R Rossell
Date: 11/15/2012
Checked: T Crowley
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DIV	Description	Quantity	Units	Unit Cost	Material Cost	Install Factor	Install Cost	Total Cost	Cost w/ Global Markups	Comments
Division 3 - Concrete	Drilled Piers	9600.00	VLF	\$ 50	\$ 480,000	1	\$ -	\$ 480,000		
	Concrete - Base Slab	1260.00	cu yd	\$ 500	\$ 630,000	1	\$ -	\$ 630,000		Assumes 24" thick slab
	Concrete - Curved Walls	630.00	cu yd	\$ 750	\$ 472,500	1	\$ -	\$ 472,500		Assumes 18" thick walls, 2' freeboard
	Floor Grout	194.00	cu yd	\$ 400	\$ 77,600	1	\$ -	\$ 77,600		
Division 5 - Metals				\$ -	1	\$ -	\$ -			
	Misc Metals	2.00	LS	\$ 30,000	\$ 60,000	1	\$ -	\$ 60,000		
Division 11 - Equipment				\$ -		1	\$ -	\$ -		
	Clarifier Mechanism	2.00	EA	\$ 350,000	\$ 700,000	1.5	\$ 350,000	\$ 1,050,000		Per CCES for 100' diameter clarifier mechanism
Division 15 - Piping				\$ -		1	\$ -	\$ -		
	Misc Piping	1.00	LS	\$ 30,000	\$ 30,000	1	\$ -	\$ 30,000		
	24" STW Inlet Piping (Buried)	300.00	LF	\$ 100	\$ 30,000	1	\$ -	\$ 30,000		
	24" STW Inlet Wall Pipe	2.00	EA	\$ 2,500	\$ 5,000	1	\$ -	\$ 5,000		
	24" STW Inlet Elbow (Buried)	2.00	EA	\$ 2,500	\$ 5,000	1	\$ -	\$ 5,000		
	24" STW Inlet Pipe Coupling (Buried)	2.00	EA	\$ 1,000	\$ 2,000	1	\$ -	\$ 2,000		
	24" STW Inlet Piping Fittings and Appurtenances (Buried)	2.00	LS	\$ 1,000	\$ 2,000	1	\$ -	\$ 2,000		
	24" STW Inlet Pipe Trench	300.00	EA	\$ 100	\$ 30,000	1	\$ -	\$ 30,000		
	24" STW Outlet Piping (Buried)	300.00	LF	\$ 100	\$ 30,000	1	\$ -	\$ 30,000		
	24" STW Outlet Wall Pipe	2.00	EA	\$ 2,500	\$ 5,000	1	\$ -	\$ 5,000		
	24" STW Outlet Elbow (Buried)	2.00	EA	\$ 2,500	\$ 5,000	1	\$ -	\$ 5,000		
	24" STW Outlet Pipe Coupling (Buried)	2.00	EA	\$ 1,000	\$ 2,000	1	\$ -	\$ 2,000		
	24" STW Outlet Piping Fittings and Appurtenances (Buried)	2.00	LS	\$ 1,000	\$ 2,000	1	\$ -	\$ 2,000		
	24" STW Outlet Pipe Trench	300.00	EA	\$ 100	\$ 30,000	1	\$ -	\$ 30,000		
	24" Precast Flow Control Vault	2.00	EA	\$ 50,000	\$ 100,000	1.3	\$ 30,000	\$ 130,000		
	24" Butterfly Control valve	2.00	EA	\$ 21,000	\$ 42,000	1.3	\$ 12,600	\$ 54,600		
Division 16 - Electrical				\$ -		1	\$ -	\$ -		
	Electrical	1.00	LS	\$ 90,000	\$ 90,000	1	\$ -	\$ 90,000		Also see contingency below
Division 17 - Instrumentation				\$ -		1	\$ -	\$ -		
	Programming	1.00	LS	\$ 40,000	\$ 40,000	1	\$ -	\$ 40,000		Also see contingency below
	24 inch flowmeters	2.00	EA	\$ 18,000	\$ 36,000	1.2	\$ 7,200	\$ 43,200		
	Subtotal Presedimentation Basins							\$ 3,526,100		
	New Lime System/Chem Bldg									
	Height	12.00	ft							Assumed building size for new lime and chemical systems
	Width	40.00	ft							
	Length	80.00	ft							
	Over Excav.	2.00	ft							Over Excavation (assumed)
	H:V = 1:	1.00								Horizontal to vertical slope
	D	1.00	ft							Distance from grade to top of structure
	Exc. Depth	13.00	ft							Total Excavation Depth
	Added W/L	6.50	ft							Based on side slope
Division 2 - Sitework										
	Excavation	2373.22	cu yd	\$ 15	\$ 35,600	1	\$ -	\$ 35,600		Doesn't account for sloped sides of excavation
	Hauling	1295.41	cu yd	\$ 2	\$ 2,600	1	\$ -	\$ 2,600		25% Swell Factor



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Job Nu 8967A.00

By: R Rossell
Date: 11/15/2012
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Date: 11/25/2013

DIV	Description	Quantity	Units	Unit Cost	Material Cost	Install Factor	Install Cost	Total Cost	Cost w/ Global Markups	Comments
	Backfill	1336.90	cu yd	\$ 10	\$ 13,400	1	\$ -	\$ 13,400		25% Swell Factor
	Drilled Piers	45.00	EA	\$ 3,000	\$ 135,000	1	\$ -	\$ 135,000		
Division 3 - Concrete										
	Concrete - 12" Base Slab	118.52	cu yd	\$ 350	\$ 41,500	1	\$ -	\$ 41,500		Assumes 12" thick slab on grade, cost from CCES 12" thick wall, cost from CCES for straight 12" wall, >8' tall
	Concrete Walls - Exterior	106.67	cu yd	\$ 840	\$ 89,600	1	\$ -	\$ 89,600		
	Concrete Walls - Interior Baffle walls	88.89	cu yd	\$ 840	\$ 74,700	1	\$ -	\$ 74,700		12" thick baffle walls spaced at 8', cost from CCES for 8" straight wall >8' tall, assumes flow depth = 3' lower than total wall height Elevated Slab - 12" thick, cost from CCES
	Roof	118.52	cu yd	\$ 404	\$ 47,900	1	\$ -	\$ 47,900		
Division 8 - Doors and Windows										
	Doors and Windows	1.00	LS	\$ 5,000	\$ 5,000	1	\$ -	\$ 5,000		
Division 11 - Equipment										
	New Coagulant Polymer Feed System	2.00	EA	\$ 35,000	\$ 70,000	1	\$ -	\$ 70,000		Based on quote from Prominent Fluid Controls 7/18/13, for ProMix-M with "C" controls, model M_0-1500x2-5.0PB @ \$35,000 (most expensive)
	New Coagulant Alum Feed System	2.00	EA	\$ 10,000	\$ 20,000	1	\$ -	\$ 20,000		
	New Lime System/Silos	1.00	LS	\$ 1,750,000	\$ 1,750,000	1.5	\$ 875,000	\$ 2,625,000		Assumed similar to Phos. Acid feed TOC Estimate (2-14-13)
	New CO2 System (3 vaporizers @ 5,900 lb/day)	1.00	LS	\$ 912,290	\$ 912,300	1.2	\$ 182,460	\$ 1,094,760		Based on quote from TOMCO2 for Norman WTP, using 2/3 rule for 1920 lb/d system
	New Filter Aid Polymer Feed System	2.00	EA	\$ 35,000	\$ 70,000	1	\$ -	\$ 70,000		Based on quote from Prominent Fluid Controls 7/18/13, for ProMix-M with "C" controls, model M_0-1500x2-5.0PB @ \$35,000 (most expensive)
	New Phosphoric Acid Feed System	3.00	EA	\$ 10,000	\$ 30,000	1	\$ -	\$ 30,000		Based on quote from EI2 6/18/13
	New LAS Feed System	1.00	EA	\$ 19,079	\$ 19,100	1	\$ -	\$ 19,100		2/3 rule based on quote from macaulay control company, for a three ducoflex dfb pump skid
	New OSHG System (3 generators @ 1,000 ppd)	1.00	LS	\$ 1,012,486	\$ 1,012,500	1.5	\$ 506,250	\$ 1,518,750		2/3 rule based on quote from PSI for 2x1600 ppd generator system
	New Chemical Tanks	2.00	EA	\$ 28,000	\$ 56,000	1	\$ -	\$ 56,000		Bulk tank for LAS and Alum coagulant (cost is for a 6,500 gallon FRP tank) Assumed Installation Cost
Division 15 - Piping										
	Piping	1.00	LS	\$ 350,000	\$ 350,000	1	\$ -	\$ 350,000		Assumption
Division 16 - Electrical										
	Electrical	1.00	LS	\$ 500,000	\$ 500,000	1	\$ -	\$ 500,000		Also see contingency below
Division 17 - Instrumentation										
	Instrumentation	1.00	LS	\$ 150,000	\$ 150,000	1	\$ -	\$ 150,000		Also see contingency below
Subtotal for New Chem/RM Building									\$ 6,948,910	
Solids Contact Clarifiers										
	Quantity	2	ea							
	Diameter, ft	100	ft							
	SWD, ft	15	ft							
	Exc Depth, ft	12	ft							
Division 2 - Sitework										
	Excavation	10585.07	cu yd	\$ 15	\$ 158,800	1	\$ -	\$ 158,800		
	Hauling	7600.47	cu yd	\$ 2	\$ 15,300	1	\$ -	\$ 15,300		
	Backfill	4504.69	cu yd	\$ 10	\$ 45,100	1	\$ -	\$ 45,100		



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DIV	Description	Quantity	Units	Unit Cost	Material Cost	Install Factor	Install Cost	Total Cost	Cost w/ Global Markups	Comments
Division 3 - Concrete	Drilled Piers	10000.00	VLF	\$ 50	\$ 500,000	1	\$ -	\$ 500,000		
	Concrete - Base Slab	1258.50	cu yd	\$ 500	\$ 629,300	1	\$ -	\$ 629,300		
	Concrete - Curved Walls	593.41	cu yd	\$ 750	\$ 445,100	1	\$ -	\$ 445,100		
	Floor Grout	193.93	cu yd	\$ 400	\$ 77,600	1	\$ -	\$ 77,600		
Division 5 - Metals	Misc Metals	2.00	LS	\$ 50,000	\$ 100,000	1	\$ -	\$ 100,000		
Division 11 - Equipment	Sludge Collector Mechanism	2.00	EA	\$ 551,769	\$ 1,103,600	1.5	\$ 551,800	\$ 1,655,400		
	Sludge Collector Mechanism - Installation	1.00	LS	\$ 55,177	\$ 55,200	1	\$ -	\$ 55,200		
Division 15 - Piping	Piping	1.00	LS	\$ 30,000	\$ 30,000	1	\$ -	\$ 30,000		
	24" STW Inlet Piping (Buried)	300	LF	\$100	\$ 30,000	1	\$ -	\$ 30,000		
	24" STW Inlet Wall Pipe	2	EA	\$2,500	\$ 5,000	1	\$ -	\$ 5,000		
	24" STW Inlet Elbow (Buried)	2	EA	\$2,500	\$ 5,000	1	\$ -	\$ 5,000		
	24" STW Inlet Pipe Coupling (Buried)	2	EA	\$1,000	\$ 2,000	1	\$ -	\$ 2,000		
	24" STW Inlet Piping Fittings and Appurtenances (Buried)	2	LS	\$1,000	\$ 2,000	1	\$ -	\$ 2,000		
	24" STW Inlet Pipe Trench	300	EA	\$100	\$ 30,000	1	\$ -	\$ 30,000		
	24" STW Outlet Piping (Buried)	300	LF	\$100	\$ 30,000	1	\$ -	\$ 30,000		
	24" STW Outlet Wall Pipe	2	EA	\$2,500	\$ 5,000	1	\$ -	\$ 5,000		
	24" STW Outlet Elbow (Buried)	2	EA	\$2,500	\$ 5,000	1	\$ -	\$ 5,000		
	24" STW Outlet Pipe Coupling (Buried)	2	EA	\$1,000	\$ 2,000	1	\$ -	\$ 2,000		
	24" STW Outlet Piping Fittings and Appurtenances (Buried)	2	LS	\$1,000	\$ 2,000	1	\$ -	\$ 2,000		
	24" STW Outlet Pipe Trench	300	EA	\$100	\$ 30,000	1	\$ -	\$ 30,000		
	Valve Replacements/Improvements	1	LS	\$75,000	\$ 75,000	1	\$ -	\$ 75,000		
Division 16 - Electrical	Electrical	1.00	LS	\$ 150,000	\$ 150,000	1	\$ -	\$ 150,000		
Division 17 - Instrumentation	Instrumentation	1.00	LS	\$ 100,000	\$ 100,000	1	\$ -	\$ 100,000		
	Solids Contact Clarifier(s) Cost							\$ 4,184,800		
	New Post-Ozone Contactor									
	Height	21.00								2 Parallel Trains @ 15 mgd each
	Width	65.00								18' min depth and 3' freeboard, and min contact time = 10 minutes (per O
	Length	65.00								Includes space for 10' access hatch
	Over Excav.	2.00								
	H:V = 1:	1.00								Over Excavation (assumed)
	D	1.00								Horizontal to vertical slope
	Exc. Depth	22.00								Distance from grade to top of structure
	Added W/L	11.00								Total Excavation Depth
										Based on side slope
Division 2 - Sitework	Excavation	6167.333333	cu yd	\$ 15	\$ 92,600	1	\$ -	\$ 92,600		Doesn't account for sloped sides of excavation
	Hauling	2962.75463	cu yd	\$ 2	\$ 6,000	1	\$ -	\$ 6,000		25% Swell Factor



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DIV	Description	Quantity	Units	Unit Cost	Material Cost	Install Factor	Install Cost	Total Cost	Cost w/ Global Markups	Comments
	Backfill	3797.12963	cu yd	\$ 10	\$ 38,000	1	\$ -	\$ 38,000		25% Swell Factor
	Drilled Piers	64	EA	\$ 3,000	\$ 192,000	1	\$ -	\$ 192,000		
Division 3 - Concrete										
	Concrete - 20" Base Slab	260.8024691	cu yd	\$ 500	\$ 130,500	1	\$ -	\$ 130,500		Assumes 20" thick slab on grade 12" thick wall, cost from CCES for straight 12" wall, >8' tall and 10' access corridor), cost from CCES for 8" straight wall >8' tall, assumes flow depth = 3' lower than total wall height Elevated Slab - 12" thick, cost from CCES
	Concrete Walls - Exterior	202.2222222	cu yd	\$ 840	\$ 169,900	1	\$ -	\$ 169,900		
	Concrete Walls - Interior Baffle walls	36.66666667	cu yd	\$ 840	\$ 30,800	1	\$ -	\$ 30,800		
	Roof	156.4814815	cu yd	\$ 404	\$ 63,200	1	\$ -	\$ 63,200		
Division 5 Miscellaneous Metals										
	Miscellaneous Metals	1	LS	\$ 25,000	\$ 25,000	1	\$ -	\$ 25,000		
Division 11 - Equipment										
	Ozone Diffusers and Piping	1.00	LS	\$ 55,000	\$ 55,000	1.2	\$ 11,000	\$ 66,000		Assumption, similar to McBaine WTP estimate (accounts for LOX piping, and general piping) Estimated to route flow to filter building (adjacent to contactor)
	Ozone Destruct Units	2.00	EA	\$ 50,000	\$ 100,000	1.1	\$ 10,000	\$ 110,000		
	Nitrogen Purge System	1.00	EA	\$ 35,000	\$ 35,000	1.1	\$ 3,500	\$ 38,500		
Division 15 - Piping										
	Piping (Ozone)	1	LS	\$ 50,000	\$ 50,000	1	\$ -	\$ 50,000		Assumption, similar to McBaine WTP estimate (accounts for LOX piping, and general piping) Estimated to route flow to filter building (adjacent to contactor)
	Piping (Process)	1	LS	\$ 100,000	\$ 100,000	1	\$ -	\$ 100,000		
Division 16 - Electrical										
	Electrical	\$1	LS	\$ 120,000	\$ 120,000	1	\$ -	\$ 120,000		Similar to McBaine WTP est.
Division 17 - Instrumentation										
	Instrumentation	1	LS	\$ 60,000	\$ 60,000	1	\$ -	\$ 60,000		Similar to McBaine WTP est. Similar to McBaine WTP est.
	Subtotal							\$ 1,292,500		
	New Filters									
	Design Flow	20.00	MGD							
	Filter Rate	6.00	gpm/ft2							
	Price/ft2 of filter Area	\$2,654	\$/ft2							
	Required Active Filter Area	2315	ft2							
	Filter Banks	6.00								
	Filters off/BW	1.00								
	Required Area/Filter	463	ft2							
	Filter Width	15.00	ft							
	Filter Length	30.00	ft							
	Area/Filter	450	ft2							
	Total Filter Area	2700	ft2							
	Total Filter Area	2250	ft2							
	Filter MGD	20	mgd	\$ 0.4				\$ 7,000,000		



Estimate Level:
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Project Water & Wastewater System Master Plan
City of Edmond, OK
Cost Opinion Expansion of WTP From 10.5 to 30 mgd
Full Softening Alternative No. 2
Job Nu 8967A.00

By: R Rossell
Date: 11/15/2012
Checked: T Crowley
Date: 11/25/2013

DIV	Description	Quantity	Units	Unit Cost	Material Cost	Install Factor	Install Cost	Total Cost	Cost w/ Global Markups	Comments
New HSPS										
	Height	24.00	ft							15' min depth per ODEQ from New Req'd Lag. Space Tab from New Req'd Lag. Space Tab Over Excavation (assumed) Horizontal to vertical slope Distance from grade to top of structure Total Excavation Depth Based on side slope Doesn't account for sloped sides of excavation 25% Swell Factor 25% Swell Factor Assumes 12" thick slab on grade, cost from CCES 12" thick wall, cost from CCES for straight 12" wall, >8' tall One 12" Wall along entire length of building
	Width	25.00	ft							
	Length	35.00	ft							
	Over Excav.	2.00	ft							
	H:V = 1:	1.00								
	D	14.00	ft							
	Exc. Depth	12.00	ft							
	Added W/L	6.00	ft							
Division 2 - Sitework										
	Excavation	773	cu yd	\$ 15.00	\$ 11,600	1	\$ -	\$ 11,600		
	Hauling	265	cu yd	\$ 2.00	\$ 600	1	\$ -	\$ 600		
	Backfill	561.0185185	cu yd	\$ 10.00	\$ 5,700	1	\$ -	\$ 5,700		
	Drilled Piers	20	EA	\$ 3,000.00	\$ 60,000	1	\$ -	\$ 60,000		
Division 3 - Concrete										
	Concrete - 12" Base Slab	32.40740741	cu yd	\$ 350.00	\$ 11,400	1	\$ -	\$ 11,400		
	Concrete Walls - Exterior	106.6666667	cu yd	\$ 840.00	\$ 89,600	1	\$ -	\$ 89,600		
	Concrete Walls - Interior Walls	22	cu yd	\$ 840.00	\$ 18,700	1	\$ -	\$ 18,700		
Division 4 - 15 Building										
	HSPS Building	5,000	LS	\$ 300.00	\$ 1,500,000	1	\$ -	\$ 1,500,000		
Division 11 - Equipment										
	24 inch suction cans	4	EA	\$ 35,000.00	\$ 140,000	1.2	\$ 28,000	\$ 168,000		
	Vertical Turbine Pumps	4	EA	\$ 150,000.00	\$ 600,000	1.3	\$ 180,000	\$ 780,000		4 pumps 6 mgd at 125 psig
Division 13 Special Construction										
	14 inch ball control valves	4	EA	\$ 23,000.00	\$ 92,000	1.2	\$ 18,400	\$ 110,400		
Division 15 - Piping										
	24" STW Outlet Piping (Buried)	800	LF	\$ 100.00	\$ 80,000	1	\$ -	\$ 80,000		
	24" STW Outlet Wall Pipe	2	EA	\$ 2,500.00	\$ 5,000	1	\$ -	\$ 5,000		
	24" STW Outlet Elbow (Buried)	2.00	EA	\$ 2,500.00	\$ 5,000	1	\$ -	\$ 5,000		
	24" STW Outlet Pipe Coupling (Buried)	2.00	EA	\$ 1,000.00	\$ 2,000	1	\$ -	\$ 2,000		
	24" STW Outlet Piping Fittings and Appurtenances (Buried)	1.00	LS	\$ 1,000.00	\$ 1,000	1	\$ -	\$ 1,000		
	24" STW Outlet Pipe Trench	800.00	EA	\$ 100.00	\$ 80,000	1	\$ -	\$ 80,000		
Division 16 - Electrical										
	Electrical	1	LS	\$ 500,000.00	\$ 500,000	1	\$ -	\$ 500,000		
Division 17 - Instrumentation										
	Instrumentation	1	LS	\$ 200,000.00	\$ 200,000	1	\$ -	\$ 200,000		
	Subtotal							\$ 3,629,000		
New BW Tank and Pumps										
Division 2 Sitework										
	Excavation for Dry Well	\$385	cuyd	\$25	\$ 9,700	1	\$ -	\$ 9,700		



Estimate Level:
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Project Water & Wastewater System Master Plan
City of Edmond, OK
Cost Opinion Expansion of WTP From 10.5 to 30 mgd
Full Softening Alternative No. 2
Job Nu 8967A.00

By: R Russell
Date: 11/15/2012
Checked: T Crowley
Date: 11/25/2013

DIV	Description	Quantity	Units	Unit Cost	Material Cost	Install Factor	Install Cost	Total Cost	Cost w/ Global Markups	Comments
	Backfill for Dry Well	\$193	cuyd	\$15	\$ 2,900	1	\$ -	\$ 2,900		
	Drilled Pier foundation for Tank	1000	VLf	\$ 50.00	\$ 50,000	1	\$ -	\$ 50,000		
	Drilled Pier Foundation for Pump Station Building	500	VLf	\$ 50.00	\$ 25,000	1	\$ -	\$ 25,000		
Division 3	Concrete				\$ -	1	\$ -	\$ -		
	Base Slab for Pumps	55.55555556	cuyd	\$ 800.00	\$ 44,500	1	\$ -	\$ 44,500		
	Walls for Dry Well	195	cuyd	\$ 1,100.00	\$ 214,500	1	\$ -	\$ 214,500		
	Top Slab	34.72222222	cuyd	\$ 1,500.00	\$ 52,100	1	\$ -	\$ 52,100		
					\$ -	1	\$ -	\$ -		
					\$ -	1	\$ -	\$ -		
Division 4-15	Building				\$ -	1	\$ -	\$ -		
	New Pump Station building	750	sqft	\$ 350.00	\$ 262,500	1	\$ -	\$ 262,500		
Division 5	Metals				\$ -	1	\$ -	\$ -		
	New Elevated Backwash Storage Tank	350,000	gallon	\$ 1.25	\$ 437,500	1	\$ -	\$ 437,500		
Division 11	Equipment				\$ -	1	\$ -	\$ -		
	Pump Cans	2	Ea	\$ 10,000.00	\$ 20,000	1.2	\$ 4,000	\$ 24,000		
	New Backwash supply pumps	2	Eaa	\$ 50,000.00	\$ 100,000	1.2	\$ 20,000	\$ 120,000		
Division 15	Piping				\$ -	1	\$ -	\$ -		
	12 inch piping buried	500	LF	\$ 180.00	\$ 90,000	1	\$ -	\$ 90,000		
	12 inch shutoff valves	4	EA	\$ 8,000.00	\$ 32,000	1	\$ -	\$ 32,000		
	12 inch check valves	2	EA	\$ 8,000.00	\$ 16,000	1	\$ -	\$ 16,000		
	10 inch ball control valves	2	EA	\$ 15,000.00	\$ 30,000	1	\$ -	\$ 30,000		
	12 inch couplings	6	EA	\$ 2,500.00	\$ 15,000	1	\$ -	\$ 15,000		
Division 16	Electrical				\$ -	1	\$ -	\$ -		
		1	LS	\$ 40,000.00	\$ 40,000	1	\$ -	\$ 40,000		
Division 17	Controls				\$ -	1	\$ -	\$ -		
		1	LS	\$ 20,000.00	\$ 20,000	1	\$ -	\$ 20,000		
	Subtotal							\$ 1,485,700		
NEW BACKWASH WASTEWATER HOLDING TANK										
	Concrete partially buried tank	610,000	gallons	\$ 1.25	\$ 762,500	1	\$ -	\$ 762,500		
	Number of tanks	2	Ea					\$ 1,525,000		
	Subtotal							\$ 1,525,000		
								\$ 37,933,110		
SUBTOTAL TREATMENT										
				\$ -		1	\$ -	\$ 37,933,110		
	General Conditions		3%				\$ 1,138,090	\$ 39,071,200		
	Overhead and Profit		7%				\$ 2,735,000	\$ 41,806,200		
	Taxes		0%				\$ -	\$ 41,806,200		
	Contingency		20%				\$ 8,361,300	\$ 50,167,500		
	Engineering and Admin		15%				\$ 7,525,200	\$ 57,692,700		
	Allowance during construction		2%							



Estimate Level:
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Project Water & Wastewater System Master Plan
City of Edmond, OK
Cost Opinion Expansion of WTP From 10.5 to 30 mgd
Full Softening Alternative No. 2
Job Nu 8967A.00

By: R Rossell
Date: 11/15/2012
Checked: T Crowley
Date: 11/25/2013

DIV	Description	Quantity	Units	Unit Cost	Material Cost	Install Factor	Install Cost	Total Cost	Cost w/ Global Markups	Comments
Total							\$ 1,153,900	\$ 58,846,600		
NEW SLUDGE THICKENERS										
	Quantity	2	Ea							
	Diameter	50	ft							
	SWD	20	ft							
	Design Loading Rate	25	drylbs/sqft							
Division 2 Excavation										
	Excavate for Thickeners and Pump Station	10000	cuyd	\$ 15.00	\$ 150,000	1	\$ -	\$ 150,000		
	Backfill for Thickeners and pump station	3333.333333	cuyd	\$ 25.00	\$ 83,400	1	\$ -	\$ 83,400		
	Drilled Piers	7500	VLF	\$ 50.00	\$ 375,000	1	\$ -	\$ 375,000		
	Base Slab	479.3510016	cuyd	\$ 800.00	\$ 383,500	1	\$ -	\$ 383,500		
	Concrete Walls	575.2212019	cuyd	\$ 900.00	\$ 517,700	1	\$ -	\$ 517,700		
	Concrete Top Slab Pump Station	57.87037037	cuyd	\$ 1,200.00	\$ 69,500	1	\$ -	\$ 69,500		
	Mexanine Concrete	46.2962963	cuyd	\$ 1,500.00	\$ 69,500	1	\$ -	\$ 69,500		
	Tank Concrete	50		\$ 800.00	\$ 40,000	1	\$ -	\$ 40,000		
Division 4-15 Pump Station Building										
	Building	1250	sqft	\$ 200.00	\$ 250,000	1	\$ -	\$ 250,000		
Division 5 Metals										
	Miscellaneous Metals	1	LS	\$ 50,000	\$ 50,000	1	\$ -	\$ 50,000		
	Solids Storage Tank	100000	gal	\$ 2	\$ 175,000	1	\$ -	\$ 175,000		
Division 11 Equipment										
	Solids Handling Pumps	6	Ea	\$ 20,000	\$ 120,000	1.3	\$ 36,000	\$ 156,000		
	Thickener Mechanism	2	Ea	\$ 250,000	\$ 500,000	1.2	\$ 100,000	\$ 600,000		
	Tank Mixing System	1	LS	\$ 40,000	\$ 40,000	1.2	\$ 8,000	\$ 48,000		
Division 13 Special Construction										
	Electric Monorail	1	LS	\$ 15,000	\$ 15,000	1.2	\$ 3,000	\$ 18,000		
Division 15 Piping										
	Piping	1	LS	\$ 120,000.00	\$ 120,000	1.2	\$ 24,000	\$ 144,000		
Division 16 Electrical										
	Electrical	1	LS	\$ 150,000.00	\$ 150,000	1.2	\$ 30,000	\$ 180,000		
Division 17 Instrumentation and Control										
	Instrumentation	1	LS	\$ 25,000.00	\$ 25,000	1.2	\$ 5,000	\$ 30,000		
	Controls	1	LS	\$ 50,000.00	\$ 50,000	1.2	\$ 10,000	\$ 60,000		
	Subtotal							\$ 3,399,600		
New Lagoons										
	Quantity	8.00								Assumed
	Water Depth	5.30	ft							(assumed, from CDM O&M)
	Width	80.00	ft							(assumed, same as other lagoons)
	Length	115.00	ft							(assumed, same as other lagoons)
	Free Board	3.00	ft							User Input
	Over Excav.	2.00	ft							Over Excavation (assumed)
	H:V = 1:	1.00								Horizontal to vertical slope



Estimate Level:
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Project Water & Wastewater System Master Plan
City of Edmond, OK
Cost Opinion Expansion of WTP From 10.5 to 30 mgd
Full Softening Alternative No. 2
Job Nu 8967A.00

By: R Rossell
Date: 11/15/2012
Checked: T Crowley
Date: 11/25/2013

DIV	Description	Quantity	Units	Unit Cost	Material Cost	Install Factor	Install Cost	Total Cost	Cost w/ Global Markups	Comments
	Exc. Depth	1.00	ft							Distance from grade to top of structure
		9.30	ft							Total Excavation Depth
	Added W/L	9.30	ft							Based on side slope
Division 2 - Sitework	Excavation	4537.352889	cu yd	\$ 15.00	\$ 68,100	1.2	\$ 13,620	\$ 81,720		Doesn't account for sloped sides of excavation
	Hauling	2468.651296	cu yd	\$ 2.00	\$ 5,000	1.2	\$ 1,000	\$ 6,000		25% Swell Factor
	Backfill	2562.431852	cu yd	\$ 10.00	\$ 25,700	1.2	\$ 5,140	\$ 30,840		25% Swell Factor
Division 3 - Concrete	Concrete - 12" Base Slab	340.7407407	cu yd	\$ 350.00	\$ 119,300	1.2	\$ 23,860	\$ 143,160		Assumes 12" thick slab
	Concrete - 12" Straight Walls	119.8888889	cu yd	\$ 840.00	\$ 100,800	1.2	\$ 20,160	\$ 120,960		Assumes 12" thick walls,
	Concrete Ramp	25.82222222	cu yd	\$ 840.00	\$ 21,700	1.2	\$ 4,340	\$ 26,040		Assumes 12'wide, 14' long, 8.3' tall access ramp (est. concrete cost)
Division 5 - Metals	Misc Metals	1	LS	\$ 10,000.00	\$ 10,000	1.2	\$ 2,000	\$ 12,000		Estimated
Division 11 - Equipment	Sluice Gate, Stainless Steel, 24" x 24"	1	EA	\$ 1,925.00	\$ 2,000	1.2	\$ 400	\$ 2,400		Use CCES estimate, assumes material cost = 40%
Division 15 - Piping	24" DI Piping	40	LF	\$ 14.00	\$ 600	1.2	\$ 120	\$ 720		Assumes DI piping spans length of lagoon, divided by 2 because each line services 2 lags. (multiplied by two for exc/bf)
	12" DI Piping	10	LF	\$ 27.00	\$ 300	1.2	\$ 60	\$ 360		Assumes DI piping spans from road to each lagoon, divided by 2 because each line services 2 lags.
	Fittings	1	LS	\$ 5,000.00	\$ 5,000	1.2	\$ 1,000	\$ 6,000		
	24" STW Inlet Piping (Buried)	0				1.2				
	24" STW Outlet Piping (Buried)	640	LF	\$ 100.00	\$ 64,000	1.2	\$ 12,800	\$ 76,800		Assumes decant line runs along entire width of each lagoon
	24" STW Outlet Wall Pipe	8	EA	\$ 1,750.00	\$ 14,000	1.2	\$ 2,800	\$ 16,800		Assumed 1 per lagoon
	24" STW Outlet Elbow (Buried)	8	EA	\$ 1,750.00	\$ 14,000	1.2	\$ 2,800	\$ 16,800		Assumed 1 per lagoon
	24" STW Outlet Pipe Coupling (Buried)	8	EA	\$ 750.00	\$ 6,000	1.2	\$ 1,200	\$ 7,200		Assumed 1 per lagoon
	24" STW Outlet Piping Fittings and Appurtenances (Buried)	1	LS	\$ 5,000.00	\$ 5,000	1.2	\$ 1,000	\$ 6,000		Assumed 1 per lagoon
	24" STW Outlet Pipe Trench	640	EA	\$ 100.00	\$ 64,000	1.2	\$ 12,800	\$ 76,800		
Division 16 - Electrical	Electrical	1	LS	\$ 20,000.00	\$ 20,000	1.2	\$ 4,000	\$ 24,000		Also see contingency below
Division 17 - Instrumentation	Instrumentation	1	LS	\$ 15,000.00	\$ 15,000	1.2	\$ 3,000	\$ 18,000		Also see contingency below
	Sub Total per Lagoon							\$ 672,600		
Other	Stormwater Diversion	1	LS	\$ 65,000.00	\$ 65,000	1	\$ -	\$ 65,000		
	Total Lagoon Cost	10	Ea					\$ 6,791,000		
	Subtotal Lagoon Dewatering							\$ 6,791,000		
	General Conditions		10%			1	\$ -	\$ 10,190,600		
	Overhead and Profit		7%				\$ 784,700	\$ 11,209,700		
	Taxes		0%				\$ -	\$ 11,994,400		
	Subtotal							\$ 11,994,400		



Estimate Level:
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Project Water & Wastewater System Master Plan
City of Edmond, OK
Cost Opinion Expansion of WTP From 10.5 to 30 mgd
Full Softening Alternative No. 2
Job Nu 8967A.00

By: R Rossell
Date: 11/15/2012
Checked: T Crowley
Date: 11/25/2013

DIV	Description	Quantity	Units	Unit Cost	Material Cost	Install Factor	Install Cost	Total Cost	Cost w/ Global Markups			Comments
	Contingency		20%				\$ 2,398,900					
	Subtotal							\$ 14,393,300				
	Engineering and Admin		24%				\$ 3,454,400					
	Subtotal							\$ 17,847,700				
	Allowance during construction		3%				\$ 535,500					
	Total							\$ 18,383,200				



Project Water & Wastewater System Master Plan
 City of Edmond, OK
 Cost Opinion Expansion of WTP From 30 to 40 mgd
 Full Softening Alternative No. 2
 Job Nu 8967A.00

Esti Class 4
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By: R Rossell
 Date: 11/15/2012

Che T Crowley
 Date: 11/25/2013

DIV	Description	Quantity	Units	Unit Cost	Material Cost	Install Factor	Install Cost	Total Cost	Cost w/ Global Markups	Comments
	New Fine Screening (1 screens at 10 mgd each)									
	Quantity	2.00								
	Height	32.00	ft							
	Width	20.00	ft							
	Length	20.00	ft							
	Over Excav.	2.00	ft							
	H:V = 1:	1.00								
	D	25.00	ft							
	Exc. Depth	9.00	ft							
	Added W/L	4.50	ft							
Division 2 - Sitework										
2	Excavation	280	cu yd	\$15	\$ 4,300	1	\$ -	\$ 4,300		screens)
2	Hauling	74	cu yd	\$2	\$ 200	1	\$ -	\$ 200		20' per screen (similar to other screens)
2	Backfill	221	cu yd	\$10	\$ 2,300	1	\$ -	\$ 2,300		20' per screen (similar to other screens)
2	Drilled Piers	9	EA	\$3,000	\$ 27,000	1	\$ -	\$ 27,000		Over Excavation (assumed)
					\$ -	1	\$ -	\$ -		Horizontal to vertical slope
					\$ -	1	\$ -	\$ -		Distance from grade to top of structure (estimated)
Division 3 - Concrete										
	Concrete - 20" Base Slab	25	cu yd	\$500	\$ 12,400	1	\$ -	\$ 12,400		Total Excavation Depth
	Concrete Walls - Exterior	95	cu yd	\$840	\$ 79,700	1	\$ -	\$ 79,700		Based on side slope
	Concrete Walls - Interior walls	22	cu yd	\$840	\$ 18,700	1	\$ -	\$ 18,700		
	Operating Floor	15	cu yd	\$404	\$ 6,000	1	\$ -	\$ 6,000		
	Roof	15	cu yd	\$404	\$ 6,000	1	\$ -	\$ 6,000		Doesn't account for sloped sides of excavation
					\$ -	1	\$ -	\$ -		25% Swell Factor, hauling to or from site
					\$ -	1	\$ -	\$ -		25% Swell Factor
Division 11 - Equipment										
	Screen Mechanism	1	EA	\$190,000	\$ 190,000	1.2	\$ 38,000	\$ 228,000		
					\$ -	1	\$ -	\$ -		
					\$ -	1	\$ -	\$ -		
Division 15 - Piping										
	36" STW Inlet Piping (Buried)	20	LF	\$200	\$ 4,000	1	\$ -	\$ 4,000		Assumes 20" thick slab on grade
	36" STW Inlet Wall Pipe	1	EA	\$3,500	\$ 3,500	1	\$ -	\$ 3,500		12" thick wall, cost from CCES for straight 12" wall, >8' tall
	36" STW Inlet Elbow (Buried)	1	EA	\$3,500	\$ 3,500	1	\$ -	\$ 3,500		12" thick interior wall running along the width of each screen
	36" STW Inlet Pipe Coupling (Buried)	1	EA	\$2,000	\$ 2,000	1	\$ -	\$ 2,000		Elevated Slab - 12" thick, cost from CCES
	36" STW Inlet Piping Fittings and Appurtenances (Buried)	1	LS	\$2,000	\$ 2,000	1	\$ -	\$ 2,000		Elevated Slab - 12" thick, cost from CCES
	36" STW Inlet Pipe Trench	20	EA	\$150	\$ 3,000	1	\$ -	\$ 3,000		
					\$ -	1	\$ -	\$ -		
					\$ -	1	\$ -	\$ -		Estimated
Division 16 - Electrical										
	Electrical	1	LS	\$50,000	\$ 50,000	1	\$ -	\$ 50,000		
Division 17 - Instrumentation										
	Instrumentation	1	LS	\$25,000	\$ 25,000	1	\$ -	\$ 25,000		Estimated per Figure 7.1
	Total for New Intake Screen(s)							\$ 477,600		
	New Pre-Ozone Contactor (additional train at 15 mgd)									
	Height	21.00	ft							1 Train @ 15 mgd ODEQ)



Project Water & Wastewater System Master Plan
 City of Edmond, OK
 Cost Opinion Expansion of WTP From 30 to 40 mgd
 Full Softening Alternative No. 2
 Job Nu 8967A.00

Esti Class 4
 ENF

9667

By: R Rossell
 Date: 11/15/2012

CheT Crowley
 Date: 11/25/2013

DIV	Description	Quantity	Units	Unit Cost	Material Cost	Install Factor	Install Cost	Total Cost	Cost w/ Global Markups	Comments
	Width	65.00	ft							Includes space for 10' access hatch Includes space for 6' influent/effluent chambers Over Excavation (assumed) Horizontal to vertical slope Distance from grade to top of structure Total Excavation Depth Based on side slope
	Length	65.00	ft							
	Over Excav.	2.00	ft							
		H:V = 1:	1.00							
		D	1.00							
	Exc. Depth	22.00	ft							
		Added W/L	11.00							
Division 2 - Sitework										
	Excavation	4040.67	cu yd	\$ 15	\$ 60,700	1	\$ -	\$ 60,700		Doesn't account for sloped sides of excavation 25% Swell Factor 25% Swell Factor
	Hauling	1370.39	cu yd	\$ 2	\$ 2,800	1	\$ -	\$ 2,800		
	Backfill	2944.35	cu yd	\$ 10	\$ 29,500	1	\$ -	\$ 29,500		
	Drilled Piers	40.00	EA	\$ 3,000	\$ 120,000	1	\$ -	\$ 120,000		
Division 3 - Concrete										
	Concrete - 20" Base Slab	140.43	cu yd	\$ 500	\$ 70,300	1	\$ -	\$ 70,300		Assumes 20" thick slab on grade 12" thick wall, cost from CCES for straight 12" wall, >8' tall 12" thick baffle walls spaced at 5' (less influent and effluent channels, and 10' access corridor), cost from CCES for 8" straight wall >8' tall, assumes flow depth = 3' lower than total wall height Elevated Slab - 12" thick, cost from CCES
	Concrete Walls - Exterior	155.56	cu yd	\$ 840	\$ 130,700	1	\$ -	\$ 130,700		
		16.67								
	Concrete Walls - Interior Baffle walls		cu yd	\$ 840	\$ 14,000	1	\$ -	\$ 14,000		
	Roof	84.26	cu yd	\$ 404	\$ 34,100	1	\$ -	\$ 34,100		
Division 8 - Doors and Windows										
	Doors and Windows	1.00	LS	\$ 5,000	\$ 5,000	1	\$ -	\$ 5,000		
Division 11 - Equipment										
	Ozone Diffusers and Piping	1.00	LS	\$ 35,000	\$ 35,000	1.2	\$ 7,000	\$ 42,000		
	Ozone Destruct Units	2.00	EA	\$ 25,000	\$ 50,000	1.1	\$ 5,000	\$ 55,000		
	Nitrogen Purge System	1.00	EA	\$ 35,000	\$ 35,000	1.1	\$ 3,500	\$ 38,500		
Division 15 - Piping										
	Piping	1.00	LS	\$ 30,000	\$ 30,000	1	\$ -	\$ 30,000		su
Division 16 - Electrical										
	Electrical	1.00	LS	\$ 25,000	\$ 25,000	1	\$ -	\$ 25,000		mil
Division 17 - Instrumentation										
	Instrumentation	1.00	LS	\$ 25,000	\$ 25,000	1	\$ -	\$ 25,000		mil
	Subtotal for New Pre-Ozone Contactor							\$ 682,600		
New Pre-Ozone Generation Building and LOX Storage (expansion from 20 to 30 within existing building)										
Division 11 - Equipment										
	650 lb/d Ozone Generator and Power Supply Unit	1.00	EA	\$ 1,119,186	\$ 1,119,200	1	\$ -	\$ 1,119,200		Using 2/3 Rule on \$1,013,333 per 560 lb/day Generator Using 2/3 Rule on \$460,000 for 15,000 gal tanks and vaporizers from McBaine WTP estimate, transformed to 2013 dollars @ 3%
	LOX Storage Tanks - 10,000 gal and Vaporizers	1.00	EA	\$ 351,046	\$ 351,100	1	\$ -	\$ 351,100		
	Destruct Unit	1	LS	\$ 50,000	\$ 50,000	1	\$ -	\$ 50,000		
	Installation of Equipment (% of total equipment cost)	0.2	%	\$ 1	\$ 100	1	\$ -	\$ 100		
Division 15 - Piping										
	Piping	1	LS	\$ 80,000	\$ 80,000	1	\$ -	\$ 80,000		and general piping)



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By: R Rossell
 Date: 11/15/2012

CheT Crowley
 Date: 11/25/2013

DIV	Description	Quantity	Units	Unit Cost	Material Cost	Install Factor	Install Cost	Total Cost	Cost w/ Global Markups	Comments
Division 16 - Electrical	Electrical	1	LS	80000	\$ 80,000	1	\$ -	\$ 80,000		Similar to McBaine WTP est.
Division 17 - Instrumentation	Instrumentation	1	LS	40000	\$ 40,000	1	\$ -	\$ 40,000		Similar to McBaine WTP est.
Subtotal for Generation Building								\$ 1,720,400		
New Presed Basins (1@10 mgd)										
	Quantity	1								Each rated at 10 MGD
	Diameter, ft	100								
	SWD, ft	16								
	Exc Depth, ft	12								
Division 2 - Sitework	Excavation	5292.54	cu yd	\$ 15	\$ 79,400	1	\$ -	\$ 79,400		Assumes excavation at 1:1 slope, 2 foot overexcavation
	Hauling	3800.24	cu yd	\$ 2	\$ 7,700	1	\$ -	\$ 7,700		25% Swell Factor
	Backfill	2252.35	cu yd	\$ 10	\$ 22,600	1	\$ -	\$ 22,600		
	Drilled Piers	121.00	VLF	\$ 50	\$ 6,100	1	\$ -	\$ 6,100		
Division 3 - Concrete	Concrete - Base Slab	629.25	cu yd	\$ 500	\$ 314,700	1	\$ -	\$ 314,700		Assumes 24" thick slab
	Concrete - Curved Walls	314.16	cu yd	\$ 750	\$ 235,700	1	\$ -	\$ 235,700		Assumes 18" thick walls, 2' freeboard
	Floor Grout	96.96	cu yd	\$ 400	\$ 38,800	1	\$ -	\$ 38,800		
Division 5 - Metals	Misc Metals	1.00	LS	\$ 30,000	\$ 30,000	1	\$ -	\$ 30,000		
Division 11 - Equipment	Clarifier Mechanism	1.00	EA	\$ 350,000	\$ 350,000	1.5	\$ 175,000	\$ 525,000		Per CCES for 100' diameter clarifier mechanism
Division 15 - Piping	Misc Piping	1.00	LS	\$ 30,000	\$ 30,000	1	\$ -	\$ 30,000		
	24" STW Inlet Piping (Buried)	50.00	LF	\$ 100	\$ 5,000	1	\$ -	\$ 5,000		
	24" STW Inlet Wall Pipe	1.00	EA	\$ 2,500	\$ 2,500	1	\$ -	\$ 2,500		
	24" STW Inlet Elbow (Buried)	1.00	EA	\$ 2,500	\$ 2,500	1	\$ -	\$ 2,500		
	24" STW Inlet Pipe Coupling (Buried)	1.00	EA	\$ 1,000	\$ 1,000	1	\$ -	\$ 1,000		
	24" STW Inlet Piping Fittings and Appurtenances (Buried)	1.00	LS	\$ 1,000	\$ 1,000	1	\$ -	\$ 1,000		
	24" STW Inlet Pipe Trench	50.00	EA	\$ 100	\$ 5,000	1	\$ -	\$ 5,000		
	24" STW Outlet Piping (Buried)	50.00	LF	\$ 100	\$ 5,000	1	\$ -	\$ 5,000		
	24" STW Outlet Wall Pipe	1.00	EA	\$ 2,500	\$ 2,500	1	\$ -	\$ 2,500		
	24" STW Outlet Elbow (Buried)	1.00	EA	\$ 2,500	\$ 2,500	1	\$ -	\$ 2,500		
	24" STW Outlet Pipe Coupling (Buried)	1.00	EA	\$ 1,000	\$ 1,000	1	\$ -	\$ 1,000		
	24" STW Outlet Piping Fittings and Appurtenances (Buried)	1.00	LS	\$ 1,000	\$ 1,000	1	\$ -	\$ 1,000		
	24" STW Outlet Pipe Trench	50.00	EA	\$ 100	\$ 5,000	1	\$ -	\$ 5,000		
	24" Precast Flow Control Vault	1.00	EA	\$ 50,000	\$ 50,000	1.3	\$ 15,000	\$ 65,000		
	24" Butterfly Control valve	1.00	EA	\$ 21,000	\$ 21,000	1.3	\$ 6,300	\$ 27,300		
Division 16 - Electrical	Electrical	1.00	LS	\$ 45,000	\$ 45,000	1	\$ -	\$ 45,000		Also see contingency below
Division 17 - Instrumentation	Programming	1.00	LS	\$ 20,000	\$ 20,000	1	\$ -	\$ 20,000		Also see contingency below



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DIV	Description	Quantity	Units	Unit Cost	Material Cost	Install Factor	Install Cost	Total Cost	Cost w/ Global Markups	Comments
	24 inch flowmeters	1.00	EA	\$ 18,000	\$ 18,000	1.2	\$ 3,600	\$ 21,600		
	Subtotal Presedimentation Basins							\$ 1,502,900		
	Expansion of Existing Chemical Building									
	Division 8 - Doors and Windows									
	Doors and Windows Replacement	1.00	LS	\$ 25,000	\$ 25,000	1	\$ -	\$ 25,000		
	Division 11 - Equipment									
	New Coagulant Alum Feed System	2.00	EA	\$10,000	\$ 20,000	1.5	\$ 10,000	\$ 30,000		
	Lime System Expansion	2.00	EA	\$583,333	\$ 1,166,700	1.2	\$ 233,340	\$ 1,400,040		
	New CO2 System (1 vaporizer @ 5,900 lb/day)	1.00	LS	\$438,583	\$ 438,600	1.5	\$ 219,300	\$ 657,900		with "C" controls, model M_0-1500x2-5.0PB @ \$35,000 (most Assumed similar to Phos. Acid feed TOC Estimate (2-14-13)
	New Filter Aid Polymer Feed System	1.00	LS	\$25,000	\$ 25,000	1.4	\$ 10,000	\$ 35,000		lb/d system
	New Phosphoric Acid Feed System	1.00	EA	\$10,000	\$ 10,000	1.3	\$ 3,000	\$ 13,000		with "C" controls, model M_0-1500x2-5.0PB @ \$35,000 (most
	New LAS Feed System	1.00	EA	\$12,019	\$ 12,100	1.4	\$ 4,840	\$ 16,940		Based on quote from E12 6/18/13
	Replacement of Softeners	1.00	LS	\$500,000	\$ 500,000	1.1	\$ 50,000	\$ 550,000		2/3 rule based on quote from PSI for 2x1600 ppd generator system
	Division 15 - Piping									
	Piping	1.00	LS	\$ 100,000	\$ 100,000	1	\$ -	\$ 100,000		Assumption
	Division 16 - Electrical									
	Electrical	1.00	LS	\$ 75,000	\$ 75,000	1	\$ -	\$ 75,000		Also see contingency below
	Division 17 - Instrumentation									
	Instrumentation	1.00	LS	\$ 80,000	\$ 80,000	1	\$ -	\$ 80,000		Also see contingency below
	Subtotal for New Chem/RM Building							\$ 2,982,880		
	Solids Contact Clarifiers									
	Quantity	1	ea							
	Diameter, ft	100	ft							
	SWD, ft	15	ft							
	Exc Depth, ft	12	ft							
	Division 2 - Sitework									
	Excavation	5292.54	cu yd	\$ 15	\$ 79,400	1	\$ -	\$ 79,400		
	Hauling	3800.24	cu yd	\$ 2	\$ 7,700	1	\$ -	\$ 7,700		
	Backfill	2252.35	cu yd	\$ 10	\$ 22,600	1	\$ -	\$ 22,600		
	Drilled Piers	5000.00	VLF	\$ 50	\$ 250,000	1	\$ -	\$ 250,000		
	Division 3 - Concrete									
	Concrete - Base Slab	629.25	cu yd	\$ 500	\$ 314,700	1	\$ -	\$ 314,700		
	Concrete - Curved Walls	296.71	cu yd	\$ 750	\$ 222,600	1	\$ -	\$ 222,600		
	Floor Grout	96.96	cu yd	\$ 400	\$ 38,800	1	\$ -	\$ 38,800		
	Division 5 - Metals									
	Misc Metals	1.00	LS	\$ 50,000	\$ 50,000	1	\$ -	\$ 50,000		
	Division 11 - Equipment									
	Sludge Collector Mechanism	1.00	EA	\$ 551,769	\$ 551,800	1.5	\$ 275,900	\$ 827,700		
	Division 15 - Piping									



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DIV	Description	Quantity	Units	Unit Cost	Material Cost	Install Factor	Install Cost	Total Cost	Cost w/ Global Markups	Comments
	Piping	1.00	LS	\$ 30,000	\$ 30,000	1	\$ -	\$ 30,000		
	24" STW Inlet Piping (Buried)	100	LF	\$360	\$ 36,000	1	\$ -	\$ 36,000		100 feet from each SCC inlet to existing SCC outlet pipe (estimated)
	24" STW Inlet Wall Pipe	1	EA	\$2,500	\$ 2,500	1	\$ -	\$ 2,500		
	24" STW Inlet Elbow (Buried)	1	EA	\$2,500	\$ 2,500	1	\$ -	\$ 2,500		
	24" STW Inlet Pipe Coupling (Buried)	1	EA	\$1,000	\$ 1,000	1	\$ -	\$ 1,000		
	24" STW Inlet Piping Fittings and Appurtenances (Buried)	1	LS	\$1,000	\$ 1,000	1	\$ -	\$ 1,000		
	24" STW Inlet Pipe Trench	100	EA	\$360	\$ 36,000	1	\$ -	\$ 36,000		
	24" STW Outlet Piping (Buried)	100	LF	\$360	\$ 36,000	1	\$ -	\$ 36,000		(estimated)
	24" STW Outlet Wall Pipe	1	EA	\$2,500	\$ 2,500	1	\$ -	\$ 2,500		
	24" STW Outlet Elbow (Buried)	1	EA	\$2,500	\$ 2,500	1	\$ -	\$ 2,500		
	24" STW Outlet Pipe Coupling (Buried)	1	EA	\$1,000	\$ 1,000	1	\$ -	\$ 1,000		
	24" STW Outlet Piping Fittings and Appurtenances (Buried)	1	LS	\$1,000	\$ 1,000	1	\$ -	\$ 1,000		
	24" STW Outlet Pipe Trench	100	EA	\$360	\$ 36,000	1	\$ -	\$ 36,000		
	Valve Replacements/Improvements		LS	\$75,000	\$ -	1	\$ -	\$ -		
Division 16 - Electrical	Electrical	1	LS	\$ 80,000	\$ 80,000	1	\$ -	\$ 80,000		Also see contingency below
Division 17 - Instrumentation	Instrumentation	1.00	LS	\$ 40,000	\$ 40,000	1	\$ -	\$ 40,000		Also see contingency below
	Solids Contact Clarifier(s) Cost							\$ 2,121,500		
	New Post-Ozone Contactor (1 @ 10 mgd)									
	Height	21.00								1 Train @ .15 mgd
	Width	65.00								ODEQ)
	Length	65.00								Includes space for 10' access hatch
	Over Excav.	2.00								Includes space for 6' influent/effluent chambers
	H:V = 1:	1.00								Over Excavation (assumed)
	D	1.00								Horizontal to vertical slope
	Exc. Depth	22.00								Distance from grade to top of structure
	Added W/L	11.00								Total Excavation Depth
										Based on side slope
Division 2 - Sitework	Excavation	4040.666667	cu yd	\$ 15	\$ 60,700	1	\$ -	\$ 60,700		Doesn't account for sloped sides of excavation
	Hauling	1370.393519	cu yd	\$ 2	\$ 2,800	1	\$ -	\$ 2,800		25% Swell Factor
	Backfill	2944.351852	cu yd	\$ 10	\$ 29,500	1	\$ -	\$ 29,500		25% Swell Factor
	Drilled Piers	40	EA	\$ 3,000	\$ 120,000	1	\$ -	\$ 120,000		
				\$ -	\$ -	1	\$ -	\$ -		
				\$ -	\$ -	1	\$ -	\$ -		
Division 3 - Concrete	Concrete - 20" Base Slab	140.4320988	cu yd	\$ 500	\$ 70,300	1	\$ -	\$ 70,300		Assumes 20" thick slab on grade
	Concrete Walls - Exterior	155.5555556	cu yd	\$ 840	\$ 130,700	1	\$ -	\$ 130,700		12" thick wall, cost from CCES for straight 12" wall, >8' tall
	Concrete Walls - Interior Baffle walls	16.66666667	cu yd	\$ 840	\$ 14,000	1	\$ -	\$ 14,000		12" thick baffle walls spaced at 5' (less influent and effluent channels, and 10' access corridor), cost from CCES for 8" straight wall >8' tall, assumes flow depth = 3' lower than total wall height



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DIV	Description	Quantity	Units	Unit Cost	Material Cost	Install Factor	Install Cost	Total Cost	Cost w/ Global Markups	Comments
	Roof	84.25925926	cu yd	\$ 404	\$ 34,100	1	\$ -	\$ 34,100		Elevated Slab - 12" thick, cost from CCES
					\$ -	1	\$ -	\$ -		
Division 5	Miscellaneous Metals				\$ -	1	\$ -	\$ -		
	Miscellaneous Metasl	1	LS	\$ 25,000	\$ 25,000	1	\$ -	\$ 25,000		
Division 11	- Equipment									
	Ozone Diffusers and Piping	1.00	LS	\$ 55,000	\$ 55,000	1.2	\$ 11,000	\$ 66,000		
	Ozone Destruct Units	2.00	EA	\$ 50,000	\$ 100,000	1.1	\$ 10,000	\$ 110,000		
	Nitrogen Purge System	1.00	EA	\$ 35,000	\$ 35,000	1.1	\$ 3,500	\$ 38,500		
					\$ -	1	\$ -	\$ -		
					\$ -	1	\$ -	\$ -		
Division 15	- Piping									
	Piping (Ozone)	1	LS	\$ 25,000	\$ 25,000	1	\$ -	\$ 25,000	Assumption, similar to McBaine WTP estimate (accounts for LOX piping, and general piping)	
	Piping (Process)	1	LS	\$ 50,000	\$ 50,000	1	\$ -	\$ 50,000	Estimated to route flow to filter building (adjacent to contactor)	
Division 16	- Electrical									
	Electrical	\$1	LS	\$ 100,000	\$ 100,000	1	\$ -	\$ 100,000	Similar to McBaine WTP est.	
Division 17	- Instrumentation									
	Instrumentation	1	LS	\$ 40,000	\$ 40,000	1	\$ -	\$ 40,000	Similar to McBaine WTP est.	
									Similar to McBaine WTP est.	
	Subtotal							\$ 916,600		
	New Filters									
	Design Flow	10.00	MGD							
	Filter Rate	6.00	gpm/ft2							
	Price/ft2 of filter Area	\$3,618	\$/ft2							
	Required Active Filter Area	1157	ft2							
	Filter Banks	6.00								
	Filters off/BW	1.00								
	Required Area/Filter	231	ft2							
	Filter Width	15.00	ft							
	Filter Length	30.00	ft							
	Area/Filter	450	ft2							
	Total Filter Area	2700	ft2							
	Total Filter Area	2250	ft2							
	Filter MGD	10	mgd	\$ 0.5				\$ 5,000,000		
	Expand HSPS from 20 to 30 mgd									
	Height	24.00	ft						15' min depth per ODEQ	
	Width	25.00	ft						from New Req'd Lag. Space Tab	
	Length	35.00	ft						from New Req'd Lag. Space Tab	
	Over Excav.	2.00	ft						Over Excavation (assumed)	
		H:V = 1:							Horizontal to vertical slope	
		D							Distance from grade to top of structure	
	Exc. Depth	14.00	ft						Total Excavation Depth	
		Added W/L							Based on side slope	
		12.00	ft							
		6.00	ft							
Division 2	- Sitework									
	Excavation	65	cu yd	\$ 15,000	\$ 1,000	1	\$ -	\$ 1,000	Doesn't account for sloped sides of excavation	
	Hauling	45	cu yd	\$ 2,000	\$ 100	1	\$ -	\$ 100	25% Swell Factor	



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DIV	Description	Quantity	Units	Unit Cost	Material Cost	Install Factor	Install Cost	Total Cost	Cost w/ Global Markups	Comments
	Backfill	35	cu yd	\$ 10.00	\$ 400	1	\$ -	\$ 400		25% Swell Factor
	Drilled Piers	1250	VLF	\$ 50.00	\$ 62,500	1	\$ -	\$ 62,500		
Division 3 - Concrete	Concrete - 24" Base Slab	133.3333333	cu yd	\$ 900.00	\$ 120,000	1	\$ -	\$ 120,000		Assumes 24 thick slab on grade, cost from CCES
Division 4 -15 Building	Generation Building	1,800	LS	\$ 300.00	\$ 540,000	1	\$ -	\$ 540,000		
Division 5 - Metals	Miscellaneous Metals	1	LS	\$ 50,000.00	\$ 50,000	1	\$ -	\$ 50,000		
Division 11 - Equipment	24 inch suction cans	2	EA	\$ 35,000.00	\$ 70,000	1.2	\$ 14,000	\$ 84,000		
	Vertical Turbine Pumps	2	EA	\$ 150,000.00	\$ 300,000	1.3	\$ 90,000	\$ 390,000		2 pumps 6 mgd at 125 psig
	Emergency Generator	1	EA	\$ 1,500,000	\$ 1,500,000	1.1	\$ 150,000	\$ 1,650,000		2 MW Generator for emergency services
Division 13 Special Construction	14 inch ball control valves	2	EA	\$ 23,000.00	\$ 46,000	1.2	\$ 9,200	\$ 55,200		
	Fuel Storage Tank	1	EA	\$ 100,000.00	\$ 100,000	1.2	\$ 20,000	\$ 120,000		10,000 gallon double contained
Division 15 - Piping	Fuel Storage Piping	1	LS	\$ 30,000.00	\$ 30,000	1	\$ -	\$ 30,000		
	14 -inch discharge piping	60	LF	\$ 140.00	\$ 8,400	1	\$ -	\$ 8,400		
	14 -inch butterfly isolation	2	EA	\$ 8,500.00	\$ 17,000	1	\$ -	\$ 17,000		
	14-inch check valves	2.00	EA	\$ 10,000.00	\$ 20,000	1	\$ -	\$ 20,000		
	14 inch 90 elbows	2.00	EA	\$ 6,000.00	\$ 12,000	1	\$ -	\$ 12,000		
	14 inch DMJ	2.00	LS	\$ 4,500.00	\$ 9,000	1	\$ -	\$ 9,000		
Division 16 - Electrical	Electrical	1	LS	\$ 350,000.00	\$ 350,000	1	\$ -	\$ 350,000		
Division 17 - Instrumentation	Instrumentation	1	LS	\$ 100,000.00	\$ 100,000	1	\$ -	\$ 100,000		
	Subtotal							\$ 3,619,600		
	New Clearwells									
	Quantity	1								
	Diameter	190	ft							
	SWD	19	ft							
	Exc Depth	10	ft							
	Volume/clearwell	538704	ft3							
	Volume/clearwell	4029507	gal							
	Total Storage	4,029,507	gal							need 15-20% of plant capacity for storage (add one in the future) currently have 8 MG of storage
Division 2 - Sitework	Excavation	14243.28296	cu yd	\$15	\$ 213,700	1	\$ -	\$ 213,700		
	Hauling	11956.8871	cu yd	\$2	\$ 24,000	1	\$ -	\$ 24,000		
	Backfill	4677.773284	cu yd	\$10	\$ 46,800	1	\$ -	\$ 46,800		
	Drilled Piers	20000	VLF	\$50	\$ 1,000,000	1	\$ -	\$ 1,000,000		
Division 3 - Concrete	Concrete - Base Slab	2189.573724	cu yd	\$650	\$ 1,423,300	1	\$ -	\$ 1,423,300		
	Concrete - Curved Walls	696.3863715	cu yd	\$900	\$ 626,800	1	\$ -	\$ 626,800		
	Floor Grout	350.0354778	cu yd	\$400	\$ 140,100	1	\$ -	\$ 140,100		
Division 5 - Metals	Misc Metals	1	LS	\$50,000	\$ 50,000	1	\$ -	\$ 50,000		
	Baffle Walls	1	ls	\$250,000	\$ 250,000	1.2	\$ 50,000	\$ 300,000		
Division 15 - Piping	36" STW Clearwell Inlet Pipe (Buried)	50	LF	\$540	\$ 27,000	1.2	\$ 5,400	\$ 32,400		
	36" STW Inlet Wall Pipe	1	EA	\$3,500	\$ 3,500	1.2	\$ 700	\$ 4,200		
	36" STW Inlet Elbow (Buried)	1	EA	\$3,500	\$ 3,500	1.2	\$ 700	\$ 4,200		



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DIV	Description	Quantity	Units	Unit Cost	Material Cost	Install Factor	Install Cost	Total Cost	Cost w/ Global Markups	Comments
	36" STW Inlet Pipe Coupling (Buried)	1	EA	\$2,000	\$ 2,000	1.2	\$ 400	\$ 2,400		
	36" STW Inlet Pipe Trench	50	EA	\$100	\$ 5,000	1.2	\$ 1,000	\$ 6,000		
	36" STW Clearwell Outlet Piping (Buried)	50	LF	\$540	\$ 27,000	1.2	\$ 5,400	\$ 32,400		
	36" STW Outlet Wall Pipe	1	EA	\$3,500	\$ 3,500	1.2	\$ 700	\$ 4,200		
	36" STW Outlet Elbow (Buried)	1	EA	\$3,500	\$ 3,500	1.2	\$ 700	\$ 4,200		
	36" STW Outlet Pipe Coupling (Buried)	1	EA	\$2,000	\$ 2,000	1.2	\$ 400	\$ 2,400		
	36" STW Outlet Piping Fittings and Appurtenances (Buried)	1	LS	\$2,000	\$ 2,000	1.2	\$ 400	\$ 2,400		
	36" STW Outlet Pipe Trench	50	EA	\$100	\$ 5,000	1.2	\$ 1,000	\$ 6,000		
Division 16 - Electrical	Electrical	1	LS	\$75,000	\$ 75,000	1	\$ -	\$ 75,000		
Division 17 - Instrumentation	Instrumentation	1	LS	\$150,000	\$ 150,000	1	\$ -	\$ 150,000		
	Subtotal Clearwell Cost							\$ 4,150,500		
NEW BACKWASH WASTEWATER HOLDING TANK										
	Concrete partially buried tank	610,000	gallons	\$ 1.25	\$ 762,500	1	\$ -	\$ 762,500		
	Number of tanks	1	Ea					\$ 762,500		
	Subtotal							\$ 762,500		
	SUBTOTAL TREATMENT			\$ -		1	\$ -	\$ 23,937,080		
	General Conditions		5%				\$ 1,196,920	\$ 25,134,000		
	Overhead and Profit	Subtotal	7%				\$ 1,759,400	\$ 26,893,400		
	Taxes	Subtotal	0%				\$ -	\$ 26,893,400		
	Contingency	Subtotal	20%				\$ 5,378,700	\$ 32,272,100		
	Engineering and Admin	Subtotal	15%				\$ 4,840,900	\$ 37,113,000		
	Allowance during construction	Subtotal	2%				\$ 742,300	\$ 37,855,300		
	Total									
	New Lagoons									
	Quantity	8.00								Assumed
	Water Depth	5.30	ft							(assumed, from CDM O&M)
	Width	80.00	ft							(assumed, same as other lagoons)
	Length	115.00	ft							(assumed, same as other lagoons)
	Free Board	3.00	ft							User Input
	Over Excav.	2.00	ft							Over Excavation (assumed)
	H:V = 1:	1.00								Horizontal to vertical slope
	D	1.00	ft							Distance from grade to top of structure
	Exc. Depth	9.30	ft							Total Excavation Depth



Project Water & Wastewater System Master Plan
 City of Edmond, OK
 Cost Opinion Expansion of WTP From 30 to 40 mgd
 Full Softening Alternative No. 2
 Job Nu 8967A.00

Esti Class 4
 ENF

9667

By: R Rossell
 Date: 11/15/2012

CheT Crowley
 Date: 11/25/2013

DIV	Description	Quantity	Units	Unit Cost	Material Cost	Install Factor	Install Cost	Total Cost	Cost w/ Global Markups	Comments
	Added W/L	9.30	ft							Based on side slope
Division 2 - Sitework										
	Excavation	4537.352889	cu yd	\$ 15.00	\$ 68,100	1.2	\$ 13,620	\$ 81,720		Doesn't account for sloped sides of excavation
	Hauling	2468.651296	cu yd	\$ 2.00	\$ 5,000	1.2	\$ 1,000	\$ 6,000		25% Swell Factor
	Backfill	2562.431852	cu yd	\$ 10.00	\$ 25,700	1.2	\$ 5,140	\$ 30,840		25% Swell Factor
Division 3 - Concrete										
	Concrete - 12" Base Slab	340.7407407	cu yd	\$ 350.00	\$ 119,300	1.2	\$ 23,860	\$ 143,160		Assumes 12" thick slab
	Concrete - 12" Straight Walls	119.8888889	cu yd	\$ 840.00	\$ 100,800	1.2	\$ 20,160	\$ 120,960		Assumes 12" thick walls,
	Concrete Ramp	25.82222222	cu yd	\$ 840.00	\$ 21,700	1.2	\$ 4,340	\$ 26,040		Assumes 12' wide, 14' long, 8.3' tall access ramp (est. concrete cost)
Division 5 - Metals										
	Misc Metals	1	LS	\$ 10,000.00	\$ 10,000	1.2	\$ 2,000	\$ 12,000		Estimated
Division 11 - Equipment										
	Sluice Gate, Stainless Steel, 24" x 24"	1	EA	\$ 1,925.00	\$ 2,000	1.2	\$ 400	\$ 2,400		Use CCES estimate, assumes material cost = 40%
Division 15 - Piping										
	24" DI Piping	40	LF	\$ 14.00	\$ 600	1.2	\$ 120	\$ 720		Assumes DI piping spans length of lagoon, divided by 2 because each
	12" DI Piping	10	LF	\$ 27.00	\$ 300	1.2	\$ 60	\$ 360		Assumes DI piping spans from road to each lagoon, divided by 2
	Fittings	1	LS	\$ 5,000.00	\$ 5,000	1.2	\$ 1,000	\$ 6,000		
	24" STW Inlet Piping (Buried)	0				1.2				
	24" STW Outlet Piping (Buried)	640	LF	\$ 100.00	\$ 64,000	1.2	\$ 12,800	\$ 76,800		Assumes decant line runs along entire width of each lagoon
	24" STW Outlet Wall Pipe	8	EA	\$ 1,750.00	\$ 14,000	1.2	\$ 2,800	\$ 16,800		Assumed 1 per lagoon
	24" STW Outlet Elbow (Buried)	8	EA	\$ 1,750.00	\$ 14,000	1.2	\$ 2,800	\$ 16,800		Assumed 1 per lagoon
	24" STW Outlet Pipe Coupling (Buried)	8	EA	\$ 750.00	\$ 6,000	1.2	\$ 1,200	\$ 7,200		Assumed 1 per lagoon
	24" STW Outlet Piping Fittings and Appurtenances (Buried)	1	LS	\$ 5,000.00	\$ 5,000	1.2	\$ 1,000	\$ 6,000		Assumed 1 per lagoon
	24" STW Outlet Pipe Trench	640	EA	\$ 100.00	\$ 64,000	1.2	\$ 12,800	\$ 76,800		
Division 16 - Electrical										
	Electrical	1	LS	\$ 20,000.00	\$ 20,000	1.2	\$ 4,000	\$ 24,000		Also see contingency below
Division 17 - Instrumentation										
	Instrumentation	1	LS	\$ 15,000.00	\$ 15,000	1.2	\$ 3,000	\$ 18,000		Also see contingency below
Sub Total per Lagoon								\$ 672,600		
Other	Stormwater Diversion	1	LS	\$ 65,000.00	\$ 65,000	1	\$ -	\$ 65,000		
	Total Lagoon Cost	6	Ea					\$ 4,100,600		
Subtotal Lagoon Dewatering								\$ 4,100,600		
					\$ -	1	\$ -	\$ 4,100,600		
	General Conditions		10%				\$ 410,100	\$ 4,510,700		
	Overhead and Profit		7%				\$ 315,800	\$ 4,826,500		
	Taxes	Subtotal	0%				\$ -	\$ 4,826,500		
	Contingency	Subtotal	20%				\$ 965,300	\$ 5,791,800		
	Engineering and Admin	Subtotal	24%				\$ 1,390,100	\$ 7,181,900		
	Allowance during construction	Subtotal	3%				\$ 215,500	\$ 7,397,400		
	Total							\$ 7,397,400		



Project: Water & Wastewater System Master Plan
 City of Edmond, OK
 Cost Opinion Expansion of Split Treatment from 10 to 30 mgd

Job Number: 8967A.00

By: RR
 Date: 11/15/2012

Checked: TOC
 Date: 11/25/2012

Description	Units	Quantity	Unit Cost	Cost	Comments
CONSTRUCTION COSTS					
Conversion of Existing Plant to Split Treatment					
Division 1 - General Requirements					
Concrete Demolition at Pre-Ozone Basin	LS	2	\$2,500	\$5,000	One opening at each side of pre-ozone basin
Division 2 - Sitework					
Excavation - Box at Pre-Ozone Basin	cu yd	148	\$15	\$2,222	Assumes excavation at 1:1 slope, 2 foot overexcavation; 8 foot excavation depth 25% Swell Factor
Hauling - Box at Pre-Ozone Basin	cu yd	22	\$2	\$44	
Backfill - Box at Pre-Ozone Basin	cu yd	130	\$10	\$1,304	
Pavement (Concrete) Demolition	sf	1,000	\$3	\$3,000	100 feet long, 10 feet wide
Pavement (Concrete) Replacement	sf	1,000	\$7	\$7,000	100 feet long, 10 feet wide
Division 3 - Concrete					
Concrete - Slabs	cu yd	11	\$400	\$4,444	Assumes box has 10' x 10' slab, 18" thick; 2 boxes
Concrete - Walls	cu yd	33	\$0	\$0	Assumes box has 30' of walls, 15' high, 12" thick; 2 boxes
Precast Meter Vault	EA	2	\$10,000	\$20,000	Flow meter vault between pre-ozone and solids contact clarifiers
Division 5 - Metals					
Misc Metals	LS	1	\$5,000	\$5,000	
Division 11 - Equipment					
Gates	EA	2	\$15,000	\$30,000	
Division 13 - Special Construction					
Chemical System Modifications at Chemical Building	LS	1	\$25,000	\$25,000	
Chemical System Modifications at Solids Contact Clarifiers	EA	4	\$5,000	\$20,000	
Division 15 - Piping					
24" CW Piping (Buried)	LF	300	\$100	\$30,000	150 feet from pre-ozone basin to each solids contact clarifiers inlet piping header
24" CW Wall Pipe	EA	2	\$2,500	\$5,000	
24" CW Elbow (Buried)	EA	2	\$2,500	\$5,000	
24" CW Tee (Buried)	EA	2	\$4,000	\$8,000	Tee at piping tie-in
24" CW Piping Fittings and Appurtenances (Buried)	LS	1	\$1,000	\$1,000	
24" CW Pipe Trench	EA	300	\$100	\$30,000	
24" SW Piping (Buried)	LF	600	\$100	\$60,000	300 feet from each flocculating clarifier to solids contact clarifier outlet piping header
24" SW Elbow (Buried)	EA	4	\$2,500	\$10,000	
24" SW Tee (Buried)	EA	2	\$4,000	\$8,000	Tee at piping tie-in
24" SW Piping Fittings and Appurtenances (Buried)	LS	1	\$1,000	\$1,000	
24" SW Venturi	EA	2	\$5,000	\$10,000	
24" SW Pipe Trench	EA	600	\$100	\$60,000	
Other Piping Modifications	LS	1	\$100,000	\$100,000	To increase capacity to 17 mgd (Ex. SCC Effluent Piping).
Division 16 - Electrical					
Electrical	LS	1	\$5,000	\$5,000	Also see contingency below.
Division 17 - Instrumentation					
Instrumentation	LS	1	\$5,000	\$5,000	Also see contingency below.
Subtotal for Converting Ex. Plant to Split Treatment				\$462,000	
New Fine Screens (2@10 mgd)					
Quantity		2.00			
Height		32.00	ft		18' SWD + 2' Freeboard (Assumed) + 12' (operating floor above screens)
Width		20.00	ft		20' per screen (similar to other screens)



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Description	Units	Quantity	Unit Cost	Cost	Comments
Length		20.00			20' per screen (similar to other screens) Over Excavation (assumed) Horizontal to vertical slope Distance from grade to top of structure (estimated) Total Excavation Depth Based on side slope
Over Excav.	ft	2.00			
H:V = 1:	ft	1.00			
D	ft	25.00			
Exc. Depth	ft	9.00			
Added W/L	ft	4.50			
Division 2 - Sitework					
Excavation	cu yd	280	\$15	\$4,205	Doesn't account for sloped sides of excavation 25% Swell Factor, hauling to or from site 25% Swell Factor
Hauling	cu yd	74	\$2	\$149	
Backfill	cu yd	221	\$10	\$2,208	
Drilled Piers	EA	9	\$3,000	\$27,000	
Division 3 - Concrete					
Concrete - 20" Base Slab	cu yd	25	\$500	\$12,346	Assumes 20" thick slab on grade 12" thick wall, cost from CCEs for straight 12" wall, >8' tall 12" thick interior wall running along the width of each screen Elevated Slab - 12" thick, cost from CCEs Elevated Slab - 12" thick, cost from CCEs
Concrete Walls - Exterior	cu yd	95	\$840	\$79,644	
Concrete Walls - Interior walls	cu yd	22	\$840	\$18,667	
Operating Floor	cu yd	15	\$404	\$5,983	
Roof	cu yd	15	\$404	\$5,983	
Division 11 - Equipment					
Screen Mechanism	EA	1	\$100,000	\$100,000	Estimated
Division 15 - Piping					
36" STW Inlet Piping (Buried)	LF	120	\$200	\$24,000	Estimated per Figure 7.1
36" STW Inlet Wall Pipe	EA	2	\$3,500	\$7,000	
36" STW Inlet Elbow (Buried)	EA	2	\$3,500	\$7,000	
36" STW Inlet Pipe Coupling (Buried)	EA	2	\$2,000	\$4,000	
36" STW Inlet Piping Fittings and Appurtenances (Buried)	LS	2	\$2,000	\$4,000	
36" STW Inlet Pipe Trench	EA	120	\$150	\$18,000	
Division 16 - Electrical					
Electrical	LS	1	\$5,000	\$5,000	Estimated for each Screen
Division 17 - Instrumentation					
Instrumentation	LS	1	\$5,000	\$5,000	Estimated for each Screen
Subtotal for New Intake Screen(s)				\$267,000	
Intake Screen(s) Cost		#	2	\$534,000	
Piping Subtotal				\$64,000	
Total for New Intake Screen(s)				\$598,000	
New RM Basins (2@30 mgd)					
Quantity		2.00			24' SWD + 2' Freeboard 7.45' square basin with 12" weir wall and 24" effluent chamber
Height	ft	26.00			
Width	ft	7.45			
Length	ft	10.45			



Project: Water & Wastewater System Master Plan
 City of Edmond, OK
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Description	Units	Quantity	Unit Cost	Cost	Comments	
Over Excav.	2.00				Over Excavation (assumed) Horizontal to vertical slope Distance from grade to top of structure (estimated) Total Excavation Depth Based on side slope	
H:V = 1:	1.00					
D	8.00					
Exc. Depth	20.00					
Added W/L	10.00					
Division 2 - Sitework						
Excavation	cu yd	619	\$15	\$9,287	Doesn't account for sloped sides of excavation 25% Swell Factor, hauling to or from site 25% Swell Factor	
Hauling	cu yd	112	\$2	\$225		
Backfill	cu yd	709	\$10	\$7,091		
Drilled Piers	EA	6	\$3,000	\$18,000		
Division 3 - Concrete						
Concrete - 20" Base Slab	cu yd	5	\$500	\$2,403	Assumes 20" thick slab on grade 12" thick wall, cost from CCES for straight 12" wall, >8' tall 12" thick weir wall	
Concrete Walls - Exterior	cu yd	34	\$840	\$28,958		
Concrete Walls - Interior Baffle walls	cu yd	7	\$840	\$5,563		
Division 15 - Piping						
24" STW Inlet Piping (Buried)	LF	120	\$100	\$12,000	Estimated per Figure 7.1	
24" STW Inlet Wall Pipe	EA	2	\$2,500	\$5,000		
24" STW Inlet Elbow (Buried)	EA	2	\$2,500	\$5,000	Estimated per Figure 7.1	
24" STW Inlet Pipe Coupling (Buried)	EA	2	\$1,000	\$2,000		
24" STW Inlet Piping Fittings and Appurtenances (Buried)	LS	2	\$1,000	\$2,000		
24" STW Inlet Pipe Trench	EA	120	\$100	\$12,000		
24" STW Outlet Piping (Buried)	LF	170	\$100	\$17,000		
24" STW Outlet Wall Pipe	EA	2	\$2,500	\$5,000		
24" STW Outlet Elbow (Buried)	EA	2	\$2,500	\$5,000		
24" STW Outlet Pipe Coupling (Buried)	EA	2	\$1,000	\$2,000		
24" STW Outlet Piping Fittings and Appurtenances (Buried)	LS	2	\$1,000	\$2,000		
24" STW Outlet Pipe Trench	EA	170	\$100	\$17,000		
Division 16 - Electrical						
Electrical	LS	1	\$10,000	\$10,000		Estimated
Division 17 - Instrumentation						
Instrumentation	LS	1	\$10,000	\$10,000		Estimated
Subtotal for New RM Basin				\$92,000		
RM Basin(s) Cost	#	2		\$184,000		
Piping Subtotal				\$86,000		
Total for New RM Basins				\$270,000		
New Conventional Treatment Train (1@8mgd)						
Subtotal for Conventional Treatment Train				\$1,170,000	Quote per Kruger Inc for 8 mgd Actiflo system dated 12/3/13.	



Project: Water & Wastewater System Master Plan
 City of Edmond, OK
 Cost Opinion Expansion of Split Treatment from 10 to 30 mgd

Job Number: 8967A.00

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Description	Units	Quantity	Unit Cost	Cost	Comments
<u>New Presed Basins (2@8 mgd)</u>					
Quantity		2			Each rated at 8 MGD
Diameter, ft		80			
SWD, ft		16			
Exc Depth, ft		12			
Division 2 - Sitework					
Excavation	cu yd	3,598	\$15	\$53,976	Assumes excavation at 1:1 slope, 2 foot overexcavation 25% Swell Factor
Hauling	cu yd	2,366	\$2	\$4,732	
Backfill	cu yd	1,705	\$10	\$17,055	
Drilled Piers	EA	81	\$3,000	\$243,000	
Division 3 - Concrete					
Concrete - Base Slab	cu yd	411	\$0	\$0	Assumes 24" thick slab Assumes 18" thick walls, 2' freeboard
Concrete - Curved Walls	cu yd	251	\$0	\$0	
Floor Grout	cu yd	62	\$400	\$24,822	
Division 5 - Metals					
Misc Metals	LS	1	\$5,000	\$5,000	
Division 11 - Equipment					
Clarifier Mechanism	EA	1	\$16,000	\$16,000	Per CCES for 80' diameter clarifier mechanism Assume 10% of equipment cost
Clarifier Mechanism - Installation	LS	1	\$1,600	\$1,600	
Division 15 - Piping					
Piping	LS	1	\$30,000	\$30,000	
Division 16 - Electrical					
Electrical	LS	1	\$5,000	\$5,000	Also see contingency below
Division 17 - Instrumentation					
Instrumentation	LS	1	\$5,000	\$5,000	Also see contingency below
Sub Total per Basin				\$406,186	
Presed Basin(s) Cost	#	2	\$406,186	\$813,000	
<u>Other Construction</u>					
Division 15 - Piping					
24" STW Inlet Piping (Buried)	LF	300	\$100	\$30,000	Estimated per Figure 7.1
24" STW Inlet Wall Pipe	EA	2	\$2,500	\$5,000	
24" STW Inlet Elbow (Buried)	EA	2	\$2,500	\$5,000	
24" STW Inlet Pipe Coupling (Buried)	EA	2	\$1,000	\$2,000	
24" STW Inlet Piping Fittings and Appurtenances (Buried)	LS	2	\$1,000	\$2,000	
24" STW Inlet Pipe Trench	EA	300	\$100	\$30,000	Estimated per Figure 7.1
24" STW Outlet Piping (Buried)	LF	300	\$100	\$30,000	
24" STW Outlet Wall Pipe	EA	2	\$2,500	\$5,000	
24" STW Outlet Elbow (Buried)	EA	2	\$2,500	\$5,000	
24" STW Outlet Pipe Coupling (Buried)	EA	2	\$1,000	\$2,000	
24" STW Outlet Piping Fittings and Appurtenances (Buried)	LS	2	\$1,000	\$2,000	
24" STW Outlet Pipe Trench	EA	300	\$100	\$30,000	
Subtotal for Other Construction				\$148,000	



Project: Water & Wastewater System Master Plan
 City of Edmond, OK
 Cost Opinion Expansion of Split Treatment from 10 to 30 mgd

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Description	Units	Quantity	Unit Cost	Cost	Comments	
New Pre-Ozone Contactor						
Height	ft	21.00			2 Parallel Trains @ 15 mgd each 18' min depth and 3' freeboard, and min contact time = 10 minutes (per ODEQ) Includes space for 10' access hatch Includes space for 6' influent/effluent chambers Over Excavation (assumed) Horizontal to vertical slope Distance from grade to top of structure Total Excavation Depth Based on side slope	
Width	ft	65.00				
Length	ft	65.00				
Over Excav.	ft	2.00				
H:V = 1:		1.00				
D	ft	1.00				
Exc. Depth	ft	22.00				
Added W/L	ft	11.00				
Division 2 - Sitework						
Excavation	cu yd	6,167	\$15	\$92,510		Doesn't account for sloped sides of excavation
Hauling	cu yd	2,963	\$2	\$5,926	25% Swell Factor	
Backfill	cu yd	3,797	\$10	\$37,971	25% Swell Factor	
Drilled Piers	EA	64	\$3,000	\$192,000		
Division 3 - Concrete						
Concrete - 20" Base Slab	cu yd	261	\$500	\$130,401	Assumes 20" thick slab on grade	
Concrete Walls - Exterior	cu yd	202	\$840	\$169,867	12" thick wall, cost from CCEs for straight 12" wall, >8' tall	
Concrete Walls - Interior Baffle walls	cu yd	37	\$840	\$30,800	12" thick baffle walls spaced at 5' (less influent and effluent channels, and 10' access corridor)	
Roof	cu yd	156	\$404	\$63,198	Elevated Slab - 12" thick, cost from CCEs	
Division 8 - Doors and Windows						
Doors and Windows	LS	1	\$5,000	\$5,000		
Division 15 - Piping						
Piping	LS	1	\$25,000	\$25,000	Assumption, similar to McBaine WTP estimate (accounts for LOX piping, and general piping)	
Division 16 - Electrical						
Electrical	LS	1	\$25,000	\$25,000	Similar to McBaine WTP est.	
Division 17 - Instrumentation						
Instrumentation	LS	1	\$25,000	\$25,000	Similar to McBaine WTP est.	
Subtotal for New Pre-Ozone Contactor				\$803,000		
New Pre-Ozone Generation Building and LOX Storage						
Height	ft	12.00			Assumed building size for new ozone generation system Over Excavation (assumed) Horizontal to vertical slope Distance from grade to top of structure Total Excavation Depth Based on side slope	
Width	ft	30.00				
Length	ft	65.00				
Over Excav.	ft	2.00				
H:V = 1:		1.00				
D	ft	10.00				
Exc. Depth	ft	4.00				
Added W/L	ft	2.00				
Division 2 - Sitework						
Excavation	cu yd	348	\$15	\$5,213		Doesn't account for sloped sides of excavation
Hauling	cu yd	117	\$2	\$234	25% Swell Factor	
Backfill	cu yd	254	\$10	\$2,539	25% Swell Factor	



Project: Water & Wastewater System Master Plan
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Description	Units	Quantity	Unit Cost	Cost	Comments	
Division 3 - Concrete	Drilled Piers	EA	32	\$3,000	\$96,000	
	Concrete - 12" Base Slab	cu yd	72	\$350	\$25,278	Assumes 12" thick slab on grade, cost from CCES
	Concrete Walls - Exterior	cu yd	84	\$840	\$70,933	12" thick wall, cost from CCES for straight 12" wall, >8' tall
Division 8 - Doors and Windows	Doors and Windows	LS	1	\$15,000	\$15,000	
Division 11 - Equipment	650 lb/d Ozone Generator and Power Supply Unit	EA	3	\$1,119,186	\$3,562,034	Using 2/3 Rule on \$1,013,333 per 560 lb/day Generator
	LOX Storage Tanks - 10,000 gal and Vaporizers	EA	3	\$351,046	\$1,117,273	Using 2/3 Rule on \$460,000 for 15,000 gal tanks and vaporizers
	Diffusers	LS	1	\$200,000	\$212,180	from McBaine WTP estimate, transformed to 2013 dollars @ 3%
	Destruct Unit	LS	1	\$100,000	\$106,090	from McBaine WTP estimate, transformed to 2013 dollars @ 3%
	Installation of Equipment (% of total equipment cost)	%	20.00%	1	\$999,516	
Division 15 - Piping	Piping	LS	1	\$185,000	\$185,000	Assumption, similar to McBaine WTP estimate (accounts for LOX piping, and general piping)
Division 16 - Electrical	Electrical	LS	1	\$160,000	\$160,000	Similar to McBaine WTP est.
Division 17 - Instrumentation	Instrumentation	LS	1	\$160,000	\$160,000	Similar to McBaine WTP est.
Subtotal for Generation Building					\$216,000	
Subtotal for New Pre-Ozone Chemical Equipment					\$5,998,000	
Subtotal for New Pre-Ozone Piping, Electrical and Instrumentation					\$505,000	
Subtotal for New Pre-Ozone System					\$6,719,000	
New Lime System/Chem Bldg						
Height	12.00	ft			Assumed building size for new lime and chemical systems	
Width	40.00	ft				
Length	80.00	ft				
Over Excav.	2.00	ft				
H:V = 1:	1.00					
D	1.00	ft				
Exc. Depth	13.00	ft				
Added W/L	6.50	ft				
Division 2 - Sitework	Excavation	cu yd	2,373	\$15	\$35,598	Doesn't account for sloped sides of excavation
	Hauling	cu yd	1,295	\$2	\$2,591	25% Swell Factor
	Backfill	cu yd	1,337	\$10	\$13,369	25% Swell Factor
	Drilled Piers	EA	45	\$3,000	\$135,000	
Division 3 - Concrete	Concrete - 12" Base Slab	cu yd	119	\$350	\$41,481	Assumes 12" thick slab on grade, cost from CCES
	Concrete Walls - Exterior	cu yd	107	\$840	\$89,600	12" thick wall, cost from CCES for straight 12" wall, >8' tall
	Concrete Walls - Interior Baffle walls	cu yd	89	\$840	\$74,667	12" thick baffle walls spaced at 8', cost from CCES for 8" straight wall >8' tall, assumes flow de



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Description	Units	Quantity	Unit Cost	Cost	Comments
Roof	cu yd	119	\$404	\$47,866	Elevated Slab - 12" thick, cost from CCES
Division 8 - Doors and Windows					
Doors and Windows	LS	1	\$5,000	\$5,000	
Division 11 - Equipment					
New Coagulant Polymer Feed System	EA	2	\$35,000	\$70,000	Based on quote from Prominent Fluid Controls 7/18/13, for ProMix-M with "C" controls, model I
New Coagulant Alum Feed System	EA	2	\$10,000	\$20,000	Assumed similar to Phos. Acid feed
New Lime System/Silos	LS	1	\$1,166,667	\$1,166,667	TOC Estimate (2-14-13)
New CO2 System (3 vaporizers @ 5,900 lb/day)	LS	1	\$912,290	\$912,290	Based on quote from TOMCO2 for Norman WTP, using 2/3 rule for 1920 lb/d system
New Filter Aid Polymer Feed System	EA	2	\$35,000	\$70,000	Based on quote from Prominent Fluid Controls 7/18/13, for ProMix-M with "C" controls, model I
New Phosphoric Acid Feed System	EA	2	\$10,000	\$20,000	Based on quote from EI2 6/18/13
New LAS Feed System	EA	1	\$19,079	\$19,079	2/3 rule based on quote from macaulay control company, for a three ducoflex dfb pump skid
New OSHG System (3 generators @ 1,000 ppd)	LS	1	\$1,012,486	\$1,012,486	2/3 rule based on quote from PSI for 2x1600 ppd generator system
New Chemical Tanks	EA	2	\$28,000	\$56,000	Bulk tank for LAS and Alum coagulant (cost is for a 6,500 gallon FRP tank)
Installation of Equipment (% of total equipment cost)	%	10.00%	1	\$334,652	Assumed Installation Cost
Division 15 - Piping					
Piping	LS	1	\$5,000	\$5,000	Assumption
Division 16 - Electrical					
Electrical	LS	1	\$2,500	\$2,500	Also see contingency below
Division 17 - Instrumentation					
Instrumentation	LS	1	\$5,000	\$5,000	Also see contingency below
Subtotal for New Chem/RM Building				\$4,139,000	
Solids Contact Clarifiers					
Quantity		2			
Diameter, ft		80			
SWD, ft		15			
Exc Depth, ft		12			
Division 2 - Sitework					
Excavation	cu yd	3,598	\$15	\$53,976	Assumes excavation at 1:1 slope, 2 foot overexcavation
Hauling	cu yd	2,366	\$2	\$4,732	25% Swell Factor
Backfill	cu yd	1,705	\$10	\$17,055	
Drilled Piers	EA	81	\$3,000	\$243,000	
Division 3 - Concrete					
Concrete - Base Slab	cu yd	411	\$500	\$205,251	Assumes 24" thick slab
Concrete - Curved Walls	cu yd	237	\$750	\$178,024	Assumes 18" thick walls, 2' freeboard
Floor Grout	cu yd	62	\$400	\$24,822	
Division 5 - Metals					
Misc Metals	LS	1	\$5,000	\$5,000	
Division 11 - Equipment					
Sludge Collector Mechanism	EA	1	\$475,500	\$475,500	Use two-thirds rule on \$435,000 per 70 ft diameter, quote from Jeff City project, Nov. 2012
Sludge Collector Mechanism - Installation	LS	1	\$47,550	\$47,550	Assume 10% of equipment cost
Division 15 - Piping					
Piping	LS	1	\$30,000	\$30,000	
Division 16 - Electrical					
Electrical	LS	1	\$5,000	\$5,000	Also see contingency below
Division 17 - Instrumentation					
Instrumentation	LS	1	\$5,000	\$5,000	Also see contingency below



Project: Water & Wastewater System Master Plan
 City of Edmond, OK
 Cost Opinion Expansion of Split Treatment from 10 to 30 mgd

By: RR
 Date: 11/15/2012

Job Number: 8967A.00

Checked: TOC
 Date: 11/25/2012

Description	Units	Quantity	Unit Cost	Cost	Comments	
Sub Total per Clarifier				\$1,294,910		
Solids Contact Clarifier(s) Cost	#	2	\$1,294,910	\$2,590,000		
Other Construction						
Division 2 - Sitework						
Pavement (Concrete) Demolition	sf	1,000	\$3	\$3,000	100 feet long, 10 feet wide	
Pavement (Concrete) Replacement	sf	10,000	\$7	\$70,000	1000 feet long, 10 feet wide	
Division 11 - Equipment						
Pump Replacement	LS	1	\$250,000	\$250,000		
Division 13 - Special Construction						
Chemical System Modifications at Chemical Building	LS	2	\$25,000	\$50,000		
Chemical System Modifications at Solids Contact Clarifiers	EA	4	\$5,000	\$20,000		
Division 15 - Piping						
24" STW Inlet Piping (Buried)	LF	250	\$100	\$25,000	Estimated per Figure 7.1	
24" STW Inlet Wall Pipe	EA	3	\$2,500	\$7,500		
24" STW Inlet Elbow (Buried)	EA	3	\$2,500	\$7,500		
24" STW Inlet Pipe Coupling (Buried)	EA	3	\$1,000	\$3,000		
24" STW Inlet Piping Fittings and Appurtenances (Buried)	LS	3	\$1,000	\$3,000		
24" STW Inlet Pipe Trench	EA	250	\$100	\$25,000	Estimated per Figure 7.1	
24" STW Outlet Piping (Buried)	LF	250	\$100	\$25,000		
24" STW Outlet Wall Pipe	EA	3	\$2,500	\$7,500		
24" STW Outlet Elbow (Buried)	EA	3	\$2,500	\$7,500		
24" STW Outlet Pipe Coupling (Buried)	EA	3	\$1,000	\$3,000		
24" STW Outlet Piping Fittings and Appurtenances (Buried)	LS	3	\$1,000	\$3,000		
24" STW Outlet Pipe Trench	EA	250	\$100	\$25,000		
Valve Replacements/Improvements	LS	1	\$75,000	\$75,000		
Division 16 - Electrical						
Electrical	LS	1	\$5,000	\$5,000	Also see contingency below	
Division 17 - Instrumentation						
Instrumentation	LS	1	\$5,000	\$5,000	Also see contingency below	
Subtotal for Other Construction				\$620,000		
New Post-Ozone Contactor						
Height	ft	21.00			2 Parallel Trains @ 15 mgd each 18' min depth and 3' freeboard, and min contact time = 10 minutes (per ODEQ) Includes space for 10' access hatch Over Excavation (assumed) Horizontal to vertical slope Distance from grade to top of structure Total Excavation Depth Based on side slope	
Width	ft	65.00				
Length	ft	65.00				
Over Excav.	ft	2.00				
H:V = 1:		1.00				
D	ft	1.00				
Exc. Depth	ft	22.00				
Added W/L	ft	11.00				
Division 2 - Sitework						



Project: Water & Wastewater System Master Plan
 City of Edmond, OK
 Cost Opinion Expansion of Split Treatment from 10 to 30 mgd

By: RR
 Date: 11/15/2012

Job Number: 8967A.00

Checked: TOC
 Date: 11/25/2012

Description	Units	Quantity	Unit Cost	Cost	Comments	
Excavation	cu yd	6,167	\$15	\$92,510	Doesn't account for sloped sides of excavation 25% Swell Factor 25% Swell Factor	
Hauling	cu yd	2,963	\$2	\$5,926		
Backfill	cu yd	3,797	\$10	\$37,971		
Drilled Piers	EA	64	\$3,000	\$192,000		
Division 3 - Concrete						
Concrete - 20" Base Slab	cu yd	261	\$500	\$130,401	Assumes 20" thick slab on grade 12" thick wall, cost from CCES for straight 12" wall, >8' tall 12" thick baffle walls spaced at 5' (less influent and effluent channels, and 10' access corridor). Elevated Slab - 12" thick, cost from CCES	
Concrete Walls - Exterior	cu yd	202	\$840	\$169,867		
Concrete Walls - Interior Baffle walls	cu yd	37	\$840	\$30,800		
Roof	cu yd	156	\$404	\$63,198		
Division 8 - Doors and Windows						
Doors and Windows	LS	1	\$5,000	\$5,000		
Division 15 - Piping						
Piping (Ozone)	LS	1	\$25,000	\$25,000	Assumption, similar to McBaine WTP estimate (accounts for LOX piping, and general piping) Estimated to route flow to filter building (adjacent to contactor)	
Piping (Process)	LS	1	\$25,000	\$25,000		
Division 16 - Electrical						
Electrical	LS	1	\$25,000	\$25,000	Similar to McBaine WTP est.	
Division 17 - Instrumentation						
Instrumentation	LS	1	\$25,000	\$25,000	Similar to McBaine WTP est.	
Subtotal for New Pre-Ozone Contactor				\$828,000		
New Filters						
Design Flow	MGD	12.00			12 MGD expansion assumed from Tom Email from Bryant Bench, 1900ft2 at 3000\$/ft2, 3500ft2 at 2500\$/ft2 (by linear interpolation for Number of filters offline during BW Accounting for filter off during BW Input Input All online During backwash	
Filter Rate	gpm/ft2	6.00				
Price/ft2 of filter Area	\$/ft2	\$3,426				
Required Active Filter Area	ft2	1389				
Filter Banks		4.00				
Filters off/BW		1.00				
Required Area/Filter	ft2	463				
Filter Width	ft	15.00				
Filter Length	ft	30.00				
Area/Filter	ft2	450				
Total Filter Area	ft2	1800				
Total Filter Area	ft2	1350				
Subtotal for Filter Construction				\$6,166,068		By using price/filter area
Contingencies:						
Division 11 - Equipment		2%		\$123,321		Assumption Also see contingency below Also see contingency below
Division 15 - Piping		2%		\$123,321		
Division 16 - Electrical		5%		\$308,303		
Division 17 - Instrumentation		5%		\$308,303		
Total for Filter Construction				\$7,029,317		



Project: Water & Wastewater System Master Plan
 City of Edmond, OK
 Cost Opinion Expansion of Split Treatment from 10 to 30 mgd

By: RR
 Date: 11/15/2012

Job Number: 8967A.00

Checked: TOC
 Date: 11/25/2012

Description	Units	Quantity	Unit Cost	Cost	Comments
New Filter Effluent Piping					
Division 15 - Piping					
24" STW Outlet Piping (Buried)	LF	350	\$100	\$35,000	Estimated per Figure 7.1
24" STW Outlet Wall Pipe	EA	1	\$2,500	\$2,500	
24" STW Inlet Wall Pipe (Clearwells)	EA	2	\$2,500	\$5,000	
24" STW Outlet Elbow (Buried)	EA	2	\$2,500	\$5,000	
24" STW Outlet Pipe Coupling (Buried)	EA	2	\$1,000	\$2,000	
24" STW Outlet Piping Fittings and Appurtenances (Buried)	LS	2	\$1,000	\$2,000	
24" STW Outlet Pipe Trench	EA	350	\$100	\$35,000	
Total for Filter Effluent Piping				\$86,500	
New HSPS					
Height	24.00	ft			15' min depth per ODEQ
Width	25.00	ft			
Length	35.00	ft			
Over Excav.	2.00	ft			
H:V = 1:	1.00				
D	14.00	ft			
Exc. Depth	12.00	ft			
Added W/L	6.00	ft			
Division 2 - Sitework					
Excavation	cu yd	773	\$15	\$11,593	Doesn't account for sloped sides of excavation 25% Swell Factor 25% Swell Factor
Hauling	cu yd	265	\$2	\$530	
Backfill	cu yd	561	\$10	\$5,610	
Drilled Piers	EA	20	\$3,000	\$60,000	
Division 3 - Concrete					
Concrete - 12" Base Slab	cu yd	32	\$350	\$11,343	Assumes 12" thick slab on grade, cost from CCES 12" thick wall, cost from CCES for straight 12" wall, >8' tall One 12" Wall along entire length of building Elevated Slab - 12" thick, cost from CCES
Concrete Walls - Exterior	cu yd	107	\$840	\$89,600	
Concrete Walls - Interior Walls	cu yd	22	\$840	\$18,667	
Roof	cu yd	32	\$404	\$13,088	
Division 8 - Doors and Windows					
Doors and Windows	LS	1	\$2,500	\$2,500	
Division 11 - Equipment					
8 mgd HS pumps	EA	2	\$15,000	\$30,000	
10 mgd HS pump(s) with VFD	EA	2	\$25,000	\$50,000	
Division 15 - Piping					
24" STW Outlet Piping (Buried)	LF	800	\$100	\$80,000	Estimated per Figure 7.1
24" STW Outlet Wall Pipe	EA	2	\$2,500	\$5,000	
24" STW Outlet Elbow (Buried)	EA	2	\$2,500	\$5,000	
24" STW Outlet Pipe Coupling (Buried)	EA	2	\$1,000	\$2,000	
24" STW Outlet Piping Fittings and Appurtenances (Buried)	LS	1	\$1,000	\$1,000	
24" STW Outlet Pipe Trench	EA	800	\$100	\$80,000	
Division 16 - Electrical					
Electrical	LS	1	\$10,000	\$10,000	Also see contingency below
Division 17 - Instrumentation					
Instrumentation	LS	1	\$10,000	\$10,000	Also see contingency below



Project: Water & Wastewater System Master Plan
 City of Edmond, OK
 Cost Opinion Expansion of Split Treatment from 10 to 30 mgd

Job Number: 8967A.00

By: RR
 Date: 11/15/2012

Checked: TOC
 Date: 11/25/2012

Description	Units	Quantity	Unit Cost	Cost	Comments	
Subtotal for New HSPS Building				\$486,000		
New BW Tank and Pumps						
Subtotal for New BW Tank and Pumps				\$350,000	Assumed by RR, need input from Tom (250k for tank and 100k for pumps and building)	
Sludge Thickener and Transfer Station						
Subtotal for New Sludge Thickener and Transfer Station				\$2,500,000	Assumed by RR, need input from Tom (1million for thickener, 1.5 million for pump station)	
New Lagoons						
Quantity		8.00			Assumed (assumed, from CDM O&M) (assumed, same as other lagoons) (assumed, same as other lagoons) User Input Over Excavation (assumed) Horizontal to vertical slope Distance from grade to top of structure Total Excavation Depth Based on side slope	
Water Depth	ft	5.30				
Width	ft	80.00				
Length	ft	115.00				
Free Board	ft	3.00				
Over Excav.	ft	2.00				
H:V = 1:		1.00				
D	ft	1.00				
Exc. Depth	ft	9.30				
Added W/L	ft	9.30				
Division 2 - Sitework						
Excavation	cu yd	4,537	\$15	\$68,060		Doesn't account for sloped sides of excavation
Hauling	cu yd	2,469	\$2	\$4,937		25% Swell Factor
Backfill	cu yd	2,562	\$10	\$25,624	25% Swell Factor	
Division 3 - Concrete						
Concrete - 12" Base Slab	cu yd	341	\$350	\$119,259	Assumes 12" thick slab	
Concrete - 12" Straight Walls	cu yd	120	\$840	\$100,707	Assumes 12" thick walls,	
Concrete Ramp	cu yd	26	\$840	\$21,691	Assumes 12' wide, 14' long, 8.3' tall access ramp (est. concrete cost)	
Division 5 - Metals						
Misc Metals	LS	1	\$10,000	\$10,000	Estimated	
Division 11 - Equipment						
Sluice Gate, Stainless Steel, 24" x 24"	EA	1	\$1,925	\$2,695	Use CCES estimate, assumes material cost = 40%	
Division 15 - Piping						
24" DI Piping	LF	40	\$14	\$1,120	Assumes DI piping spans length of lagoon, divided by 2 because each line services 2 lags. (m	
12" DI Piping	LF	10	\$27	\$270	Assumes DI piping spans from road to each lagoon, divided by 2 because each line services 2	
Fittings	LS	1	\$5,000	\$5,000		
24" STW Outlet Piping (Buried)	LF	640	\$100	\$64,000	Assumes decant line runs along entire width of each lagoon	
24" STW Outlet Wall Pipe	EA	8	\$1,750	\$14,000	Assumed 1 per lagoon	
24" STW Outlet Elbow (Buried)	EA	8	\$1,750	\$14,000	Assumed 1 per lagoon	



Project: Water & Wastewater System Master Plan
 City of Edmond, OK
 Cost Opinion Expansion of Split Treatment from 10 to 30 mgd

By: RR
 Date: 11/15/2012

Job Number: 8967A.00

Checked: TOC
 Date: 11/25/2012

Description	Units	Quantity	Unit Cost	Cost	Comments
24" STW Outlet Pipe Coupling (Buried)	EA	8	\$750	\$6,000	Assumed 1 per lagoon
24" STW Outlet Piping Fittings and Appurtenances (Buried)	LS	1	\$5,000	\$5,000	Assumed 1 per lagoon
24" STW Outlet Pipe Trench	EA	640	\$100	\$64,000	
Division 16 - Electrical					
Electrical	LS	1	\$10,000	\$10,000	Also see contingency below
Division 17 - Instrumentation					
Instrumentation	LS	1	\$10,000	\$10,000	Also see contingency below
Sub Total per Lagoon				\$546,364	
Other Sitework: Stoirmwater Diversion	LS	1	\$45,000	\$45,000	
Total Lagoon Cost	#	8	\$546,364	\$4,416,000	
Subtotal 1				\$34,100,000	
Yard Piping		1%		\$341,000	
Paving/Grading		1%		\$341,000	
Coatings		1%		\$341,000	
Electrical		5%		\$1,705,000	
Instrumentation		10%		\$3,410,000	
Total Direct Cost				\$40,238,000	
Estimating Contingency (30%)				\$12,071,000	
GC OH&P (10%)				\$4,024,000	
Total Estimated Construction Cost				\$56,333,000	



Project: Water & Wastewater System Master Plan
 City of Edmond, OK
 Cost Opinion Expansion of Split Treatment from 30 to 40 mgd

Job Number: 8967A.00

By: RR
 Date: 11/15/2012
 Checked: _____
 Date: _____

Description	Units	Quantity	Unit Cost	Cost	Comments
CONSTRUCTION COSTS					
New Fine Screens (1 @10 mgd)					
Quantity		1.00			
Height	ft	32.00			18' SWD + 2' Freeboard (Assumed) + 12' (operating floor above screens)
Width	ft	20.00			20' per screen (similar to other screens)
Length	ft	20.00			20' per screen (similar to other screens)
Over Excav.	ft	2.00			Over Excavation (assumed)
H:V = 1:		1.00			Horizontal to vertical slope
D	ft	25.00			Distance from grade to top of structure (estimated)
Exc. Depth	ft	9.00			Total Excavation Depth
Added W/L	ft	4.50			Based on side slope
Division 2 - Sitework					
Excavation	cu yd	280	\$15	\$4,205	Doesn't account for sloped sides of excavation
Hauling	cu yd	74	\$2	\$149	25% Swell Factor, hauling to or from site
Backfill	cu yd	221	\$10	\$2,208	25% Swell Factor
Drilled Piers	EA	9	\$3,000	\$27,000	
Division 3 - Concrete					
Concrete - 20" Base Slab	cu yd	25	\$500	\$12,346	Assumes 20" thick slab on grade
Concrete Walls - Exterior	cu yd	95	\$840	\$79,644	12" thick wall, cost from CCES for straight 12" wall, >8' tall
Concrete Walls - Interior walls	cu yd	22	\$840	\$18,667	12" thick interior wall running along the width of each screen
Operating Floor	cu yd	15	\$404	\$5,983	Elevated Slab - 12" thick, cost from CCES
Roof	cu yd	15	\$404	\$5,983	Elevated Slab - 12" thick, cost from CCES
Division 11 - Equipment					
Screen Mechanism	EA	1	\$100,000	\$100,000	Estimated
Division 15 - Piping					
36" STW Inlet Piping (Buried)	LF	20	\$200	\$4,000	Estimated per Figure 7.1
36" STW Inlet Wall Pipe	EA	1	\$3,500	\$3,500	
36" STW Inlet Elbow (Buried)	EA	1	\$3,500	\$3,500	
36" STW Inlet Pipe Coupling (Buried)	EA	1	\$2,000	\$2,000	
36" STW Inlet Piping Fittings and Appurtenances (Buried)	LS	1	\$2,000	\$2,000	
36" STW Inlet Pipe Trench	EA	20	\$150	\$3,000	
Division 16 - Electrical					
Electrical	LS	1	\$5,000	\$5,000	Estimated for each Screen
Division 17 - Instrumentation					
Instrumentation	LS	1	\$5,000	\$5,000	Estimated for each Screen
Subtotal for New Intake Screen(s)				\$267,000	
Intake Screen(s) Cost		#	1	\$267,000	
Piping Subtotal				\$18,000	
Total for New Intake Screen(s)				\$285,000	
New Pre-Ozone Contactor					
Height	ft	21.00			1 Train @ 15 mgd
Width	ft	35.00			18' min depth and 3' freeboard, and min contact time = 10 minutes (per ODEQ)
Length	ft	65.00			Includes space for 10' access hatch
Over Excav.	ft	2.00			Includes space for 6' influent/effluent chambers
H:V = 1:		1.00			Over Excavation (assumed)
D	ft	1.00			Horizontal to vertical slope
	ft				Distance from grade to top of structure



Project: Water & Wastewater System Master Plan
 City of Edmond, OK
 Cost Opinion Expansion of Split Treatment from 30 to 40 mgd

Job Number: 8967A.00

By: RR
 Date: 11/15/2012

Checked: _____
 Date: _____

Description	Units	Quantity	Unit Cost	Cost	Comments	
Exc. Depth	22.00 Added W/L 11.00	ft ft			Total Excavation Depth Based on side slope	
Division 2 - Sitework	Excavation	cu yd	4,041	\$15	\$60,610	Doesn't account for sloped sides of excavation 25% Swell Factor 25% Swell Factor
	Hauling	cu yd	1,370	\$2	\$2,741	
	Backfill	cu yd	2,944	\$10	\$29,444	
	Drilled Piers	EA	40	\$3,000	\$120,000	
Division 3 - Concrete	Concrete - 20" Base Slab	cu yd	140	\$500	\$70,216	Assumes 20" thick slab on grade 12" thick wall, cost from CCES for straight 12" wall, >8' tall 12" thick baffle walls spaced at 5' (less influent and effluent channels, and 10' access corridor), Elevated Slab - 12" thick, cost from CCES
	Concrete Walls - Exterior	cu yd	156	\$840	\$130,667	
	Concrete Walls - Interior Baffle walls	cu yd	17	\$840	\$14,000	
	Roof	cu yd	84	\$404	\$34,030	
Division 8 - Doors and Windows	Doors and Windows	LS	1	\$5,000	\$5,000	
Division 15 - Piping	Piping	LS	1	\$25,000	\$25,000	Assumption, similar to McBaine WTP estimate (accounts for LOX piping, and general piping)
Division 16 - Electrical	Electrical	LS	1	\$25,000	\$25,000	Similar to McBaine WTP est.
Division 17 - Instrumentation	Instrumentation	LS	1	\$25,000	\$25,000	Similar to McBaine WTP est.
Subtotal for New Pre-Ozone Contactor					\$542,000	
New Conventional Treatment Train (1 @8mgd)						
Subtotal for Conventional Treatment Train					\$1,170,000	Quote per Kruger Inc for 8 mgd Actiflo system dated 12/3/13.
Solids Contact Clarifiers						
Quantity			1			Each rated at 8 MGD
Diameter, ft			80			
SWD, ft			15			
Exc Depth, ft			12			
Division 2 - Sitework	Excavation	cu yd	3,598	\$15	\$53,976	Assumes excavation at 1:1 slope, 2 foot overexcavation 25% Swell Factor
	Hauling	cu yd	2,366	\$2	\$4,732	
	Backfill	cu yd	1,705	\$10	\$17,055	
	Drilled Piers	EA	81	\$3,000	\$243,000	
Division 3 - Concrete	Concrete - Base Slab	cu yd	411	\$500	\$205,251	Assumes 24" thick slab Assumes 18" thick walls, 2' freeboard
	Concrete - Curved Walls	cu yd	237	\$750	\$178,024	
	Floor Grout	cu yd	62	\$400	\$24,822	
Division 5 - Metals	Misc Metals	LS	1	\$5,000	\$5,000	
Division 11 - Equipment	Sludge Collector Mechanism	EA	1	\$475,500	\$475,500	Use two-thirds rule on \$435,000 per 70 ft diameter, quote from Jeff City project, Nov. 2012 Assume 10% of equipment cost
	Sludge Collector Mechanism - Installation	LS	1	\$47,550	\$47,550	
Division 15 - Piping	Piping	LS	1	\$30,000	\$30,000	
Division 16 - Electrical	Electrical	LS	1	\$5,000	\$5,000	Also see contingency below
Division 17 - Instrumentation	Instrumentation	LS	1	\$5,000	\$5,000	Also see contingency below



Project: Water & Wastewater System Master Plan
 City of Edmond, OK
 Cost Opinion Expansion of Split Treatment from 30 to 40 mgd

Job Number: 8967A.00

By: RR
 Date: 11/15/2012

Checked: _____
 Date: _____

Description	Units	Quantity	Unit Cost	Cost	Comments
Sub Total per Clarifier				\$1,294,910	
Solids Contact Clarifier(s) Cost	#	1	\$1,294,910	\$1,295,000	
Other Construction					
Division 2 - Sitework					
Pavement (Concrete) Demolition	sf	500	\$3	\$1,500	50 feet long, 10 feet wide
Pavement (Concrete) Replacement	sf	500	\$7	\$3,500	50 feet long, 10 feet wide
Division 11 - Equipment					
Replacement of Existing Clarifier Mechanisms	EA	4	\$450,000	\$1,800,000	
Division 13 - Special Construction					
Chemical System Modifications at Chemical Building	LS	1	\$25,000	\$25,000	
Chemical System Modifications at Solids Contact Clarifiers	EA	1	\$5,000	\$5,000	
Division 15 - Piping					
24" STW Inlet Piping (Buried)	LF	100	\$100	\$10,000	100 feet from each SCC inlet to existing SCC outlet pipe (estimated)
24" STW Inlet Wall Pipe	EA	1	\$2,500	\$2,500	
24" STW Inlet Elbow (Buried)	EA	1	\$2,500	\$2,500	
24" STW Inlet Pipe Coupling (Buried)	EA	1	\$1,000	\$1,000	
24" STW Inlet Piping Fittings and Appurtenances (Buried)	LS	1	\$1,000	\$1,000	
24" STW Inlet Pipe Trench	EA	100	\$100	\$10,000	
24" STW Outlet Piping (Buried)	LF	100	\$100	\$10,000	100 feet from each SCC outlet to existing SCC outlet pipe (estimated)
24" STW Outlet Wall Pipe	EA	1	\$2,500	\$2,500	
24" STW Outlet Elbow (Buried)	EA	1	\$2,500	\$2,500	
24" STW Outlet Pipe Coupling (Buried)	EA	1	\$1,000	\$1,000	
24" STW Outlet Piping Fittings and Appurtenances (Buried)	LS	1	\$1,000	\$1,000	
24" STW Outlet Pipe Trench	EA	100	\$100	\$10,000	
Division 16 - Electrical					
Electrical	LS	1	\$5,000	\$5,000	Also see contingency below
Division 17 - Instrumentation					
Instrumentation	LS	1	\$5,000	\$5,000	Also see contingency below
Subtotal for Other Construction				\$1,899,000	
New Post-Ozone Contactor					
Height		21.00			ft
Width		35.00			ft
Length		65.00			ft
Over Excav.		2.00			ft
H:V = 1:		1.00			
D		1.00			ft
Exc. Depth		22.00			ft
Added W/L		11.00			ft
Division 2 - Sitework					
Excavation	cu yd	4,041	\$15	\$60,610	Doesn't account for sloped sides of excavation
Hauling	cu yd	1,370	\$2	\$2,741	25% Swell Factor
Backfill	cu yd	2,944	\$10	\$29,444	25% Swell Factor
Drilled Piers	EA	40	\$3,000	\$120,000	
Division 3 - Concrete					
Concrete - 20" Base Slab	cu yd	140	\$500	\$70,216	Assumes 20" thick slab on grade
Concrete Walls - Exterior	cu yd	156	\$840	\$130,667	12" thick wall, cost from CCES for straight 12" wall, >8' tall
Concrete Walls - Interior Baffle walls	cu yd	17	\$840	\$14,000	12" thick baffle walls spaced at 5' (less influent and effluent channels, and 10' access corridor)
Roof	cu yd	84	\$404	\$34,030	Elevated Slab - 12" thick, cost from CCES
Division 8 - Doors and Windows					
Doors and Windows	LS	1	\$5,000	\$5,000	



Project: Water & Wastewater System Master Plan
 City of Edmond, OK
 Cost Opinion Expansion of Split Treatment from 30 to 40 mgd

Job Number: 8967A.00

By: RR
 Date: 11/15/2012
 Checked: _____
 Date: _____

Description	Units	Quantity	Unit Cost	Cost	Comments	
Division 15 - Piping	Piping	1	\$25,000	\$25,000	Assumption, similar to McBaine WTP estimate (accounts for LOX piping, and general piping)	
Division 16 - Electrical	Electrical	1	\$25,000	\$25,000	Similar to McBaine WTP est.	
Division 17 - Instrumentation	Instrumentation	1	\$25,000	\$25,000	Similar to McBaine WTP est.	
Subtotal for New Pre-Ozone Contactor				\$542,000		
New Filters						
Design Flow		16.00	MGD		4 filters @ 4 mgd each assumed from Tom Email from Bryant Bench, 1900ft2 at 3000\$/ft2, 3500ft2 at 2500\$/ft2 (by linear interpolation for	
Filter Rate		6.00	gpm/ft2			
Price/ft2 of filter Area		\$3,040	\$/ft2			
Required Active Filter Area		1852	ft2			
Filter Banks		4.00				
Filters off/BW		0.00				
Required Area/Filter		463	ft2			
Filter Width		15.00	ft			
Filter Length		30.00	ft			
Area/Filter		450	ft2			
Total Filter Area		1800	ft2			
Total Filter Area		1800	ft2		All online During backwash	
Subtotal for Filter Construction				\$5,471,623	By using price/filter area	
	Filter Piping & Valve Replacement	1	\$125,000	\$125,000		
Contingencies:						
Division 11 - Equipment		2%		\$109,432	Assumption	
Division 15 - Piping		2%		\$109,432	Assumption	
Division 16 - Electrical		2%		\$109,432	Assumption	
Division 17 - Instrumentation		2%		\$109,432	Assumption	
Total for Filter Construction				\$6,034,353		
New Clearwells						
Quantity		1			need 15-20% of plant capacity for storage (add one in the future) currently have 8 MG of storage	
Diameter		190	ft			
SWD		19	ft			
Exc Depth		10	ft			
Volume/clearwell		538704	ft3			
Volume/clearwell		4029507	gal			
Total Storage		4,029,507	gal			
Division 2 - Sitework						
	Excavation	cu yd	14,243	\$15	\$213,649	Assumes excavation at 1:1 slope, 2 foot over excavation 25% Swell Factor 25% Swell Factor
	Hauling	cu yd	11,957	\$2	\$23,914	
	Backfill	cu yd	4,678	\$10	\$46,778	
	Drilled Piers	EA	400	\$3,000	\$1,200,000	
Division 3 - Concrete						
	Concrete - Base Slab	cu yd	2,190	\$500	\$1,094,787	Assumes 24" thick slab Assumes 18" thick walls, 2' freeboard
	Concrete - Curved Walls	cu yd	696	\$750	\$522,290	
	Floor Grout	cu yd	350	\$400	\$140,014	
Division 5 - Metals						
	Misc Metals	LS	1	\$5,000	\$5,000	
Division 15 - Piping						



Project: Water & Wastewater System Master Plan
 City of Edmond, OK
 Cost Opinion Expansion of Split Treatment from 30 to 40 mgd

Job Number: 8967A.00

By: RR
 Date: 11/15/2012

Checked: _____
 Date: _____

Description	Units	Quantity	Unit Cost	Cost	Comments		
Division 16 - Electrical	Piping	LS	1	\$30,000	\$30,000	Includes piping to clearwells	
Division 17 - Instrumentation	Electrical	LS	1	\$5,000	\$5,000	Also see contingency below	
	Instrumentation	LS	1	\$5,000	\$5,000	Also see contingency below	
Sub Total per Clearwell					\$3,286,432		
Total Clearwell(s) Cost				#	1	\$3,286,432	\$3,287,000
Other Construction							
Division 15 - Piping	36" STW Clearwell Inlet Pipe (Buried)	LF	50	\$200	\$10,000	Estimated from Layout	
	36" STW Inlet Wall Pipe	EA	190	\$3,500	\$665,000		
	36" STW Inlet Elbow (Buried)	EA	1	\$3,500	\$3,500		
	36" STW Inlet Pipe Coupling (Buried)	EA	1	\$2,000	\$2,000		
	36" STW Inlet Pipe Trench	EA	50	\$150	\$7,500		
	36" STW Clearwell Outlet Piping (Buried)	LF	50	\$200	\$10,000	Estimated from Layout	
	36" STW Outlet Wall Pipe	EA	190	\$3,500	\$665,000		
	36" STW Outlet Elbow (Buried)	EA	1	\$3,500	\$3,500		
	36" STW Outlet Pipe Coupling (Buried)	EA	1	\$2,000	\$2,000		
	36" STW Outlet Piping Fittings and Appurtenances (Buried)	LS	1	\$2,000	\$2,000		
	36" STW Outlet Pipe Trench	EA	50	\$150	\$7,500		
Division 16 - Electrical	Electrical	LS	1	\$5,000	\$5,000	Also see contingency below	
Division 17 - Instrumentation	Instrumentation	LS	1	\$5,000	\$5,000	Also see contingency below	
Subtotal for Other Construction					\$1,388,000		
New HSPS							
Division 11 - Equipment	8 mgd HS pump(s)	EA	1	\$15,000	\$15,000	15' min depth per ODEQ	
	10 mgd HS pump(s)	EA	1	\$25,000	\$25,000		
Division 16 - Electrical	Electrical	LS	1	\$5,000	\$5,000		
Division 17 - Instrumentation	Instrumentation	LS	1	\$5,000	\$5,000		
Subtotal for New HSPS Building					\$50,000		
Chemical System Expansion							
Division 11 - Equipment	650 lb/d Ozone Generator and Power Supply Unit	EA	1	\$1,119,186	\$1,187,345	Using 2/3 Rule on \$1,013,333 per 560 lb/day	
	LOX Storage Tanks - 10,000 gal and Vaporizers	EA	1	\$351,046	\$372,424	Using 2/3 Rule on \$460,000 for 15,000 gal tanks and vaporizers	
	New Lime Slurry Loop to New SCC	LS	1	\$50,000	\$50,000	Estimated Piping Expansion	
	Lime System Expansion	LS	1	\$583,333	\$583,333	TOC Estimate (2-14-13)	
	New CO2 System (1 vaporizer @ 5,900 lb/day)	LS	1	\$438,583	\$438,583	Based on quote from TOMCO2 for Norman WTP, using 2/3 rule for 1920 lb/d system	
	New Filter Aid Polymer Feed System	LS	2	\$25,000	\$50,000	Estimated Piping Expansion	
	New Phosphoric Acid Feed System	EA	1	\$10,000	\$10,000	Based on quote from E12 6/18/13	
	New LAS Feed System	EA	1	\$12,019	\$12,019	2/3 rule based on quote from macaulay control company, for a three ducoflex dfb pump skid	
	Installation of Equipment (% of total equipment cost)	%	10.00%	1	\$270,370	Assumed Installation Cost	
	Replacement of Softeners	LS	1	\$500,000	\$500,000		



Project: Water & Wastewater System Master Plan
 City of Edmond, OK
 Cost Opinion Expansion of Split Treatment from 30 to 40 mgd

Job Number: 8967A.00

By: RR
 Date: 11/15/2012

Checked: _____
 Date: _____

Description	Units	Quantity	Unit Cost	Cost	Comments		
Division 15 - Piping	Piping	1	\$5,000	\$5,000	Assumption		
Division 16 - Electrical	Electrical	1	\$2,500	\$2,500	Also see contingency below		
Division 17 - Instrumentation	Instrumentation	1	\$5,000	\$5,000	Also see contingency below		
Subtotal for New Chem/RM Building				\$3,487,000			
New Lagoons							
Quantity		8.00			Assumed		
Water Depth		5.30			(assumed, from CDM O&M)		
Width		80.00			(assumed, same as other lagoons)		
Length		115.00			(assumed, same as other lagoons)		
Free Board		3.00			User Input		
Over Excav.		2.00			Over Excavation (assumed)		
	H:V = 1:	1.00			Horizontal to vertical slope		
	D	1.00			Distance from grade to top of structure		
Exc. Depth		9.30			Total Excavation Depth		
	Added W/L	9.30			Based on side slope		
Division 2 - Sitework	Excavation	cu yd	4,537	\$15	\$68,060	Doesn't account for sloped sides of excavation	
	Hauling	cu yd	2,469	\$2	\$4,937	25% Swell Factor	
	Backfill	cu yd	2,562	\$10	\$25,624	25% Swell Factor	
Division 3 - Concrete	Concrete - 12" Base Slab	cu yd	341	\$350	\$119,259	Assumes 12" thick slab	
	Concrete - 12" Straight Walls	cu yd	120	\$840	\$100,707	Assumes 12" thick walls,	
	Concrete Ramp	cu yd	26	\$840	\$21,691	Assumes 12 wide, 14' long, 8.3' tall access ramp (est. concrete cost)	
Division 5 - Metals	Misc Metals	LS	1	\$10,000	\$10,000	Estimated	
Division 11 - Equipment	Sluice Gate, Stainless Steel, 24" x 24"	EA	1	\$1,925	\$2,695	Use CCES estimate, assumes material cost = 40%	
Division 15 - Piping	24" DI Piping	LF	40	\$14	\$1,120	Assumes DI piping spans length of lagoon, divided by 2 because each line services 2 lags. (mu	
	12" DI Piping	LF	10	\$27	\$270	Assumes DI piping spans from road to each lagoon, divided by 2 because each line services 2	
	Fittings	LS	1	\$5,000	\$5,000		
	24" STW Outlet Piping (Buried)	LF	640	\$100	\$64,000	Assumes decant line runs along entire width of each lagoon	
	24" STW Outlet Wall Pipe	EA	8.00	\$1,750	\$14,000	Assumed 1 per lagoon	
	24" STW Outlet Elbow (Buried)	EA	8.00	\$1,750	\$14,000	Assumed 1 per lagoon	
	24" STW Outlet Pipe Coupling (Buried)	EA	8.00	\$750	\$6,000	Assumed 1 per lagoon	
	24" STW Outlet Piping Fittings and Appurtenances (Buried)	LS	1.00	\$5,000	\$5,000	Assumed 1 per lagoon	
	24" STW Outlet Pipe Trench	EA	640	\$100	\$64,000		
Division 16 - Electrical	Electrical	LS	1	\$10,000	\$10,000	Also see contingency below	
Division 17 - Instrumentation	Instrumentation	LS	1	\$10,000	\$10,000	Also see contingency below	
Sub Total per Lagoon					\$546,364		
Total Lagoon Cost				#	8	\$546,364	\$4,371,000
Subtotal 1							\$24,400,000
Yard Piping			1%		\$244,000		
Paving/Grading			1%		\$244,000		
Coatings			1%		\$244,000		
Electrical			5%		\$1,220,000		
Instrumentation			10%		\$2,440,000		
Standby Power			25%		\$6,100,000		



Project: Water & Wastewater System Master Plan
City of Edmond, OK
Cost Opinion Expansion of Split Treatment from 30 to 40 mgd

Job Number: 8967A.00

By: RR
Date: 11/15/2012
Checked: _____
Date: _____

Description	Units	Quantity	Unit Cost	Cost	Comments
Total Direct Cost				\$34,892,000	
Estimating Contingency (30%)				\$10,468,000	
GC OH&P (10%)				\$3,489,000	
Total Estimated Construction Cost				\$48,849,000	



Estimate Level:
ENR (December 2013)

Class 4
9667

Project Water & Wastewater System Master Plan
City of Edmond, OK
Cost Opinion - Centrifuge Dewatering - Alternative No. 1
for 40 mgd buildout w/0 IPR
Job Nu 8967A.00

By: R Rossell
Date: 11/15/2012
Checked: T Crowley
Date: 11/25/2013

DIV	Description	Quantity	Units	Unit Cost	Material Cost	Install Factor	Install Cost	Total Cost	Cost w/ Global Markups	Comments
NEW SLUDGE THICKENERS										
	Quantity	2	Ea							
	Diameter	50	ft							
	SWD	20	ft							
	Design Loading Rate	25	drylbs/sqft							
Division 2 Excavation										
	Excavate for Thickeners and Pump Station	10000	cuyd	\$ 15.00	\$ 150,000	1	\$ -	\$ 150,000		
	Backfill for Thickeners and pump station	3333.333333	cuyd	\$ 25.00	\$ 83,400	1	\$ -	\$ 83,400		
	Drilled Piers	7500	VLF	\$ 50.00	\$ 375,000	1	\$ -	\$ 375,000		
	Base Slab	479.3510016	cuyd	\$ 800.00	\$ 383,500	1	\$ -	\$ 383,500		
	Concrete Walls	575.2212019	cuyd	\$ 900.00	\$ 517,700	1	\$ -	\$ 517,700		
	Concrete Top Slab Pump Station	57.87037037	cuyd	\$ 1,200.00	\$ 69,500	1	\$ -	\$ 69,500		
	Mexanine Concrete	46.2962963	cuyd	\$ 1,500.00	\$ 69,500	1	\$ -	\$ 69,500		
	Tank Concrete	50		\$ 800.00	\$ 40,000	1	\$ -	\$ 40,000		
Division 4-15 Pump Station Building										
	Building	1250	sqft	\$ 200.00	\$ 250,000	1	\$ -	\$ 250,000		
Division 5 Metals										
	Miscellaneous Metals	1	LS	\$ 50,000	\$ 50,000	1	\$ -	\$ 50,000		
	Solids Storage Tank	100000	gal	\$ 2	\$ 175,000	1	\$ -	\$ 175,000		
Division 11 Equipment										
	Solids Handling Pumps	6	Ea	\$ 20,000	\$ 120,000	1.3	\$ 36,000	\$ 156,000		
	Thickener Mechanism	2	Ea	\$ 250,000	\$ 500,000	1.2	\$ 100,000	\$ 600,000		
	Tank Mixing System	1	LS	\$ 40,000	\$ 40,000	1.2	\$ 8,000	\$ 48,000		
Division 13 Special Construction										
	Electric Monorail	1	LS	\$ 15,000	\$ 15,000	1.2	\$ 3,000	\$ 18,000		
Division 15 Piping										
	Piping	1	LS	\$ 120,000.00	\$ 120,000	1.2	\$ 24,000	\$ 144,000		
Division 16 Electrical										
	Electrical	1	LS	\$ 150,000.00	\$ 150,000	1.2	\$ 30,000	\$ 180,000		
Division 17 Instrumentation and Control										
	Instrumentation	1	LS	\$ 25,000.00	\$ 25,000	1.2	\$ 5,000	\$ 30,000		
	Controls	1	LS	\$ 50,000.00	\$ 50,000	1.2	\$ 10,000	\$ 60,000		
	Subtotal							\$ 3,399,600		

New Centrifuge Dewatering Facility													
Peak Week Solids Production	889.00	dry Ton/week											
Percent Solids Inlet	10-15	ft											
Percent Solids Outlet	50-60	ft											
Operating Hours/Day	3.00	ft											
Operating Days/week	3.00	ft											
No of Centrifuges	3.00												
Size of Centrifuge	1184.39	gpm											Assumes 10 percent solids to centrifuge
Building Size													
No of Stories	2.00												
Length	165	ft											
Width	90	ft											
Division 2 - Sitework													
Excavation	2475	cu yd	\$ 15.00	\$ 37,200	1	\$ -	\$ 37,200						Doesn't account for sloped sides of excavation
Hauling	1856.25	cu yd	\$ 2.00	\$ 3,800	1	\$ -	\$ 3,800						25% Swell Factor
Backfill	618.75	cu yd	\$ 25.00	\$ 15,500	1	\$ -	\$ 15,500						25% Swell Factor
Division 3 - Concrete													
Concrete - 12" Base Slab	1100	cu yd	\$ 800.00	\$ 880,000	1	\$ -	\$ 880,000						Assumes 12" thick slab
Concrete - 2nd Floor	1100	cu yd	\$ 1,000.00	\$ 1,100,000	1	\$ -	\$ 1,100,000						Assumes 12" thick walls,
Concrete Ramp	25.82222222	cu yd	\$ 840.00	\$ 21,700	1	\$ -	\$ 21,700						Assumes 12'wide, 14' long, 8.3' tall access ramp (est.
Division 4-15 Dewatering Building													
Dewatering Building	29700	sqft	\$ 200.00	\$ 5,940,000	1	\$ -	\$ 5,940,000						
Division 5 - Metals													
Misc Metals	1	LS	\$ 100,000.00	\$ 100,000	1	\$ -	\$ 100,000						Estimated
Division 11 - Equipment													
Centrifuges	3	ea	800,000.00	\$ 2,400,000	1.1	\$ 240,000	\$ 2,640,000						
Progressive Cavity Centrifuge Feed Pumps	3	ea	45,000.00	\$ 135,000	1.2	\$ 27,000	\$ 162,000						
Solids Handling Bldg Bridge Crane	1	ea	90,000.00	\$ 90,000	1	\$ -	\$ 90,000						
Polymer Blending & Feed System	2	LS	50,000.00	\$ 100,000	1	\$ -	\$ 100,000						
Decant Pump Station	1	LS	\$ 100,000.00	\$ 100,000	1	\$ -	\$ 100,000						
Division 15 - Piping													
6-inch Plug Valves	12	ea	1,900.00	\$ 22,800	1	\$ -	\$ 22,800						
6-inch Check Valves	3	ea	2,700.00	\$ 8,100	1	\$ -	\$ 8,100						
6-inch Thickened Sludge Piping	500	LF	33.21	\$ 16,700	1	\$ -	\$ 16,700						
				\$ -	1	\$ -	\$ -						
				\$ -	1	\$ -	\$ -						
Centrifuge Dewatering Station													
Polymer Piping		LF		\$ -	1	\$ -	\$ -						
6-inch Centrate Piping	1	LS	220,000.00	\$ 220,000	1	\$ -	\$ 220,000						
Thickened Solids Screw Conveyors	100	LF	3,000.00	\$ 300,000	1	\$ -	\$ 300,000						
				\$ -	1	\$ -	\$ -						
				\$ -	1	\$ -	\$ -						
Centrate & Supernatant Junction Box													
6" X 16" Reducer	1	ea	1,150.00	\$ 1,200	1	\$ -	\$ 1,200						
24" X 16" WYE Centrate to Lagoon supernatant	1	ea	5,320.00	\$ 5,400	1	\$ -	\$ 5,400						
Division 16 - Electrical													
Electrical	1	LS	\$ 550,000.00	\$ 550,000	1.2	\$ 110,000	\$ 660,000						Also see contingency below
Division 17 - Instrumentation													
Instrumentation	1	LS	\$ 200,000.00	\$ 200,000	1.2	\$ 40,000	\$ 240,000						Also see contingency below
Subtotal Centrifuge Dewatering Building							\$ 12,664,400						

Subtotal Lagoon Dewatering						\$ -			
General Conditions		15%	\$ -	1	\$ -	\$ 16,064,000			
					\$ 2,409,600	\$ 18,473,600			
Overhead and Profit		7%			\$ 1,293,200	\$ 19,766,800			
Taxes		0%			\$ -	\$ 19,766,800			
Contingency		30%			\$ 5,930,100	\$ 25,696,900			
Engineering and Admin		25%			\$ 6,424,300	\$ 32,121,200			
Allowance during construction		5%			\$ 1,606,100	\$ 33,727,300			
Total									



Estimate Level:
ENR (December 2013)

Class 4
9667

Project Water & Wastewater System Master Plan
City of Edmond, OK
Cost Opinion - Buildout of lagoon Facilities

By: R Rossell
Date: 11/15/2012

Job Nu 8967A.00

Checked: T Crowley
Date: 11/25/2013

DIV	Description	Quantity	Units	Unit Cost	Material Cost	Install Factor	Install Cost	Total Cost	Cost w/ Global Markups	Comments
NEW SLUDGE THICKENERS										
	Quantity	2	Ea							
	Diameter	50	ft							
	SWD	20	ft							
	Design Loading Rate	25	drylbs/sqft							
Division 2 Excavation										
	Excavate for Thickeners and Pump Station	10000	cuyd	\$ 15.00	\$ 150,000	1	\$ -	\$ 150,000		
	Backfill for Thickeners and pump station	3333.333333	cuyd	\$ 25.00	\$ 83,400	1	\$ -	\$ 83,400		
	Drilled Piers	7500	VLF	\$ 50.00	\$ 375,000	1	\$ -	\$ 375,000		
	Base Slab	479.3510016	cuyd	\$ 800.00	\$ 383,500	1	\$ -	\$ 383,500		
	Concrete Walls	575.2212019	cuyd	\$ 900.00	\$ 517,700	1	\$ -	\$ 517,700		
	Concrete Top Slab Pump Station	57.87037037	cuyd	\$ 1,200.00	\$ 69,500	1	\$ -	\$ 69,500		
	Mexanine Concrete	46.2962963	cuyd	\$ 1,500.00	\$ 69,500	1	\$ -	\$ 69,500		
	Tank Concrete	50		\$ 800.00	\$ 40,000	1	\$ -	\$ 40,000		
Division 4-15 Pump Station Building										
	Building	1250	sqft	\$ 200.00	\$ 250,000	1	\$ -	\$ 250,000		
Division 5 Metals										
	Miscellaneous Metals	1	LS	\$ 50,000	\$ 50,000	1	\$ -	\$ 50,000		
	Solids Storage Tank	100000	gal	\$ 2	\$ 175,000	1	\$ -	\$ 175,000		
Division 11 Equipment										
	Solids Handling Pumps	6	Ea	\$ 20,000	\$ 120,000	1.3	\$ 36,000	\$ 156,000		
	Thickener Mechanism	2	Ea	\$ 250,000	\$ 500,000	1.2	\$ 100,000	\$ 600,000		
	Tank Mixing System	1	LS	\$ 40,000	\$ 40,000	1.2	\$ 8,000	\$ 48,000		
Division 13 Special Construction										
	Electric Monorail	1	LS	\$ 15,000	\$ 15,000	1.2	\$ 3,000	\$ 18,000		
Division 15 Piping										
	Piping	1	LS	\$ 120,000.00	\$ 120,000	1.2	\$ 24,000	\$ 144,000		
Division 16 Electrical										
	Electrical	1	LS	\$ 150,000.00	\$ 150,000	1.2	\$ 30,000	\$ 180,000		
Division 17 Instrumentation and Control										
	Instrumentation	1	LS	\$ 25,000.00	\$ 25,000	1.2	\$ 5,000	\$ 30,000		
	Controls	1	LS	\$ 50,000.00	\$ 50,000	1.2	\$ 10,000	\$ 60,000		
	Subtotal							\$ 3,399,600		

APPENDIX I – MIEX JAR TESTING RESULTS

MIEX Resin Jar Testing Results on Raw Water

Arcadia WTP

Lab Control #:	NA1100-LC-168	Client:	Edmond, OK				
Sample Date:		Analyst:	SB				
Arrival Date:	2/25/2013	Treatment Date:	2/28/2013	MIEX HC DOC			
		Raw water					
Parameter	Units	Raw	1000	800	600	400	200
DOC	mg/L	4.25	2.72	2.64	2.60	2.49	2.08
UVA	1/cm	0.079	0.029	0.028	0.028	0.025	0.016
SUVA		1.86	1.07	1.06	1.08	1.00	0.77
True Color	CU	12	8	8	8	6	2
Apparent Color	CU	234	144	165	203	224	212
pH	pH Units	7.74	8.00	7.97	8.04	7.94	7.69
T-Alkalinity	mg/L CaCO3	140	140				
Ca Hardness	mg/L CaCO3	120	120				
T-Hardness	mg/L CaCO3	160	160				
Iron	mg/L	0.083	0.111				
Sulfate	mg/L	35.1	26.5				
Chloride	mg/L	45	50				
Turbidity	NTU	13.1	13.50				
notes: sample has suspended solids leading to erratic apparent color values							

APPENDIX J – CHROMIUM (VI) TREATMENT ALTERNATIVES

Based on the number of wells that are projected to be over the future hexavalent chromium MCL and the amount that the wells would be over the projected MCL, the blending of groundwater with treated surface water to the MCL was not considered further.

Treatment of Groundwater

Options for the treatment of groundwater include individual treatment units at each well, grouping of wells for combined treatment at several locations, or grouping of all wells at a central location for treatment of all wells. The average well capacity is approximately 0.25 mgd with a maximum of nearly 0.5 mgd and a minimum of approximately 0.1 mgd. Treatment options for arsenic include ion exchange, coagulation/filtration, adsorptive media, and membrane softening while treatment options for hexavalent chromium include reductive coagulation/filtration and weak base anion exchange. As discussed in the treatment technology review, reductive coagulation/filtration and weak base ion exchange appear to be the most promising treatment techniques to remove both arsenic and hexavalent chromium.

Treatment for arsenic at individual well sites via adsorptive media or ion exchange is feasible. Costs were provided previously for use of granular ferric hydroxide media (\$800,000 per well in 2009 dollars). However, with the anticipated MCLs for hexavalent chromium, future compliance of these wells would still be a concern. Because of the number of wells affected, the fact that multiple treatment technologies at individual well sites where both arsenic and hexavalent chromium require treatment, and the fact that the treatment technologies required for hexavalent chromium removal would require the addition of chemicals for pre and post treatment and residuals disposal, treatment at individual well sites was not considered further.

Grouping of wells geographically for treatment of multiple wells has the potential to work in areas where several wells are concentrated within an area. Some potential groupings would include wells 11 through 20 and wells 1-5, 37-40 along with several other smaller groupings. However, due to how spread out the remaining wells are this would lead to several treatment facilities which results in reduced economies of scale on construction costs as well as additional operators required to operate multiple treatment facilities.

A central treatment facility to treat all of the groundwater wells for hexavalent chromium and arsenic would require a treatment facility capacity of approximately 12.5 mgd. Based on the central location of the Norman WTP to the groundwater wells spread out around the City, treatment facilities for the groundwater located at the existing Norman WTP site would be recommended. Co-locating the treatment facilities there would also allow for post treatment blending with the surface water, which would provide a uniform water quality being pumped to the distribution system.

Treatment at the Surface Water Treatment Plant

The existing Norman WTP utilizes lime softening upflow clarifiers to treat the surface water supply. The existing WTP can be expanded to provide treatment of the groundwater wells. Arsenic would be removed through the lime softening process. This combined with blending with wells with lower arsenic and the surface water being treated, would result in arsenic levels below the MCL in the finished water. However, as in the treatment technology discussion, lime softening is not effective at removing hexavalent chromium. The use of the lime softening treatment plant to reduce hexavalent chromium would be limited to its ability to provide dilution via blending. This would restrict the total groundwater flow that could be used in the lime softening process. The amount of groundwater that could be used would ultimately depend on the future MCL of hexavalent chromium. The average chromium concentration found in the existing wells was approximately 50 ppb. Therefore, based on samples of chromium in the surface water being measured at <5 ppb and 9.2 ppb, this option would only be feasible if the future MCL is set at 20 ppb and would be limited to a groundwater flow of a third to a half of the surface water flow rate.

Cost

The costs for a treatment facility to remove arsenic and hexavalent chromium are based on a 12.5 mgd capacity and reductive coagulation/filtration treatment. A summary of the cost opinion is provided in Table 2

Table 2 – Cost Opinion for 12.5 MGD Groundwater Treatment Facilities at the Existing Norman WTP

Description	Cost Opinion
Conventional Treatment and Filtration	\$14,800,000
Chemical Feed Systems	\$2,700,000
Aeration	\$5,700,000
Waste Handling Facilities	\$3,700,000
Finished Water Storage and Pumping	\$3,500,000
<i>Subtotal – Treatment Facilities</i>	<i>\$31,400,000</i>
Raw Water Transmission Mains	\$41,000,000
Total	\$71,400,000

**APPENDIX K – SELECTION AND DISTRIBUTION SYSTEM
REHABILITATION SCHEDULE**

Active Sanitary Sewer Lines Projected 60-Year Replacement Budget Requirements

YEAR BUILT	FEET	INCH-FEET	AVE DIA	AGE	CUM FEET TO DATE	CUM INCH-FEET TO DATE	REHAB FISCAL YEAR	REQ'D REHAB FT/YR	CUM REQ'D REHAB FT	FT OF PIPE >60 YRS OLD	FT > 60 YRS MOVING AVG	EST COST (PRESENT WORTH)	EST COST (BUDGET AMOUNT) 4.75% CCI	REHAB FISCAL YEAR	REQ'D REHAB IN-FT/YR	CUM REQ'D REHAB IN-FT	IN-FT OF PIPE >60 YRS OLD	IN-FT > 60 YRS MOVING AVG	EST COST (PRESENT WORTH)	EST COST (BUDGET AMOUNT) 4.75% CCI
1960	2,760	22,080	8.0	49	233,083	1,864,459	2011	15,000	15,000	190,966		1,500,000	1,500,000	2011	120,000	120,000	1,527,524		1,500,000	1,500,000
1961	2,246	17,965	8.0	48	235,328	1,882,424	2012	16,250	31,250	175,216		1,625,000	1,702,188	2012	130,000	250,000	1,401,524		1,625,000	1,702,188
1962	28,375	360,808	12.7	47	263,704	2,243,232	2013	11,010	42,260	164,706		1,101,019	1,208,100	2013	140,000	390,000	1,265,524		1,750,000	1,920,198
1963	23,834	197,675	8.3	46	287,537	2,440,908	2014	18,085	60,346	148,460		1,808,542	2,078,695	2014	150,000	540,000	1,130,241		1,875,000	2,155,800
1964	12,247	93,803	7.7	45	299,784	2,534,710	2015	20,890	81,235	128,225		2,088,950	2,515,036	2015	160,000	700,000	975,482		2,000,000	2,407,943
1965	55,731	961,565	17.3	44	355,515	3,496,275	2016	9,853	91,088	121,697		985,291	1,242,609	2016	170,000	870,000	832,078		2,125,000	2,679,965
1966	1,279	10,513	8.2	43	356,794	3,506,788	2017	21,900	112,988	100,297		2,190,022	2,893,161	2017	180,000	1,050,000	656,078		2,250,000	2,972,396
1967	5,319	42,555	8.0	42	362,113	3,549,342	2018	23,750	136,738	84,898		2,375,000	3,286,562	2018	190,000	1,240,000	532,885		2,375,000	3,286,562
1968	4,911	39,290	8.0	41	367,025	3,588,633	2019	25,000	161,738	65,188		2,500,000	3,623,867	2019	200,000	1,440,000	375,210		2,500,000	3,623,867
1969	10,163	80,879	8.0	40	377,187	3,669,511	2020	26,387	188,125	42,198	122,185	2,638,676	4,006,566	2020	210,000	1,650,000	192,379	888,893	2,625,000	3,985,801
1970	11,935	102,792	8.6	39	389,122	3,772,304	2021	25,543	213,668	19,415	105,030	2,554,286	4,062,654	2021	220,000	1,870,000	(5,541)	735,586	2,750,000	4,373,942
1971	33,907	272,147	8.0	38	423,029	4,044,451	2022	28,656	242,324	(6,996)	86,809	2,865,603	4,774,307	2022	230,000	2,100,000	(217,576)	573,676	2,875,000	4,789,963
1972	112,970	1,760,835	15.6	37	535,999	5,805,286	2023	15,398	257,722	5,982	70,936	1,539,774	2,687,234	2023	240,000	2,340,000	(96,768)	437,447	3,000,000	5,235,638
1973	83,866	779,091	9.3	36	619,865	6,584,377	2024	26,911	284,633	2,904	56,381	2,691,147	4,919,713	2024	250,000	2,590,000	(149,092)	309,513	3,125,000	5,712,845
1974	16,367	138,440	8.5	35	636,232	6,722,818	2025	30,738	315,371	(15,587)	42,000	3,073,761	5,886,085	2025	260,000	2,850,000	(315,290)	180,436	3,250,000	6,223,573
1975	17,852	152,848	8.6	34	654,083	6,875,666	2026	31,534	346,905	8,610	30,691	3,153,407	6,325,437	2026	270,000	3,120,000	376,275	134,856	3,375,000	6,769,931
1976	77,626	755,340	9.7	33	731,710	7,631,005	2027	28,776	375,680	(18,886)	18,773	2,877,561	6,046,290	2027	280,000	3,400,000	106,788	79,927	3,500,000	7,354,151
1977	57,460	470,506	8.2	32	789,170	8,101,512	2028	35,416	411,096	(48,983)	5,385	3,541,584	7,794,999	2028	290,000	3,690,000	(140,658)	12,573	3,625,000	7,938,597
1978	66,621	520,561	7.8	31	855,791	8,622,073	2029	38,394	449,490	(82,466)	(9,381)	3,839,379	8,851,840	2029	300,000	3,990,000	(401,367)	(65,085)	3,750,000	8,645,773
1979	17,288	156,190	9.0	30	873,079	8,778,263	2030	35,420	484,910	(107,723)	(24,373)	3,542,021	8,554,168	2030	320,000	4,310,000	(640,489)	(148,372)	4,000,000	9,660,211
1980	41,255	331,637	8.0	29	914,334	9,109,900	2031	42,296	527,206	(138,084)	(40,123)	4,229,563	10,699,812	2031	340,000	4,650,000	(877,696)	(235,587)	4,250,000	10,751,512
1981	35,582	284,150	8.0	28	949,916	9,394,049	2032	45,080	572,286	(149,257)	(54,349)	4,508,026	11,945,961	2032	360,000	5,010,000	(965,549)	(310,385)	4,500,000	11,924,692
1982	57,134	510,214	8.9	27	1,007,051	9,904,263	2033	42,553	614,839	(78,840)	(62,831)	4,255,286	11,811,836	2033	380,000	5,390,000	415,286	(259,179)	4,750,000	13,185,066
1983	190,059	1,530,474	8.1	26	1,197,110	11,434,736	2034	49,673	664,512	(44,647)	(67,586)	4,967,338	14,443,299	2034	400,000	5,790,000	794,377	(164,832)	5,000,000	14,538,270
1984	70,668	572,116	8.1	25	1,267,778	12,006,852	2035	51,879	716,391	(80,159)	(74,044)	5,187,854	15,800,998	2035	420,000	6,210,000	512,818	(82,021)	5,250,000	15,990,280
1985	98,548	601,256	6.1	24	1,366,326	12,608,109	2036	72,117	788,508	(134,425)	(88,347)	7,211,728	23,008,598	2036	440,000	6,650,000	225,666	(97,082)	5,500,000	17,547,428
1986	6,806	56,498	8.3	23	1,373,131	12,664,607	2037	55,410	843,918	(112,209)	(97,679)	5,541,002	18,517,959	2037	460,000	7,110,000	521,005	(55,661)	5,750,000	19,216,428
1987	676	5,409	8.0	22	1,373,807	12,670,016	2038	60,000	903,918	(114,749)	(104,256)	6,000,000	21,004,392	2038	480,000	7,590,000	511,512	9,556	6,000,000	21,004,392
1988	43,766	523,795	12.0	21	1,417,573	13,193,811	2039	40,106	944,025	(88,234)	(104,833)	4,010,640	14,707,083	2039	480,000	8,070,000	552,073	104,900	6,000,000	22,002,100
1989	31,830	255,147	8.0	20	1,449,403	13,448,957	2040	59,880	1,003,905	(130,826)	(107,143)	5,988,007	23,001,133	2040	480,000	8,550,000	228,263	191,775	6,000,000	23,047,200
1990	46,586	675,956	14.5	19	1,495,989	14,124,913	2041	33,081	1,036,986	(122,652)	(105,600)	3,308,109	13,310,694	2041	480,000	9,030,000	79,900	287,535	6,000,000	24,141,942
1991	32,902	262,605	8.0	18	1,528,890	14,387,518	2042	60,139	1,097,125	(147,208)	(105,395)	6,013,897	25,347,256	2042	480,000	9,510,000	(115,951)	372,495	6,000,000	25,288,684
1992	27,414	267,472	9.8	17	1,556,304	14,654,990	2043	49,196	1,146,321	(139,270)	(111,438)	4,919,597	21,719,934	2043	480,000	9,990,000	(85,737)	322,393	6,000,000	26,489,897
1993	33,150	283,214	8.5	16	1,589,454	14,938,204	2044	56,184	1,202,505	(5,394)	(107,513)	5,618,384	25,983,309	2044	480,000	10,470,000	964,736	339,428	6,000,000	27,748,167
1994	42,235	351,227	8.3	15	1,631,689	15,289,431	2045	57,719	1,260,224	7,554	(98,741)	5,771,950	27,961,446	2045	480,000	10,950,000	1,056,852	393,832	6,000,000	29,066,205
1995	35,882	298,743	8.3	14	1,667,571	15,588,173	2046	57,653	1,317,878	48,448	(80,454)	5,765,347	29,256,111	2046	480,000	11,430,000	1,178,109	489,076	6,000,000	30,446,849
1996	48,408	443,850	9.2	13	1,715,980	16,032,023	2047	52,351	1,370,229	2,903	(68,943)	5,235,112	27,827,303	2047	480,000	11,910,000	754,607	512,436	6,000,000	31,893,075
1997	52,805	433,369	8.2	12	1,768,785	16,465,392	2048	58,487	1,428,715	(54,908)	(62,959)	5,848,687	32,565,488	2048	480,000	12,390,000	280,016	489,287	6,000,000	33,407,996
1998	42,055	354,665	8.4	11	1,810,840	16,820,057	2049	56,917	1,485,632	(68,059)	(60,941)	5,691,662	33,196,499	2049	480,000	12,870,000	323,811	466,461	6,000,000	34,994,875
1999	36,773	295,835	8.0	10	1,847,613	17,115,892	2050	59,666	1,545,298	(95,895)	(57,448)	5,966,553	36,452,787	2050	480,000	13,350,000	98,957	453,530	6,000,000	36,657,132
2000	36,021	324,304	9.0	9	1,883,634	17,440,196	2051	53,314	1,598,612	(102,623)	(55,445)	5,331,444	34,119,772	2051	480,000	13,830,000	294,913	475,031	6,000,000	38,398,346
2001	35,919	302,784	8.4	8	1,919,553	17,742,980	2052	56,942	1,655,554	(126,664)	(53,391)	5,694,200	38,172,273	2052	480,000	14,310,000	77,518	494,378	6,000,000	40,222,267
2002	38,816	314,793	8.1	7	1,958,368	18,057,772	2053	59,187	1,714,741	(158,437)	(55,308)	5,918,667	41,561,696	2053	480,000	14,790,000	(135,010)	489,451	6,000,000	42,132,825
2003	51,564	447,827	8.7	6	2,009,933	18,505,599	2054	55,269	1,770,010	(180,556)	(72,824)	5,526,896	40,654,132	2054	480,000	15,270,000	(331,796)	359,798	6,000,000	44,134,134
2004	52,946	470,536	8.9	5	2,062,878	18,976,135	2055	54,011	1,824,020	(192,332)	(92,812)	5,401,065	41,615,664	2055	480,000	15,750,000	(460,569)	208,055	6,000,000	46,230,506
2005	75,992	1,216,175	16.0	4	2,138,870	20,192,310	2056	29,993	1,854,013	(186,442)	(116,301)	2,999,252	24,207,189	2056	480,000	16,230,000	(641,827)	26,062	6,000,000	48,426,455
2006	63,735	611,891	9.6	3	2,202,606	20,804,201	2057	49,998	1,904,010	(188,031)	(135,395)	4,999,752	42,270,159	2057	480,000	16,710,000	(677,977)	(117,196)	6,000,000	50,726,711
2007	27,761	222,531	8.0	2	2,230,367	21,026,732	2058	59,880	1,963,891	(195,106)	(149,414)	5,988,015	53,030,092	2058	480,000	17,190,000	(724,608)	(217,659)	6,000,000	53,136,230

**Active Water Lines in Highly Corrosive Soil
Projected 40-Year Replacement Budget Requirements**

			BASED ON LENGTH								BASED ON LENGTH AND DIAMETER										
YEAR BUILT	FEET	INCH-FEET	AVE DIA	AGE	CUM FEET TO DATE	CUM INCH-FEET TO DATE	REHAB FISCAL YEAR	REQ'D REHAB FT/YR	CUM REQ'D REHAB FT	FT OF PIPE >40 YRS OLD	FT > 40 YRS 10-YEAR MOVING AVG	EST COST (PRESENT WORTH)	EST COST (BUDGET AMOUNT) 4.75% ANN.CCI	REHAB FISCAL YEAR	REQ'D REHAB IN-FT/YR	CUM REQ'D REHAB IN-FT	IN-FT OF PIPE >40 YRS OLD	IN-FT > 40 YRS 10-YEAR MOVING AVG	EST COST (PRESENT WORTH)	EST COST (BUDGET AMOUNT) 4.75% ANN.CCI	
1908	27,635	176,849	6.4	101	27,635	176,849															
1909	-	-	0.0	100	27,635	176,849															
1910	16	96	6.0	99	27,651	176,945															
1911	5,013	29,969	6.0	98	32,664	206,914															
1912	-	-	0.0	97	32,664	206,914															
1913	-	-	0.0	96	32,664	206,914															
1914	-	-	0.0	95	32,664	206,914															
1915	-	-	0.0	94	32,664	206,914															
1916	-	-	0.0	93	32,664	206,914															
1917	3,589	17,915	5.0	92	36,253	224,829															
1918	1,758	5,505	3.1	91	38,011	230,334															
1919	572	2,290	4.0	90	38,583	232,624															
1920	-	-	0.0	89	38,583	232,624															
1921	-	-	0.0	88	38,583	232,624															
1922	-	-	0.0	87	38,583	232,624															
1923	-	-	0.0	86	38,583	232,624															
1924	-	-	0.0	85	38,583	232,624															
1925	-	-	0.0	84	38,583	232,624															
1926	-	-	0.0	83	38,583	232,624															
1927	-	-	0.0	82	38,583	232,624															
1928	-	-	0.0	81	38,583	232,624															
1929	3,091	13,963	4.5	80	41,674	246,587															
1930	-	-	0.0	79	41,674	246,587															
1931	-	-	0.0	78	41,674	246,587															
1932	-	-	0.0	77	41,674	246,587															
1933	-	-	0.0	76	41,674	246,587															
1934	-	-	0.0	75	41,674	246,587															
1935	-	-	0.0	74	41,674	246,587															
1936	-	-	0.0	73	41,674	246,587															
1937	-	-	0.0	72	41,674	246,587															
1938	3,591	14,291	4.0	71	45,265	260,879															
1939	-	-	0.0	70	45,265	260,879															
1940	-	-	0.0	69	45,265	260,879															
1941	-	-	0.0	68	45,265	260,879															
1942	-	-	0.0	67	45,265	260,879															
1943	-	-	0.0	66	45,265	260,879															
1944	-	-	0.0	65	45,265	260,879															
1945	1,853	22,237	12.0	64	47,119	283,116															
1946	-	-	0.0	63	47,119	283,116															
1947	2,354	6,903	2.9	62	49,473	290,019															
1948	9,759	46,426	4.8	61	59,232	336,445															
1949	-	-	0.0	60	59,232	336,445															
1950	-	-	0.0	59	59,232	336,445															
1951	15,160	108,513	7.2	58	74,392	444,958															
1952	-	-	0.0	57	74,392	444,958															
1953	1,433	10,436	7.3	56	75,826	455,394															
1954	4,123	16,494	4.0	55	79,949	471,888															
1955	2,860	15,893	5.6	54	82,809	487,780															
1956	-	-	0.0	53	82,809	487,780															
1957	-	-	0.0	52	82,809	487,780															
1958	6,665	56,506	8.5	51	89,474	544,286															
1959	2,905	17,832	6.1	50	92,379	562,119															
1960	2,916	17,496	6.0	49	95,295	579,615															
1961	3,216	20,826	6.5	48	98,511	600,441															
1962	10,938	76,161	7.0	47	109,448	676,602															
1963	16,372	111,074	6.8	46	125,820	787,676															
1964	5,588	50,818	9.1	45	131,408	838,494															
1965	19,711	131,468	6.7	44	151,119	969,962															

**Active Water Lines in Highly Corrosive Soil
Projected 40-Year Replacement Budget Requirements**

			BASED ON LENGTH										BASED ON LENGTH AND DIAMETER								
YEAR BUILT	FEET	INCH-FEET	AVE DIA	AGE	CUM FEET TO DATE	CUM INCH-FEET TO DATE	REHAB FISCAL YEAR	REQ'D REHAB FT/YR	CUM REQ'D REHAB FT	FT OF PIPE >40 YRS OLD	FT > 40 YRS 10-YEAR MOVING AVG	EST COST (PRESENT WORTH)	EST COST (BUDGET AMOUNT) 4.75% ANN.CCI	REHAB FISCAL YEAR	REQ'D REHAB IN-FT/YR	CUM REQ'D REHAB IN-FT	IN-FT OF PIPE >40 YRS OLD	IN-FT > 40 YRS 10-YEAR MOVING AVG	EST COST (PRESENT WORTH)	EST COST (BUDGET AMOUNT) 4.75% ANN.CCI	
																					1966
1967	12	99	8.0	42	153,636	995,108															
1968	8,594	48,296	5.6	41	162,229	1,043,404															
1969	10,781	92,734	8.6	40	173,011	1,136,138															
1970	3,152	10,799	3.4	39	176,162	1,146,936															
1971	28,378	186,957	6.6	38	204,540	1,333,893	2011	15,000	15,000	161,162		1,320,000	1,320,000	2011	120,000	120,000	1,026,936		1,320,000	1,320,000	
1972	66,925	551,254	8.2	37	271,466	1,885,147	2012	17,500	32,500	172,040		1,540,000	1,613,150	2012	140,000	260,000	1,073,893		1,540,000	1,613,150	
1973	35,708	259,987	7.3	36	307,174	2,145,134	2013	20,000	52,500	218,966		1,760,000	1,931,171	2013	160,000	420,000	1,465,147		1,760,000	1,931,171	
1974	6,630	43,051	6.5	35	313,804	2,188,185	2014	22,500	75,000	232,174		1,980,000	2,275,764	2014	180,000	600,000	1,545,134		1,980,000	2,275,764	
1975	6,928	53,297	7.7	34	320,731	2,241,483	2015	25,000	100,000	213,804		2,200,000	2,648,737	2015	200,000	800,000	1,388,185		2,200,000	2,648,737	
1976	10,719	78,197	7.3	33	331,450	2,319,680	2016	27,500	127,500	193,231		2,420,000	3,052,007	2016	220,000	1,020,000	1,221,483		2,420,000	3,052,007	
1977	17,484	122,847	7.0	32	348,934	2,442,527	2017	30,000	157,500	173,950		2,640,000	3,487,612	2017	250,000	1,270,000	1,049,680		2,750,000	3,632,929	
1978	31,641	216,020	6.8	31	380,575	2,658,546	2018	30,000	187,500	161,434		2,640,000	3,653,273	2018	250,000	1,520,000	922,527		2,750,000	3,805,493	
1979	23,830	176,020	7.4	30	404,406	2,834,566	2019	30,000	217,500	163,075		2,640,000	3,826,804	2019	250,000	1,770,000	888,546		2,750,000	3,986,254	
1980	41,553	327,641	7.9	29	445,959	3,162,207	2020	30,000	247,500	156,906	184,674	2,640,000	4,008,577	2020	250,000	2,020,000	814,566	1,139,610	2,750,000	4,175,601	
1981	24,611	219,012	8.9	28	470,570	3,381,220	2021	30,000	277,500	168,459	185,404	2,640,000	4,198,984	2021	250,000	2,270,000	892,207	1,126,137	2,750,000	4,373,942	
1982	33,687	285,415	8.5	27	504,257	3,666,635	2022	30,000	307,500	163,070	184,507	2,640,000	4,398,436	2022	250,000	2,520,000	861,220	1,104,870	2,750,000	4,581,704	
1983	102,501	858,978	8.4	26	606,759	4,525,612	2023	30,000	337,500	166,757	179,286	2,640,000	4,607,362	2023	250,000	2,770,000	896,635	1,048,018	2,750,000	4,799,335	
1984	55,764	681,910	12.2	25	662,522	5,207,522	2024	30,000	367,500	239,259	179,995	2,640,000	4,826,211	2024	250,000	3,020,000	1,505,612	1,044,066	2,750,000	5,027,304	
1985	13,758	108,318	7.9	24	676,281	5,315,840	2025	30,000	397,500	265,022	185,116	2,640,000	5,055,456	2025	250,000	3,270,000	1,937,522	1,099,000	2,750,000	5,266,100	
1986	15,846	118,953	7.5	23	692,126	5,434,793	2026	30,000	427,500	248,781	190,671	2,640,000	5,295,591	2026	250,000	3,520,000	1,795,840	1,156,436	2,750,000	5,516,240	
1987	7,416	88,095	11.9	22	699,542	5,522,888	2027	30,000	457,500	234,626	196,739	2,640,000	5,547,131	2027	250,000	3,770,000	1,664,793	1,217,947	2,750,000	5,778,262	
1988	3,121	23,855	7.6	21	702,663	5,546,743	2028	30,000	487,500	212,042	201,800	2,640,000	5,810,620	2028	250,000	4,020,000	1,502,888	1,275,983	2,750,000	6,052,729	
1989	6,653	64,048	9.6	20	709,316	5,610,791	2029	30,000	517,500	185,163	204,009	2,640,000	6,086,624	2029	250,000	4,270,000	1,276,743	1,314,803	2,750,000	6,340,234	
1990	2,708	26,078	9.6	19	712,024	5,636,870	2030	30,000	547,500	161,816	204,500	2,640,000	6,375,739	2030	250,000	4,520,000	1,090,791	1,342,425	2,750,000	6,641,395	
1991	7,840	66,266	8.5	18	719,865	5,703,135	2031	30,000	577,500	134,524	201,106	2,640,000	6,678,587	2031	250,000	4,770,000	866,870	1,339,891	2,750,000	6,956,861	
1992	4,754	42,479	8.9	17	724,618	5,745,614	2032	30,000	607,500	112,365	196,036	2,640,000	6,995,819	2032	250,000	5,020,000	683,135	1,322,083	2,750,000	7,287,312	
1993	8,273	77,989	9.4	16	732,892	5,823,603	2033	30,000	637,500	87,118	188,072	2,640,000	7,328,121	2033	250,000	5,270,000	475,614	1,279,981	2,750,000	7,633,459	
1994	25,605	219,881	8.6	15	758,496	6,043,484	2034	30,000	667,500	65,392	170,685	2,640,000	7,676,207	2034	250,000	5,520,000	303,603	1,159,780	2,750,000	7,996,049	
1995	16,908	150,248	8.9	14	775,404	6,193,732	2035	30,000	697,500	60,996	150,282	2,640,000	8,040,826	2035	250,000	5,770,000	273,484	993,376	2,750,000	8,375,861	
1996	28,648	249,534	8.7	13	804,052	6,443,266	2036	30,000	727,500	47,904	130,195	2,640,000	8,422,766	2036	250,000	6,020,000	173,732	831,166	2,750,000	8,773,714	
1997	20,078	167,878	8.4	12	824,130	6,611,144	2037	30,000	757,500	46,552	111,387	2,640,000	8,822,847	2037	250,000	6,270,000	173,266	682,013	2,750,000	9,190,466	
1998	17,178	144,999	8.4	11	841,309	6,756,143	2038	30,000	787,500	36,630	93,846	2,640,000	9,241,932	2038	250,000	6,520,000	91,144	540,838	2,750,000	9,627,013	
1999	28,690	235,985	8.2	10	869,998	6,992,128	2039	30,000	817,500	23,809	77,711	2,640,000	9,680,924	2039	250,000	6,770,000	(13,857)	411,778	2,750,000	10,084,296	
2000	26,275	238,969	9.1	9	896,274	7,231,097	2040	30,000	847,500	22,498	63,779	2,640,000	10,140,768	2040	250,000	7,020,000	(27,872)	299,912	2,750,000	10,563,300	
2001	37,478	364,061	9.7	8	933,751	7,595,159	2041	30,000	877,500	18,774	52,204	2,640,000	10,622,454	2041	250,000	7,270,000	(38,903)	209,335	2,750,000	11,065,057	
2002	14,287	122,214	8.6	7	948,038	7,717,372	2042	30,000	907,500	26,251	43,593	2,640,000	11,127,021	2042	250,000	7,520,000	75,159	148,537	2,750,000	11,590,647	
2003	40,808	361,538	8.9	6	988,846	8,078,910	2043	30,000	937,500	10,538	35,935	2,640,000	11,655,554	2043	300,000	7,820,000	(102,628)	90,713	3,300,000	14,569,443	
2004	42,063	435,406	10.4	5	1,030,909	8,514,317	2044	30,000	967,500	21,346	31,530	2,640,000	12,209,193	2044	350,000	8,170,000	(91,090)	51,244	3,850,000	17,805,074	
2005	53,009	864,943	16.3	4	1,083,918	9,379,259	2045	30,000	997,500	33,409	28,771	2,640,000	12,789,130	2045	400,000	8,570,000	(55,683)	18,327	4,400,000	21,315,217	
2006	43,730	697,640	16.0	3	1,127,648	10,076,899	2046	30,000	1,027,500	56,418	29,623	2,640,000	13,396,614	2046	400,000	8,970,000	409,259	41,880	4,400,000	22,327,689	
2007	10,468	80,410	7.7	2	1,138,116	10,157,309	2047	30,000	1,057,500	70,148	31,982	2,640,000	14,032,953	2047	400,000	9,370,000	706,899	95,243	4,400,000	23,388,255	
							2048	30,000	1,087,500	50,616	33,381	2,640,000	14,699,518	2048	400,000	9,770,000	387,309	124,859	4,400,000	24,499,197	