City of Modesto
Area 2 Storm Drain to Sanitary Sewer Cross Connections Removal
Final Preliminary Design Report
April 30, 2010

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April 30, 2010

David Felix, Assistant Civil Engineer
City of Modesto Public Works Department
Capital Improvement Services, 4th Floor
P.O. Box 642
Modesto, California 95353

Re: Area 2 Storm Drain to Sanitary Sewer Cross Connection Removal Preliminary Design Report

Dear David:

RRM Design Group is pleased to present to the City of Modesto this Final Preliminary Design Report for the Area 2 Storm Drain to Sanitary Sewer Cross Connection Removal Project. Transmitted herein is the report.

We look forward to working with the City on implementation of the project. Please call me at (209) 847-1794 with any questions.

Sincerely,
RRM DESIGN GROUP

William F. Strand

William F. Strand, M.S., P.E.
Manager of Engineering Services

REGISTERED PROFESSIONAL ENGINEER
WILLIAM FREDERICK STRAND
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STATE OF CALIFORNIA
4/30/10

Table of Contents

LIST OF ACRONYMS 3

1. INTRODUCTION 4

1.1 Background 4

1.2 Project Goals 6

1.3 Scope of Work and Approach 6

1.4 Authorization 7

2. DESIGN CRITERIA 7

2.1 Runoff Rates and Volumes 7

2.2 Storm Drain Lines 8

3. PROPOSED PROJECT FACILITIES 9

3.1 Conveyance Systems 9

3.2 Disposal Systems 9

3.3 Park Improvements 9

4. PRELIMINARY HYDROLOGY 10

4.1 Sub-Basin Delineation 10

4.2 Runoff Volumes and Rates 10

4.3 Preliminary Geotechnical Findings 15

5. DISPOSAL OPTION ANALYSIS 15

5.1 Potential Disposal Products 15

5.2 Analysis of Potential Disposal Products 15

5.3 Recommended Disposal Products 16

6. WATER QUALITY TREATMENT PRODUCTS 19

6.1 Potential Pre-Treatment Products 19

6.2 Analysis of Potential Pre-Treatment Products 19

6.3 Recommended Pre-Treatment Product 20

7. INTERAGENCY COORDINATION 22

7.1 Coordination with Planning 22
7.2 Coordination with Parks and Recreation 22
7.3 Coordination with Operations and Maintenance 22
7.4 Regional Water Quality Control Board 22
8. CONSTRUCTION CONSIDERATIONS 22
8.1 Existing Utilities 23
8.2 Construction Excavation 23
8.3 Construction Within Existing Parks 23
8.4 Public Outreach 24
8.5 Traffic Control 24
9. PERMITTING AND CEQA CONSIDERATIONS 24
9.1 CEQA Compliance 24
9.2 Permitting 24
10. PROJECT ALTERNATIVES ANALYSIS 25
10.1 Retention Alternative 25
10.2 Detention Alternative 25
10.3 Stantec Cross Connection Report Alternative 25
10.4 Construction Cost 26
11. RECOMMENDED PROJECTS 26
11.2 Catherine Everett Park 27
11.3 JM Pike Park 27
11.4 Roosevelt Park 27
11.5 Alternatives 29
11.6 Operations 29
11.7 Project Schedule and Phasing 29
11.8 Implementation 30
12. LIMITATIONS 30

LIST OF ACRONYMS

AC	Acre
AC-FT	Acre foot (43,560 cubic feet)
CF	Cubic feet
CFS	Cubic feet per second
City	City of Modesto.
FT	Feet
GIS	Geographic information system
HDPE	High density polyethylene
MH	Manhole
MID	Modesto Irrigation District
NPDES	National Pollution Discharge Elimination System
O&M	Operations and Maintenance
PDR	Preliminary Design Report
RCP	Reinforced concrete pipe
RWQCB	Regional Water Quality Control Board
SD	Storm Drain
WQ	Water Quality
WQF	Water Quality Flow Rate (CFS)
WQV	Water Quality Volume (CF)

1. INTRODUCTION

This preliminary design report (PDR) summarizes the results of the preliminary analysis and design for the Modesto Area 2 Storm to Sanitary Sewer Drain Cross Connection Project. The goals of the PDR are to determine the most effective means of collecting and discharging stormwater from the twenty-one existing Cross Connections to four existing City of Modesto Neighborhood Parks (Roosevelt, Pike, Catherine Everett, and Garrison). The PDR evaluated three alternatives for each park on the basis of cost, functionality, and constructability. The three alternatives were: detention and pumped discharge, retention and infiltration, and constructing the facilities proposed in the Storm Drain Cross Connection Report (Stantec, 2007).

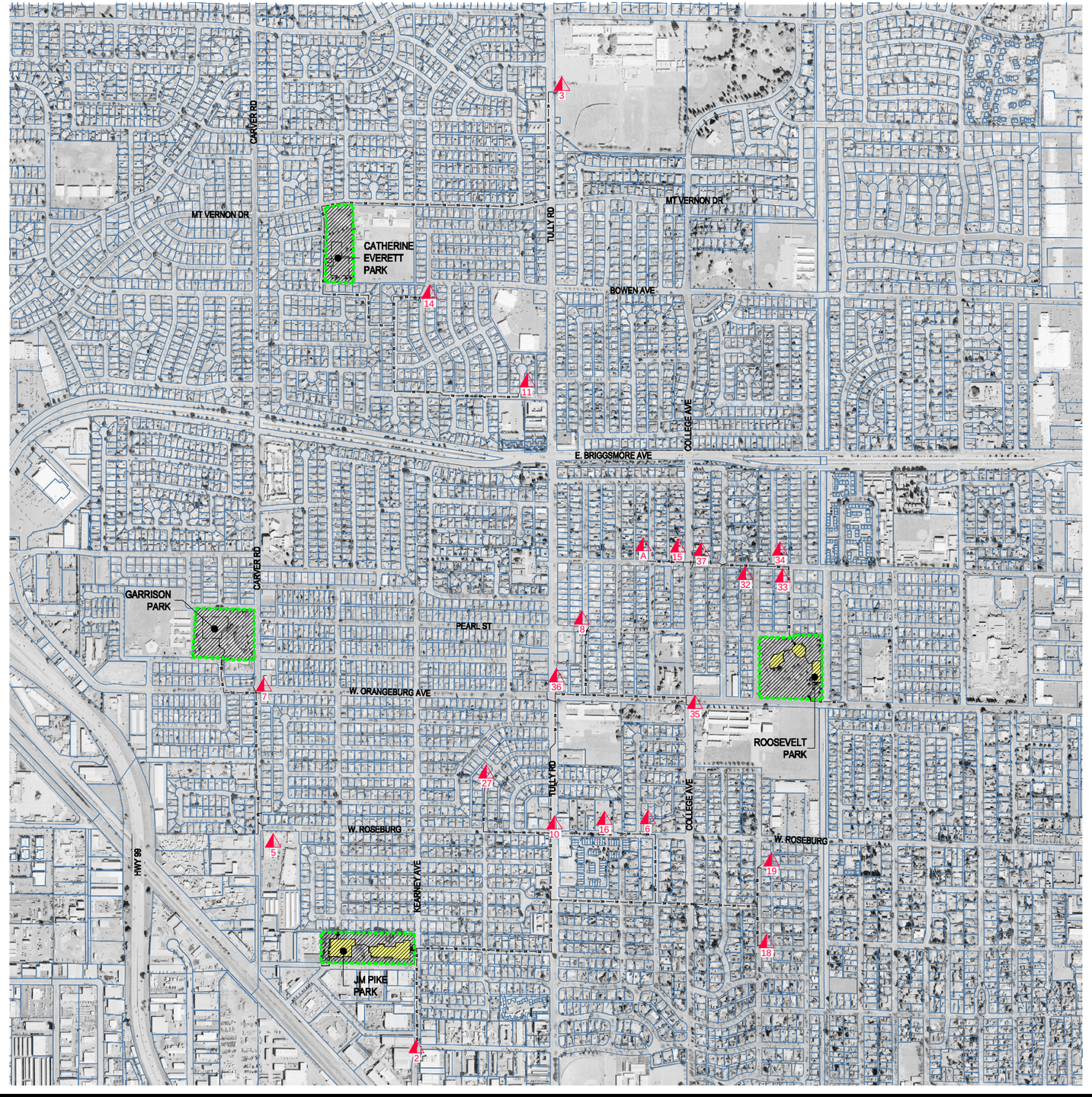
1.1 Background

The 2007 City of Modesto Waste Water Master Plan (WWMP) divides the city into ten areas. Area 2 is located in the northwest portion of the City and contains twenty-one existing cross connections. The Cross Connection Removal Project was identified in the WWMP as a highest priority project.

A cross connection is the connection of a non sanitary sewer flow to the sanitary sewer system. In areas of Modesto which do not have a storm drainage conveyance system, cross connections have been utilized to drain areas of persistent flooding. In many cases existing rockwells with a history of not draining street intersections in a timely manner have had a cross connection pipe installed connecting them to an adjacent sanitary sewer manhole. When the capacity of the rockwell is exceeded, storm water is drained by the sanitary sewer. In other areas a “lamp hole” was installed in the roadway adjacent to an area with persistent flooding. A lamp hole is a terminal sanitary sewer cleanout. During periods of flooding City maintenance crews remove the cleanout lid allowing storm water to flow into the sanitary sewer.

Cross connections present several problems to the sanitary sewer and storm drainage systems. Cross connections typically do not drain stormwater efficiently. Because sewer flows are typically smaller than storm drainage flows, the sewer system is not adequately sized to convey storm flows. Large storms can lead to sanitary sewer overflows into streets and buildings. Finally there is a cost to treat the stormwater at the sewer treatment plant.

For this project, the City of Modesto determined that four existing neighborhood parks would be utilized to store and infiltrate stormwater. The stormwater is to be stored underground to minimize the impact to the parks. Figure 1 shows an overview of the project location and proposed improvements.



north

SCALE: 1" = 400'

Legend

- Park Boundary
- 18 — Cross Connection Number
- SD — Proposed Storm Drain Line

Figure 1

1.2 Project Goals

The main goal of the project is to remove the twenty-one storm drain to sanitary sewer cross connections. Additional project goals include:

- Reduce street flooding in the vicinity of the cross connections
- Provide conveyance of the 10-year storm
- Provide detention/retention of the 100-year storm
- Remove aging rockwells
- Provide improved water quality treatment
- Rehabilitate existing parks

1.3 Scope of Work and Approach

The project scope of work was negotiated with the City of Modesto and executed on April 7th, 2009. The major items in the scope are:

Data collection – Existing utility information was obtained from the City and private utility companies in the form of utility plats and as-built drawings. The City of Modesto's Geographical Information System files were obtained and utilized as a basemap. City of Modesto grade maps were obtained to help define areas draining to the cross connections. Field surveys were conducted of the four parks and portions of the roadways along the proposed conveyance system alignments. Preliminary geotechnical explorations were conducted including deep borings, soil profiles, and infiltration testing.

Preliminary Hydrology – Utilizing the grade maps provided by the City of Modesto, areas draining to the cross connections were delineated. Utilizing these areas, stormwater runoff rates and volumes were calculated.

Disposal Options Analysis – A thorough investigation of underground stormwater storage and disposal products was conducted. The products were ranked based on their scores for six criteria.

Water Quality Treatment Option Analysis – A thorough investigation was conducted of water quality treatment devices and methods. The products were ranked based on their scores for four criteria.

Public Outreach Meeting – A public outreach meeting was held August 27, 2009 at Fremont Elementary School to advise the public of the project and solicit comments.

Preliminary CEQA Review – A preliminary review of the proposed improvements was conducted to determine potential issues with regard to the California Environmental Quality Act (CEQA).

Preliminary Design – Based on the preliminary hydrology, preliminary designs of the storm drainage system to convey flows from the cross connections to the disposal systems in the parks were prepared.

Preliminary designs of the underground storage and disposal systems and pre-treatment devices were prepared. Preliminary park surface improvements were described.

Preliminary Design Report – This PDR summarizes the findings of this project and recommends proposed improvements.

1.4 Authorization

The work associated with this PDR is being completed by RRM Design Group under an Agreement authorized by the City of Modesto on April 7th, 2009.

2. DESIGN CRITERIA

This section defines the criteria by which the PDR was conducted. The City of Modesto Standard Specifications (2006) and the City of Modesto Guidance Manual for On-Site Stormwater Quality Control Measures were utilized for design criteria. The City of Modesto's NPDES permit was reviewed for conformance.

2.1 Runoff Rates and Volumes

The City of Modesto Standard Specifications, 2006 and the City of Modesto Guidance Manual for On-Site Stormwater Quality Control Measures were utilized to calculate runoff rates and volumes, size storm drainage pipes, and size underground storage and disposal facilities. Per section 4.02A of the Standard Specifications, the Rational Method should be used when the design area is less than 400 acres. Because the project area is less than 400 acres the Rational Method was used.

2.1.1 Storm Drain Pipe Design Return Period – 10-year (Section 4.01 B.2 Standard Specifications)

- For starting HGL, assume storm basin is full.
- Rational Method - Q = CIA

  Q = Design runoff, in cubic feet per second
  C = Coefficient of runoff based on ultimate development of the drainage area
  I = Rainfall intensity in inches per hour from Detail 400 (City of Modesto Standards and Specifications), Time to gutter = 10 minutes
  A = Area tributary to cross connection in acres

2.1.2 Storm Basin Design Return Period – 100-year (Section 4.01 B.1 Standard Specifications)

- 100-year volume to be contained within top of curb (provided pad grades are a minimum of 1' above top of curb)

  Rational Method V = CAR/12
  - V = Volume in acre-feet
  - C = Runoff Coefficient

- A = Area in acres
- R = Design runoff in inches

- Retention (Infiltration) Basins
  - Volume 100-year, 6 day duration storm
  - R = 5.6 inches
  - Minimum of 2 infiltration tests required for design
  - Infiltration rate must drain the 100-year, 24 hour volume in 48 hours.

- Detention Basins (With Pumped Discharge)
  - 100-year, 24 hour storm
  - V = CAR/12
    V = Volume in acre-feet
    C = Runoff Coefficient
    A = Area in acres
    R = 100-year, 24 hour runoff (2.88 inches per Figure 4-2 of the Standard Specifications)
  - Pumps sized to drain the 1-year, 3 day storm in 48 hours, following 48 hours of retention.

2.1.3 Storm Water Quality - Design event is 2-year, six hour storm (City of Modesto Guidance Manual for On-Site Stormwater Quality Control Measures)

WQF-CIA

- WQF – Water quality flow in cubic feet per second
- C = Runoff Coefficient
- I = Rainfall intensity, (0.15 inches per hour)
- A= Tributary area in acres

2.2 Storm Drain Lines

The City of Modesto Standards and Specifications, 2006 were utilized for the design of the storm drainage pipe system and separation from other utilities.

2.2.1 Line Size – Minimum 12 inch diameter and sized to flow with a minimum velocity of 2 feet per second when flowing full.

2.2.2 Vertical Alignment – Minimum of 2 feet of cover from finished grade to top of pipe or 1 foot below subgrade whichever is greater.

2.2.3 Manholes – Shall be placed at changes in grade, conduit size, or junction points. Spacing shall not exceed 400 feet. Manholes shall be placed at beginning and end of curves.

2.2.4 Horizontal separation from utilities – Per Title 22, Section 64572 of the California Code of Regulations, horizontal separation from water mains shall be 4 feet.

2.2.5 Vertical separation from utilities

- Basic separation from water – For perpendicular crossings of water mains the water main shall be at least 1 foot above the storm drain line.
- Alternate criteria for construction – Where the basic separation cannot be obtained and the waterline is to cross under the storm drain line the water main shall be constructed of one of the following and have no joints for 10 feet either side of the crossing:
    - Ductile iron pipe with hot dip bituminous coating.
    - Dipped and wrapped ¼" thick welded steel pipe.
    - Class 200 pressure rated plastic water pipe (DR 14 per AWWA C900) or equivalent.
    - Reinforced concrete pressure pipe, steel cylinder type, per AWWA (C300-74 or C301-79 or C303-70 C303-70).

2.2.6 Sewer Drops – Where existing sewer lines are to be lowered to accommodate proposed storm drains, drops are to occur in standard manholes – Per City of Modesto direction.

3. PROPOSED PROJECT FACILITIES

As mentioned in the Introduction, the project proposes to remove twenty-one (21) storm drain to sanitary sewer cross connections. Storm water will be conveyed to existing parks in proposed storm drains. The stormwater will be detained/retained underground at the parks and disposed.

3.1 Conveyance Systems

Storm drains will be provided to convey runoff to the four parks. Alignments of the storm drains were selected to provide the most efficient routes to the parks while avoiding major streets and utilizing streets with minimal utilities. In much of the project area, utilities are located in the existing alleys. In these areas residential streets where utilized to minimize costs and utility interruptions during construction.

Proposed alignments were analyzed to ensure minimal crossings. The depth of the proposed storm drains was minimized whenever possible. In several locations, existing sewer and water lines were lowered to minimize the depth of the proposed storm drains. Plan and profiles of the proposed storm drains are provided in Appendix A.

3.2 Disposal Systems

Underground disposal systems will be provided in each of the four parks. The systems will provide either retention or detention depending on the soil properties at the park and costs of each option. The disposal systems are analyzed in more detail in Section 5.

3.3 Park Improvements

Construction of the proposed underground detention/retention facilities will require excavation and restoration of large areas of each park site. Existing park features within the limits of excavation will need to be removed and replaced. Construction staging areas, soil stockpiles, and other construction

support activities may also require removal and replacement of existing site features. Wherever possible, the open turf areas were targeted for limits of excavation and other construction activities as these areas would be the least expensive to reconstruct; however, this was not always possible and some significant park features will require removal and replacement. In some cases, it makes sense to replace these park features exactly as they were prior to construction and in other cases there are opportunities to reconfigure these park features to enhance the function of the park. In some situations, reconfiguring these site features is required due to constraints imposed by the new underground detention/retention facilities. In addition, the replacement of existing features that are removed during construction in conjunction with development of maintenance access drives and large paved areas required for maneuvering maintenance vehicles in the areas around the pump stations and pretreatment devices may provide opportunities to add recreation features at little additional cost to the project. Specific improvements at each park site are discussed in further detail later in this report.

4. PRELIMINARY HYDROLOGY

Preliminary hydrologic and hydraulic analyses were conducted to determine the areas tributary to the cross connections, runoff volumes, and flow rates. Infiltration rates from the preliminary geotechnical explorations were evaluated.

4.1 Sub-Basin Delineation

Utilizing the grade maps provided by the City of Modesto sub-basins were defined which are tributary to the twenty-one cross connections. Sub-basin boundaries were defined by high and low points along roadways as depicted on the grade maps. In addition, it was assumed that residential lots drained from their back property line to the street in front. In alley locations, the center of the alley was assumed to be the divide. On corner lots, the center of the house was assumed to be the divide with water flowing to the side street and the fronting street.

Sub-basin boundaries were field verified. Commercial and institutional facilities were field verified with respect to drainage facilities observable at the surface. It was assumed that onsite drainage facilities were adequately sized and flows would not enter the street system except where grading visibly drained to adjacent streets. The sub-basin delineations are presented in Figures 2A & 2B.

4.2 Runoff Volumes and Rates

Based on the design criteria and sub-basin delineations, runoff volumes were calculated for detention and retention. The results are presented in table format in Figure 2A. The results are grouped by park site. Volumes were assigned to each park based on location relative to the parks and the available space in the parks.

Runoff rates for the 10-year event were calculated using the computer program Hydroflow. Hydroflow was utilized to size the storm drainage lines and calculate hydraulic grade lines (HGL's). Hydroflow

utilizes the Rational Method to calculate peak runoff rates and dynamically route hydrographs. HGL's were checked to ensure compliance with city storm water design standards. These hydraulic analyses are located in Appendix C.

Hydrology Summary

Park Name	Cross Connection Number	Area ac	V (100 yr) (Detention ac-ft)	V (100 yr) (Retention ac-ft)
Garrison Park	5	7.63	1.2	2.2
	7	9.74	1.4	2.8
		17.37	2.6	5.0

Park Name	Cross Connection Number	Area ac	V (100 yr) (Detention ac-ft)	V (100 yr) (Retention ac-ft)
Catherine Everett Park	3	2.27	0.3	0.6
	11	6.64	1.0	1.9
	14	10.64	1.5	3.0
		19.55	2.8	5.5

Park Name	Cross Connection Number	Area ac	V (100 yr) (Detention ac-ft)	V (100 yr) (Retention ac-ft)
JM Pike Park	2	15.57	2.9	5.6
	6	6.95	1.0	1.9
	8	14.31	2.1	4.0
	10	3.37	0.6	1.1
	16	6.35	1.1	2.1
	18	7.21	1.0	2.0
	19	5.73	0.8	1.6
	27	4.26	0.6	1.2
	35	6.05	1.0	2.0
	36	9.00	1.4	2.6
		78.80	12.4	24.2

Park Name	Cross Connection Number	Area ac	V (100 yr) (Detention ac-ft)	V (100 yr) (Retention ac-ft)
Roosevelt Park	15	6.55	0.9	1.8
	32	9.87	1.4	2.8
	33	3.59	0.5	1.0
	34	6.52	0.9	1.8
	37	9.76	1.4	2.7
	A	5.67	0.8	1.6
		41.96	6.0	11.7

Legend

- Park Boundary
- Tributary Area (To Park)
- 14 — Cross Connection
- Flow Arrow

north

SCALE: 1" = 200'

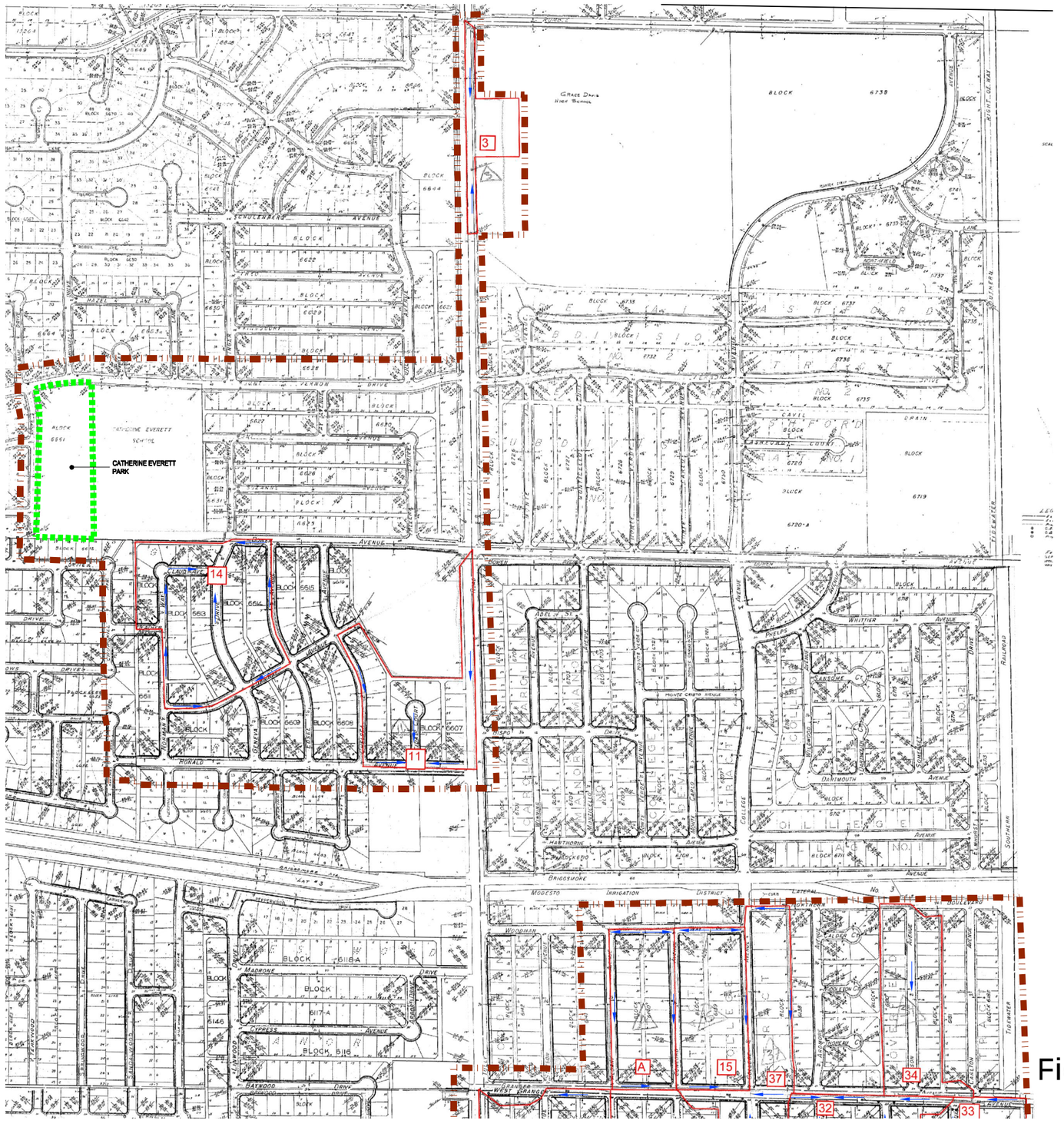


Figure 2A

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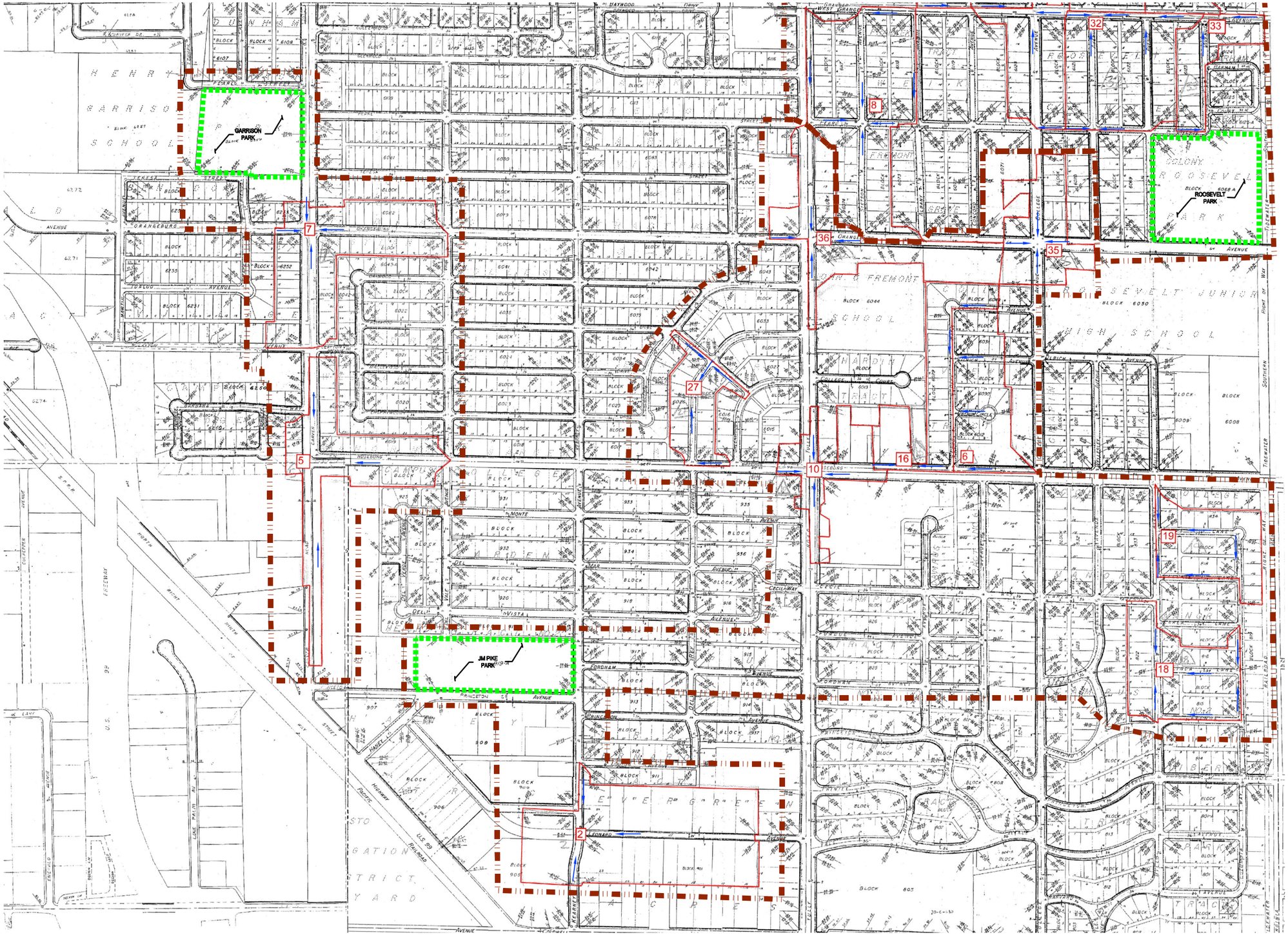
Modesto Area II Storm Drain to Sanitary Sewer Cross Connection Removal - Hydrology Map (North)

2108543

January 26, 2010



north

SCALE: 1" = 200'

Figure 2B

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Modesto Area II Storm Drain to Sanitary Sewer Cross Connection Removal - Hydrology Map (South)

2108543

January 26, 2010

Modesto Area 2
Water Quality Calculations verified with Modesto Grade Maps
February 15, 2010

Garrison Park

Storm / Sewer Cross Connection*	Area (ac)	C *	WQF (cfs)	WQV ($ft^{\wedge 3}$)	WQV (gallons)	WQV (ac-ft)	
7	9.74	0.61	0.89	17,678	132,232	0.41	
5	7.63	0.63	0.72	13,848	103,586	0.32	
	17.37		**1.61**	**31,527**	**235,819**	**0.72**	**Total**

Catherine Everett Park

Storm / Sewer Cross Connection*	Area (ac)	C *	WQF (cfs)	WQV ($ft^{\wedge 3}$)	WQV (gallons)	WQV (ac-ft)	
3	2.27	0.6	0.20	4,120	30,818	0.09	
11	6.64	0.6	0.60	12,052	90,146	0.28	
14	10.64	0.6	0.96	19,312	144,451	0.44	
	19.55		**1.76**	**35,483**	**265,415**	**0.81**	**Total**

JM Pike Park

Storm / Sewer Cross Connection*	Area (ac)	C *	WQF (cfs)	WQV ($ft^{\wedge 3}$)	WQV (gallons)	WQV (ac-ft)	
2	15.57	0.77	1.80	28,260	211,382	0.65	
6	6.95	0.6	0.63	12,614	94,355	0.29	
8	14.31	0.6	1.29	25,973	194,276	0.60	
10	3.37	0.71	0.36	6,117	45,752	0.14	
16	6.35	0.71	0.68	11,525	86,209	0.26	
18	7.21	0.6	0.65	13,086	97,884	0.30	
19	5.73	0.6	0.52	10,400	77,792	0.24	
27	4.26	0.6	0.38	7,732	57,835	0.18	
35	6.05	0.7	0.64	10,981	82,136	0.25	
36	9	0.63	0.85	16,335	122,186	0.38	
	78.8		**7.78**	**143,022**	**1,069,805**	**3.28**	**Total**

Roosevelt Park

Storm / Sewer Cross Connection*	Area (ac)	C *	WQF (cfs)	WQV ($ft^{\wedge 3}$)	WQV (gallons)	WQV (ac-ft)	
15	6.55	0.6	0.59	11,888	88,924	0.27	
32	9.87	0.6	0.89	17,914	133,997	0.41	
33	3.59	0.6	0.32	6,516	48,739	0.15	
34	6.52	0.6	0.59	11,834	88,517	0.27	
37	9.76	0.6	0.88	17,714	132,504	0.41	
A	5.67	0.6	0.51	10,291	76,977	0.24	
	41.96		**3.78**	**76,157**	**569,658**	**1.75**	**Total**

* Indicates Data obtained directly from "City of Modesto Storm Drain Cross Connection Report" Prepared by Stantec Consulting Inc
WQF = Water Quality Flow Rate
WQV = Water Quality Volume

4.3 Preliminary Geotechnical Findings

Blackburn Consulting conducted preliminary borings and infiltration tests at the four parks. The Preliminary Geotechnical Report is attached in the Appendix E.

The report found that infiltration rates were favorable at Catherine Everett, Garrison, and Pike parks. Roosevelt Park is underlain by a layer of hardpan and infiltration rates are not favorable for retention and infiltration.

Average infiltration rates for the parks are as follows:

- Catherine Everett 7.6 inches per hour
- JM Pike 16.9 inches per hour
- Garrison 4.5 inches per hour
- Roosevelt infiltration not recommended

Groundwater was encountered between 28 and 38 feet below the surface of the parks. These groundwater depths allow for adequate separation from the bottom of the proposed retention/detention systems.

5. DISPOSAL OPTION ANALYSIS

The underground disposal is a large component of the total project cost. The parks in which the disposal systems will be constructed have been in existence for many years and will continue to be a vital part of the community for many more. Because of the cost and longevity concerns, it is vital to select disposal systems which are cost effective, have demonstrated their longevity, and meet the storm drainage needs of the project. To accomplish this, a thorough evaluation was conducted of potential products.

5.1 Potential Disposal Products

RRM Design group worked with the City of Modesto to develop a list of potential disposal products. Internet searches for underground detention and retention systems as well as products advertised in stormwater publications were utilized to develop the list. This list was forwarded to the City of Modesto for any addition of products which may have been missed in the searches, but had submitted information directly to the City. No additional products were discovered.

5.2 Analysis of Potential Disposal Products

RRM and the City of Modesto evaluated the potential disposal products based on design information provided by the manufacturers, product specifications, and verification with owners or agencies of installed products. Six criteria were evaluated and given a 1 – 5 score (5 being the most favorable):

- Cost

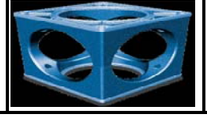
- Ability to be implemented
- Similar Installations
- Corrosion Resistance – Included because Modesto has Moderate to High Corrosion Potential for Steel
- Warranty
- Maintainability

The rankings are included in Table 2.

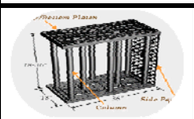
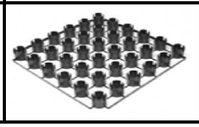
5.3 Recommended Disposal Products

Two products obtained a 27 out 30 ranking and are recommended for use in this project: Storm Chamber by HydroLogic Solutions and Stormwater Chambers by Triton Environmental Solutions. Both products are high density polyethylene open bottom arches which are installed with ¾ inch angular rock backfill. Both products can be used for either retention or detention systems. The Storm Chamber (Hydrologic Solutions) is capable of being installed in stacked configurations 1 to 3 layers deep. The Stormwater Chambers (Triton) are capable of being stacked 1 to 2 layers deep.

Modesto Area 2
Draft Disposal Option Ranking
February 15, 2010

Manufacturer	Products	Product Description	Cost Ranking [1]	Capital Cost ($/CF)	Ability to be Implemented [2]	Similar Installations [3]	Installation Description	Corrosion Resistance [4]	Warranty Ranking [5]	Warranty Period Years	Maintainability [6]	Total
Triton Environmental Solutions	Stormwater Chambers		4	$4.24	4	4	Underground detention system designed for 100,000 cf. Keyser shopping complex Keyser, West Virginia.	5	5	Limited Lifetime (100 yrs)	5	27
Hydrologic Solution	Storm Chamber		4	$4.29	4	4	Commercial site in Jordan UT. (116,840 cf) Under parking lot.	5	5	Limited Lifetime	5	27
Contech	Corrugated Metal Pipe		5	$3.90	5	5	Wal-Mart, Greeley Colorado underground detention system (255,353 cf)	3	1	1	5	24
Rotondo Environmental Solutions	Precast Conc. Vaults		2	$10.00	5	4	Underground detention/infiltration/ treatment system (200,000 cu-ft). WQV (30,400 cu-ft) Under commercial parking lot in Stafford VA	5	1	Varies	5	22
Contech	Con/Span		1	$14.00	5	4	Seattle Tacoma International Airport, precast detention system designed for (215,187cf)	5	1	1	5	21
Contech	Plate System		1	$10.00	5	5	Wal-Mart and Sam's Club, Laurel Maryland. (363,000 cf of storage) under parking lot.	3	1	1	5	20
Stormtech / Landsavor	SC-740		3	$5.32	1	5	Underground detention system using 5,600 units (420,000 cf) Parking Lot Application	5	1	1	5	20
Stormtech	MC3500		4	$4.05	3	1	New Product.	5	1	1	5	19
Kristar	CUDO		3	$6.00	5	3	Underground retention system (13,226 cf) Under Parking Lot Application	5	1	1	1	18

Modesto Area 2
Draft Disposal Option Ranking
February 15, 2010

Manufacturer	Products	Product Description	Cost Ranking [1]	Capital Cost ($/CF)	Ability to be Implemented [2]	Similar Installations [3]	Installation Description	Corrosion Resistance [4]	Warranty Ranking [5]	Warranty Period Years	Maintainability [6]	Total
Brentwood	Storm Tank		3	$5.45	4	4	Underground detention system (123,093 cf) athletic field	5	1	1	1	18
ADS	HDPE Pipe		1	$14.40	3	3	Underground retention system (22,500 cf) under Walgreens parking lot in Naperville, IL	5	1	1	5	18
Layfield Group	Atlantis D		2	$6.62	5	3	Underground detention system (26,839 cf) Parking Lot Application for Villa Riva Apartment Complex in Miami Florida	5	1	0	1	17
Contech	Chamber Max		2	$6.30	1	3	Medical Plaza Way, Clarksville, Indiana underground retention system (62,000 cf)	5	1	1	5	17
Invisible Structure	Rainstore 3		2	$7.09	5	2	Underground retention system (3,610 cf) under grass play area surrounded by tricycle track.	5	2	2	1	17

* Note - List developed from internet search for stormwater treatment systems and product advertisements in stormwater publications. Scoring system is based on a 1 thru 5 rating, with 5 being the most favorable.

[1] Cost Ranking (S/ CFS): 5(≤ $4.00), 4 ($4.01 - $5.00), 3 ($5.01 - $6.00), 2 ($6.01 - $9.99), 1 (≥ $10.00) Cost are based on systems designed to hold at least 100,000 cf of storm runoff.

[2] Each product analyzed to verify if it can be implemented based on useable park area. Ranking based on number of applications (retention and detention). Maximum 8 points: 5 (≥ 6) , 4 (5), 3 (4), 2 (3), 1 (≤ 2)

[3] Similar Installations: 5 (systems designed for over 250,000 cf), 4 (systems design for 100,000 to 250,000 cf of storage), 3 (systems designed < 100,000 cf but under a parking lot), 2 (systems designed < 100,000 cf but under turf) and 1 (no installations)

[4] Corrosion Resistance: 5 (non corrosive), 3 (corrosive but can be protected), 1 (corrosive)

[5] Warranty Ranking: 5 (≥50), 4 (25 - 49.9), 3 (10 - 24.9), 2 (1.1 - 9.9), 1 (≤ 1)

[6] Maintainability: 5 (can be accessed and hydraulically flushed) and 1 (not maintainable)

6. WATER QUALITY TREATMENT PRODUCTS

The City of Modesto has a NPDES permit issued by the Regional Water Quality Control Board in 2008, Order Number R5-2008-0092. This project complies with the permit.

Treatment of stormwater will be provided in two ways as a part of this project. Flows entering the disposal system will be pre-treated before entering the system. The systems will also be designed with siltation chambers to allow water quality flows to settle prior to entering the main system. The siltation chambers will be fitted with sumps and access hatches to allow City crews to annually remove accumulated sediment.

6.1 Potential Pre-Treatment Products

RRM Design Group worked with the City of Modesto to develop a list of potential pre-treatment products. Internet searches for stormwater treatment systems as well as products advertised in stormwater publications were utilized to develop the list. The list was forwarded to the City of Modesto for addition of products which may have been missed in the searches, but had submitted information directly to the City. No additional products were discovered.

6.2 Analysis of Potential Pre-Treatment Products

The list of potential pre-treatment products was refined to only include products which remove 80% of Total Suspended Solids (TSS). 80% TSS removal is a common standard used by many agencies such as the Washington Department of Ecology. The Washington Department of Ecology requires 80% TSS removal for Basic Treatment devices. Grassy Swales and Sand Filters typically remove 80% TSS.

Of the products which remove 80% TSS, a questionnaire was emailed to the manufacturer or manufacturer representative requesting: capital cost data, maintenance cost, treatment capacity, TSS removal, and 3 references for installed products.

Based on the information provided by the manufacturers, product specifications, and responses from the references, the products were evaluated based on 4 criteria and given a 1-5 score (5 being the most favorable):

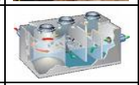
- Capital Cost
- Maintenance Cost
- Maximum treatment flow
- Ability to be implemented

The rankings are included in Table 3. Additional products were evaluated but not ranked because they did not remove 80% TSS. The complete list of products considered is included in Appendix F. Reference checks were made for the top three ranked products and are included in Appendix F.

6.3 Recommended Pre-Treatment Product

Upon completion of the analysis and ranking of the pre-treatment devices RRM and City staff met to review the results. The BaySeparator ranked the highest with an 18 out of 20 ranking and is recommend for use in the project. The BaySeparator is a patented flow diversion device which connects two sump manholes. The BaySeperator has a maximum treatment rate of 21.8 CFS, 80% TSS removal, and removal of trash, oil and grease.

Modesto Area 2
Draft Pre-Treatment Ranking
February 15, 2010

Manufacturer	Products	Image	Provided Requested Information	Capital Cost Ranking [1]	Capital Cost ($)/Treatment CFS	Maintenance Cost Ranking [2]	Maintenance Cost $/YR	Max Treatment Ranking [3]	Max Treatment Q (cfs)	Percent TSS Removal	Ability to be Implemented / Maintained [4]	Total
Baysaver Technologies inc	Bay Separator		Yes	4	$2,100	4	$1,150	5	21.8	80	5	18
Contech	VortSentry HS		Yes	3	$8,318	4	$1,343	5	8.1	80	5	17
Contech	CDS		Yes	2	$12,750	4	$1,414	5	7.5	100	5	16
Bio Clean	Nutrient Separating Baffle Box		Yes	3	$9,681	4	$1,675	5	42.4	87	3	15
Contech	Vortechs		Yes	2	$14,089	4	$2,357	5	14.0	80	4	15
KriStar	FloGard Dual Vortex		Yes	1	$22,838	3	$3,063	5	9.5	80	5	14
KriStar	FloGard		Yes	3	$5,450	5	$100	3	3.9	80	3	14
Bio Clean	Grate Inlet Skimmer Box		Yes	5	$800	5	$267	1	1.0	84	3	14
Bio Clean	Curb Inlet Basket		Yes	5	$1,059	5	$267	1	0.9	93	2	13
Bio Clean	Nutrient Separating Baffle Box with Up Flow Media Filter		Yes	1	$37,795	3	$3,851	5	42.4	85	3	12
Contech	MFS		Yes	1	$72,953	2	$7,848	5	7.0	83.6	3	11
Fabco	Storm Basin		Yes	3	$9,939	4	$1,100	1	0.5	80	3	11
KriStar	Up-Flow Filter		Yes	1	$98,949	1	$11,863	5	7.0	80	3	10
KriStar	Perk Filter		Yes	1	$76,367	1	$15,525	5	7.5	80	2	9
Modular Wetlands	MWS Linear Underground Vault		Yes	1	$103,704	5	$860	1	0.3	98	2	9

* Note - List developed from internet search for stormwater treatment systems and product advertisements in stormwater publications. Scoring system is based on a 1 thru 5 rating, with 5 being the most favorable.
All devices must have capability of removing trash and capturing a minimum of 80% T.S.S. and have submitted all the requested information and a minimum of three project references.
[1] Capital Cost Ranking based on cost per Water Quality Treatment (CFS): 5 (< $1,500), 4 ($1,500 - $5,000), 3 ($5,001 - $10,000), 2 ($10,001 - $20,000), 1 ($20,001)
[2] Maintenance Cost Ranking based on estimated yearly cost: 5 (≤ $ 1,000), 4 ($1,001 - $3,000), 3 ($3,001 - $5,000), 2 ($5,001 - $10,000), 1 (> $10,000)
[3] Max Treatment (CFS): 5 (≥ 7), 4 (5 - 6.9), 3 (3 - 4.9), 2 (1 - 2.9) 1 (< 1)
[4] Ability to be Implemented: 5 (Small centralized), 4 (Medium centralized), 3 (Decentralized or large centralized), 2 (Decentralized w/ modification), 1 (Not applicable)

7. INTERAGENCY COORDINATION

Because the project affects many departments within the City of Modesto, an effort has been made to include representatives from Planning, Parks Planning, Parks Maintenance, Stormwater, Public Works Operations and Maintenance. Representatives were included in the kick-off meeting, parks tour, and key meetings throughout the project.

7.1 Coordination with Planning

The City of Modesto's planning department was involved in the project to review CEQA compliance. Representatives attended meetings, consulted by phone, and reviewed the Initial Study Checklist.

7.2 Coordination with Parks and Recreation

Since a large amount of the construction activity will occur in the four parks, the City's parks and recreation department has been involved throughout the project. Several meetings with Parks Planning and Parks Maintenance have been held on-site in the parks to discuss the project and potential issues. Specific issues have been raised and resolved with the parks department including:

- Maintaining the character of the parks
- Minimizing removal of large trees
- Removing older restrooms and pools
- Removing and replacing play structures
- Rehabilitation of existing athletic fields
- Rehabilitation of existing irrigation systems
- Minimizing down time during construction
- Operation and maintenance of the systems

7.3 Coordination with Operations and Maintenance

The City's Public Works Operations and Maintenance Department attended several meetings regarding operations, maintenance, water quality and disposal. The department provided review of the proposed pre-treatment and disposal products. Input was also received regarding the proposed designs, access, and maintenance.

7.4 Regional Water Quality Control Board

The project is a part of the implementation of the City's Sanitary Sewer Master Plan (SSMP). The project also complies with the City's NPDES Permit.

8. CONSTRUCTION CONSIDERATIONS

Because the projects are entirely in developed areas of the city and will impact existing roads and parks, there are several construction considerations. The storm drain lines will run down several major streets

and many residential streets. The streets have many existing utilities constructed in the public right-of-way. The parks have large shade trees of significant value and athletic fields that are utilized frequently.

8.1 Existing Utilities

The proposed improvements will take place in the public right-of-way or in City parks which contain a number of existing utilities. These utilities were preliminarily identified based on utility plats, asbuilts, and limited field surveys. Where possible, the proposed storm drainage lines have been routed down streets with minimal utilities or on the side of the street with the least utilities. Additional survey and potholing work to identify utilities will be completed during final design.

8.2 Construction Excavation

Excavations greater than 5 feet deep must be sloped or shored to prevent failure. The soils in the project area are Class C and must be sloped no steeper than 1.5:1 (H:V). Excavations in the right-of-way are to be shored using conventional methods. Excavations in the parks have been designed to allow for sloping of excavations at 1.5:1 (H:V) in most cases with some shoring around structures.

8.3 Construction Within Existing Parks

Several construction considerations will be required for the existing parks due to their mature tree canopies, intensive development, and high usage. Scheduling of construction within the parks will need to be coordinated with the City's parks and recreation department to minimize impact on use of the athletic fields.

The preliminary design has attempted to avoid construction within the drip line (root zone) of existing trees with trunks over 6 inches in diameter. During construction the contractor will be required to keep all excavation and equipment outside of the tree drip lines. The contractor will also be required to avoid damaging tree limbs with construction equipment.

Stockpiling of excavations and storage of construction equipment and materials will likely necessitate phased construction within the parks. A portion of the site will have to be utilized for stockpiling and storage while the remainder of the park is being constructed and visa versa.

Security fencing will be required around active areas of construction. Areas of the parks not being improved should be left open for use by the public.

The scheduling of the project's construction will be coordinated with the City's parks and recreation department so construction occurs during the times of the year with the least use of the athletic fields. The final construction documents will specify the exact move-in and move-out dates for construction within the parks along with penalties for non compliance. Reconstruction of the parks will include sod turf and rehabilitation of irrigation systems to allow for immediate use of the athletic fields.

8.4 Public Outreach

Public outreach is a key part of this project. To date, one public outreach meeting has been conducted. During final design an additional public outreach meeting will be conducted.

Six community members attended the public outreach meeting that was held August 27, 2009 at Fremont Elementary School. Community members were supportive of the project and well aware of the flooding problems in the project area. Their main concerns were of disruption of the parks and construction impacts in their streets.

Prior to construction, mailers will be sent to affected residents advising them of the project, general construction timeframes, and what types of impacts they will have. During construction flyers should be distributed to affected blocks one week prior to construction indicating lane closures, restricted parking, and other impacts.

On major roadways at least one week notice shall be provided to alert motorists of upcoming construction that will be occurring and what type of traffic limitations will occur.

8.5 Traffic Control

Where possible, the proposed storm drainage lines have been routed down residential streets to minimize traffic disruption. The proposed storm drains have been run adjacent to the curb in the parking lane where possible to limit disturbances to one side of the roadway. This will permit two way traffic in most cases, with limited use of one way traffic with flaggers. Standard construction signing and delineation for lane closures and detours shall be utilized.

9. PERMITTING AND CEQA CONSIDERATIONS

Permitting issues related to CEQA, City of Modesto Public Works, City of Modesto Parks and Recreation Department, and City of Modesto Stormwater were investigated.

9.1 CEQA Compliance

The City of Modesto's Wastewater Master Plan Master Environmental Impact Report, published in December 2006, analyzed the program of facility improvements in the WWMP including the cross connection removal project. This project must comply with the MEIR's mitigation monitoring program.

9.2 Permitting

The project will be required to obtain City Plan Check Approval, City Encroachment Permits, State Stormwater Construction Permits, and San Joaquin Valley Air Pollution Control District Permits.

10. PROJECT ALTERNATIVES ANALYSIS

Three project alternatives were evaluated as a part of this PDR. The first alternative evaluated was retention and infiltration of stormwater in existing parks. The second alternative evaluated was detention of stormwater in existing parks and pumping to existing storm drains. The third alternative evaluated was that proposed in the City of Modesto Storm Drain Cross Connection Report prepared by Stantec.

10.1 Retention Alternative

This alternative utilized retention and infiltration as the means for disposing of stormwater. Stormwater was conveyed to the parks, pretreated, and then infiltrated. Advantages of the retention alternative are: pumps not required, lower operation costs, lower maintenance costs, no mechanical systems to fail, and recharge of groundwater. Disadvantages of this system include: larger underground systems due to retention standards, and dependence on infiltration rates of the soils.

10.2 Detention Alternative

This alternative conveyed stormwater to the parks, provided pre-treatment, detained the stormwater and then pumped to existing storm drains. Advantages of the detention alternative are: smaller underground systems, not dependant on the infiltration rates of the soils. Disadvantages are: higher operational costs, higher maintenance costs, and mechanical systems which could fail.

10.3 Stantec Cross Connection Report Alternative

The City of Modesto Storm Drain Cross Connection Report (Stantec 2007) proposed building portions of the storm drainage system proposed in the Draft City of Modesto 2008 Storm Drainage Master Plan (Stantec). The storm drain lines were proposed to be oversized to provide storage. The system was to utilize existing rockwells and proposed Turlock Rockwells to drain the system.

It is difficult to compare the Stantec Cross Connection Report Alternative because the design was for the 100-year, 24 hour event, while retention systems, should be designed for the 100-year, 6 day event.

To compare the Stantec Cross Connection Report Alternative to the Retention and Detention Alternatives, only the cross connections being removed by this project were evaluated. The Cross Connection Report includes other areas in addition to Area 2. The retention volumes required to meet the City Standards were calculated. Because the Cross Connection report utilized different volumes, a unit cost per cubic foot was calculated based on the total project cost in the Cross Connection Report. The unit cost was applied to the required retention volumes to develop a revised project cost to meet the City Standards.

Advantages of the Stantec Cross Connection Report Alternative are: it builds a portion of the Master Plan infrastructure, and does not disturb the parks. Disadvantages include high cost, extreme difficulty of constructing oversized pipes in existing roads with many existing utilities, length of time until downstream facilities are constructed, and no water quality treatment.

10.4 Construction Cost

A preliminary opinion of the probable cost of construction was prepared for each of the detention and retention alternatives based on current cost data obtained from bid results, suppliers, and construction estimation guides. Cost comparisons for all three alternatives are listed in Appendix B.

11. RECOMMENDED PROJECTS

The recommended project is a combination of the detention and retention options. Retention is preferred where economically feasible because it has lower operation and maintenance costs. Detention tends to have lower capital costs because the required storage volume is half that of retention, but the operation and maintenance costs are higher.

All retention/detention systems will have pretreatment devices, isolation valves, isolation rows (for sediment deposition), observation wells and SCADA systems. Detention systems will have duplex pump stations and force mains.

At a minimum, surface improvements at each park will generally include replacing irrigation system components—sprinkler heads, pipe, control wire, valves, etc.—and turf within the limits of excavation and within other areas disturbed by construction activities. It is recommended that the new turf be planted with sod to reduce the grow-in period. Additionally, new sprinkler heads will be installed on individual irrigation zones that span across disturbed and undisturbed areas as may be required to balance the precipitation rate for the affected zone. In addition to this minimum amount of restoration, each park will require other surface improvements, which are summarized in the following paragraphs.

The recommended improvements at each park are shown in Figures 3 thru 10.

11.1 Garrison Park

For Garrison Park, retention is recommended. Percolation tests indicate percolation should be good. The park also has adequate open space to accommodate the volume required for retention. The capital costs for retention are only slightly higher than detention.

In addition to the basic restoration of turf and irrigation in disturbed areas, surface improvements at this park will include replacement of the baseball infield and replacement of concrete walks that extend into the park from Teresa Street. This segment of concrete walk will be designed to accommodate truck access to the pre-treatment as required for maintenance. Given the size of the area required for maneuvering a vacuum truck, an opportunity is presented to configure this new paving as a useable space. The concept plan presented in Figure #3 demonstrates how this space can be designed as a double half-court basketball court with an adjacent seating area while accommodating maintenance access. The final design of this area will need to be closely coordinated with the requirements of the

maintenance vehicles. The excavation plan is designed to avoid the existing baseball backstop so it should not require replacement.

11.2 Catherine Everett Park

Retention is recommended for Catherine Everett Park. The park has enough open space to accommodate the retention volume. Percolation tests indicate percolation should be good. The costs of detention and retention are nearly identical for this park.

It is anticipated that construction activities at this site will be limited to open turf areas and the baseball infield. As a result, reconstruction of the baseball infield is the only surface improvement required in addition to the basic turf and irrigation replacement described above. The excavation plan is designed to avoid the existing backstop so it should not require replacement.

11.3 JM Pike Park

JM Pike Park has the largest proposed storage system. Detention has significantly lower capital costs than retention because of the large storage volume required. Detention requires a pump station with a force main to the existing storm drain line in 9th Street at Tully, south of the park. Removal of one large tree is necessary to achieve the required storage volume. Removal of this tree was discussed with City Parks Department staff during the design process.

Due to the extent of the excavation required at this park, significantly more surface improvements are required in addition to the basic irrigation and turf restoration described above. Generally, these improvements include reconstruction of the large play area, replacement of the baseball backstop, and reconstruction of the baseball infield. These reconstructed facilities require ADA-compliant access from Princeton Avenue as well as from the neighborhood to the north. ADA-compliant access between the new facilities is also required. Additional proposed surface improvements include a new concrete walkway system in the core area of the park interconnecting all new features and the existing restroom building. See Figure #7 for a design concept of how this can be accomplished as well as other details about the proposed surface improvements.

The existing play equipment will be re-used to the extent possible based on review of compliance with governing safety and access regulations in effect at the time of implementation. The excavation plan has been designed to avoid the existing restroom building so replacement of this building should not be required.

11.4 Roosevelt Park

Roosevelt Park is the most heavily developed and used of the four parks. Detention is recommended because percolation rates were very low. An existing City storm drain line which is part of the McHenry Storm Drain system is located just east of the park in Orangeburg Avenue allowing the system to be pumped.

Due to site constraints at this park, significantly more surface improvements are required than at the other parks. Surface improvements at this site will include the basic irrigation system and turf restoration common to all sites as well as additional modifications to the irrigation system and replacement of some significant site features.

The existing irrigation system for this park appears to be directly connected to the City's water main. It should be isolated from the City water system as part of this project. To accomplish this, it is recommended that a new City water main be installed as part of this project. This new City water main would extend from the existing well site to Bronson Avenue and branch north and south to connect into the City's water system. The existing 12-inch line that appears to be serving both as a City water main and irrigation mainline should then be isolated from the City water system except for a single point of connection to the new City water main with a new backflow prevention device. It can then continue to serve as the irrigation mainline; however, the City may want to consider replacing the full length of the existing 12-inch line with a new PVC line that is more appropriately sized (smaller) for the irrigation system demand. This would facilitate easier maintenance on that line should the need occur. The opinion of probable cost in this report assumes leaving the existing 12-inch pipe in place.

Due to the abundance of mature trees, limited open turf areas, and the directive from the City to minimize removal of trees, it was necessary to locate a portion of the underground detention facilities where the tennis courts, restrooms, and play areas are currently located. As a result, reconstruction of these features is included in this project. The tennis court is proposed to be replaced in its original location and configuration; whereas, the restroom and play areas require reconfiguration because the restroom cannot be constructed over the top of the detention facilities. Figure #9 illustrates a conceptual plan for this reconfiguration that perpetuates the circular forms of the original park design. In reconstructing the play area, it is anticipated that the existing play equipment will be re-used to the extent possible based on review of compliance with governing safety and access regulations in effect at the time of implementation.

This park also requires a new paved drive to provide maintenance vehicles access to the pretreatment device. This access is proposed to come off of the corner of Pearl Street and Carlton Avenue. The paved area over the pretreatment device is expanded to accommodate maneuvering of a vacuum truck and other vehicles. This expanded paved area presents an opportunity to develop this area as a "plaza" area that can be used for children's games that require a hard surface. Similarly, the existing maintenance access drive from West Orangeburg to the existing well site requires some modification to accommodate access to the new pump station. The concept plan illustrates how the expanded paved area at this location can be enhanced as a small sitting area.

Note that the conceptual design includes reference to a pergola as a future project. That feature is shown for reference only and is not proposed to be constructed as part of this project.

11.5 Alternatives

There may be a possibility to work with the Modesto City School District to utilize Roosevelt Junior High School in place of Roosevelt Park. The school district has indicated they are open to the idea and there have been a couple meetings with the district to date. Because the talks are very preliminary, and this option is beyond the scope of this report, it is only briefly discussed.

Should the City and the School District reach agreement on utilizing the school site, both Roosevelt Park and JM Pike Park would need to be reevaluated for hydrology and hydraulics. The school site has much more space available for detention and volume should be shifted to it from JM Pike Park. This may allow JM Pike to be developed as a retention basin. To confirm this, both parks and their associated detention/retention systems and conveyance systems would need to be preliminarily designed. This preliminary design could occur as an addendum to this report or as part of the final design for either Roosevelt Park or JM Pike Park.

11.6 Operations

Operation is a key component of each park. Both conveyance and disposal systems will require maintenance. All systems will have pretreatment devices, isolation valves, observation wells, and SCADA systems to report pump operations, water levels, and alarms.

Conveyance systems will require routine maintenance to flush sediment and debris. The pretreatment devices will need to be flushed approximately twice a year with one cleaning occurring prior to the rainy season. Retention/detention systems will need to be monitored for sediment build up. If accumulation occurs in the isolation rows, it will need to be removed with a vacuum truck.

Pump systems on detention systems should be maintained yearly and tested prior to the rainy season. Valves in both the pumping system and the retention/detention systems should be maintained yearly. Above ground park improvements will require ongoing maintenance.

11.7 Project Schedule and Phasing

Since the total recommended project cost is $22.6 million, it is recommended that the project be phased. Garrison Park has been identified as Phase One because it has the lowest cost, will relieve flooding at two major intersections on Carver Road, will have minimal effect on adjacent residences, and will serve as a good demonstration project. JM Pike Park is recommended as Phase 2 because it will alleviate flooding at two major intersections on Tully Road and one major intersection on College Avenue. Roosevelt Park is recommended for Phase 3 because it will alleviate flooding along Granger Avenue. Catherine Everett Park has been recommended as Phase 4 because it only alleviates one source of flooding on a major roadway, Tully Road.

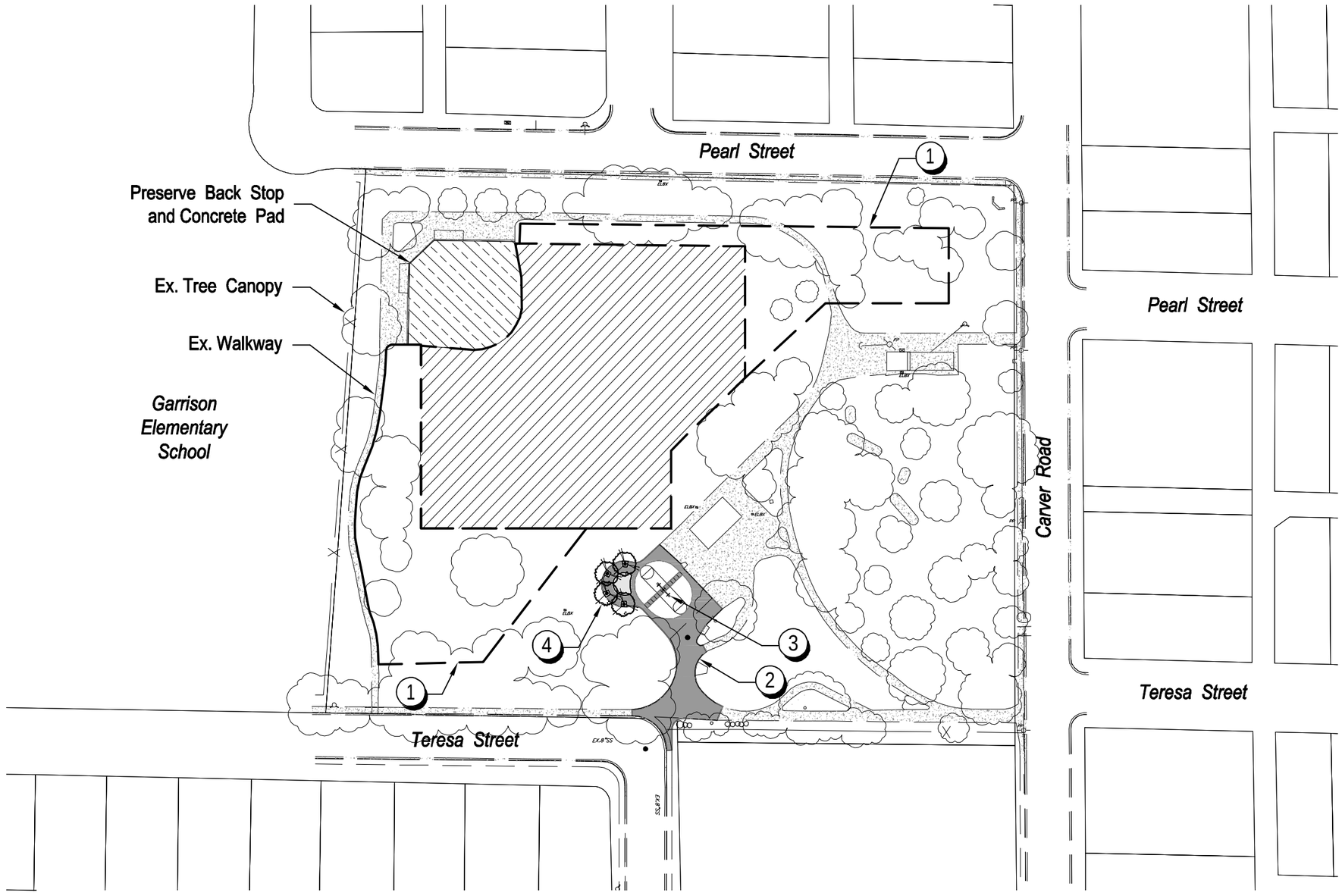
Only the schedule for Garrison Park (Phase 1) is included in this report (Figure 11) because the funding for future phases in unknown. The entire project will likely occur over many years.

11.8 Implementation

Each phase will build upon the Preliminary Design Report. Construction Documents, including final plans, specifications, and estimates will be prepared for each phase. Included in this task will be additional topographic surveys, design refinement, cost estimating, coordination with utility companies, coordination with parks and recreation, permitting, public outreach, and bid assistance.

12. LIMITATIONS

This report was prepared solely for the City of Modesto in accordance with professional standards at the time the services were performed and in accordance with the contract between the City of Modesto and RRM Design Group dated April 7, 2009. This document is governed by the above listed contract and its scope of work. This document is not intended for any use other than that described in the contract. Information provided by the City of Modesto and other parties utilized in this report unless expressly indicated has not been verified as a part of this project.



LEGEND

SYMBOL	DESCRIPTION
	Replace Irrigation System Components and Turf within Limits of Excavation
	New Infield with Bases
1	Area of Sprinkler Head Replacement to Match New Irrigation Equipment
2	New Paved Area to Support Vacuum Truck
3	New Basketball Court. Coordinate Pavement Design and Basket Location with Vacuum Truck Reqmts.
4	Develop Paved Seating Area with Trees and Landscaping Around Pre-Treatment Device

NOTES:

1. This exhibit does not illustrate extent of restoration improvements related to areas distrubed by construction staging and other construction support activities. The opinion of cost includes an allowance for these addtional improvements.

north

SCALE

50' 0' 50' 100' 200'

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CITY of MODESTO

AREA 2 STORM DRAIN CROSS CONNECTION REMOVAL GARRISON PARK SURFACE IMPROVEMENTS - FIGURE 3

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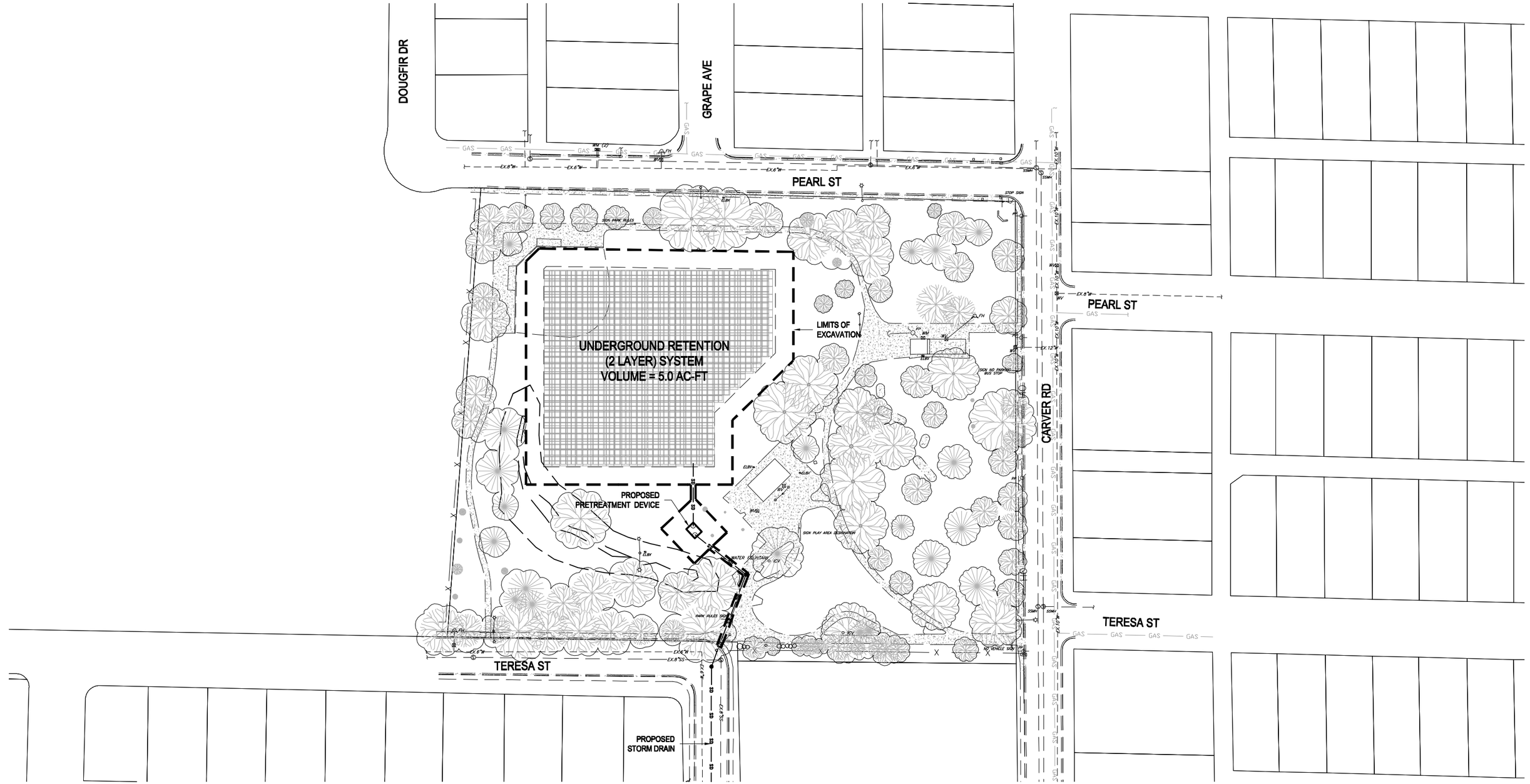

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CITY of MODESTO

NORTH

AREA 2 STORM DRAIN
CROSS CONNECTION REMOVAL
GARRISON PARK
UNDERGROUND IMPROVEMENTS - FIGURE 4

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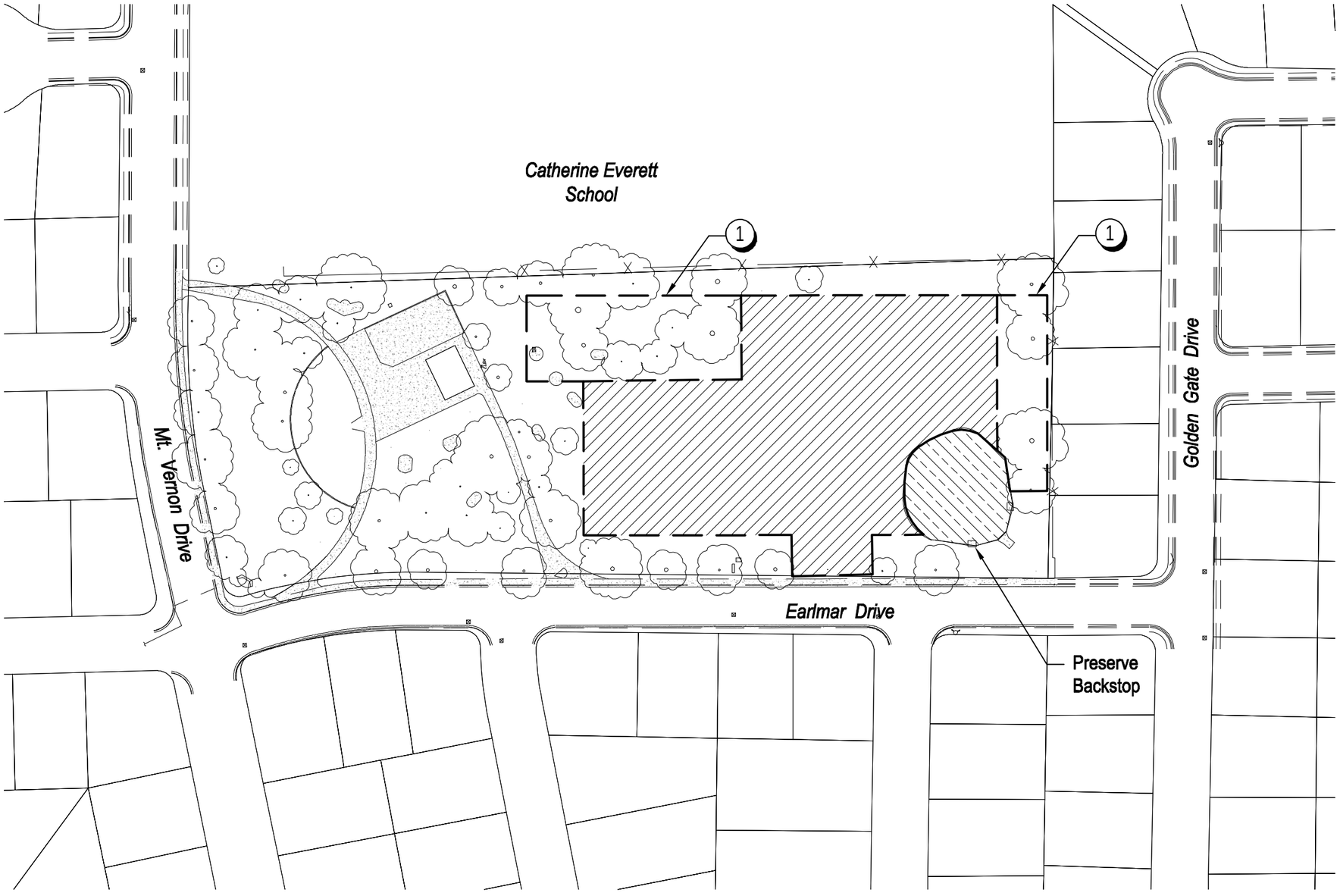

LEGEND

SYMBOL	DESCRIPTION
	Replace Irrigation System Components and Turf within Limits of Excavation
	Replace Infield and Bases
1	Area of Sprinkler Head Replacement to Match New Irrigation Equipment

NOTES:

1. This exhibit does not illustrate extent of restoration improvements related to areas distrubed by construction staging and other construction support activities. The opinion of cost includes an allowance for these addtional improvements.

north

SCALE

50' 0' 50' 100' 200'

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CITY of MODESTO

AREA 2 STORM DRAIN
CROSS CONNECTION REMOVAL
CATHERINE EVERETT PARK
SURFACE IMPROVEMENTS - FIGURE 5

Sheet No. CE - L1
By RSH
Checked WRM
Date JANUARY 26, 2010
Job No. 2108543
Scale AS SHOWN

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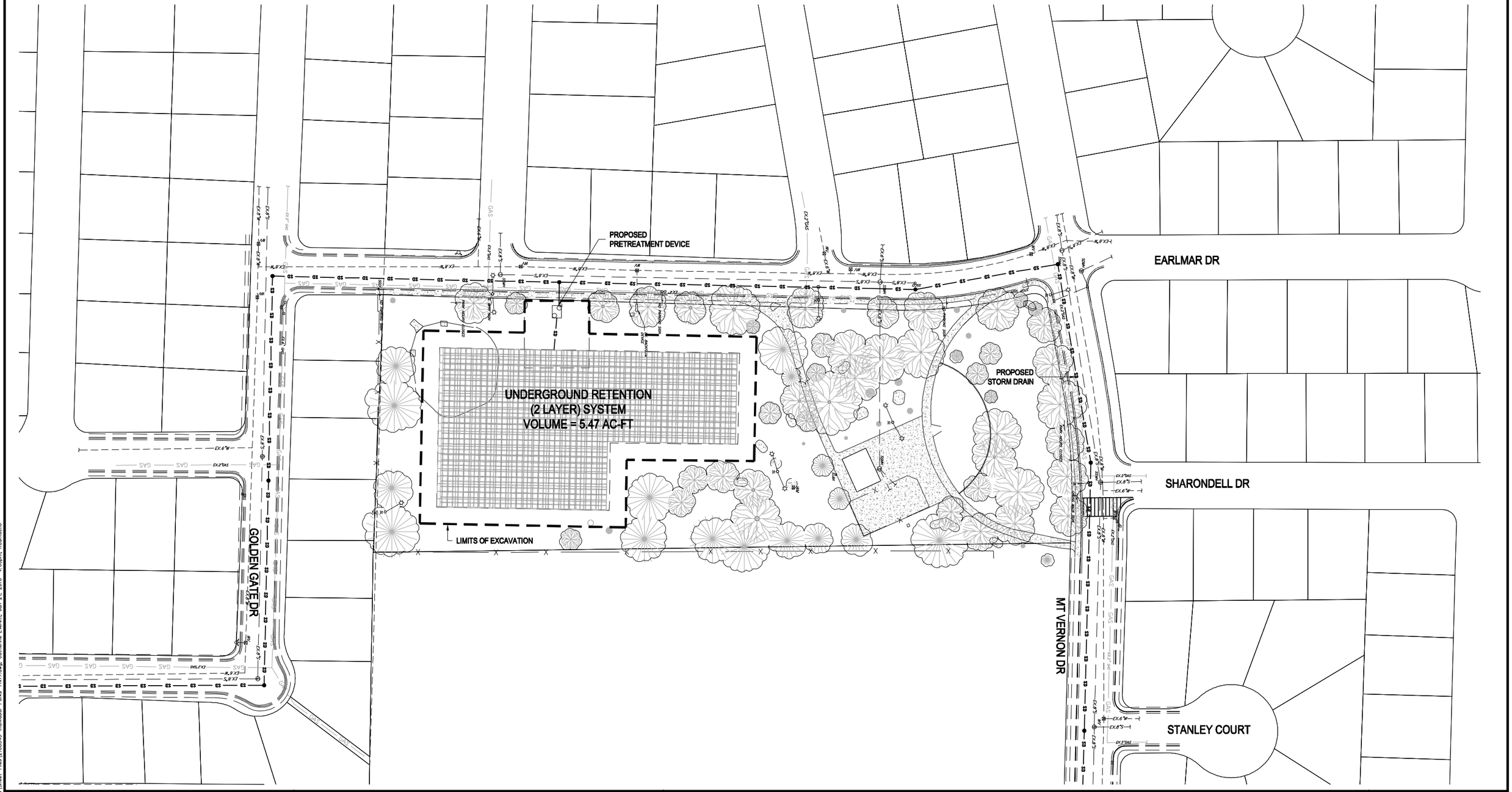

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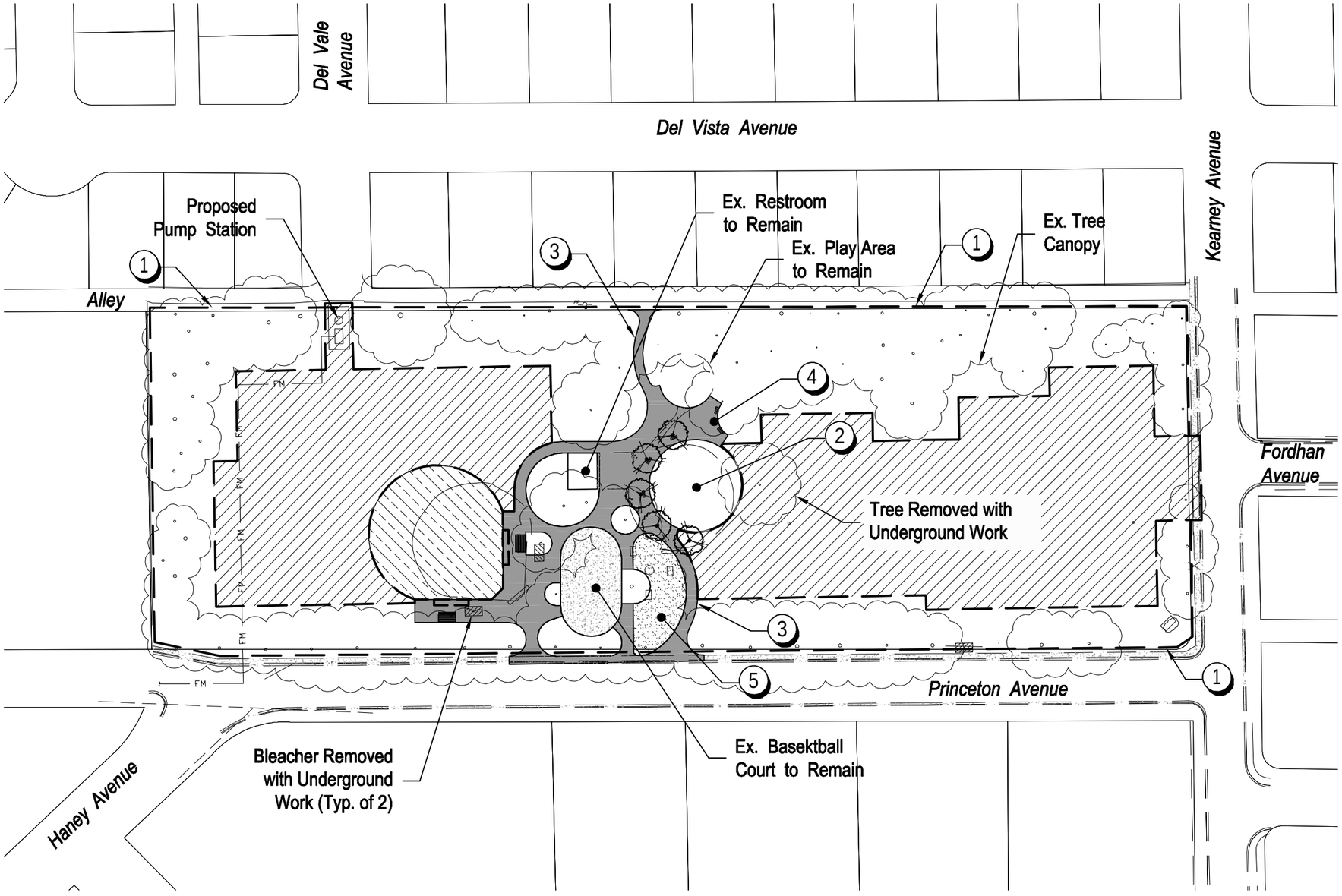
NORTH

AREA 2 STORM DRAIN
CROSS CONNECTION REMOVAL
CATHERINE EVERETT PARK
UNDERGROUND IMPROVEMENTS - FIGURE 6

Sheet No. 2 OF 4
By RAC
Checked WFS
Date JANUARY 26, 2010
Job No. 2108543
Scale 1" = 100'



LEGEND

SYMBOL	DESCRIPTION
	Replace Irrigation System Components and Turf within Limits of Excavation
	New Baseball Backstop, Infield, Bases, Dugouts and Bleachers
1	Area of Sprinkler Head Replacement to Match New Irrigation Equipment
2	Re-Build Play Area. Re-Use Existing Play Structures. Provide New Trees and Benches Along Perimeter.
3	New Paving.
4	New Seating Area
5	Bar-B-Que Area with Picnic Tables. New Furnishings. Decomposed Granite or other All-Weather Surface.

NOTES:

1. This exhibit does not illustrate extent of restoration improvements related to areas distrubed by construction staging and other construction support activities. The opinion of cost includes an allowance for these addtional improvements.

north

SCALE

50' 0' 50' 100' 200'

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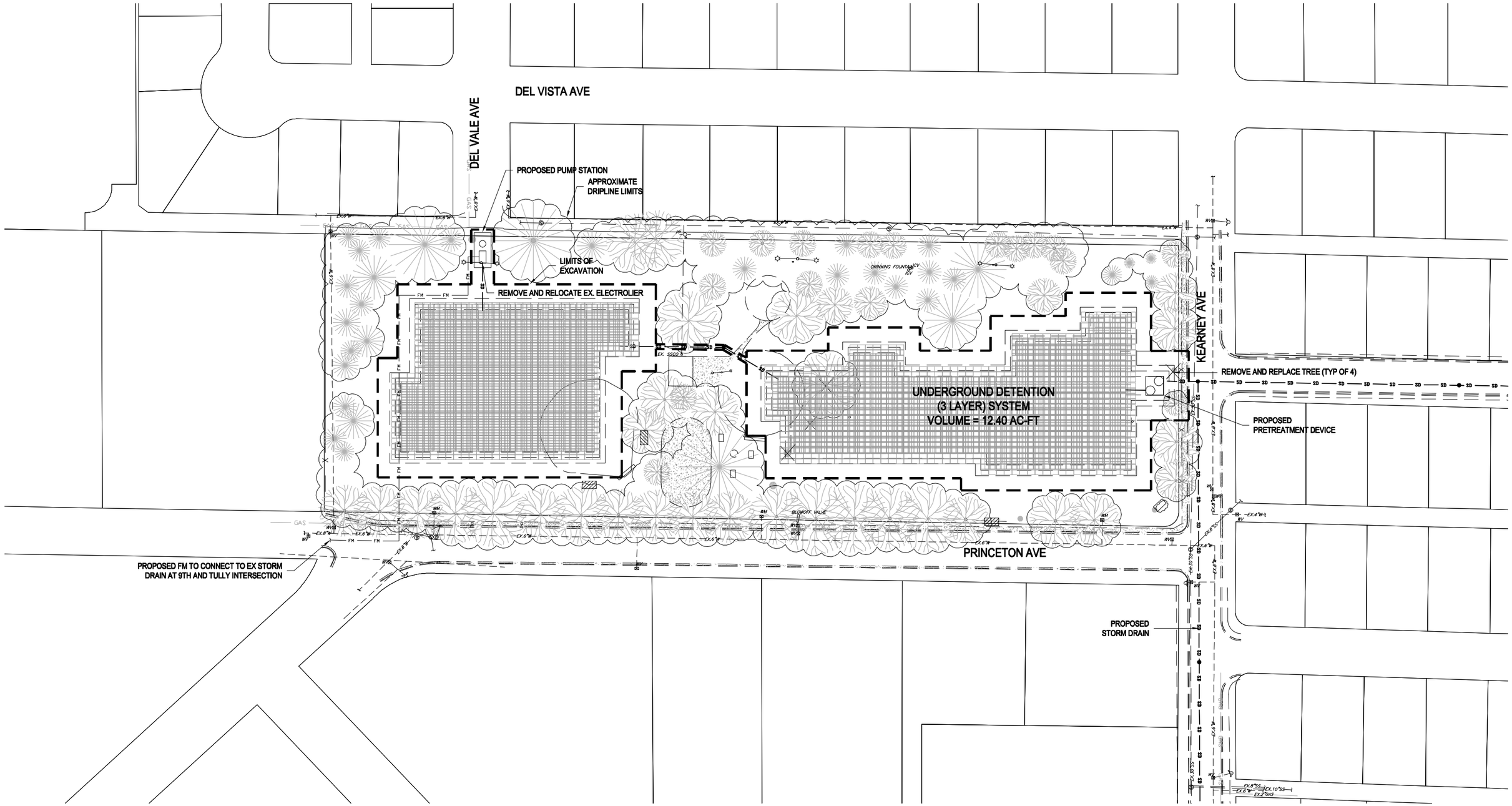
AREA 2 STORM DRAIN CROSS CONNECTION REMOVAL J.M. PIKE PARK SURFACE IMPROVEMENTS - FIGURE 7

Sheet No. JM - L1
By RSH
Checked WRM
Date JANUARY 26, 2010
Job No. 2108543
Scale AS SHOWN



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AREA 2 STORM DRAIN CROSS CONNECTION REMOVAL JM PIKE PARK UNDERGROUND IMPROVEMENTS - FIGURE 8

Sheet No. 3 OF 4
By RAC
Checked WFS
Date JANUARY 26, 2010
Job No. 2108543
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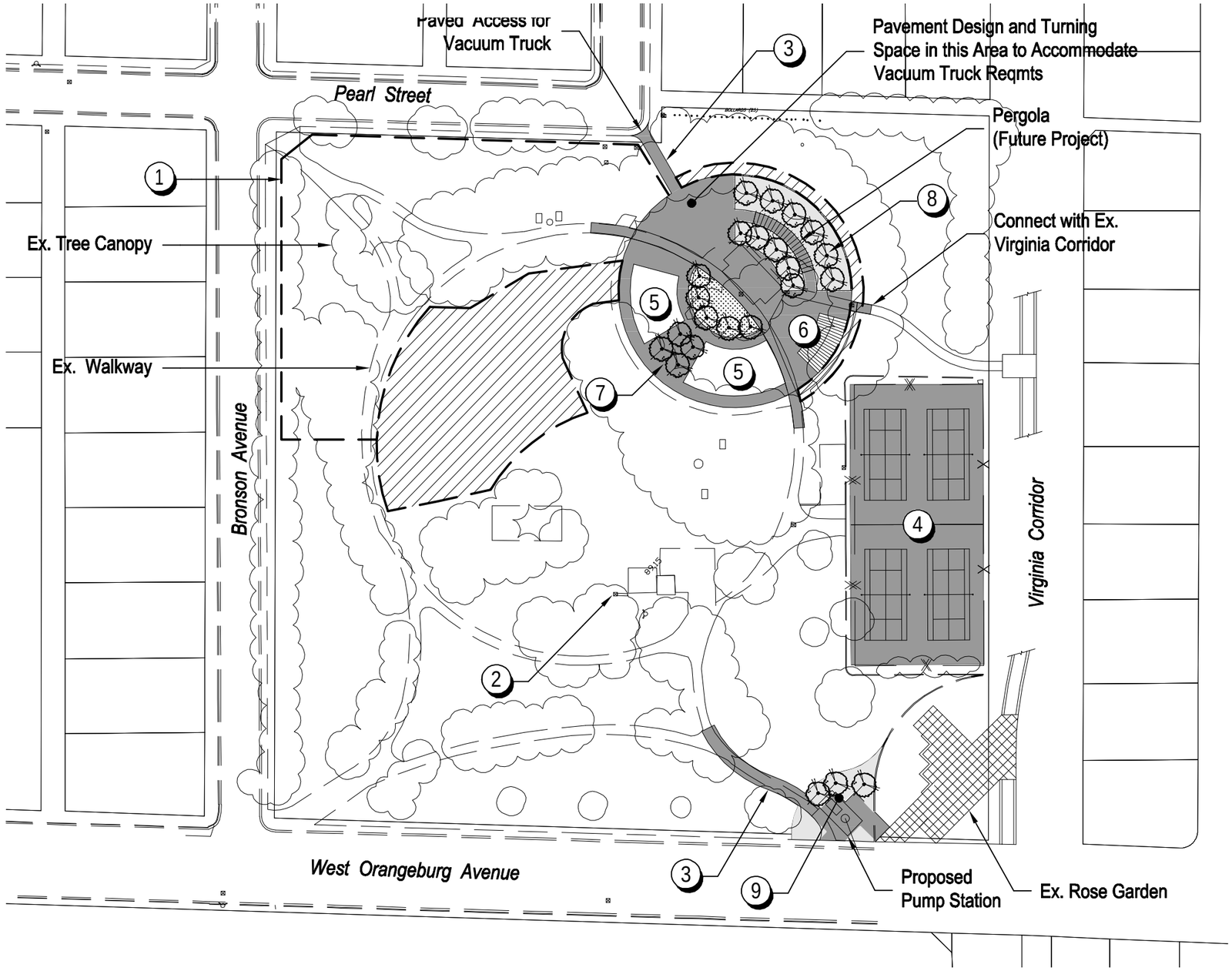

LEGEND

SYMBOL	DESCRIPTION
	Replace Irrigation System Components and Turf within Limits of Excavation
1	Area of Sprinkler Head Replacement to Match New Irrigation Equipment
2	New Irrigation POC and Backflow Preventer
3	New Paving (Shaded Area)
4	New Tennis Courts, Fencing, and Lights
5	Rebuild Play Area, Re-Use Existing Play Structure
6	New Restroom
7	Shade Trees and Benches
8	Planted Area with Shade Trees and Benches
9	Expand Paving, Seat Wall and Planter from Rose Garden Plaza

NOTES:

1. This exhibit does not illustrate extent of restoration improvements related to areas distrubed by construction staging and other construction support activities. The opinion of cost includes an allowance for these addtional improvements.

north

SCALE 50' 0' 50' 100' 200'

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AREA 2 STORM DRAIN CROSS CONNECTION REMOVAL ROOSEVELT PARK SURFACE IMPROVEMENTS - FIGURE 9

Sheet No. R - L1
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Date JANUARY 26, 2010
Job No. 2108543
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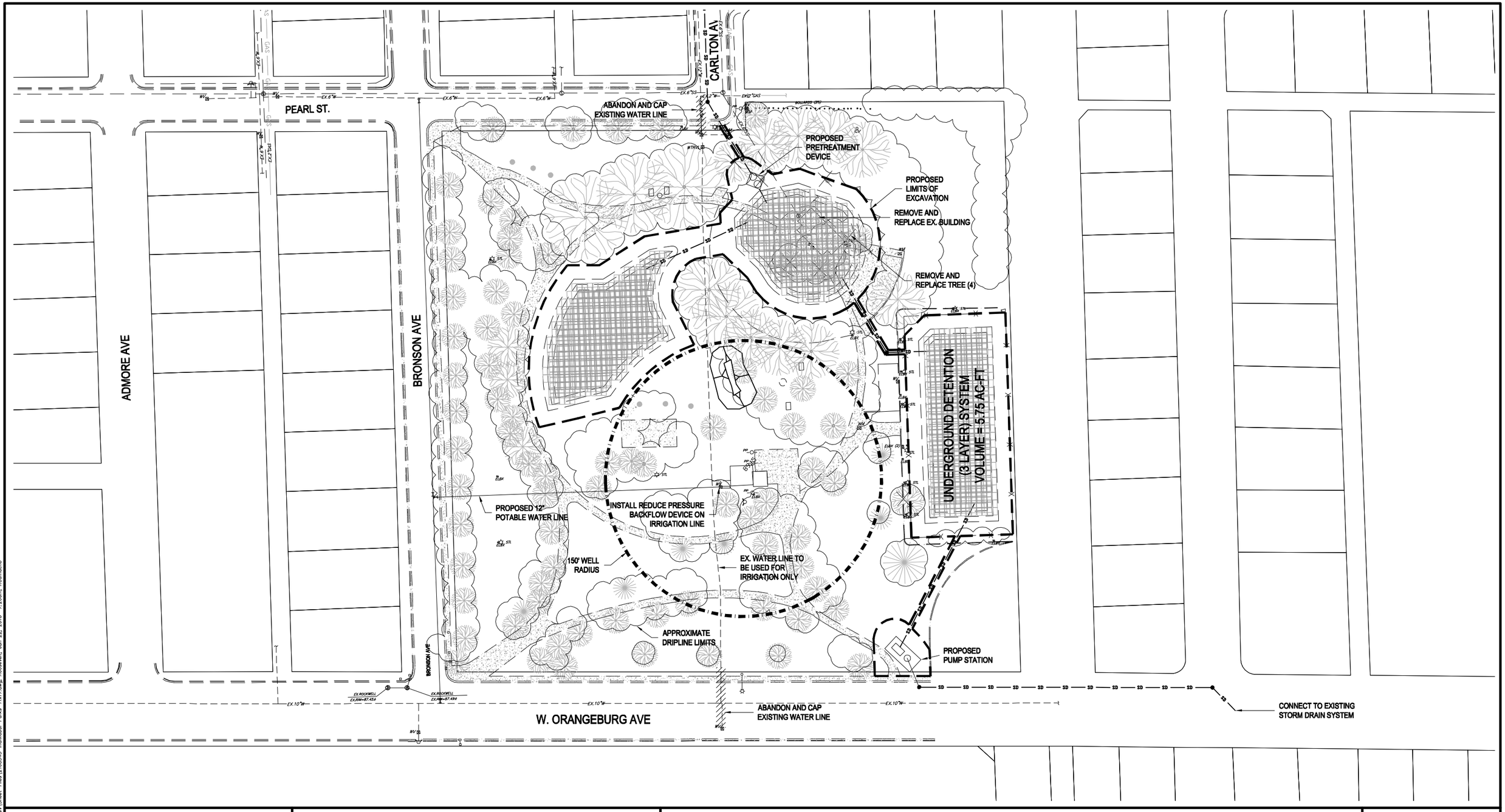

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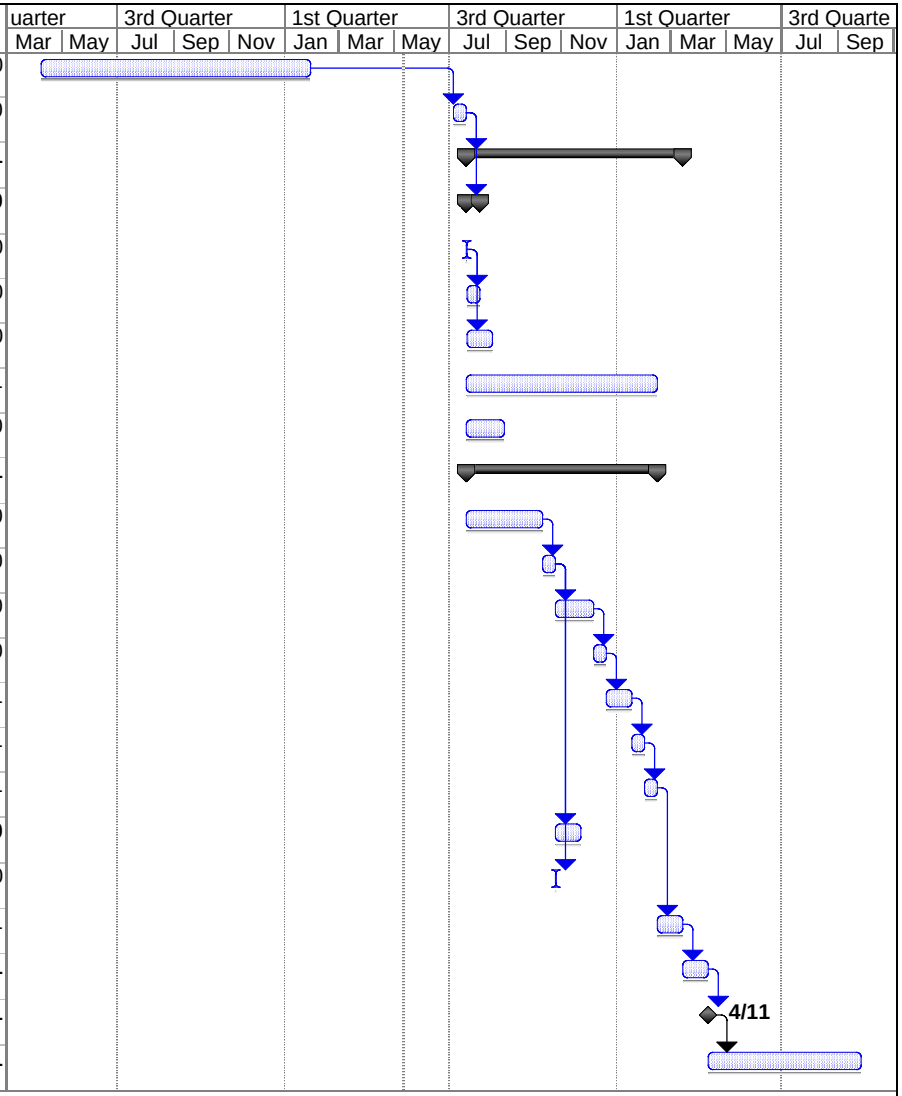
AREA 2 STORM DRAIN CROSS CONNECTION REMOVAL ROOSEVELT PARK UNDERGROUND IMPROVEMENTS - FIGURE 10

Sheet No. 4 OF 4
By RAC
Checked WFS
Date JANUARY 26, 2010
Job No. 2108543
Scale 1" = 100'

ID	Task Name	Duration	Start	Finish
1	Preliminary Design	212 days?	Thu 4/9/09	Fri 1/29/10
2	Scope/Contract	2 wks	Tue 7/6/10	Mon 7/19/10
3	**Final Design**	**170 days**	**Tue 7/20/10**	**Mon 3/14/11**
4	**Task A - Project Set Up**	**11 days**	**Tue 7/20/10**	**Tue 8/3/10**
5	A.1 - Kick-Off Meeting	1 day	Tue 7/20/10	Tue 7/20/10
6	A.2 Supplimental Survey	2 wks	Wed 7/21/10	Tue 8/3/10
7	Task B - Addendum to PDR	4 wks	Wed 7/21/10	Tue 8/17/10
8	Task C - Agency Coordination	150 days	Tue 7/20/10	Mon 2/14/11
9	Task D - Park Design Development	6 wks	Tue 7/20/10	Mon 8/30/10
10	**Task E - Plan, Specificaton, and Estir**	**150 days**	**Tue 7/20/10**	**Mon 2/14/11**
11	50% Construction Documents	3 mons	Tue 7/20/10	Mon 10/11/10
12	50% Review	2 wks	Tue 10/12/10	Mon 10/25/10
13	90% Construction Documents	6 wks	Tue 10/26/10	Mon 12/6/10
14	90% Review	2 wks	Tue 12/7/10	Mon 12/20/10
15	100% Construction Documents	1 mon	Tue 12/21/10	Mon 1/17/11
16	100% Review	2 wks	Tue 1/18/11	Mon 1/31/11
17	Bid Set of Plans	2 wks	Tue 2/1/11	Mon 2/14/11
18	**Task F - CEQA**	**1 mon**	**Tue 10/26/10**	**Mon 11/22/10**
19	**Task G - Public Outreach**	1 day	Tue 10/26/10	Tue 10/26/10
20	Design Acceptance By City	1 mon	Tue 2/15/11	Mon 3/14/11
21	**Bidding**	**1 mon**	**Tue 3/15/11**	**Mon 4/11/11**
22	**Award Construction Contract**	**0 days**	**Mon 4/11/11**	**Mon 4/11/11**
23	**Construction**	**6 mons**	**Tue 4/12/11**	**Mon 9/26/11**



Project: Modesto Area 2
Date: Tue 5/11/10

Task	Milestone	External Tasks	
Split	Summary	External Milestone	
Progress	Project Summary	Deadline	

Figure 11

GLOSSARY

Asbuilts: Drawings which have been prepared by an engineer which represent the constructed state of improvements.

Cross Connection: The connection of a non-sanitary sewer pipe to the sanitary sewer system

Conveyance System: The drainage facilities, both natural and human-made, which collect, contain, and provide for the flow of surface water and urban runoff from the highest points on the land down to a receiving water. The natural elements of the conveyance system include swales and small drainage courses, streams, rivers, lakes, and wetlands. The human-made elements of the conveyance system include gutters, ditches, pipes, channels, and most retention/detention facilities.

Design Return Period: A rainfall event of specified size and return frequency (e.g., a 10-year storm, a storm that has a 10% chance of occurring in any year) that is used to calculate the runoff volume and peak discharge rate.

Detention: The delay of storm runoff prior to discharge into receiving waters.

Disposal System: A system for the disposing of wastes, either by surface or underground methods; includes sewer systems, treatment works, disposal wells, and other systems.

Geographical Information System (GIS): computer system that can store manipulate and display geographically referenced information .

Hydraulics: study of the mechanical uses of fluids (especially water) in motion
California Environmental Quality Ac t (CEQA) - Enacted in 1970 and amended through 1983, established state policy to maintain a high-quality environment in California and set up regulations to inhibit degradation of the environment.

Hydrology : a science dealing with the properties, distribution, and circulation of water on and below the earth's surface and in the atmosphere.

Manhole: opening with a removable cover through which a person can access a sewer (or stormdrain)
AWWA: American Water Works Association.

National Pollutant Discharge Elimination System (NPDES): the surface water quality program authorized by Congress as part of the 1987 Clean Water Act. This is EPA's program to control the discharge of pollutants to waters of the United States (see 40 CFR 122.2).

Plats: A plot; a plan; a design; a diagram; a map; a chart.

Pre-Treatment: Processes used to reduce or eliminate stormwater pollutants from before they are discharged.

Regional Water Quality Control Board (RWQCB): There are nine Regional Water Quality Control Boards. The mission of the Regional Boards is to develop and enforce water quality objectives and implementation plans that will best protect the beneficial uses of the State's waters, recognizing local differences in climate, topography, geology and hydrology.

Retention: The prevention of direct discharge of storm runoff into receiving waters; included as examples are systems which discharge through percolation, exfiltration, and evaporation processes and which generally have residence times less than 3 days.

Right-of-Way: a strip of land granted for the public to travel over it, such as a street, road, sidewalk, or footpath.

Rockwell: A vertical drain that infiltrates stormwater into the ground.

Runoff: the portion of precipitation on land that ultimately reaches streams.

Sanitary Sewer: A system of underground pipes that carries sanitary waste or process wastewater to a treatment plant.

Storm Sewer (Storm Drain): Above and below ground structures for transporting stormwater to streams or outfalls for flood control purposes.

Sub-Basin: A portion of a subregion or basin drained by a single stream or group of minor streams Infiltration - the gradual downward flow of water from the surface of the earth into the soil.

Total Suspended Solids (TSS): A measure of water quality defined as those solids which are retained by a glass fiber filter and dried to constant weight at 103-105EC.

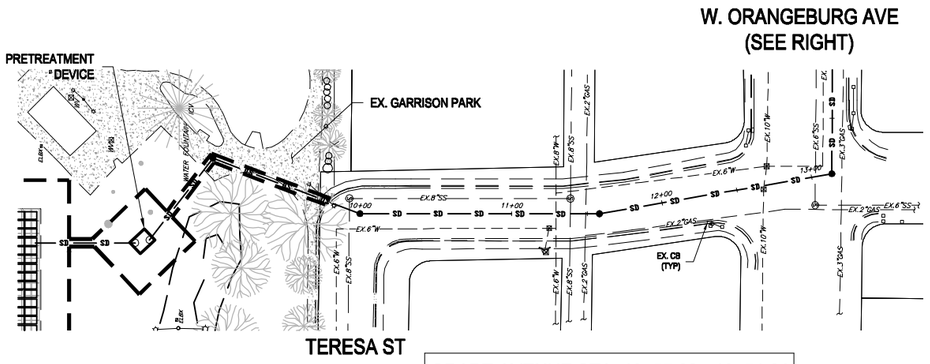
Water Quality: The chemical, physical and biological characteristics of water in respect to its suitability for a particular purpose.

Water Quality Flow Rate: “First flush” defined as the runoff associated with the two-year/siz-hour storm (average intensity = 0.15 inches per hour).

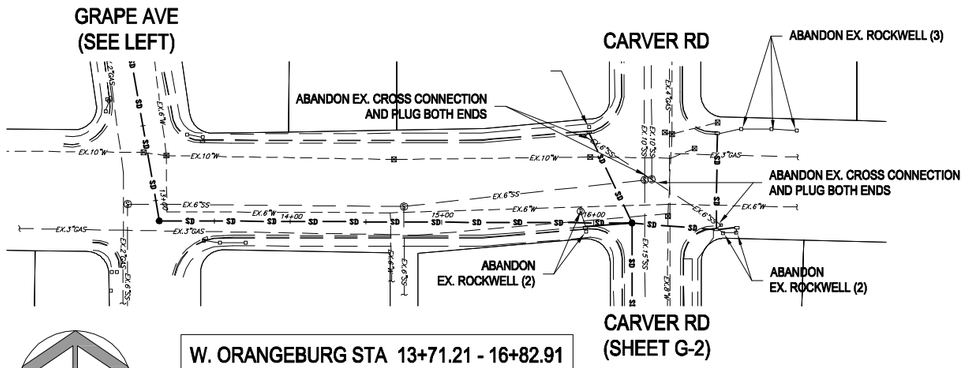
Water Quality Volume: “First Flush” also defined as the first 0.5 inch of runoff.

APPENDIX A

PRELIMINARY DESIGN DRAWINGS



GRAPE AVENUE STA 10+57.62 - 13+71.21



W. ORANGEBURG STA 13+71.21 - 16+82.91

north

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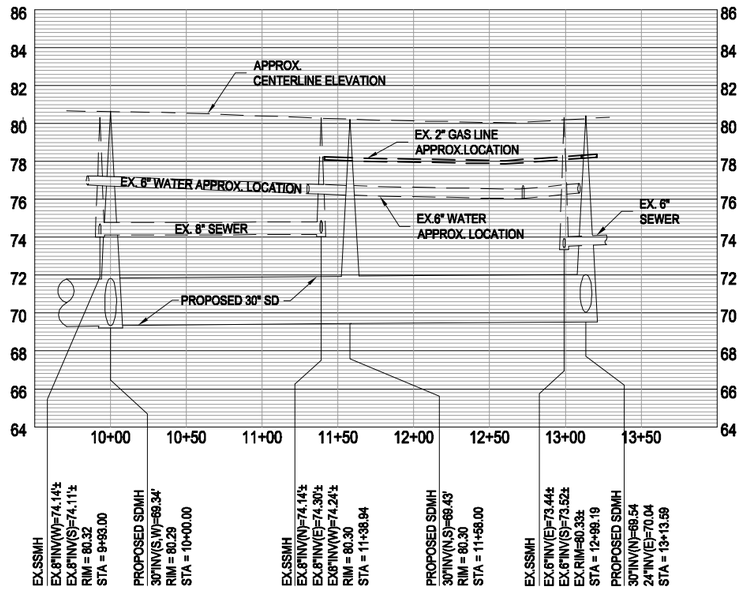
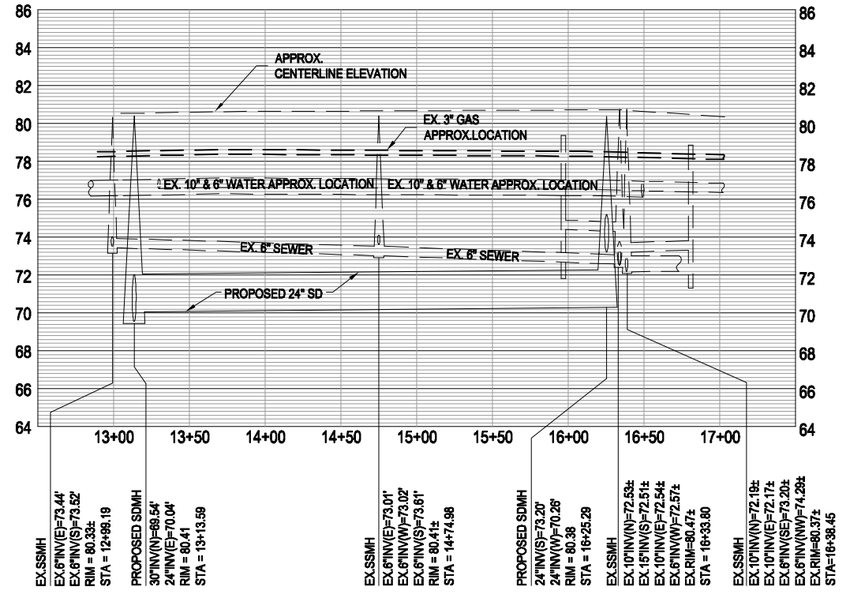
NOTE: PROPERTY AND ROW LINES BASED ON CITY GIS LINEWORK, NOT SURVEYED.

north

SCALE: 1" = 100'

NOT FOR CONSTRUCTION





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CITY of MODESTO

AREA 2 STORM DRAIN
CROSS CONNECTION REMOVAL
GARRISON - CONVEYANCE SYSTEM

Sheet No. G-1
By RC
Checked WFS
Date JANUARY 26, 2010
Job No. 2108543
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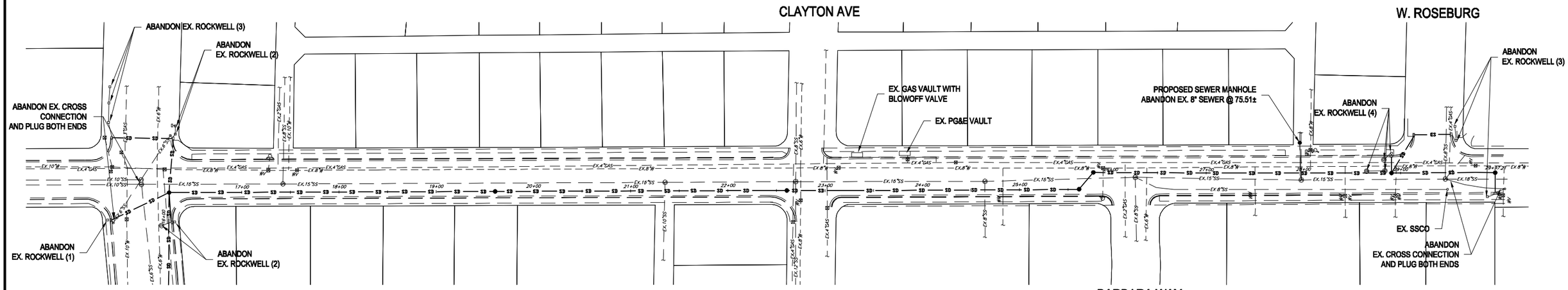

CARVER ROAD STA 16+82.91 - 30+54.83

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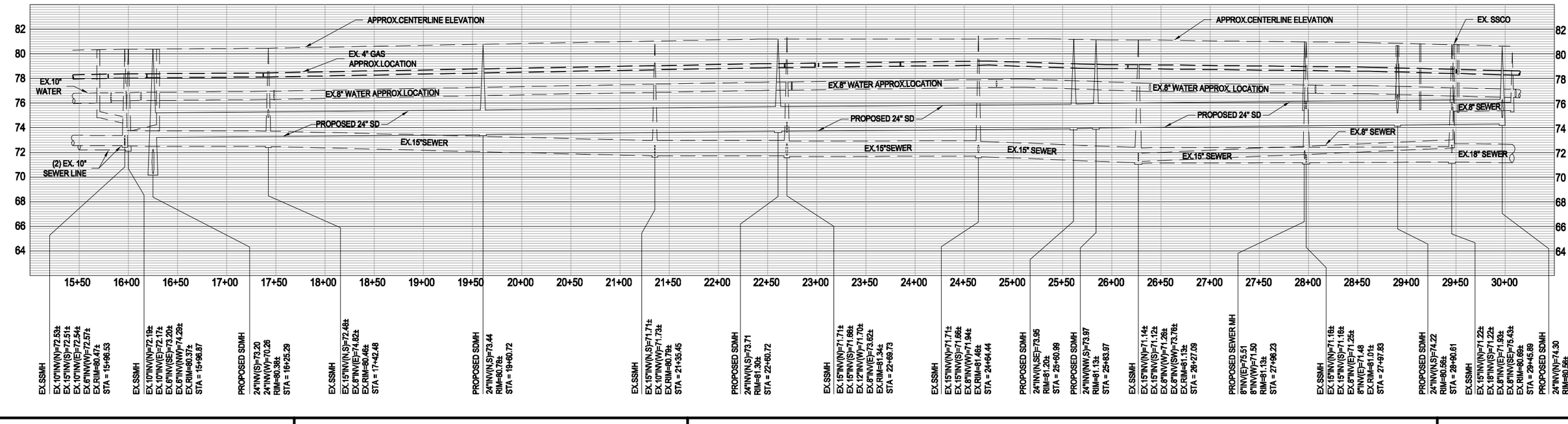
NOT FOR CONSTRUCTION



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north

SCALE: 1" = 100'

AREA 2 STORM DRAIN CROSS CONNECTION REMOVAL GARRISON - CONVEYANCE SYSTEM

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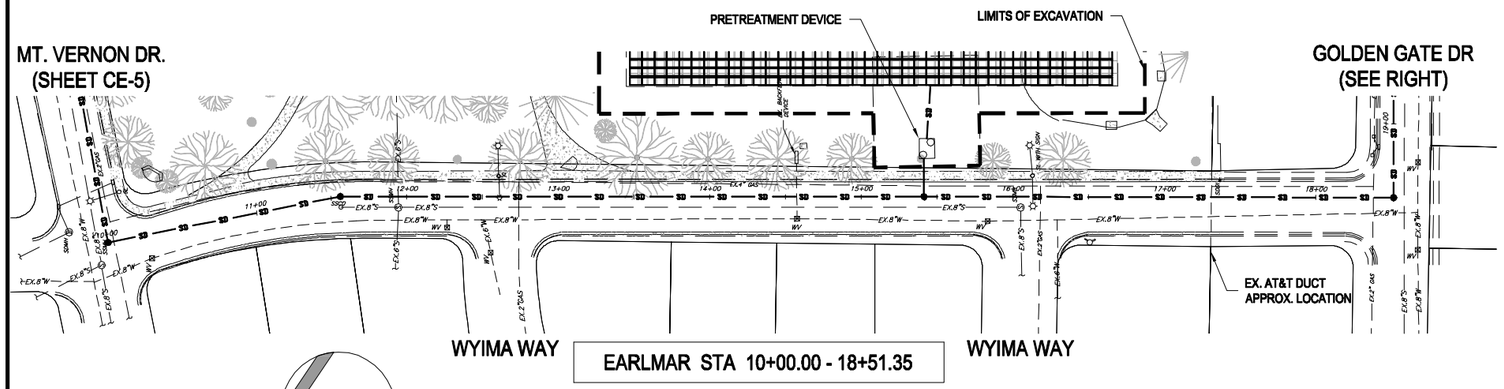
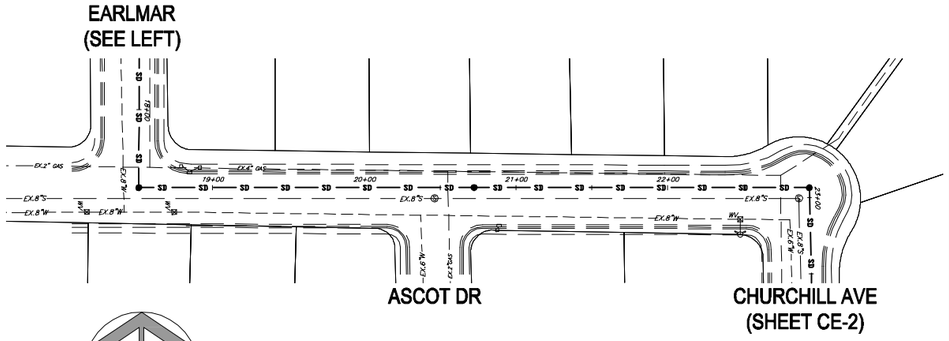


EARLMAR STA 10+00.00 - 18+51.35



GOLDEN GATE DR STA 18+51.35 - 22+93.39

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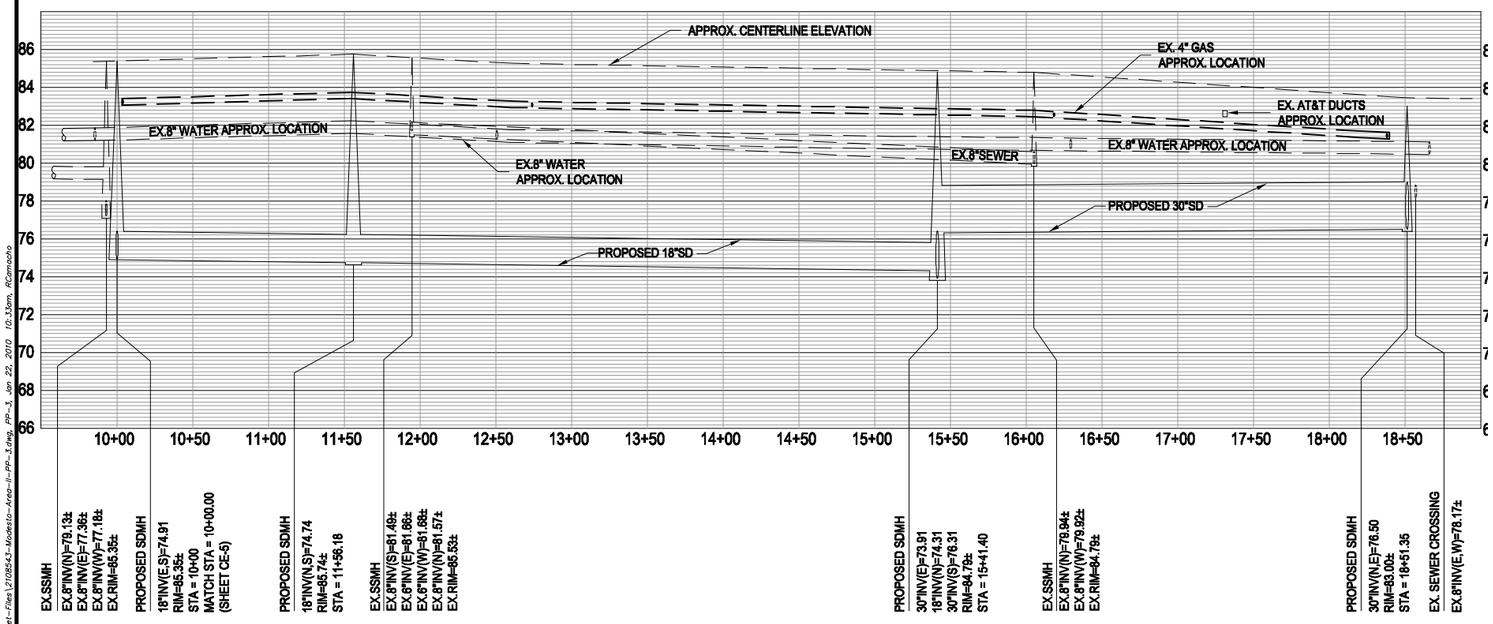
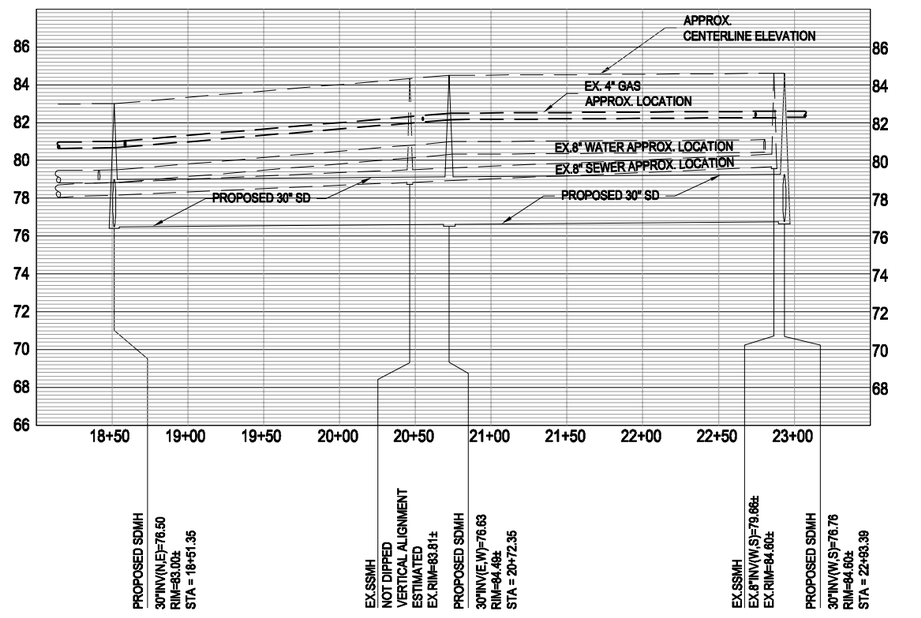
north

SCALE: 1" = 100'

NOT FOR CONSTRUCTION





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AREA 2 STORM DRAIN
CROSS CONNECTION REMOVAL
CATHERINE EVERETT - CONVEYANCE SYSTEM

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Date JANUARY 26, 2010
Job No. 2108543
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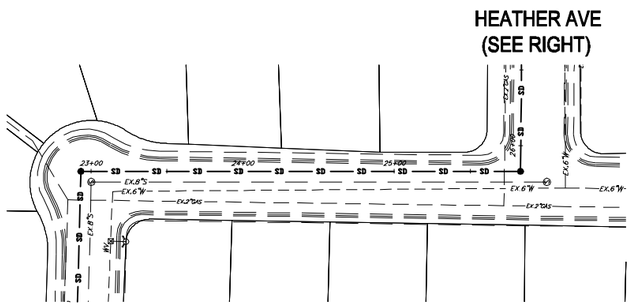
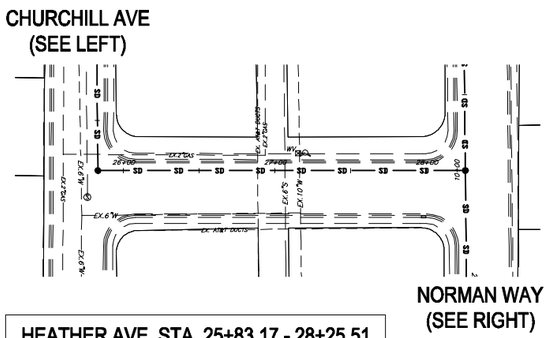
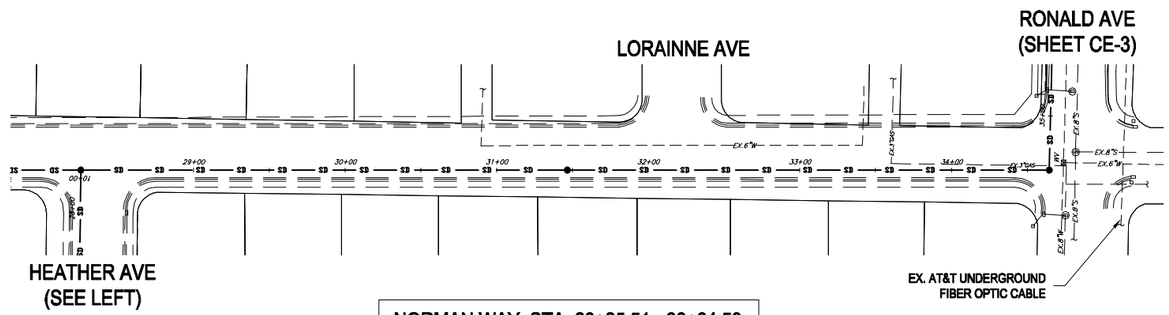


CHURCHILL AVE STA 22+93.39 - 25+83.17



HEATHER AVE STA 25+83.17 - 28+25.51



NORMAN WAY STA 28+25.51 - 38+64.53

north

SCALE: 1" = 100'

north

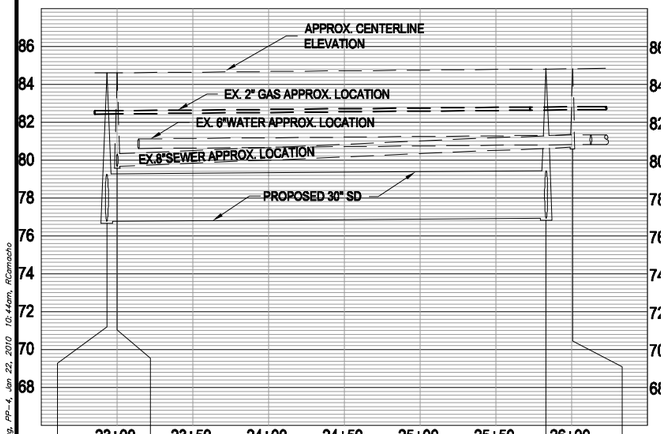
SCALE: 1" = 100'

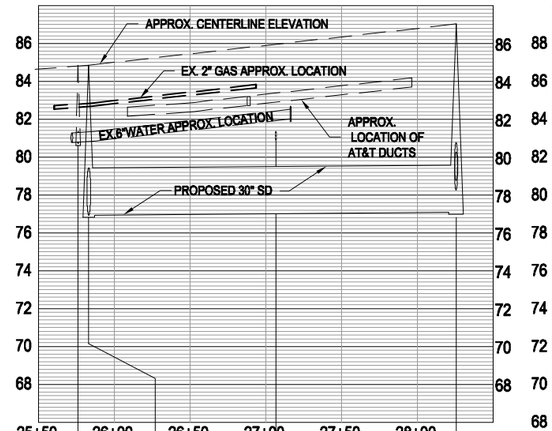
NOTE: PROPERTY AND ROW LINES BASED ON CITY GIS LINEWORK, NOT SURVEYED.

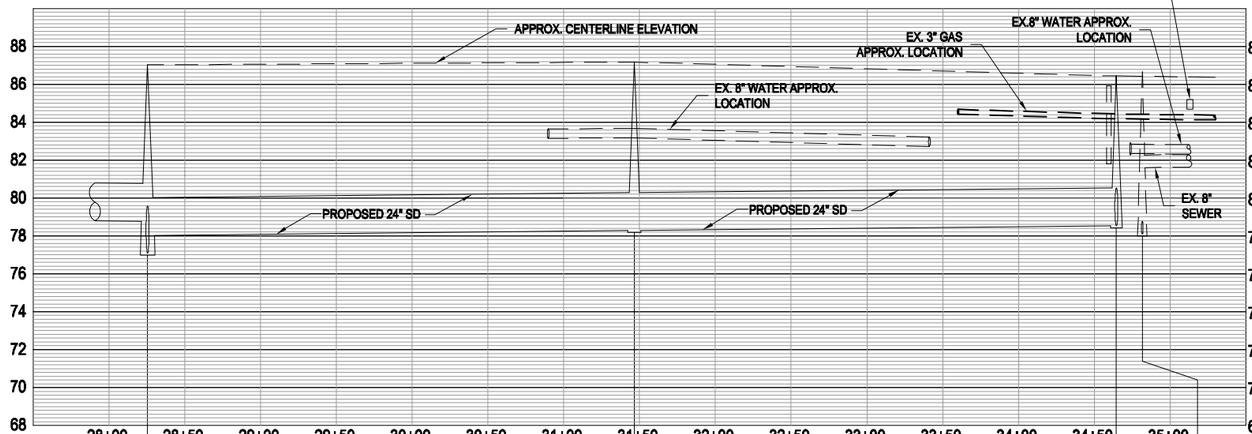
north

SCALE: 1" = 100'

NOT FOR CONSTRUCTION







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CITY of MODESTO

AREA 2 STORM DRAIN
CROSS CONNECTION REMOVAL
CATHERINE EVERETT - CONVEYANCE SYSTEM

Sheet No. CE-2
By RC
Checked WFS
Date JANUARY 26, 2010
Job No. 2108543
Scale 1" = 100'

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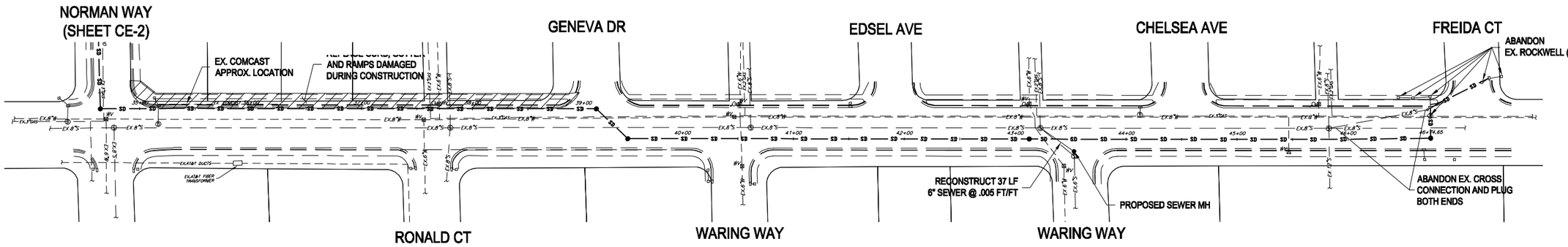


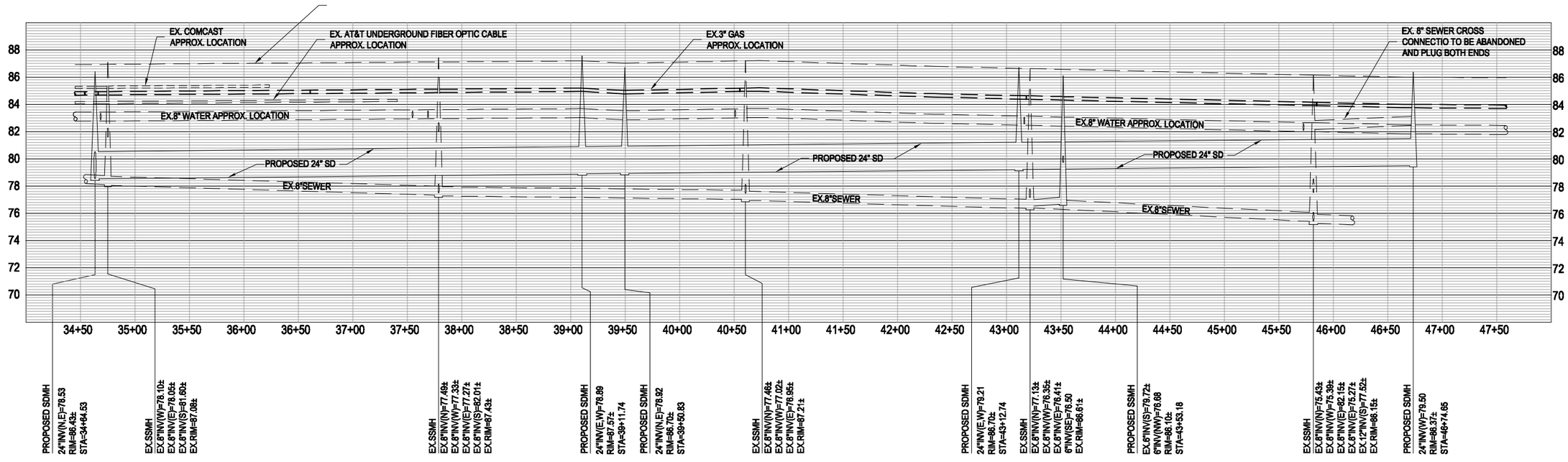
north

SCALE: 1" = 100'

RONALD AVE STA 34+64.53 - 46+74.65

NOTE: PROPERTY AND ROW LINES BASED ON CITY GIS LINEWORK, NOT SURVEYED.

NOT FOR CONSTRUCTION



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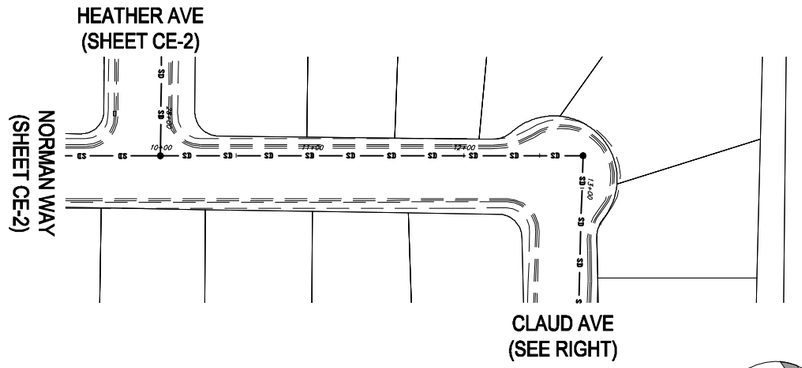
CROSS CONNECTION REMOVAL
CATHERINE EVERETT - CONVEYANCE SYSTEM

Sheet No. CE-3
By RC
Checked WFS
Date JANUARY 26, 2010
Job No. 2108543
Scale 1" = 100'

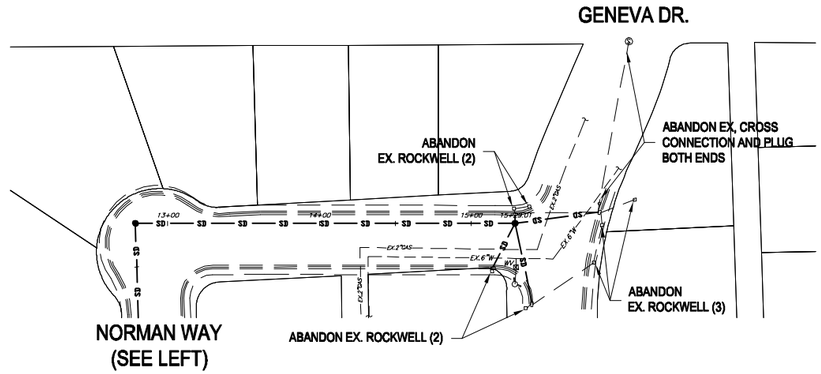
N:\2008\2108543--Modesto\03Storm\Engineering\DesDev\Sheet--Files\2108543--Modesto--Area--II--PP--5.dwg, PP--5, Feb 03, 2010 11:18am, rcamacho



NORMAN WAY STA 10+00.00 - 12+78.72

north

SCALE: 1" = 100'



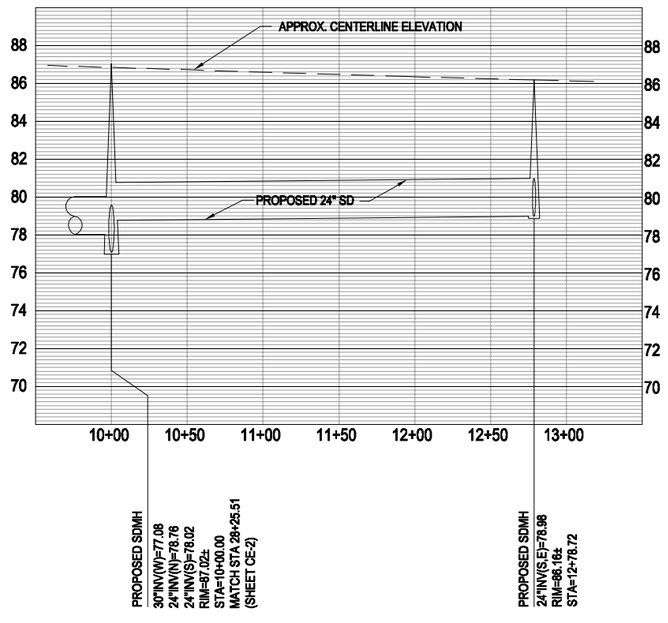
CLAUD STA 12+78.72 - 15+29.01

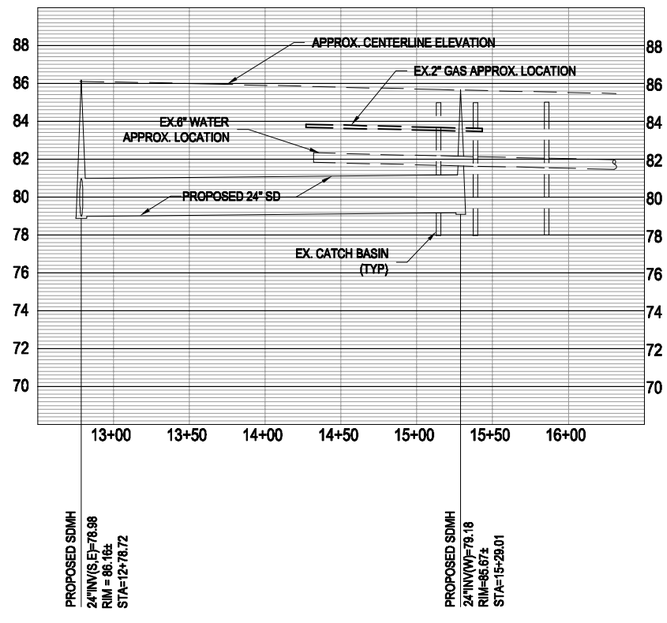
north

SCALE: 1" = 100'

NOTE: PROPERTY AND ROW LINES BASED ON CITY GIS LINEWORK, NOT SURVEYED.

NOT FOR CONSTRUCTION





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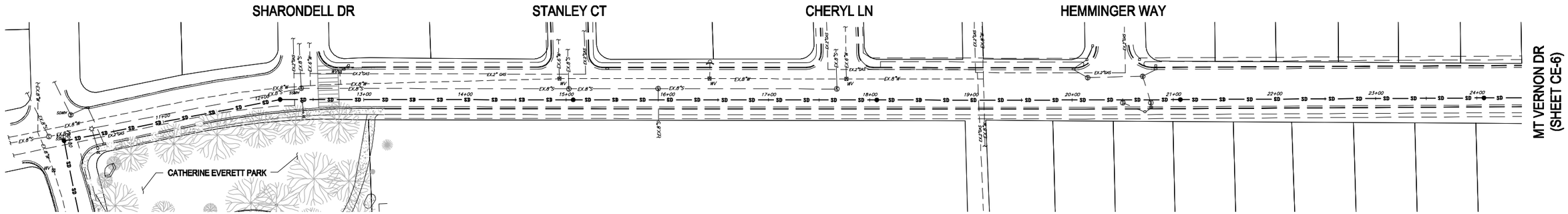
CITY of MODESTO

AREA 2 STORM DRAIN
CROSS CONNECTION REMOVAL
CATHERINE EVERETT - CONVEYANCE SYSTEM

Sheet No. CE-4
By RC
Checked WFS
Date JANUARY 26, 2010
Job No. 2108543
Scale 1" = 100'

N:\2008\2108543--Modesto2Storm\Engineering\DesDev\Sheet--Files\2108543--Modesto--Area--II--PP--6.dwg, PP--5, Feb 05, 2010 8:02pm, RComacho



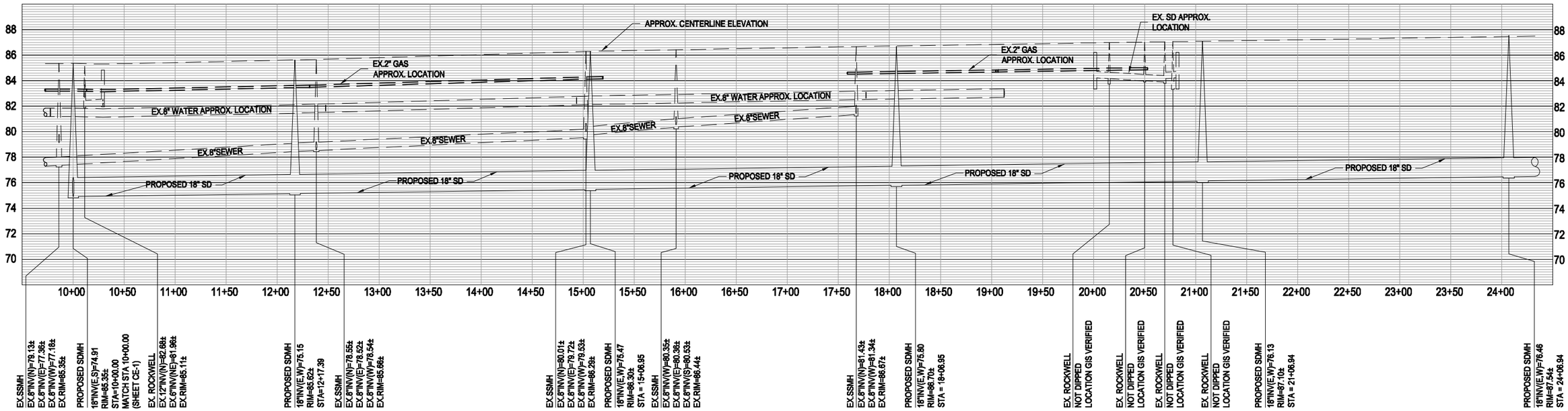
north

SCALE: 1" = 100'

MT VERNON DR STA 10+00.00 - 24+32.83

NOTE: PROPERTY AND ROW LINES BASED ON CITY GIS LINEWORK, NOT SURVEYED.

NOT FOR CONSTRUCTION



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CITY of MODESTO

AREA 2 STORM DRAIN
CROSS CONNECTION REMOVAL
CATHERINE EVERETT - CONVEYANCE SYSTEM

Sheet No. CE-5
By RC
Checked WFS
Date JANUARY 26, 2010
Job No. 2108543
Scale 1" = 100'

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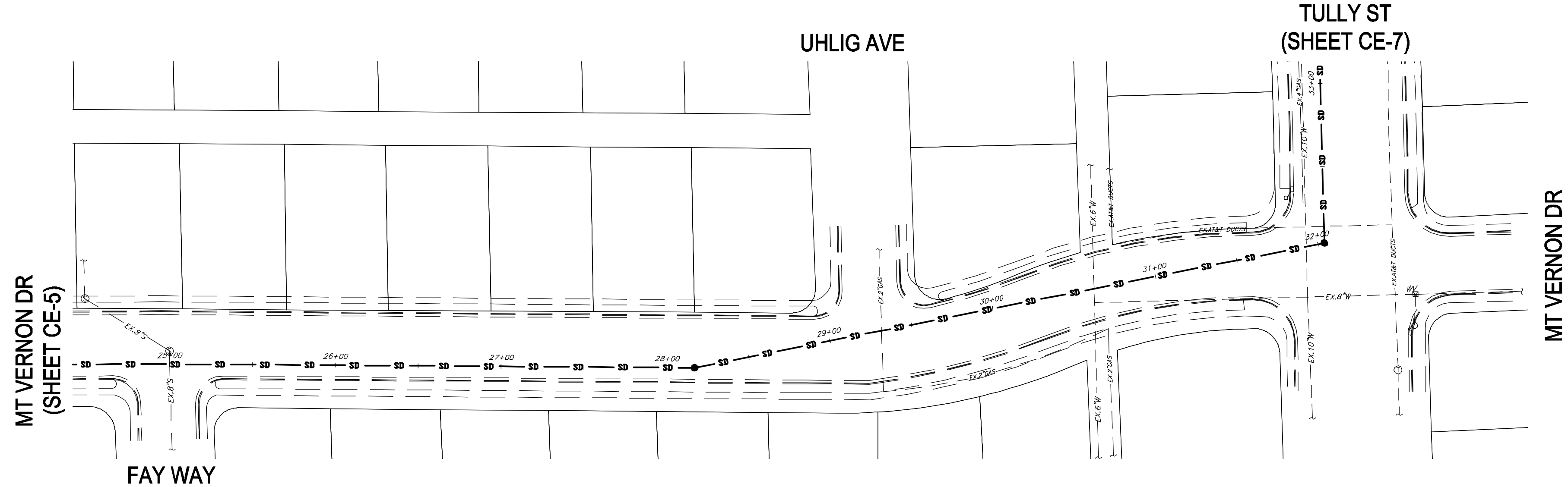


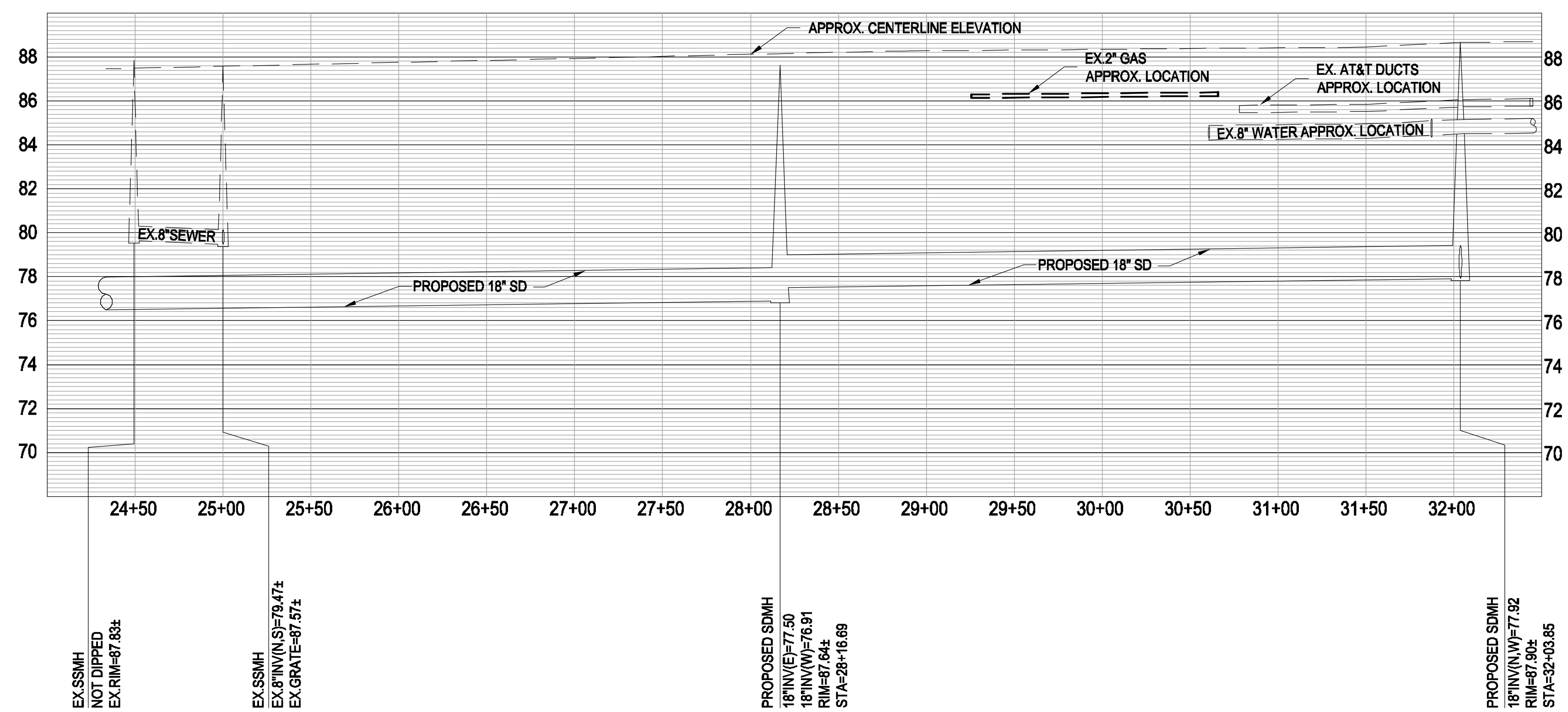
north

SCALE: 1" = 100'

MT VERNON DR STA 24+32.83 - 32+03.85

NOT FOR CONSTRUCTION

NOTE: PROPERTY AND ROW LINES BASED ON CITY GIS LINEWORK, NOT SURVEYED.



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CITY of MODESTO

AREA 2 STORM DRAIN
CROSS CONNECTION REMOVAL
CATHERINE EVERETT - CONVEYANCE SYSTEM

Sheet No. CE-6
By RC
Checked WFS
Date JANUARY 26, 2010
Job No. 2108543
Scale 1" = 100'

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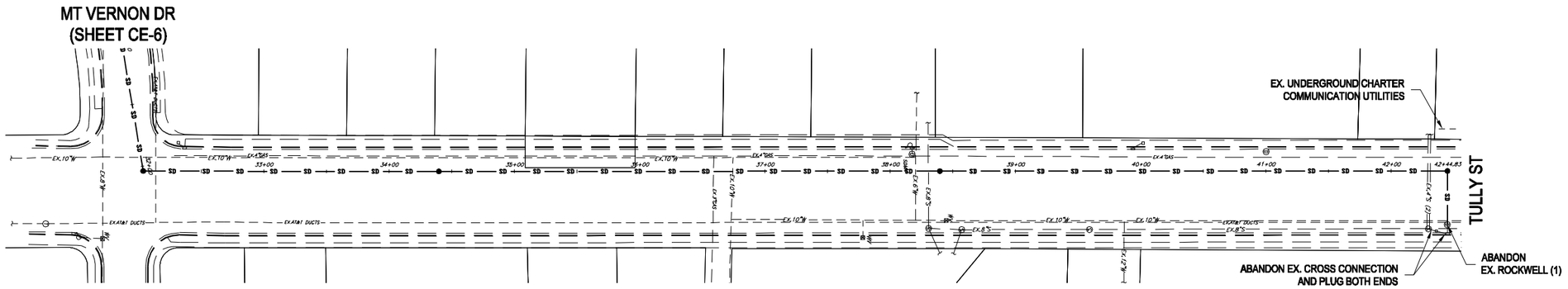


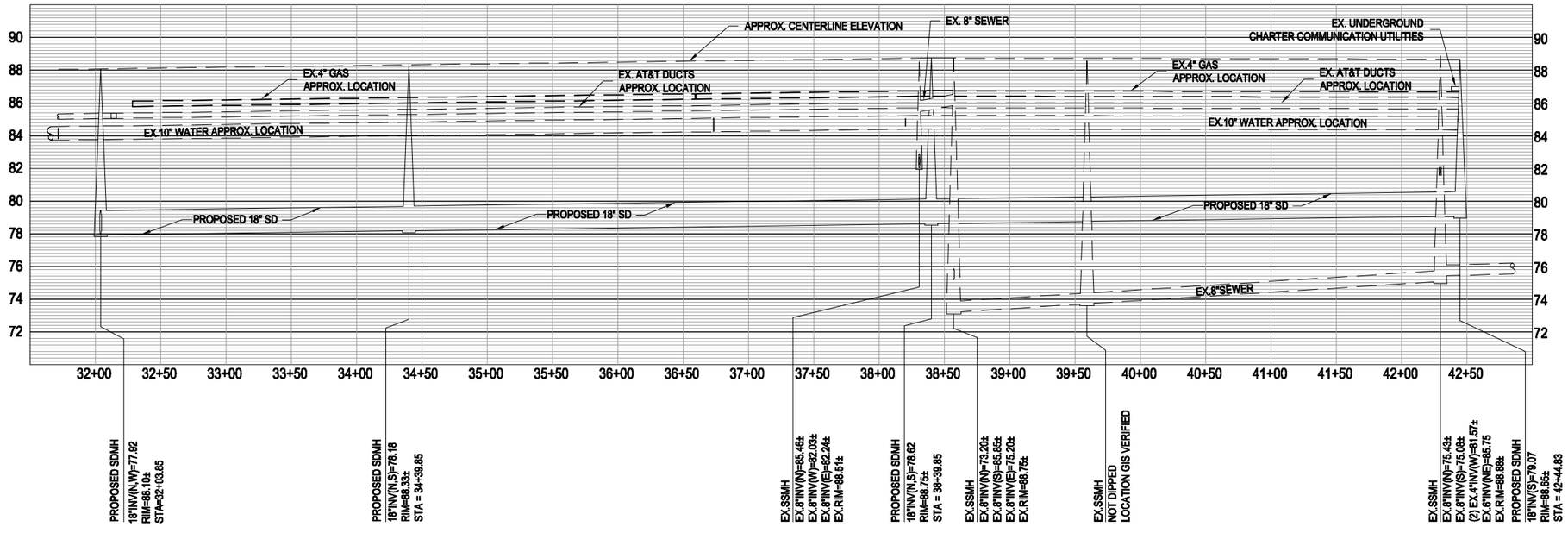
NOTE: PROPERTY AND ROW LINES BASED ON CITY GIS LINEWORK, NOT SURVEYED.

north

SCALE: 1" = 100'

TULLY ST STA 32+03.85 - 42+44.83

NOT FOR CONSTRUCTION



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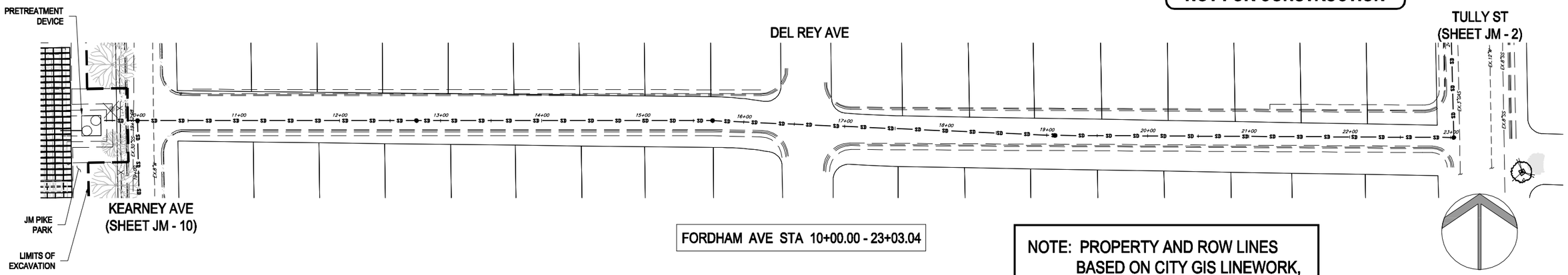
CITY of MODESTO

AREA 2 STORM DRAIN
CROSS CONNECTION REMOVAL
CATHERINE EVERETT - CONVEYANCE SYSTEM

Sheet No. CE-7
By RC
Checked WFS
Date JANUARY 26, 2010
Job No. 2108543
Scale 1" = 100'

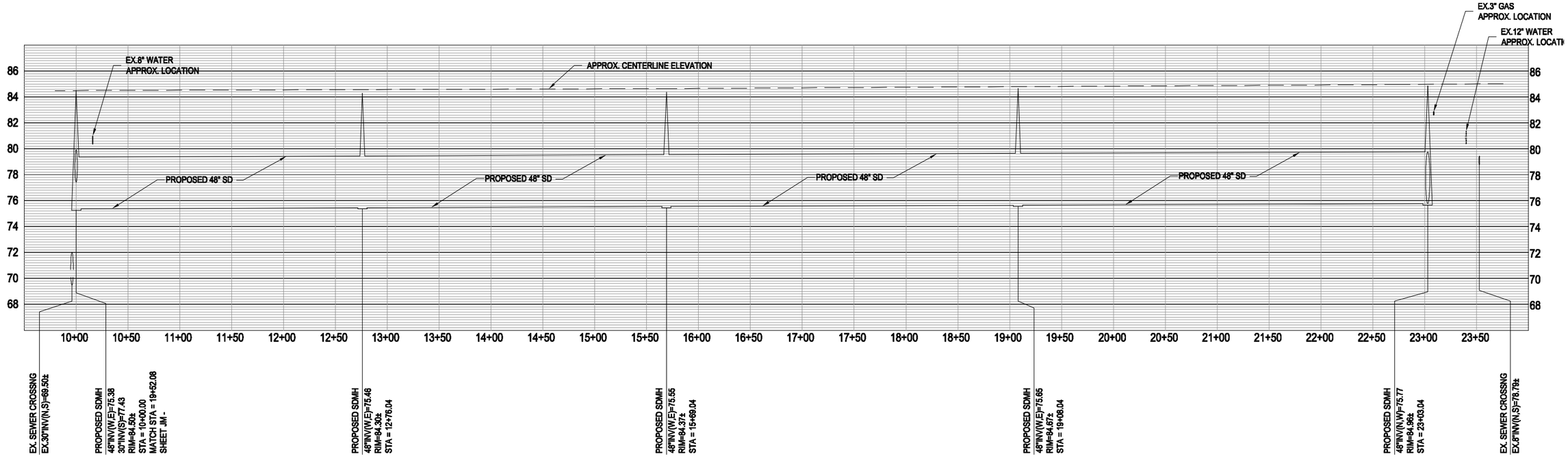
NOT FOR CONSTRUCTION



FORDHAM AVE STA 10+00.00 - 23+03.04

NOTE: PROPERTY AND ROW LINES BASED ON CITY GIS LINEWORK, NOT SURVEYED.

SCALE: 1" = 100'



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CITY of MODESTO

AREA 2 STORM DRAIN CROSS CONNECTION REMOVAL JM PIKE - CONVEYANCE SYSTEM

Sheet No. JM-1

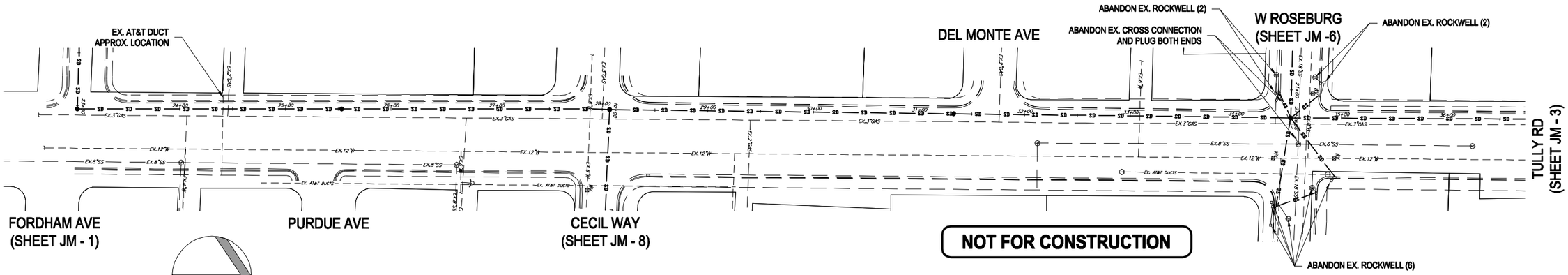
By RC

Checked WFS

Date JANUARY 26, 2010

Job No. 2108543

Scale 1" = 100'

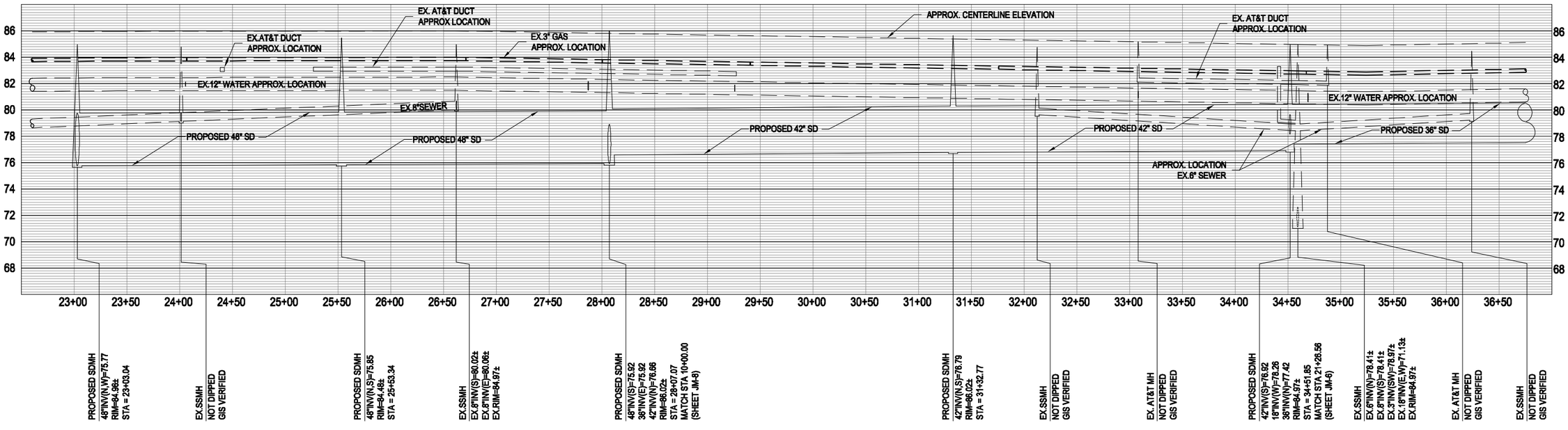


SCALE: 1" = 100'

NOT FOR CONSTRUCTION

TULLY RD STA 23+03.04 - 36+75.00

NOTE: PROPERTY AND ROW LINES BASED ON CITY GIS LINEWORK, NOT SURVEYED.



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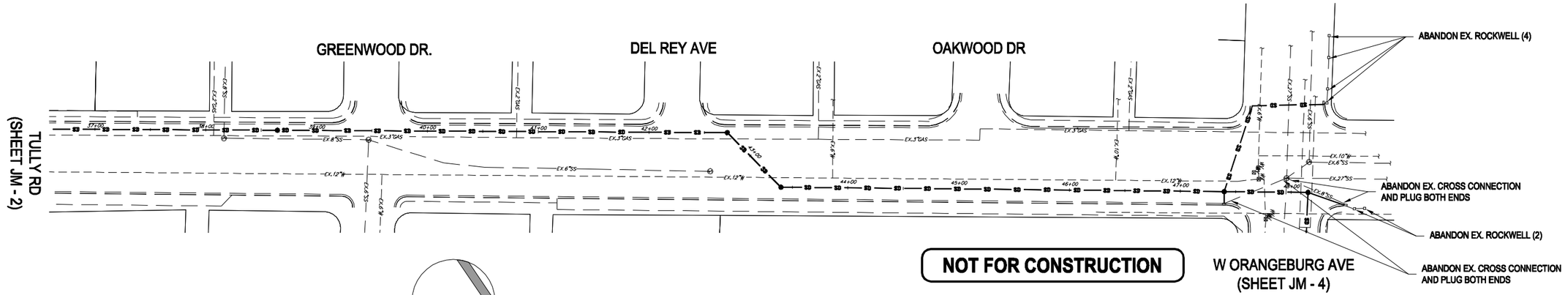
CITY of MODESTO

AREA 2 STORM DRAIN
CROSS CONNECTION REMOVAL
JM PIKE - CONVEYANCE SYSTEM

Sheet No. JM-2
By RC
Checked WFS
Date JANUARY 26, 2010
Job No. 2108543
Scale 1" = 100'

N:\2008\2108543--Modesto2Storm\Engineering\DesDev\Sheet--Files\2108543--Modesto--Area--II--PP--13.dwg, PP--13, Feb 05, 2010 8:21am, RComacho



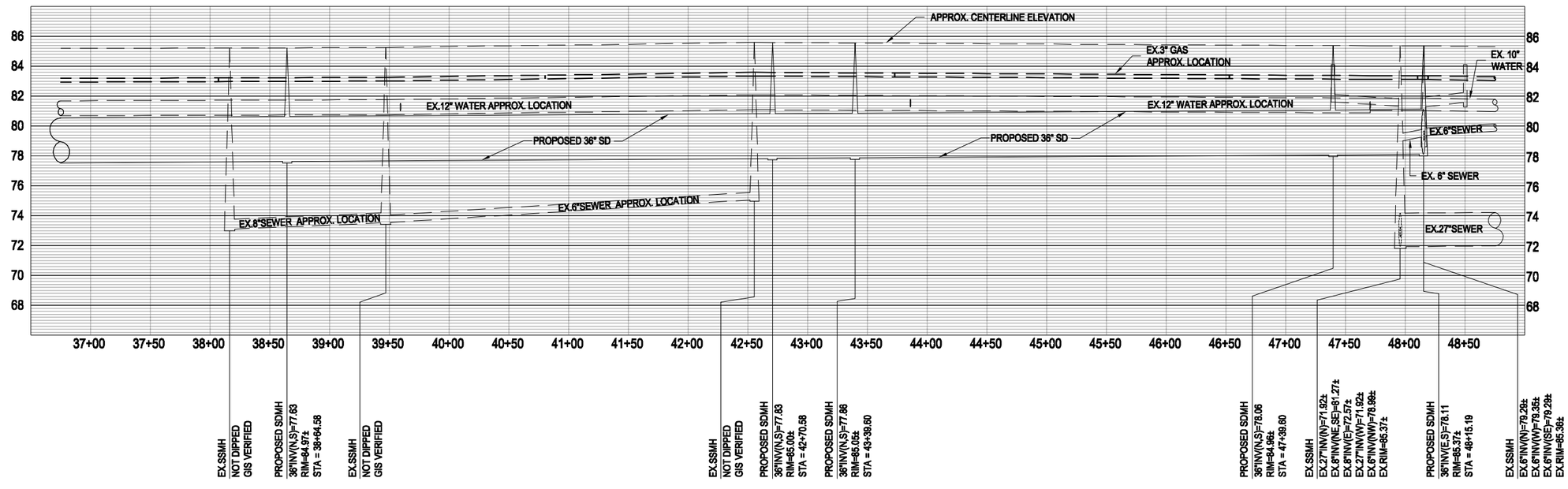
NOT FOR CONSTRUCTION

north

SCALE: 1" = 100'

TULLY RD STA 36+75.00 - 48+15.19

NOTE: PROPERTY AND ROW LINES BASED ON CITY GIS LINEWORK, NOT SURVEYED.



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CITY of MODESTO

AREA 2 STORM DRAIN
CROSS CONNECTION REMOVAL
JM PIKE - CONVEYANCE SYSTEM

Sheet No. JM-3
By RC
Checked WFS
Date JANUARY 26, 2010
Job No. 2108543
Scale 1" = 100'

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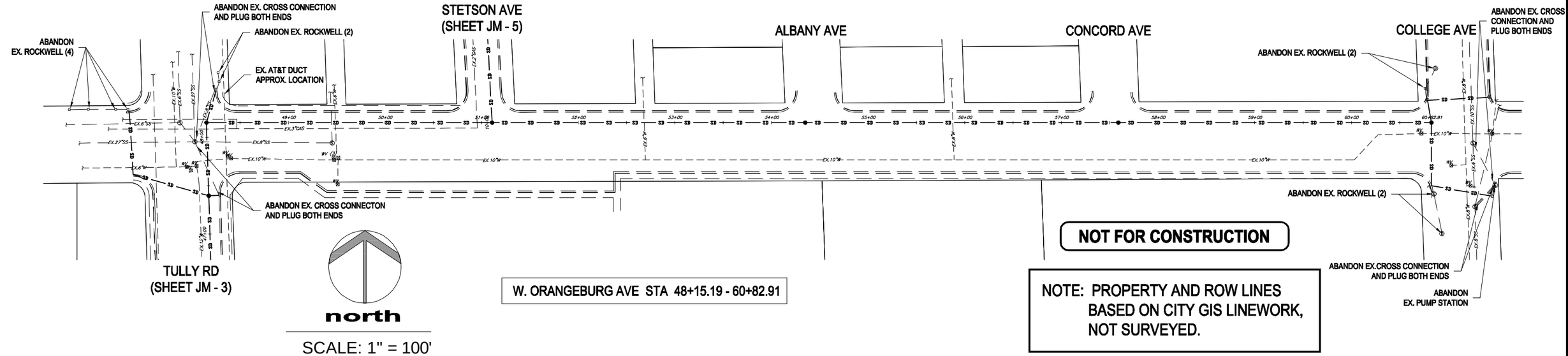

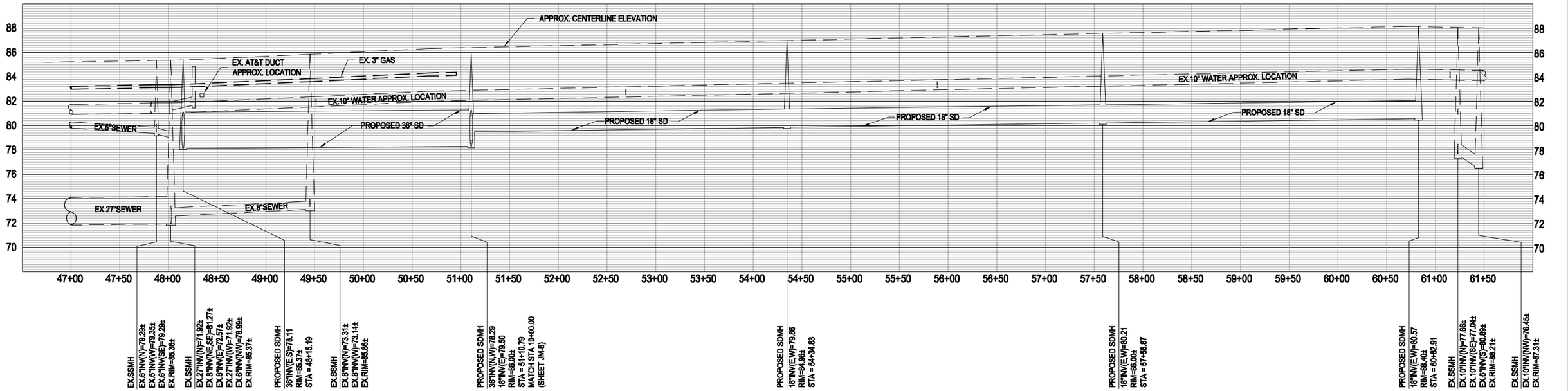

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CITY of MODESTO

AREA 2 STORM DRAIN CROSS CONNECTION REMOVAL JM PIKE - CONVEYANCE SYSTEM

Sheet No. JM-4
By RC
Checked WFS
Date JANUARY 26, 2010
Job No. 2108543
Scale 1" = 100'

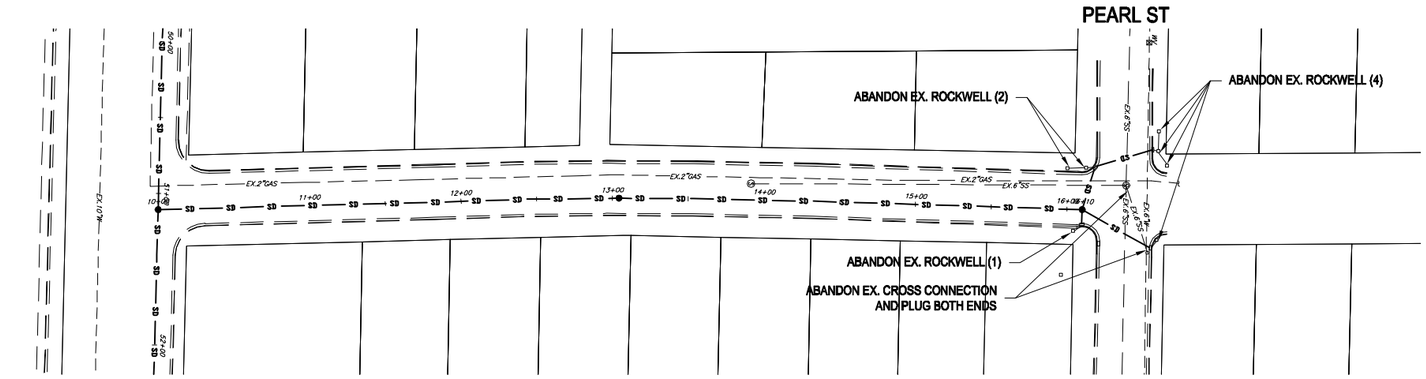
N:\2008\2108543--Modesto2Storm\Engineering\DesDev\Sheet--Files\2108543--Modesto--Area--II--PP--15.dwg, PP--15, Jan 25, 2010 12:37pm, RCamacho

north

SCALE: 1" = 100'

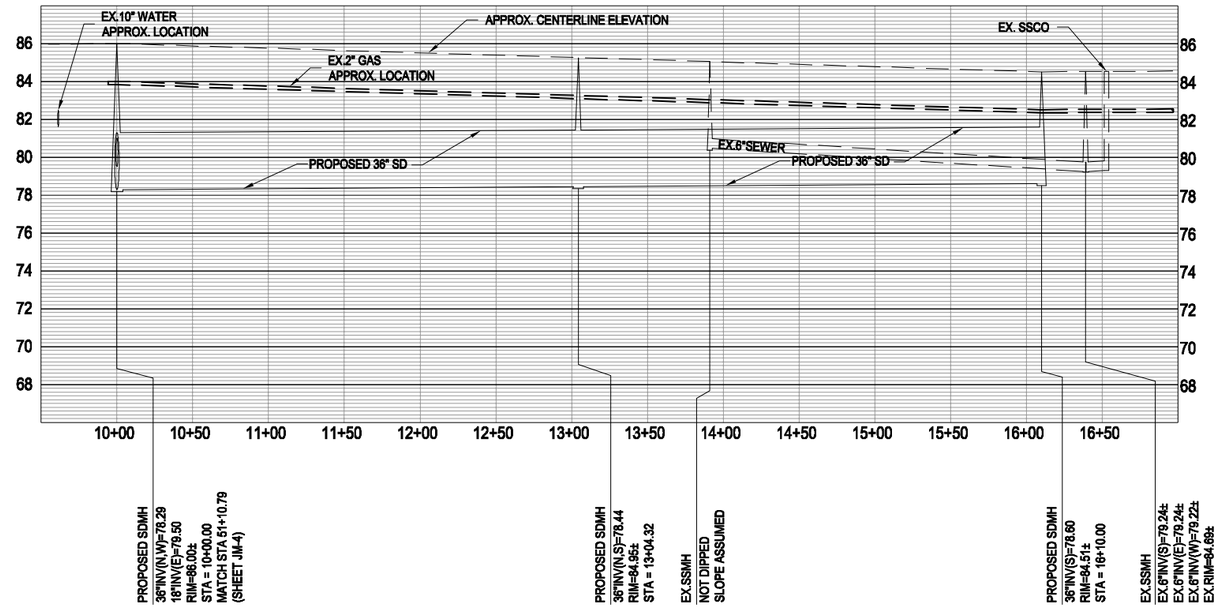
NOT FOR CONSTRUCTION

NOTE: PROPERTY AND ROW LINES BASED ON CITY GIS LINEWORK, NOT SURVEYED.



W ORANGEBURG AVE
(SHEET JM - 4)

STETSON AVE STA 10+00.00 - 16+10.00



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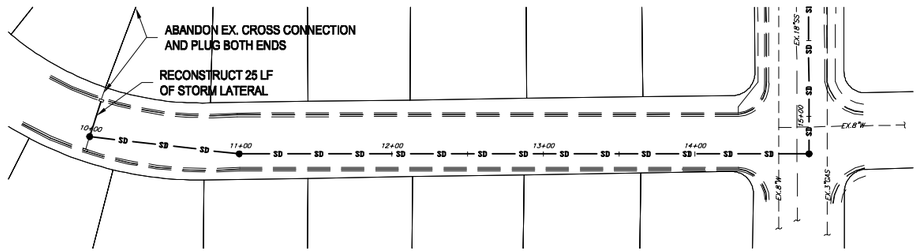
CITY of MODESTO

AREA 2 STORM DRAIN CROSS CONNECTION REMOVAL JM PIKE - CONVEYANCE SYSTEM

Sheet No. JM-5
By RC
Checked WFS
Date JANUARY 26, 2010
Job No. 2108543
Scale 1" = 100'

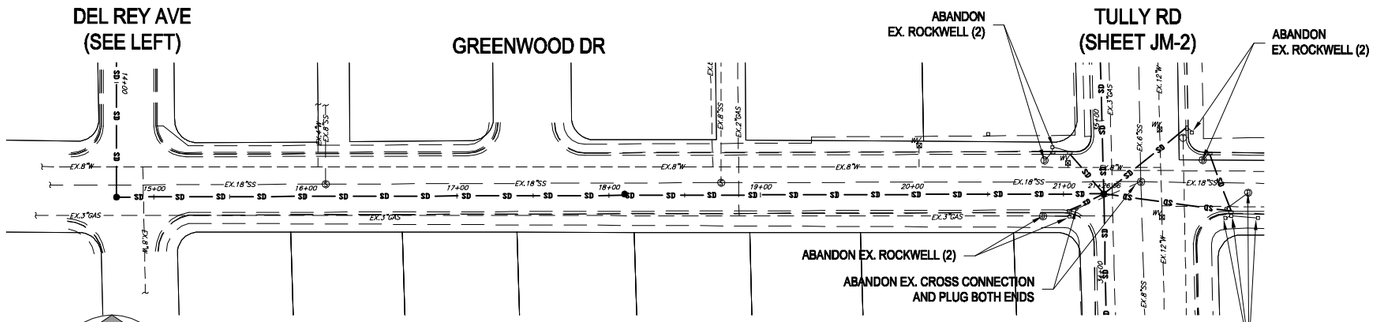


DEL REY AVE 10+00.00 - 14+75.32

north

SCALE: 1" = 100'

NOTE: PROPERTY AND ROW LINES BASED ON CITY GIS LINEWORK, NOT SURVEYED.

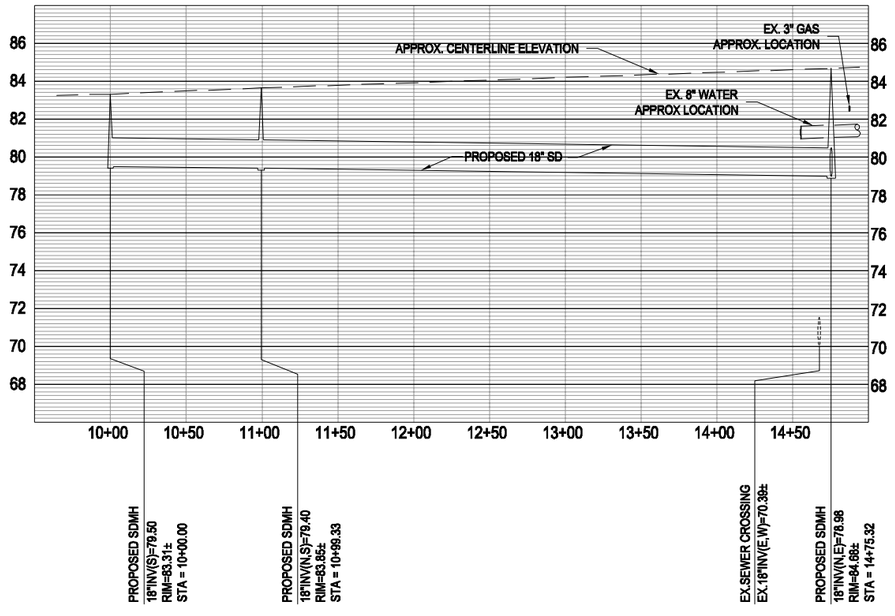


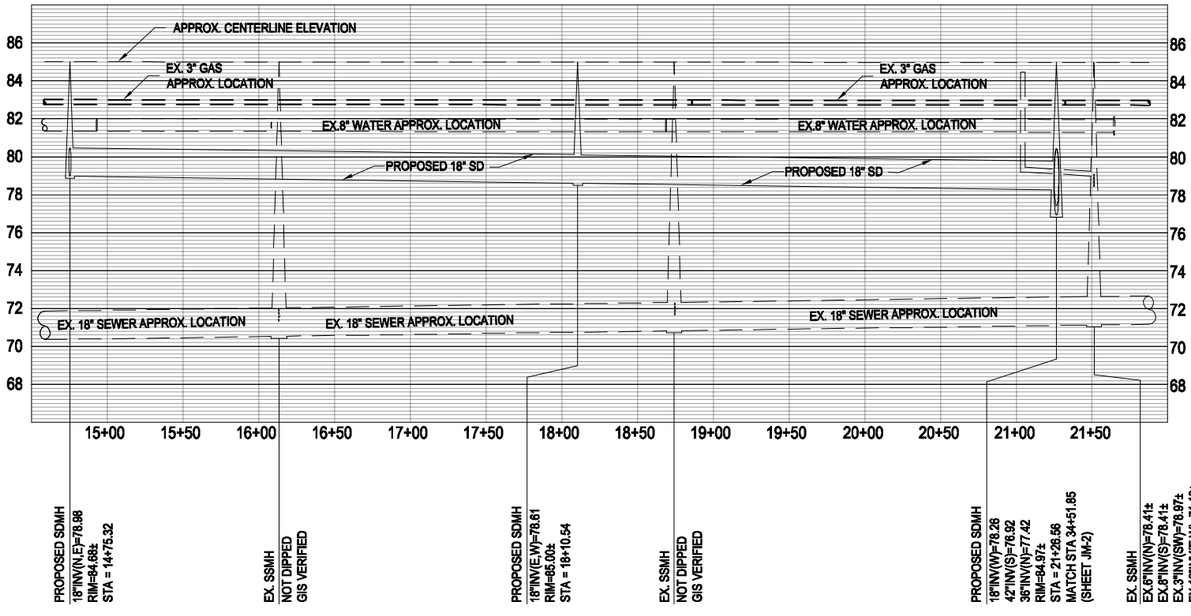
W ROSEBURG 14+75.32 - 21+26.56

north

SCALE: 1" = 100'

NOT FOR CONSTRUCTION





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CITY of MODESTO

AREA 2 STORM DRAIN
CROSS CONNECTION REMOVAL
JM PIKE - CONVEYANCE SYSTEM

Sheet No. JM-6
By RC
Checked WFS
Date JANUARY 26, 2010
Job No. 2108543
Scale 1" = 100'

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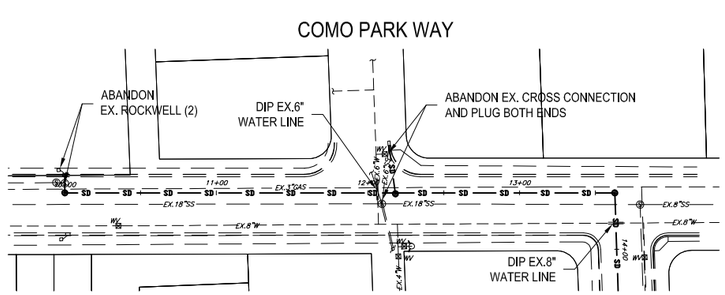
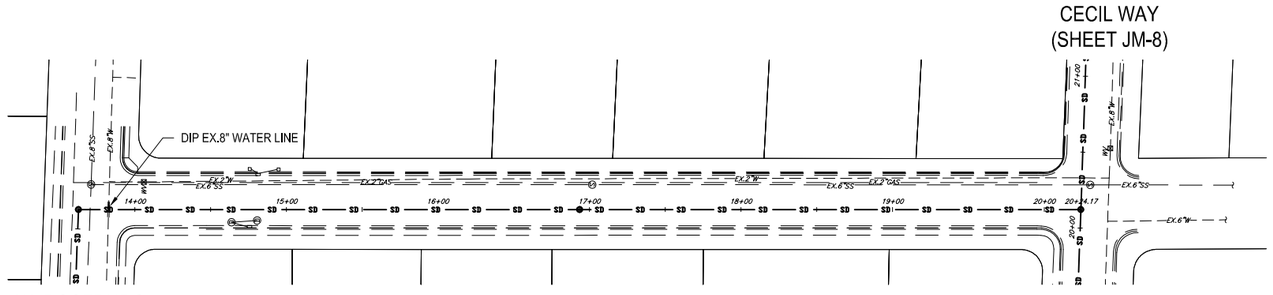


W. ROSEBURG 10+00.00 - 13+62.82

north

SCALE: 1" = 100'

NOTE: PROPERTY AND ROW LINES BASED ON CITY GIS LINEWORK, NOT SURVEYED.

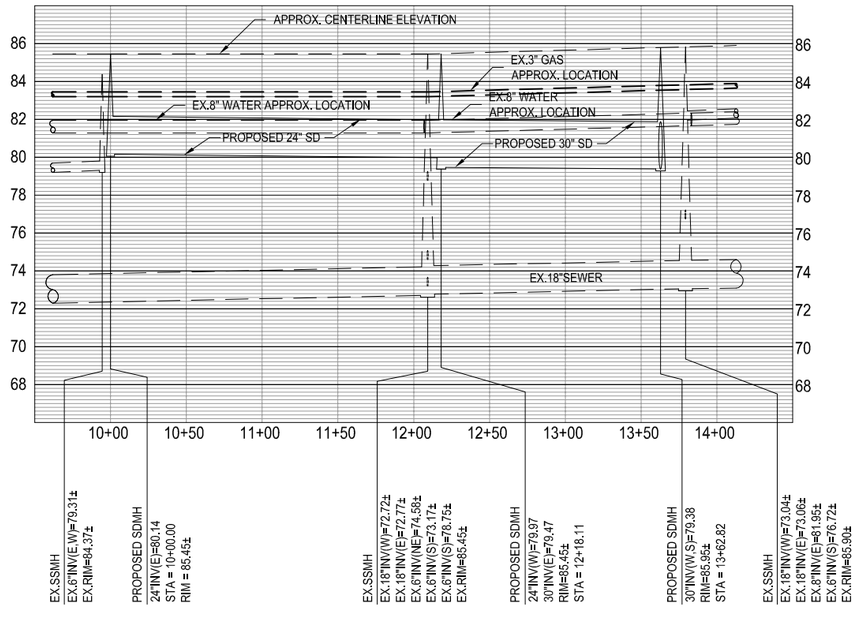


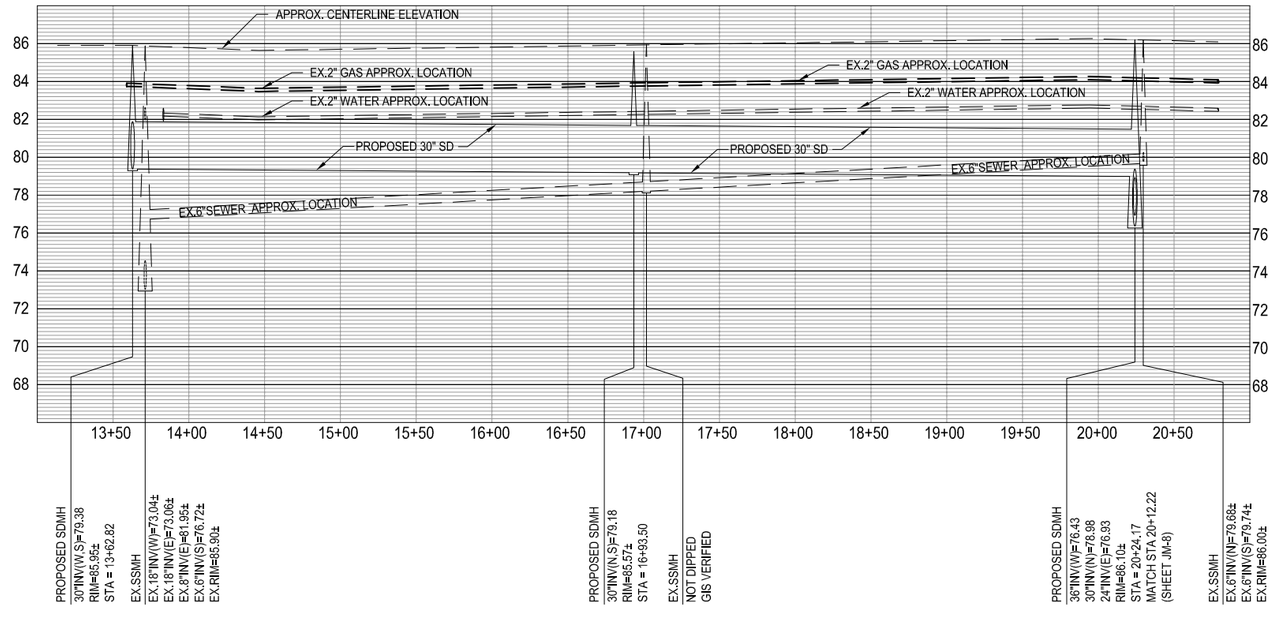
AMHERST AVE 13+62.82 - 20+24.17

north

SCALE: 1" = 100'

NOT FOR CONSTRUCTION





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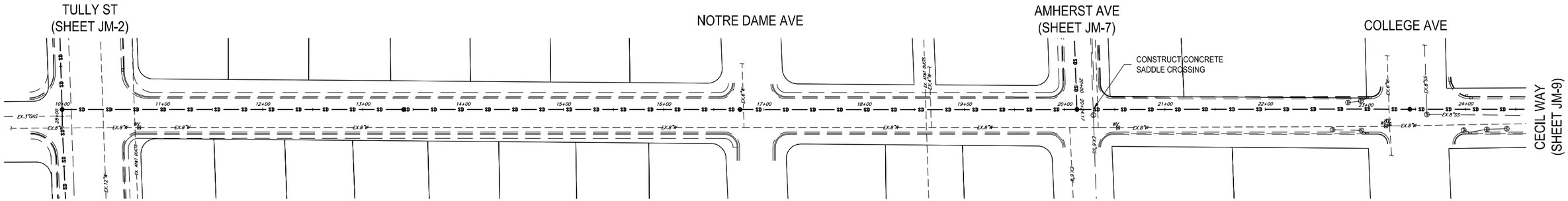
CITY of MODESTO

AREA 2 STORM DRAIN CROSS CONNECTION REMOVAL JM PIKE - CONVEYANCE SYSTEM

Sheet No. JM-7
By RC
Checked WFS
Date JANUARY 26, 2010
Job No. 2108543
Scale 1" = 100'



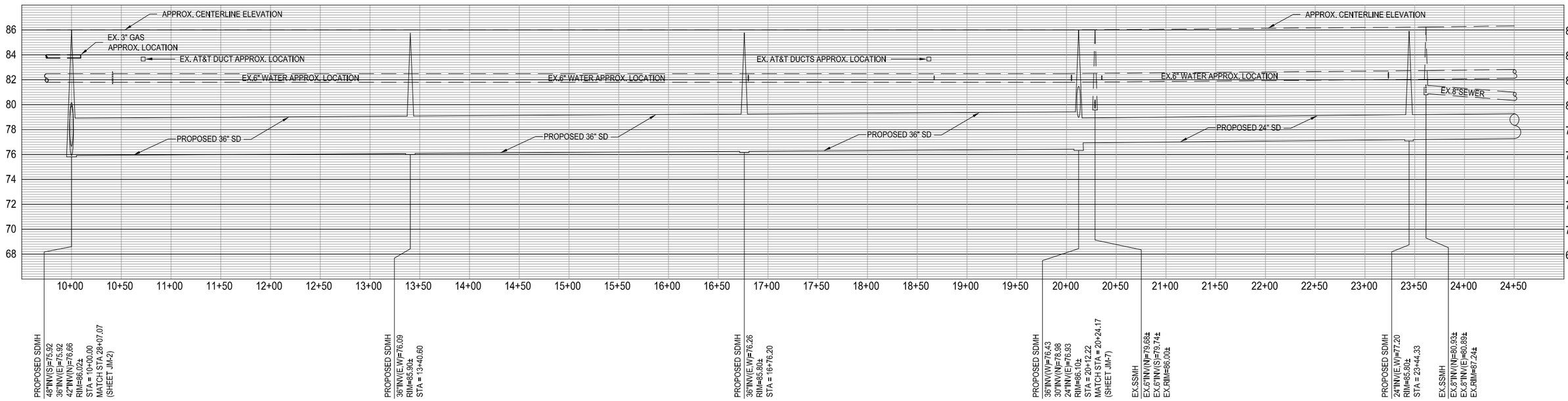
north

SCALE: 1" = 100'

CECIL WAY 10+00.00 - 24+50.00

NOTE: PROPERTY AND ROW LINES BASED ON CITY GIS LINEWORK, NOT SURVEYED.

NOT FOR CONSTRUCTION



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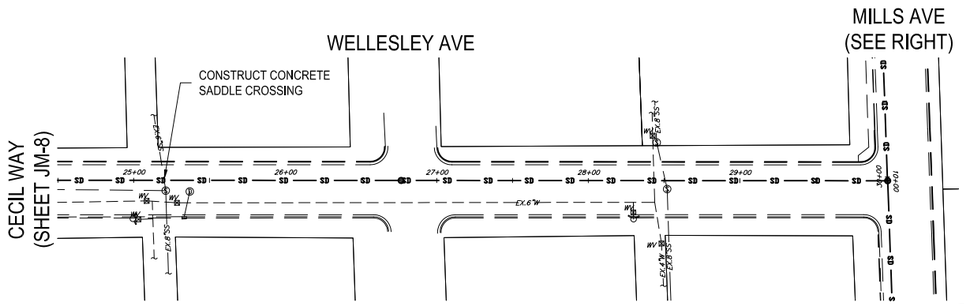
CITY of MODESTO

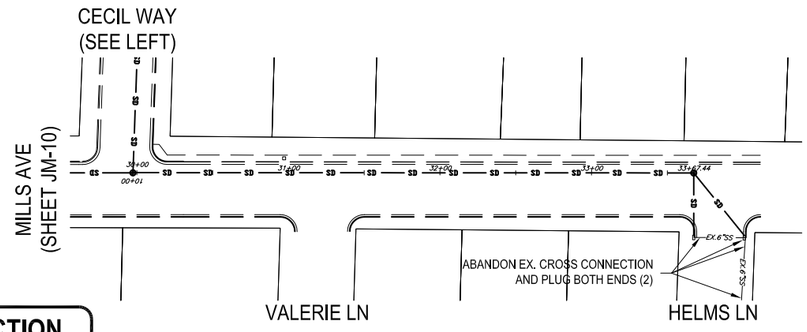
AREA 2 STORM DRAIN
CROSS CONNECTION REMOVAL
JM PIKE - CONVEYANCE SYSTEM

Sheet No. JM-8
By RC
Checked WFS
Date JANUARY 26, 2010
Job No. 2108543
Scale 1" = 100'

N:\2008\2108543--Modesto\25storm\Engineering\DesDev\1Sheet--Files\2108543--Modesto--Area--II--PP--19.dwg, PP--19, Jan 25, 2010 1:09pm, RCamacho



CECIL WAY 24+50.00 - 29+97.39



MILLS AVE 29+97.39 - 33+67.44

NOT FOR CONSTRUCTION

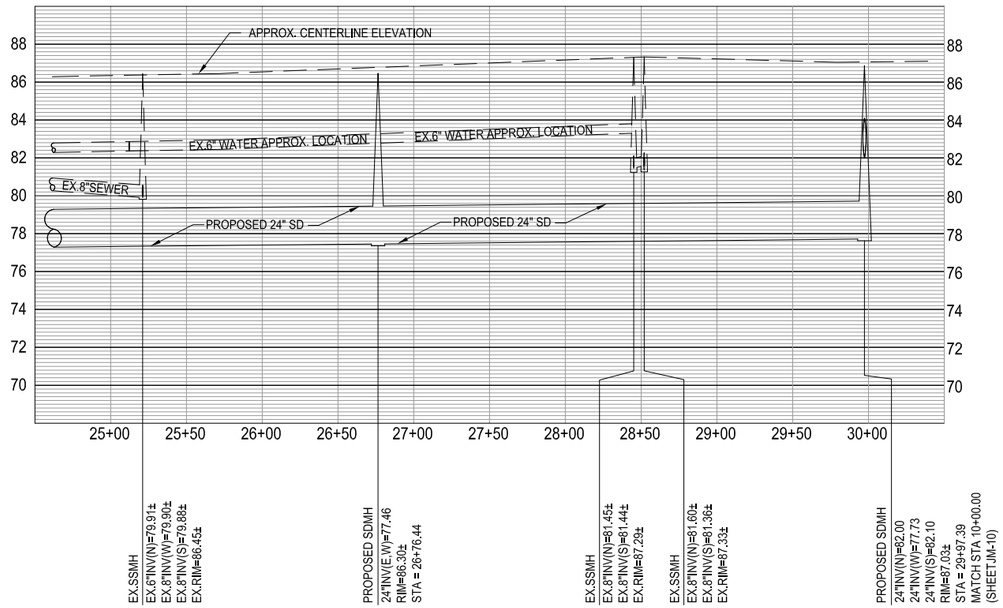
NOTE: PROPERTY AND ROW LINES BASED ON CITY GIS LINEWORK, NOT SURVEYED.

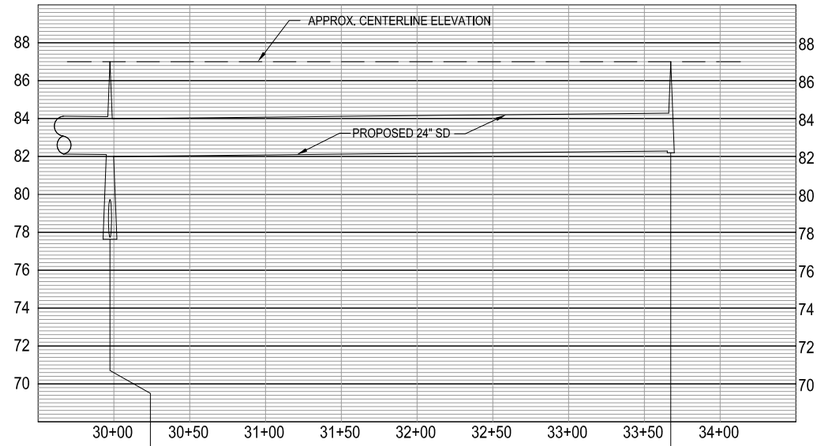
north

SCALE: 1" = 100'

north

SCALE: 1" = 100'





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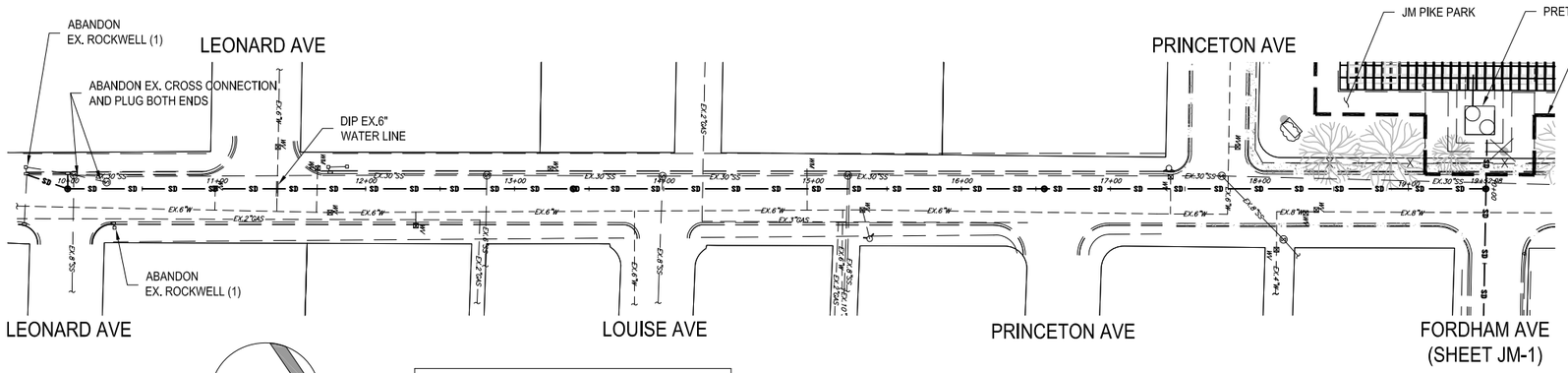
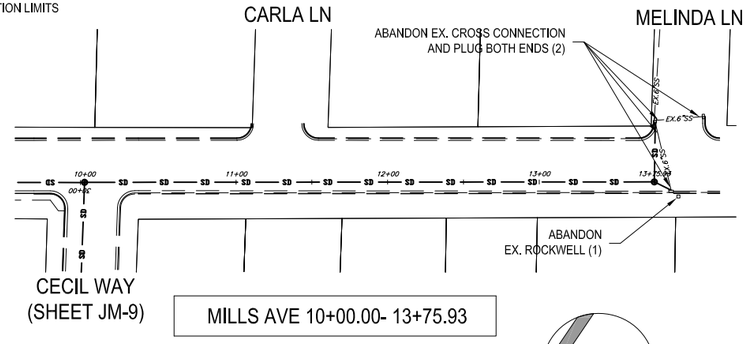
CITY of MODESTO

AREA 2 STORM DRAIN
CROSS CONNECTION REMOVAL
JM PIKE - CONVEYANCE SYSTEM

Sheet No. JM-9
By RC
Checked WFS
Date JANUARY 26, 2010
Job No. 2108543
Scale 1" = 100'





KEARNEY AVE 10+00.00 - 19+52.08

MILLS AVE 10+00.00- 13+75.93

north

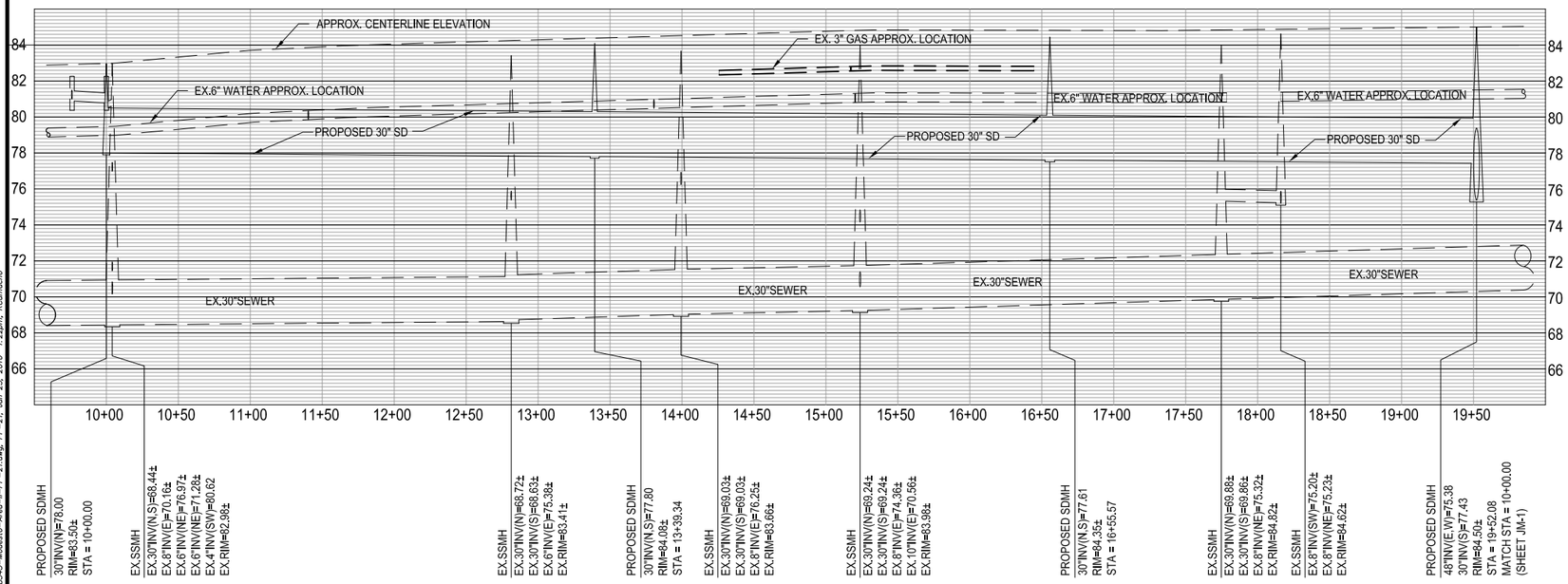
SCALE: 1" = 100'

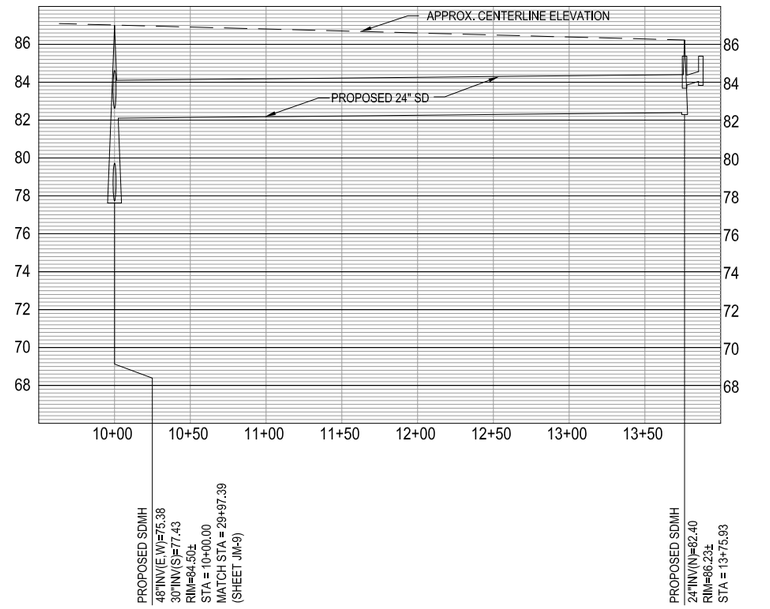
NOTE: PROPERTY AND ROW LINES BASED ON CITY GIS LINEWORK, NOT SURVEYED.

NOT FOR CONSTRUCTION

north

SCALE: 1" = 100'





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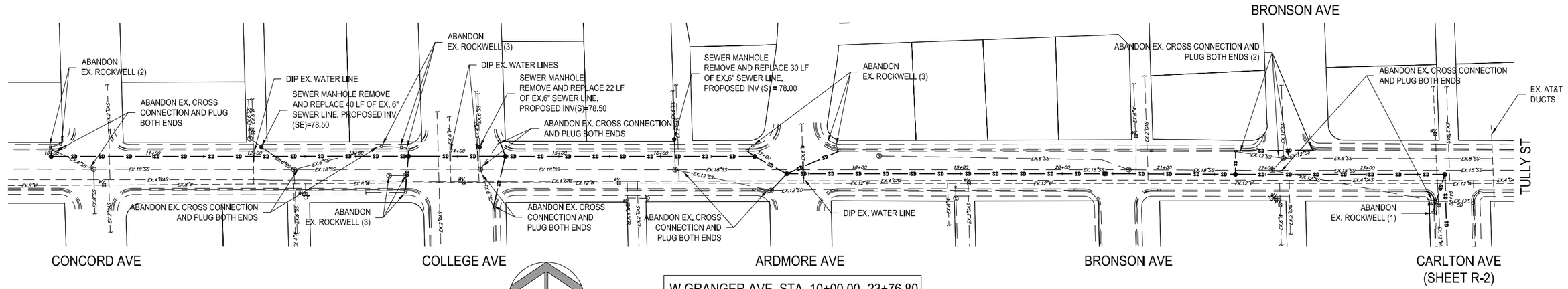
CITY of MODESTO

AREA 2 STORM DRAIN
CROSS CONNECTION REMOVAL
JM PIKE - CONVEYANCE SYSTEM

Sheet No. JM-10
By RC
Checked WFS
Date JANUARY 26, 2010
Job No. 2108543
Scale 1" = 100'

N:\2008\2108543--Modesto\25Storm\Engineering\DataDev\Sheet--Files\2108543--Modesto--Area--J--PP--21.dwg, PP--21, Jan 25, 2010 1:23pm, RComacho



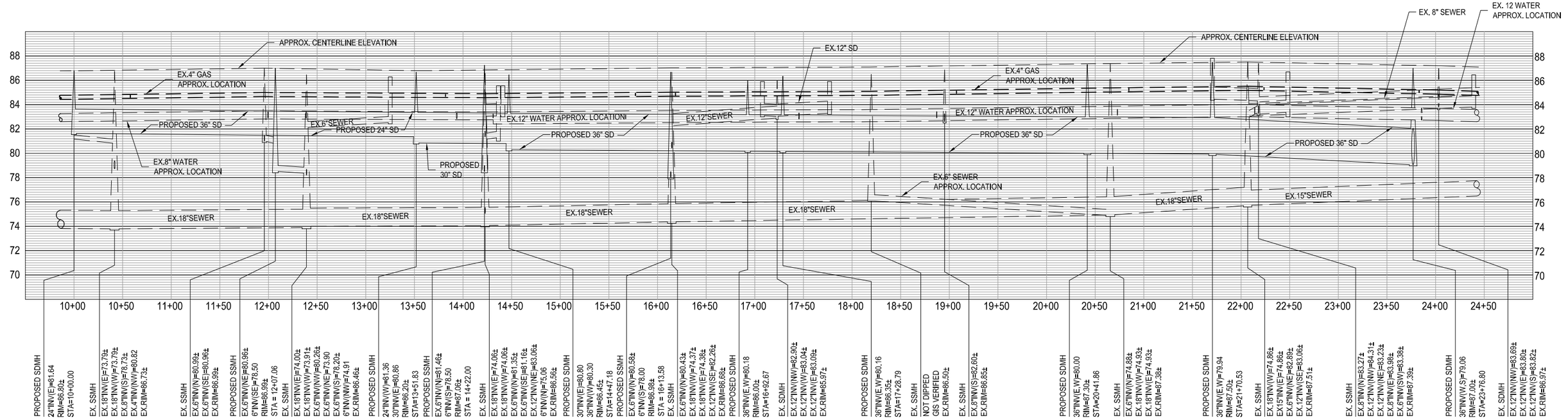
W GRANGER AVE STA 10+00.00- 23+76.80

NOTE: PROPERTY AND ROW LINES BASED ON CITY GIS LINEWORK, NOT SURVEYED.

north

SCALE: 1" = 100'

NOT FOR CONSTRUCTION



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CITY of MODESTO

AREA 2 STORM DRAIN CROSS CONNECTION REMOVAL ROOSEVELT - CONVEYANCE SYSTEM

Sheet No. R-1
By RC
Checked WFS
Date JANUARY 26, 2010
Job No. 2108543
Scale 1" = 100'

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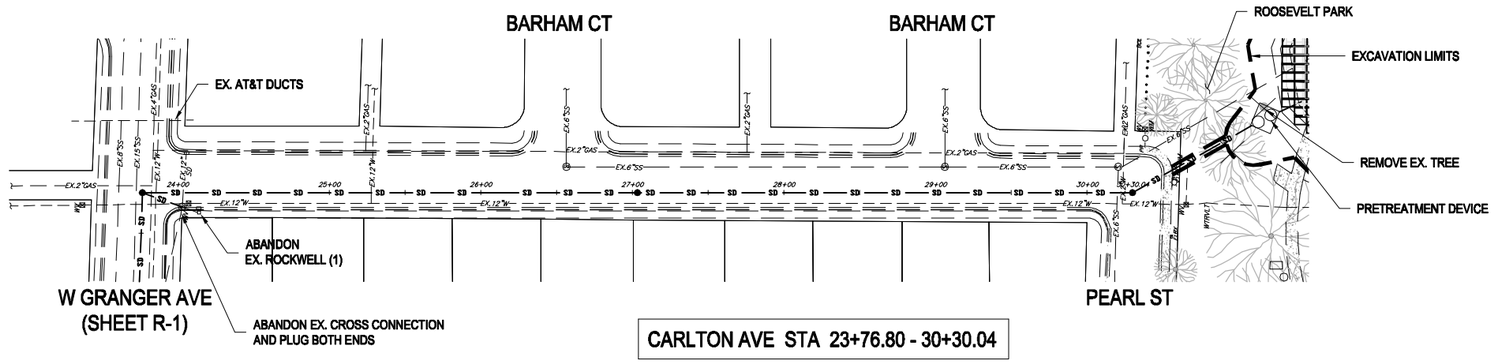


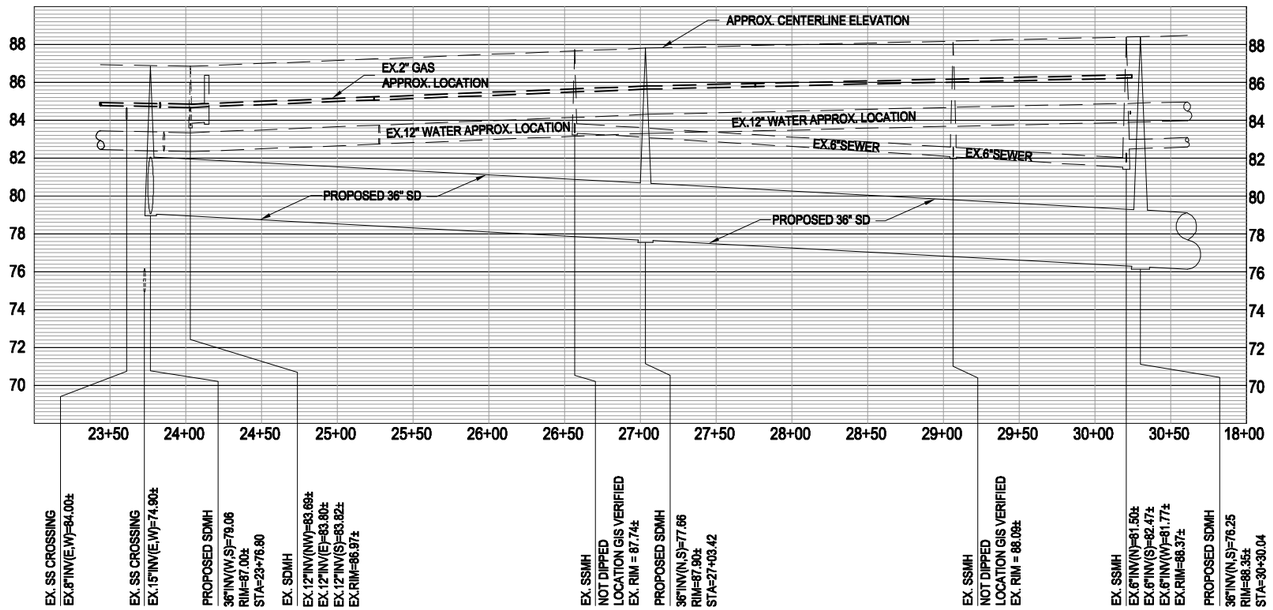
CARLTON AVE STA 23+76.80 - 30+30.04

north

SCALE: 1" = 100'

NOT FOR CONSTRUCTION

NOTE: PROPERTY AND ROW LINES BASED ON CITY GIS LINEWORK, NOT SURVEYED.



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CITY of MODESTO

AREA 2 STORM DRAIN
CROSS CONNECTION REMOVAL
ROOSEVELT - CONVEYANCE SYSTEM

Sheet No. R-2
By RC
Checked WFS
Date JANUARY 26, 2010
Job No. 2108543
Scale 1" = 100'

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APPENDIX B

PRELIMINARY OPINIONS OF COST

OPINION OF PROBABLE COST

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Project: Modesto Area 2

SUMMARY

Project No: 2108543

In providing this opinion of probable cost, it is recognized that neither the Client nor RRM Design Group has control over the costs of labor, equipment, or materials, or over the Contractor's methods of determining prices for bidding. This opinion of probable costs is based on RRM Design Group's reasonable professional judgment and experience and does not constitute a warranty, expressed or implied, that the Contractor's bids or negotiated price of Work will not vary from the Client's budget or from any opinion prepared by RRM Design Group.

DESCRIPTION	CONSTRUCTION SUB TOTAL	TOTAL INCL CONTINGENCIES AND SOFT COSTS
Garrison - Retention	$ 1,874,634	**$ 2,929,116**
Garrison - Detention	$ 1,792,403	**$ 2,800,630**
Catherine Everett - Retention	$ 2,491,478	**$ 3,892,934**
Catherine Everett - Detention	$ 2,428,463	**$ 3,794,474**
JM Pike - Retention	$ 8,651,517	**$ 13,517,996**
JM Pike - Detention	$ 6,550,458	**$ 10,235,090**
Roosevelt - Retention	$ 4,557,831	**$ 7,121,611**
Roosevelt - Detention	$ 3,586,677	**$ 5,604,183**
Total Detention Alternative	$ 14,358,002	**$ 22,434,378**
Total Retention Alternative	$ 17,575,460	**$ 27,461,657**
Total Stantec Cross Connection Report Alternative		**$ 53,420,382**
Recommended Project		
$ -	$ 1,874,634	**$ -**
$ -	$ 2,491,478	**$ -**
	$ 6,550,458	**$ -**
	$ 3,586,677	**$ -**
		$ 22,661,323

OPINION OF PROBABLE COST

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Project:		**Modesto Area 2**					
Project No:		**2108543**					
Park:		**Garrison - Retention**					
		In providing this opinion of probable cost, it is recognized that neither the Client nor RRM Design Group has control over the costs of labor, equipment, or materials, or over the Contractor's methods of determining prices for bidding. This opinion of probable costs is based on RRM Design Group's reasonable professional judgment and experience and does not constitute a warranty, express or implied, that the Contractor's bids or negotiated price of Work will not vary from the Client's budget or from any opinion prepared by RRM Design Group.					
						TOTAL:	**$ 2,929,116**

		DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	EXTENSION	SECTION TOTAL
0.00		**SITE PREPARATION**					$ 8,542
	0.01	PARK DEMOLITION AND REMOVAL	63,217	SF	$ 0.13	$ 8,218	
	0.02	REMOVE EX. RESTROOM		LS	$ 16,000.00	$ -	
	0.03	REMOVE EXISTING POOL		LS	$ 9,500.00	$ -	
	0.04	TREE REMOVAL 1" DIA OR LARGER		EA	$ 822.64	$ -	
	0.05	TREE REMOVAL 1" DIA OR SMALLER		EA	$ 328.98	$ -	
	0.06	REMOVE EXISTING TENNIS COURT AND ELECTROLIERS		EA	$ 31,223.00	$ -	
	0.07	REMOVE SIDEWALK	251	SF	$ 1.29	$ 324	
1.00		**CONVEYANCE SYSTEM**					$ 336,509
	1.01	SAWCUT	4,526	LF	$ 2.23	$ 10,092	
	1.02	ABANDON EX. ROCKWELL	15	EA	$ 300.00	$ 4,500	
	1.03	ABANDON EX. CROSS CONNECTION AND PLUG BOTH ENDS	3	EA	$ 400.00	$ 1,200	
	1.04	REMOVE EX. 6" SANITARY SEWER PIPE		LF	$ 9.56	$ -	
	1.05	REPLACE EX. 6" SANITARY SEWER PIPE		LF	$ 30.74	$ -	
	1.06	REMOVE EX. 8" SANITARY SEWER PIPE	38	LF	$ 9.56	$ 367	
	1.07	REPLACE EX. 8" SANITARY SEWER PIPE		LF	$ 35.95	$ -	
	1.08	REMOVE AND REPLACE EXISTING SEWER LATERAL		EA	$ 500.00	$ -	
	1.09	REMOVE EXISTING PUMP STATION		EA	$ 1,000.00	$ -	
	1.10	REPLACE SIDEWALK	251	SF	$ 3.14	$ 788	
	1.11	REMOVE CURB AND GUTTER	31	LF	$ 2.63	$ 82	
	1.12	REPLACE CURB AND GUTTER	31	LF	$ 14.01	$ 436	
	1.13	CONNECT TO EXISTING CATCH BASIN	8	EA	$ 500.00	$ 4,000	
	1.14	CONNECT TO EXISTING MANHOLE		EA	$ 500.00	$ -	
	1.15	COLLAR CONNECTION TO EXISTING		EA	$ 250.00	$ -	
	1.16	SEWER DIVERSION (DURING CONSTRUCTION)		EA	$ 2,500.00	$ -	
	1.17	PAVEMENT REMOVAL	8,650	SF	$ 0.83	$ 7,180	
	1.18	HOT PATCH	8,650	SF	$ 2.43	$ 21,020	
	1.19	DIP EXISTING WATER LINE		EA	$ 2,000.00	$ -	
	1.20	CONSTRUCT CONCRETE SADDLE		EA	$ 500.00	$ -	
	1.19	12" STORM DRAIN	212	LF	$ 43.90	$ 9,320	
	1.21	15" STORM DRAIN		LF	$ 57.78	$ -	
	1.22	18" STORM DRAIN	30	LF	$ 73.20	$ 2,221	
	1.23	24" STORM DRAIN	1,684	LF	$ 99.53	$ 167,571	

OPINION OF PROBABLE COST

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Project:		**Modesto Area 2**					
Project No:		**2108543**					
Park:		**Garrison - Retention**					
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						TOTAL:	**$ 2,929,116**

		DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	EXTENSION	SECTION TOTAL
	1.24	30" STORM DRAIN	551	LF	$ 134.71	$ 74,264	
	1.25	36" STORM DRAIN		LF	$ 168.26	$ -	
	1.26	42" STORM DRAIN		LF	$ 186.52	$ -	
	1.27	48" STORM DRAIN		LF	$ 204.78	$ -	
	1.28	48" MANHOLE	12	EA	$ 2,789.00	$ 33,468	
	1.29	60" MANHOLE		EA	$ 5,000.00	$ -	
2.00		**DISPOSAL SYSTEM**					$ 1,138,564
	2.01	RETENTION SYSTEM (Including excavation, filter fabric, bedding, and installation)	213,444	CF	$ 4.50	$ 960,498	
	2.02	EARTHWORK (Including excavation, stockpile, off-haul and replace)	213,444	CF	$ 0.60	$ 128,066	
	2.03	PUMP STATION (Includes power connection, control, SCADA)		EA	$ 300,000.00	$ -	
	2.04	SCADA SYSTEM (No pump station)	1	LS	$ 50,000.00	$ 50,000	
	2.05	6" FORCEMAIN		LF	$ 45.32	$ -	
	2.06	48" MANHOLE		EA	$ 2,789.00	$ -	
	2.07	36" STORM DRAIN		LF	$ 168.26	$ -	
	2.08	SAWCUT		LF	$ 2.23	$ -	
	2.09	REMOVE CURB AND GUTTER		LF	$ 2.63	$ -	
	2.10	REPLACE CURB AND GUTTER		LF	$ 14.01	$ -	
	2.11	REMOVE SIDEWALK		SF	$ 1.29	$ -	
	2.12	REPLACE SIDEWALK		SF	$ 3.14	$ -	
	2.13	PAVEMENT REMOVAL		SF	$ 0.83	$ -	
	2.14	HOT PATCH		SF	$ 2.43	$ -	
	2.15	OUTLET STRUCTURE		EA	$ 10,000.00	$ -	

OPINION OF PROBABLE COST

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Project:	**Modesto Area 2**
Project No:	**2108543**
Park:	**Garrison - Retention**

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TOTAL: $ 2,929,116

		DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	EXTENSION	SECTION TOTAL
3.00		**TREATMENT SYSTEM**					$ 60,000
	3.01	PRETREATMENT DEVICE	1	EA	$ 30,000.00	$ 30,000	
	3.02	ISOLATION VALVE	1	EA	$ 30,000.00	$ 30,000	
4.00		**PARK IMPROVEMENTS**					$ 216,750
	4.01	SITE DRAINAGE	1	LS	$ 2,000.00	$ 2,000	
	4.02	PAVING AND SURFACING	1	LS	$ 69,000.00	$ 69,000	
	4.03	SITE WALLS		LS		$ -	
	4.04	SITE FURNISHING AND EQUIPMENT	1	LS	$ 10,750.00	$ 10,750	
	4.05	TENNIS COURTS, COMPLETE INCLUDING PAVEMENT, STRIPING, LIGHTING, FENCING AND EQUIPMENT		LS		$ -	
	4.06	RE-SET EXISTING PLAY STRUCTURE		EA	$ 15,000.00	$ -	
	4.07	BASEBALL INFIELD AND BASES	1	LS	$ 32,250.00	$ 35,250	
	4.08	IRRIGATION	1	LS	$ 16,250.00	$ 16,250	
	4.09	PLANTING AND TURF	1	LS	$ 83,500.00	$ 83,500	
	4.10	RESTROOM		LS		$ -	
5.00		**MISC.**					$ 25,000
	5.01	DISCONNECT AND ABANDON EXISTING 12 WATER LINE		EA	$ 500.00	$ -	
	5.02	12" WATER LINE (Including trenching, sawcutting and hatch patch)		LF	$ 85.20	$ -	
	5.03	12" WATER VALVE		EA	$ 2,154.63	$ -	
	5.04	CONNECT TO EXISTING WATER LINE		EA	$ 5,401.59	$ -	
	5.05	PRESSURE BACKFLOW DEVICE		EA	$ 28,570.00	$ -	
	5.06	TRAFFIC CONTROL	1	LS	$ 25,000.00	$ 25,000	
	5.07	SHORING		EA	$ 10,000.00	$ -	
		SUBTOTAL					$ 1,785,366
6.00		**Mobilization and Bonding**					$ 89,268
	6.01	Mobilization (Includes the cost of purchase, installation and maintenance of all proposed erosion control methods shown on the civil plans.)		%	4%	$ 71,415	
	6.02	Bonding		%	1%	$ 17,854	
		CONSTRUCTION SUBTOTAL					$ 1,874,634
		Design Contingency			25.0%	$ 468,659	$ 468,659
		SUBTOTAL					$ 2,343,293
		Legal, Engineering and Administration			25.0%	$ 585,823	$ 585,823
		TOTAL					$ 2,929,116

OPINION OF PROBABLE COST

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Project:		**Modesto Area 2**					
Project No:		**2108543**					
Park:		**Garrison - Detention**					
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						TOTAL:	**$ 2,800,630**

		DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	EXTENSION	SECTION TOTAL
0.00		**SITE PREPARATION**					$ 8,542
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	0.02	REMOVE EX. RESTROOM		LS	$ 16,000.00	$ -	
	0.03	REMOVE EXISTING POOL		LS	$ 9,500.00	$ -	
	0.04	TREE REMOVAL 1" DIA OR LARGER		EA	$ 822.64	$ -	
	0.05	TREE REMOVAL 1" DIA OR SMALLER		EA	$ 328.98	$ -	
	0.06	REMOVE EXISTING TENNIS COURT AND ELECTROLIERS		EA	$ 31,223.00	$ -	
	0.07	REMOVE SIDEWALK	251	SF	$ 1.29	$ 324	
1.00		**CONVEYANCE SYSTEM**					$ 336,509
	1.01	SAWCUT	4,526	LF	$ 2.23	$ 10,092	
	1.02	ABANDON EX. ROCKWELL	15	EA	$ 300.00	$ 4,500	
	1.03	ABANDON EX. CROSS CONNECTION AND PLUG BOTH ENDS	3	EA	$ 400.00	$ 1,200	
	1.04	REMOVE EX. 6" SANITARY SEWER PIPE		LF	$ 9.56	$ -	
	1.05	REPLACE EX. 6" SANITARY SEWER PIPE		LF	$ 30.74	$ -	
	1.06	REMOVE EX. 8" SANITARY SEWER PIPE	38	LF	$ 9.56	$ 367	
	1.07	REPLACE EX. 8" SANITARY SEWER PIPE		LF	$ 35.95	$ -	
	1.08	REMOVE AND REPLACE EXISTING SEWER LATERAL		EA	$ 500.00	$ -	
	1.09	REMOVE EXISTING PUMP STATION		EA	$ 1,000.00	$ -	
	1.10	REPLACE SIDEWALK	251	SF	$ 3.14	$ 788	
	1.11	REMOVE CURB AND GUTTER	31	LF	$ 2.63	$ 82	
	1.12	REPLACE CURB AND GUTTER	31	LF	$ 14.01	$ 436	
	1.13	CONNECT TO EXISTING CATCH BASIN	8	EA	$ 500.00	$ 4,000	
	1.14	CONNECT TO EXISTING MANHOLE		EA	$ 500.00	$ -	
	1.15	COLLAR CONNECTION TO EXISTING		EA	$ 250.00	$ -	
	1.16	SEWER DIVERSION (DURING CONSTRUCTION)		EA	$ 2,500.00	$ -	
	1.17	PAVEMENT REMOVAL	8,650	SF	$ 0.83	$ 7,180	
	1.18	HOT PATCH	8,650	SF	$ 2.43	$ 21,020	
	1.19	DIP EXISTING WATER LINE		EA	$ 2,000.00	$ -	
	1.20	CONSTRUCT CONCRETE SADDLE		EA	$ 500.00	$ -	
	1.19	12" STORM DRAIN	212	LF	$ 43.90	$ 9,320	
	1.21	15" STORM DRAIN		LF	$ 57.78	$ -	
	1.22	18" STORM DRAIN	30	LF	$ 73.20	$ 2,221	
	1.23	24" STORM DRAIN	1,684	LF	$ 99.53	$ 167,571	

OPINION OF PROBABLE COST

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Project:		**Modesto Area 2**					
Project No:		**2108543**					
Park:		**Garrison - Detention**					
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						TOTAL:	**$ 2,800,630**

		DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	EXTENSION	SECTION TOTAL
	1.24	30" STORM DRAIN	551	LF	$ 134.71	$ 74,264	
	1.25	36" STORM DRAIN		LF	$ 168.26	$ -	
	1.26	42" STORM DRAIN		LF	$ 186.52	$ -	
	1.27	48" STORM DRAIN		LF	$ 204.78	$ -	
	1.28	48" MANHOLE	12	EA	$ 2,789.00	$ 33,468	
	1.29	60" MANHOLE		EA	$ 5,000.00	$ -	
2.00		**DISPOSAL SYSTEM**					$ 1,050,250
	2.01	DETENTION SYSTEM (Including excavation, filter fabric, bedding, and installation)	112,367	CF	$ 4.50	$ 505,652	
	2.02	EARTHWORK (Including excavation, stockpile, off-haul and replace)	112,367	CF	$ 0.60	$ 67,420	
	2.03	PUMP STATION (Includes power connection, control, SCADA)	1	EA	$ 300,000.00	$ 300,000	
	2.04	SCADA SYSTEM (No pump station)	1	LS	$ 50,000.00	$ 50,000	
	2.05	6" FORCEMAIN	1,897	LF	$ 45.32	$ 85,962	
	2.06	48" MANHOLE		EA	$ 2,789.00	$ -	
	2.07	36" STORM DRAIN		LF	$ 168.26	$ -	
	2.08	SAWCUT	3,794	LF	$ 2.23	$ 8,460	
	2.09	REMOVE CURB AND GUTTER	10	LF	$ 2.63	$ 26	
	2.10	REPLACE CURB AND GUTTER	10	LF	$ 14.01	$ 140	
	2.11	REMOVE SIDEWALK	50	SF	$ 1.29	$ 65	
	2.12	REPLACE SIDEWALK	50	SF	$ 3.14	$ 157	
	2.13	PAVEMENT REMOVAL	3,794	SF	$ 0.83	$ 3,149	
	2.14	HOT PATCH	3,794	SF	$ 2.43	$ 9,219	
	2.15	OUTLET STRUCTURE	2	EA	$ 10,000.00	$ 20,000	

OPINION OF PROBABLE COST

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Project:	**Modesto Area 2**
Project No:	**2108543**
Park:	**Garrison - Detention**

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TOTAL: $ 2,800,630

		DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	EXTENSION	SECTION TOTAL
3.00		**TREATMENT SYSTEM**					$ 60,000
	3.01	PRETREATMENT DEVICE	1	EA	$ 30,000.00	$ 30,000	
	3.02	ISOLATION VALVE	1	EA	$ 30,000.00	$ 30,000	
4.00		**PARK IMPROVEMENTS**					$ 216,750
	4.01	SITE DRAINAGE	1	LS	$ 2,000.00	$ 2,000	
	4.02	PAVING AND SURFACING	1	LS	$ 69,000.00	$ 69,000	
	4.03	SITE WALLS		LS		$ -	
	4.04	SITE FURNISHING AND EQUIPMENT	1	LS	$ 10,750.00	$ 10,750	
	4.05	TENNIS COURTS, COMPLETE INCLUDING PAVEMENT, STRIPING, LIGHTING, FENCING AND EQUIPMENT		LS		$ -	
	4.06	RE-SET EXISTING PLAY STRUCTURE		EA	$ 15,000.00	$ -	
	4.07	BASEBALL INFIELD AND BASES	1	LS	$ 32,250.00	$ 35,250	
	4.08	IRRIGATION	1	LS	$ 16,250.00	$ 16,250	
	4.09	PLANTING AND TURF	1	LS	$ 83,500.00	$ 83,500	
	4.10	RESTROOM		LS		$ -	
5.00		**MISC.**					$ 35,000
	5.01	DISCONNECT AND ABANDON EXISTING 12 WATER LINE		EA	$ 500.00	$ -	
	5.02	12" WATER LINE (Including trenching, sawcutting and hatch patch)		LF	$ 85.20	$ -	
	5.03	12" WATER VALVE		EA	$ 2,154.63	$ -	
	5.04	CONNECT TO EXISTING WATER LINE		EA	$ 5,401.59	$ -	
	5.05	PRESSURE BACKFLOW DEVICE		EA	$ 28,570.00	$ -	
	5.06	TRAFFIC CONTROL	1	LS	$ 25,000.00	$ 25,000	
	5.07	SHORING	1	EA	$ 10,000.00	$ 10,000	
		SUBTOTAL					$ 1,707,051
6.00		**Mobilization and Bonding**					$ 85,353
	6.01	Mobilization (Includes the cost of purchase, installation and maintenance of all proposed erosion control methods shown on the civil plans.)		%	4%	$ 68,282	
	6.02	Bonding		%	1%	$ 17,071	
		CONSTRUCTION SUBTOTAL					$ 1,792,403
		Design Contingency			25.0%	$ 448,101	$ 448,101
		SUBTOTAL					$ 2,240,504
		Legal, Engineering and Administration			25.0%	$ 560,126	$ 560,126
		TOTAL					$ 2,800,630

OPINION OF PROBABLE COST

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Project:		**Modesto Area 2**					
Project No:		**2108543**					
Park:		**Catherine Everett - Retention**					
		In providing this opinion of probable cost, it is recognized that neither the Client nor RRM Design Group has control over the costs of labor, equipment, or materials, or over the Contractor's methods of determining prices for bidding. This opinion of probable costs is based on RRM Design Group's reasonable professional judgment and experience and does not constitute a warranty, express or implied, that the Contractor's bids or negotiated price of Work will not vary from the Client's budget or from any opinion prepared by RRM Design Group.					
						TOTAL:	**$ 3,892,934**

		DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	EXTENSION	SECTION TOTAL
0.00		**SITE PREPARATION**					$ 14,613
	0.01	PARK DEMOLITION AND REMOVAL	67,389	SF	$ 0.13	$ 8,761	
	0.02	REMOVE EX. RESTROOM		LS	$ 16,000.00	$ -	
	0.03	REMOVE EXISTING POOL		LS	$ 9,500.00	$ -	
	0.04	TREE REMOVAL 1" DIA OR LARGER		EA	$ 822.64	$ -	
	0.05	TREE REMOVAL 1" DIA OR SMALLER		EA	$ 328.98	$ -	
	0.06	REMOVE EXISTING TENNIS COURT AND ELECTROLIERS		EA	$ 31,223.00	$ -	
	0.07	REMOVE SIDEWALK	4,537	SF	$ 1.29	$ 5,853	
1.00		**CONVEYANCE SYSTEM**					$ 946,558
	1.01	SAWCUT	15,329	LF	$ 2.23	$ 34,184	
	1.02	ABANDON EX. ROCKWELL	14	EA	$ 300.00	$ 4,200	
	1.03	ABANDON EX. CROSS CONNECTION AND PLUG BOTH ENDS	3	EA	$ 400.00	$ 1,200	
	1.04	REMOVE EX. 6" SANITARY SEWER PIPE	39	LF	$ 9.56	$ 373	
	1.05	REPLACE EX. 6" SANITARY SEWER PIPE	39	LF	$ 30.74	$ 1,199	
	1.06	REMOVE EX. 8" SANITARY SEWER PIPE		LF	$ 9.56	$ -	
	1.07	REPLACE EX. 8" SANITARY SEWER PIPE		LF	$ 35.95	$ -	
	1.08	REMOVE AND REPLACE EXISTING SEWER LATERAL	11	EA	$ 500.00	$ 5,500	
	1.09	REMOVE EXISTING PUMP STATION		EA	$ 1,000.00	$ -	
	1.10	REPLACE SIDEWALK	4,537	SF	$ 3.14	$ 14,246	
	1.11	REMOVE CURB AND GUTTER	462	LF	$ 2.63	$ 1,215	
	1.12	REPLACE CURB AND GUTTER	462	LF	$ 14.01	$ 6,475	
	1.13	CONNECT TO EXISTING CATCH BASIN	8	EA	$ 500.00	$ 4,000	
	1.14	CONNECT TO EXISTING MANHOLE	1	EA	$ 500.00	$ 500	
	1.15	COLLAR CONNECTION TO EXISTING	1	EA	$ 250.00	$ 250	
	1.16	SEWER DIVERSION (DURING CONSTRUCTION)	1	SF	$ 2,500.00	$ 2,500	
	1.17	PAVEMENT REMOVAL	26,862	SF	$ 0.83	$ 22,296	
	1.18	HOT PATCH	26,862	SF	$ 2.43	$ 65,275	
	1.19	DIP EXISTING WATER LINE		EA	$ 2,000.00	$ -	
	1.20	CONSTRUCT CONCRETE SADDLE		EA	$ 500.00	$ -	
	1.19	12" STORM DRAIN	146	LF	$ 43.90	$ 6,414	
	1.21	15" STORM DRAIN		LF	$ 57.78	$ -	
	1.22	18" STORM DRAIN	3,913	LF	$ 73.20	$ 286,459	
	1.23	24" STORM DRAIN	2,378	LF	$ 99.53	$ 236,690	

OPINION OF PROBABLE COST

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Project:		**Modesto Area 2**					
Project No:		**2108543**					
Park:		**Catherine Everett - Retention**					
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						TOTAL:	**$ 3,892,934**

		DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	EXTENSION	SECTION TOTAL
	1.24	30" STORM DRAIN	1,344	LF	$ 134.71	$ 181,068	
	1.25	36" STORM DRAIN		LF	$ 168.26	$ -	
	1.26	42" STORM DRAIN		LF	$ 186.52	$ -	
	1.27	48" STORM DRAIN		LF	$ 204.78	$ -	
	1.28	48" MANHOLE	26	EA	$ 2,789.00	$ 72,514	
	1.29	60" MANHOLE		EA	$ 5,000.00	$ -	
2.00		**DISPOSAL SYSTEM**					$ 1,169,664
	2.01	RETENTION SYSTEM (Including excavation, filter fabric, bedding, and installation)	219,542	CF	$ 4.50	$ 987,939	
	2.02	EARTHWORK (Including excavation, stockpile, off-haul and replace)	219,542	CF	$ 0.60	$ 131,725	
	2.03	PUMP STATION (Includes power connection, control, SCADA)		EA	$ 300,000.00	$ -	
	2.04	SCADA SYSTEM (No pump station)	1	LS	$ 50,000.00	$ 50,000	
	2.05	6" FORCEMAIN		LF	$ 45.32		
	2.06	48" MANHOLE		EA	$ 2,789.00	$ -	
	2.07	36" STORM DRAIN		LF	$ 168.26	$ -	
	2.08	SAWCUT		LF	$ 2.23	$ -	
	2.09	REMOVE CURB AND GUTTER		LF	$ 2.63	$ -	
	2.10	REPLACE CURB AND GUTTER		LF	$ 14.01	$ -	
	2.11	REMOVE SIDEWALK		SF	$ 1.29	$ -	
	2.12	REPLACE SIDEWALK		SF	$ 3.14	$ -	
	2.13	PAVEMENT REMOVAL		SF	$ 0.83	$ -	
	2.14	HOT PATCH		SF	$ 2.43	$ -	
	2.15	OUTLET STRUCTURE		EA	$ 10,000.00	$ -	

OPINION OF PROBABLE COST

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Project:	**Modesto Area 2**
Project No:	**2108543**
Park:	**Catherine Everett - Retention**

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TOTAL: $ 3,892,934

		DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	EXTENSION	SECTION TOTAL
3.00		**TREATMENT SYSTEM**					$ 60,000
	3.01	PRETREATMENT DEVICE	1	EA	$ 30,000.00	$ 30,000	
	3.02	ISOLATION VALVE	1	EA	$ 30,000.00	$ 30,000	
4.00		**PARK IMPROVEMENTS**					$ 122,000
	4.01	SITE DRAINAGE		LS		$ -	
	4.02	PAVING AND SURFACING		LS		$ -	
	4.03	SITE WALLS		LS		$ -	
	4.04	SITE FURNISHING AND EQUIPMENT		LS		$ -	
	4.05	TENNIS COURTS, COMPLETE INCLUDING PAVEMENT, STRIPING, LIGHTING, FENCING AND EQUIPMENT		LS		$ -	
	4.06	RE-SET EXISTING PLAY STRUCTURE		EA	$ 15,000.00	$ -	
	4.07	BASEBALL INFIELD AND BASES	1	LS	$ 32,500.00	$ 32,500	
	4.08	IRRIGATION	1	LS	$ 7,500.00	$ 7,500	
	4.09	PLANTING AND TURF	1	LS	$ 82,000.00	$ 82,000	
	4.10	RESTROOM		LS		$ -	
5.00		**MISC.**					$ 60,000
	5.01	DISCONNECT AND ABANDON EXISTING 12 WATER LINE		EA	$ 500.00	$ -	
	5.02	12" WATER LINE (Including trenching, sawcutting and hatch patch)		LF	$ 85.20	$ -	
	5.03	12" WATER VALVE		EA	$ 2,154.63	$ -	
	5.04	CONNECT TO EXISTING WATER LINE		EA	$ 5,401.59	$ -	
	5.05	PRESSURE BACKFLOW DEVICE		EA	$ 28,570.00	$ -	
	5.06	TRAFFIC CONTROL	1	LS	$ 50,000.00	$ 50,000	
	5.07	SHORING		EA	$ 10,000.00	$ 10,000	
		SUBTOTAL					$ 2,372,836
6.00		**Mobilization and Bonding**					$ 118,642
	6.01	Mobilization (Includes the cost of purchase, installation and maintenance of all proposed erosion control methods shown on the civil plans.)		%	4%	$ 94,913	
	6.02	Bonding		%	1%	$ 23,728	
		CONSTRUCTION SUBTOTAL					$ 2,491,478
		Design Contingency			25.0%	$ 622,869	$ 622,869
		SUBTOTAL					$ 3,114,347
		Legal, Engineering and Administration			25.0%	$ 778,587	$ 778,587
		TOTAL					$ 3,892,934

OPINION OF PROBABLE COST

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Project:		**Modesto Area 2**					
Project No:		**2108543**					
Park:		**Catherine Everett - Detention**					
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						TOTAL:	**$ 3,794,474**

		DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	EXTENSION	SECTION TOTAL
0.00		**SITE PREPARATION**					$ 14,613
	0.01	PARK DEMOLITION AND REMOVAL	67,389	SF	$ 0.13	$ 8,761	
	0.02	REMOVE EX. RESTROOM		LS	$ 16,000.00	$ -	
	0.03	REMOVE EXISTING POOL		LS	$ 9,500.00	$ -	
	0.04	TREE REMOVAL 1" DIA OR LARGER		EA	$ 822.64	$ -	
	0.05	TREE REMOVAL 1" DIA OR SMALLER		EA	$ 328.98	$ -	
	0.06	REMOVE EXISTING TENNIS COURT AND ELECTROLIERS		EA	$ 31,223.00	$ -	
	0.07	REMOVE SIDEWALK	4,537	SF	$ 1.29	$ 5,853	
1.00		**CONVEYANCE SYSTEM**					$ 946,558
	1.01	SAWCUT	15,329	LF	$ 2.23	$ 34,184	
	1.02	ABANDON EX. ROCKWELL	14	EA	$ 300.00	$ 4,200	
	1.03	ABANDON EX. CROSS CONNECTION AND PLUG BOTH ENDS	3	EA	$ 400.00	$ 1,200	
	1.04	REMOVE EX. 6" SANITARY SEWER PIPE	39	LF	$ 9.56	$ 373	
	1.05	REPLACE EX. 6" SANITARY SEWER PIPE	39	LF	$ 30.74	$ 1,199	
	1.06	REMOVE EX. 8" SANITARY SEWER PIPE		LF	$ 9.56	$ -	
	1.07	REPLACE EX. 8" SANITARY SEWER PIPE		LF	$ 35.95	$ -	
	1.08	REMOVE AND REPLACE EXISTING SEWER LATERAL	11	EA	$ 500.00	$ 5,500	
	1.09	REMOVE EXISTING PUMP STATION		EA	$ 1,000.00	$ -	
	1.10	REPLACE SIDEWALK	4,537	SF	$ 3.14	$ 14,246	
	1.11	REMOVE CURB AND GUTTER	462	LF	$ 2.63	$ 1,215	
	1.12	REPLACE CURB AND GUTTER	462	LF	$ 14.01	$ 6,475	
	1.13	CONNECT TO EXISTING CATCH BASIN	8	EA	$ 500.00	$ 4,000	
	1.14	CONNECT TO EXISTING MANHOLE	1	EA	$ 500.00	$ 500	
	1.15	COLLAR CONNECTION TO EXISTING	1	EA	$ 250.00	$ 250	
	1.16	SEWER DIVERSION (DURING CONSTRUCTION)	1	SF	$ 2,500.00	$ 2,500	
	1.17	PAVEMENT REMOVAL	26,862	SF	$ 0.83	$ 22,296	
	1.18	HOT PATCH	26,862	SF	$ 2.43	$ 65,275	
	1.19	DIP EXISTING WATER LINE		EA	$ 2,000.00	$ -	
	1.20	CONSTRUCT CONCRETE SADDLE		EA	$ 500.00	$ -	
	1.19	12" STORM DRAIN	146	LF	$ 43.90	$ 6,414	
	1.21	15" STORM DRAIN		LF	$ 57.78	$ -	
	1.22	18" STORM DRAIN	3,913	LF	$ 73.20	$ 286,459	
	1.23	24" STORM DRAIN	2,378	LF	$ 99.53	$ 236,690	

OPINION OF PROBABLE COST

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Project:		**Modesto Area 2**					
Project No:		**2108543**					
Park:		**Catherine Everett - Detention**					
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						TOTAL:	**$ 3,794,474**

		DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	EXTENSION	SECTION TOTAL
	1.24	30" STORM DRAIN	1,344	LF	$ 134.71	$ 181,068	
	1.25	36" STORM DRAIN		LF	$ 168.26	$ -	
	1.26	42" STORM DRAIN		LF	$ 186.52	$ -	
	1.27	48" STORM DRAIN		LF	$ 204.78	$ -	
	1.28	48" MANHOLE	26	EA	$ 2,789.00	$ 72,514	
	1.29	60" MANHOLE		EA	$ 5,000.00	$ -	
2.00		**DISPOSAL SYSTEM**					$ 1,109,650
	2.01	DETENTION SYSTEM (Including excavation, filter fabric, bedding, and installation)	122,630	CF	$ 4.50	$ 551,835	
	2.02	EARTHWORK (Including excavation, stockpile, off-haul and replace)	122,630	CF	$ 0.60	$ 73,578	
	2.03	PUMP STATION (Includes power connection, control, SCADA)	1	EA	$ 300,000.00	$ 300,000	
	2.04	SCADA SYSTEM (No pump station)	1	LS	$ 50,000.00	$ 50,000	
	2.05	6" FORCEMAIN	2,200	LF	$ 45.32	$ 99,694	
	2.06	48" MANHOLE		EA	$ 2,789.00	$ -	
	2.07	36" STORM DRAIN		LF	$ 168.26	$ -	
	2.08	SAWCUT	4,400	LF	$ 2.23	$ 9,811	
	2.09	REMOVE CURB AND GUTTER	10	LF	$ 2.63	$ 26	
	2.10	REPLACE CURB AND GUTTER	10	LF	$ 14.01	$ 140	
	2.11	REMOVE SIDEWALK	50	SF	$ 1.29	$ 65	
	2.12	REPLACE SIDEWALK	50	SF	$ 3.14	$ 157	
	2.13	PAVEMENT REMOVAL	4,400	SF	$ 0.83	$ 3,652	
	2.14	HOT PATCH	4,400	SF	$ 2.43	$ 10,692	
	2.15	OUTLET STRUCTURE	1	EA	$ 10,000.00	$ 10,000	

OPINION OF PROBABLE COST

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Project:	**Modesto Area 2**
Project No:	**2108543**
Park:	**Catherine Everett - Detention**

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TOTAL: $ 3,794,474

		DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	EXTENSION	SECTION TOTAL
3.00		**TREATMENT SYSTEM**					$ 60,000
	3.01	PRETREATMENT DEVICE	1	EA	$ 30,000.00	$ 30,000	
	3.02	ISOLATION VALVE	1	EA	$ 30,000.00	$ 30,000	
4.00		**PARK IMPROVEMENTS**					$ 122,000
	4.01	SITE DRAINAGE		LS		$ -	
	4.02	PAVING AND SURFACING		LS		$ -	
	4.03	SITE WALLS		LS		$ -	
	4.04	SITE FURNISHING AND EQUIPMENT		LS		$ -	
	4.05	TENNIS COURTS, COMPLETE INCLUDING PAVEMENT, STRIPING, LIGHTING, FENCING AND EQUIPMENT		LS		$ -	
	4.06	RE-SET EXISTING PLAY STRUCTURE		EA	$ 15,000.00	$ -	
	4.07	BASEBALL INFIELD AND BASES	1	LS	$ 32,500.00	$ 32,500	
	4.08	IRRIGATION	1	LS	$ 7,500.00	$ 7,500	
	4.09	PLANTING AND TURF	1	LS	$ 82,000.00	$ 82,000	
	4.10	RESTROOM		LS		$ -	
5.00		**MISC.**					$ 60,000
	5.01	DISCONNECT AND ABANDON EXISTING 12 WATER LINE		EA	$ 500.00	$ -	
	5.02	12" WATER LINE (Including trenching, sawcutting and hatch patch)		LF	$ 85.20	$ -	
	5.03	12" WATER VALVE		EA	$ 2,154.63	$ -	
	5.04	CONNECT TO EXISTING WATER LINE		EA	$ 5,401.59	$ -	
	5.05	PRESSURE BACKFLOW DEVICE		EA	$ 28,570.00	$ -	
	5.06	TRAFFIC CONTROL	1	LS	$ 50,000.00	$ 50,000	
	5.07	SHORING	1	EA	$ 10,000.00	$ 10,000	
		SUBTOTAL					$ 2,312,822
6.00		**Mobilization and Bonding**					$ 115,641
	6.01	Mobilization (Includes the cost of purchase, installation and maintenance of all proposed erosion control methods shown on the civil plans.)		%	4%	$ 92,513	
	6.02	Bonding		%	1%	$ 23,128	
		CONSTRUCTION SUBTOTAL					$ 2,428,463
		Design Contingency			25.0%	$ 607,116	$ 607,116
		SUBTOTAL					$ 3,035,579
		Legal, Engineering and Administration			25.0%	$ 758,895	$ 758,895
		TOTAL					$ 3,794,474

OPINION OF PROBABLE COST

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Project:		**Modesto Area 2**					
Project No:		**2108543**					
Park:		**JM Pike - Retention**					
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						TOTAL:	**$ 13,517,996**

		DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	EXTENSION	SECTION TOTAL
0.00		**SITE PREPARATION**					$ 18,442
	0.01	PARK DEMOLITION AND REMOVAL	127,362	SF	$ 0.13	$ 16,557	
	0.02	REMOVE EX. RESTROOM		LS	$ 16,000.00	$ -	
	0.03	REMOVE EXISTING POOL		LS	$ 9,500.00	$ -	
	0.04	TREE REMOVAL 1" DIA OR LARGER	1	EA	$ 822.64	$ 823	
	0.05	TREE REMOVAL 1" DIA OR SMALLER	3	EA	$ 328.98	$ 987	
	0.06	REMOVE EXISTING TENNIS COURT AND ELECTROLIERS		EA	$ 31,223.00	$ -	
	0.07	REMOVE SIDEWALK	58	SF	$ 1.29	$ 75	
1.00		**CONVEYANCE SYSTEM**					$ 2,107,475
	1.01	SAWCUT	24,976	LF	$ 2.23	$ 55,696	
	1.02	ABANDON EX. ROCKWELL	32	EA	$ 300.00	$ 9,600	
	1.03	ABANDON EX. CROSS CONNECTION AND PLUG BOTH ENDS	12	EA	$ 400.00	$ 4,800	
	1.04	REMOVE EX. 6" SANITARY SEWER PIPE		LF	$ 9.56	$ -	
	1.05	REPLACE EX. 6" SANITARY SEWER PIPE		LF	$ 30.74	$ -	
	1.06	REMOVE EX. 8" SANITARY SEWER PIPE		LF	$ 9.56	$ -	
	1.07	REPLACE EX. 8" SANITARY SEWER PIPE		LF	$ 35.95	$ -	
	1.08	REMOVE AND REPLACE EXISTING SEWER LATERAL	1	EA	$ 500.00	$ 500	
	1.09	REMOVE EXISTING PUMP STATION	1	EA	$ 1,000.00	$ 1,000	
	1.10	REPLACE SIDEWALK	58	SF	$ 3.14	$ 182	
	1.11	REMOVE CURB AND GUTTER	10	LF	$ 2.63	$ 26	
	1.12	REPLACE CURB AND GUTTER	10	LF	$ 14.01	$ 140	
	1.13	CONNECT TO EXISTING CATCH BASIN	25	EA	$ 500.00	$ 12,500	
	1.14	CONNECT TO EXISTING MANHOLE		EA	$ 500.00	$ -	
	1.15	COLLAR CONNECTION TO EXISTING		EA	$ 250.00	$ -	
	1.16	SEWER DIVERSION (DURING CONSTRUCTION)		SF	$ 2,500.00	$ -	
	1.17	PAVEMENT REMOVAL	48,523	SF	$ 0.83	$ 40,274	
	1.18	HOT PATCH	48,523	SF	$ 2.43	$ 117,910	
	1.19	DIP EXISTING WATER LINE	3	EA	$ 2,000.00	$ 6,000	
	1.20	CONSTRUCT CONCRETE SADDLE	2	EA	$ 500.00	$ 1,000	
	1.19	12" STORM DRAIN	867	LF	$ 43.90	$ 38,052	
	1.21	15" STORM DRAIN		LF	$ 57.78	$ -	
	1.22	18" STORM DRAIN	2,142	LF	$ 73.20	$ 156,769	
	1.23	24" STORM DRAIN	1,949	LF	$ 99.53	$ 194,009	

OPINION OF PROBABLE COST

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Project:		**Modesto Area 2**					
Project No:		**2108543**					
Park:		**JM Pike - Retention**					
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						TOTAL:	**$ 13,517,996**

		DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	EXTENSION	SECTION TOTAL
	1.24	30" STORM DRAIN	1,758	LF	$ 134.71	$ 236,839	
	1.25	36" STORM DRAIN	3,281	LF	$ 168.26	$ 552,083	
	1.26	42" STORM DRAIN	645	LF	$ 186.52	$ 120,294	
	1.27	48" STORM DRAIN	2,081	LF	$ 204.78	$ 426,131	
	1.28	48" MANHOLE	30	EA	$ 2,789.00	$ 83,670	
	1.29	60" MANHOLE	10	EA	$ 5,000.00	$ 50,000	
2.00		**DISPOSAL SYSTEM**					$ 5,427,624
	2.01	RETENTION SYSTEM (Including excavation, filter fabric, bedding, and installation)	1,054,436	CF	$ 4.50	$ 4,744,962	
	2.02	EARTHWORK (Including excavation, stockpile, off-haul and replace)	1,054,436	CF	$ 0.60	$ 632,662	
	2.03	PUMP STATION (Includes power connection, control, SCADA)		EA	$ 300,000.00	$ -	
	2.04	SCADA SYSTEM (No pump station)	1	LS	$ 50,000.00	$ 50,000	
	2.05	6" FORCEMAIN		LF	$ 45.32		
	2.06	48" MANHOLE		EA	$ 2,789.00	$ -	
	2.07	36" STORM DRAIN		LF	$ 168.26	$ -	
	2.08	SAWCUT		LF	$ 2.23	$ -	
	2.09	REMOVE CURB AND GUTTER		LF	$ 2.63	$ -	
	2.10	REPLACE CURB AND GUTTER		LF	$ 14.01	$ -	
	2.11	REMOVE SIDEWALK		SF	$ 1.29	$ -	
	2.12	REPLACE SIDEWALK		SF	$ 3.14	$ -	
	2.13	PAVEMENT REMOVAL		SF	$ 0.83	$ -	
	2.14	HOT PATCH		SF	$ 2.43	$ -	
	2.15	OUTLET STRUCTURE		EA	$ 10,000.00	$ -	

OPINION OF PROBABLE COST

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Project:	**Modesto Area 2**
Project No:	**2108543**
Park:	**JM Pike - Retention**

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TOTAL: $ 13,517,996

		DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	EXTENSION	SECTION TOTAL
3.00		**TREATMENT SYSTEM**					$ 60,000
	3.01	PRETREATMENT DEVICE	1	EA	$ 30,000.00	$ 30,000	
	3.02	ISOLATION VALVE	1	EA	$ 30,000.00	$ 30,000	
4.00		**PARK IMPROVEMENTS**					$ 551,000
	4.01	SITE DRAINAGE	1	LS	$ 18,500.00	$ 18,500	
	4.02	PAVING AND SURFACING	1	LS	$ 208,500.00	$ 208,500	
	4.03	SITE WALLS		LS		$ -	
	4.04	SITE FURNISHING AND EQUIPMENT	1	LS	$ 34,500.00	$ 34,500	
	4.05	TENNIS COURTS, COMPLETE INCLUDING PAVEMENT, STRIPING, LIGHTING, FENCING AND EQUIPMENT		LS		$ -	
	4.06	RE-SET EXISTING PLAY STRUCTURE	1	EA	$ 15,000.00	$ 15,000	
	4.07	BASEBALL INFIELD, FENCING AND EQUIPMENT	1	LS	$ 84,500.00	$ 84,500	
	4.08	IRRIGATION	1	LS	$ 40,000.00	$ 40,000	
	4.09	PLANTING AND TURF	1	LS	$ 150,000.00	$ 150,000	
	4.10	RESTROOM		LS		$ -	
5.00		**MISC.**					$ 75,000
	5.01	DISCONNECT AND ABANDON EXISTING 12 WATER LINE		EA	$ 500.00	$ -	
	5.02	12" WATER LINE (Including trenching, sawcutting and hatch patch)		LF	$ 85.20	$ -	
	5.03	12" WATER VALVE		EA	$ 2,154.63	$ -	
	5.04	CONNECT TO EXISTING WATER LINE		EA	$ 5,401.59	$ -	
	5.05	PRESSURE BACKFLOW DEVICE		EA	$ 28,570.00	$ -	
	5.06	TRAFFIC CONTROL	1	LS	$ 75,000.00	$ 75,000	
	5.07	SHORING		EA	$ 10,000.00	$ -	
		SUBTOTAL					$ 8,239,540
6.00		**Mobilization and Bonding**					$ 411,977
	6.01	Mobilization (Includes the cost of purchase, installation and maintenance of all proposed erosion control methods shown on the civil plans.)		%	4%	$ 329,582	
	6.02	Bonding		%	1%	$ 82,395	
		CONSTRUCTION SUBTOTAL					$ 8,651,517
		Design Contingency			25.0%	$ 2,162,879	$ 2,162,879
		SUBTOTAL					$ 10,814,397
		Legal, Engineering and Administration			25.0%	$ 2,703,599	$ 2,703,599
		TOTAL					$ 13,517,996

OPINION OF PROBABLE COST

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Project:		**Modesto Area 2**					
Project No:		**2108543**					
Park:		**JM Pike - Detention**					
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						TOTAL:	**$ 10,235,090**

		DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	EXTENSION	SECTION TOTAL
0.00		**SITE PREPARATION**					$ 18,441
	0.01	PARK DEMOLITION AND REMOVAL	127,362	SF	$ 0.13	$ 16,557	
	0.02	REMOVE EX. RESTROOM		LS	$ 16,000.00	$ -	
	0.03	REMOVE EXISTING POOL		LS	$ 9,500.00	$ -	
	0.04	TREE REMOVAL 1" DIA OR LARGER	1	EA	$ 822.64	$ 823	
	0.05	TREE REMOVAL 1" DIA OR SMALLER	3	EA	$ 328.98	$ 987	
	0.06	REMOVE EXISTING TENNIS COURT AND ELECTROLIERS		EA	$ 31,223.00	$ -	
	0.07	REMOVE SIDEWALK	58	SF	$ 1.29	$ 75	
1.00		**CONVEYANCE SYSTEM**					$ 2,107,641
	1.01	SAWCUT	24,976	LF	$ 2.23	$ 55,696	
	1.02	ABANDON EX. ROCKWELL	32	EA	$ 300.00	$ 9,600	
	1.03	ABANDON EX. CROSS CONNECTION AND PLUG BOTH ENDS	12	EA	$ 400.00	$ 4,800	
	1.04	REMOVE EX. 6" SANITARY SEWER PIPE		LF	$ 9.56	$ -	
	1.05	REPLACE EX. 6" SANITARY SEWER PIPE		LF	$ 30.74	$ -	
	1.06	REMOVE EX. 8" SANITARY SEWER PIPE		LF	$ 9.56	$ -	
	1.07	REPLACE EX. 8" SANITARY SEWER PIPE		LF	$ 35.95	$ -	
	1.08	REMOVE AND REPLACE EXISTING SEWER LATERAL	1	EA	$ 500.00	$ 500	
	1.09	REMOVE EXISTING PUMP STATION	1	EA	$ 1,000.00	$ 1,000	
	1.10	REPLACE SIDEWALK	58	SF	$ 3.14	$ 182	
	1.11	REMOVE CURB AND GUTTER	20	LF	$ 2.63	$ 53	
	1.12	REPLACE CURB AND GUTTER	20	LF	$ 14.01	$ 280	
	1.13	CONNECT TO EXISTING CATCH BASIN	25	EA	$ 500.00	$ 12,500	
	1.14	CONNECT TO EXISTING MANHOLE		EA	$ 500.00	$ -	
	1.15	COLLAR CONNECTION TO EXISTING		EA	$ 250.00	$ -	
	1.16	SEWER DIVERSION (DURING CONSTRUCTION)		SF	$ 2,500.00	$ -	
	1.17	PAVEMENT REMOVAL	48,523	SF	$ 0.83	$ 40,274	

OPINION OF PROBABLE COST

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Project:	**Modesto Area 2**
Project No:	**2108543**
Park:	**JM Pike - Detention**

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TOTAL: $ 10,235,090

		DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	EXTENSION	SECTION TOTAL
	1.18	HOT PATCH	48,523	SF	$ 2.43	$ 117,910	
	1.19	DIP EXISTING WATER LINE	3	EA	$ 2,000.00	$ 6,000	
	1.20	CONSTRUCT CONCRETE SADDLE	2	EA	$ 500.00	$ 1,000	
	1.19	12" STORM DRAIN	867	LF	$ 43.90	$ 38,052	
	1.21	15" STORM DRAIN		LF	$ 57.78	$ -	
	1.22	18" STORM DRAIN	2,142	LF	$ 73.20	$ 156,769	
	1.23	24" STORM DRAIN	1,949	LF	$ 99.53	$ 194,009	
	1.24	30" STORM DRAIN	1,758	LF	$ 134.71	$ 236,839	
	1.25	36" STORM DRAIN	3,281	LF	$ 168.26	$ 552,083	
	1.26	42" STORM DRAIN	645	LF	$ 186.52	$ 120,294	
	1.27	48" STORM DRAIN	2,081	LF	$ 204.78	$ 426,131	
	1.28	48" MANHOLE	30	EA	$ 2,789.00	$ 83,670	
	1.29	60" MANHOLE	10	EA	$ 5,000.00	$ 50,000	
2.00		**DISPOSAL SYSTEM**					$ 3,416,449
	2.01	DETENTION SYSTEM (Including excavation, filter fabric, bedding, and installation)	551,034	CF	$ 4.50	$ 2,479,653	
	2.02	EARTHWORK (Including excavation, stockpile, off-haul and replace)	551,034	CF	$ 0.60	$ 330,620	
	2.03	PUMP STATION (Includes power connection, control, SCADA)	1	EA	$ 300,000.00	$ 300,000	
	2.04	SCADA SYSTEM (No pump station)	1	LS	$ 50,000.00	$ 50,000	
	2.05	6" FORCEMAIN	4,634	LF	$ 45.32	$ 210,013	
	2.06	48" MANHOLE		EA	$ 2,789.00	$ -	
	2.07	36" STORM DRAIN		LF	$ 168.26	$ -	
	2.08	SAWCUT	9,268	LF	$ 2.23	$ 20,668	
	2.09	REMOVE CURB AND GUTTER	10	LF	$ 2.63	$ 26	
	2.10	REPLACE CURB AND GUTTER	10	LF	$ 14.01	$ 140	
	2.11	REMOVE SIDEWALK	50	SF	$ 1.29	$ 65	
	2.12	REPLACE SIDEWALK	50	SF	$ 3.14	$ 157	
	2.13	PAVEMENT REMOVAL	4,634	SF	$ 0.83	$ 3,846	
	2.14	HOT PATCH	4,634	SF	$ 2.43	$ 11,261	
	2.15	OUTLET STRUCTURE	1	EA	$ 10,000.00	$ 10,000	

OPINION OF PROBABLE COST

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Project:	**Modesto Area 2**
Project No:	**2108543**
Park:	**JM Pike - Detention**

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TOTAL: $ 10,235,090

		DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	EXTENSION	SECTION TOTAL
3.00		**TREATMENT SYSTEM**					$ 60,000
	3.01	PRETREATMENT DEVICE	1	EA	$ 30,000.00	$ 30,000	
	3.02	ISOLATION VALVE	1	EA	$ 30,000.00	$ 30,000	
4.00		**PARK IMPROVEMENTS**					$ 551,000
	4.01	SITE DRAINAGE	1	LS	$ 18,500.00	$ 18,500	
	4.02	PAVING AND SURFACING	1	LS	$ 208,500.00	$ 208,500	
	4.03	SITE WALLS		LS		$ -	
	4.04	SITE FURNISHING AND EQUIPMENT	1	LS	$ 34,500.00	$ 34,500	
	4.05	TENNIS COURTS, COMPLETE INCLUDING PAVEMENT, STRIPING, LIGHTING, FENCING AND EQUIPMENT		LS		$ -	
	4.06	RE-SET EXISTING PLAY STRUCTURE	1	EA	$ 15,000.00	$ 15,000	
	4.07	BASEBALL INFIELD, FENCING AND EQUIPMENT	1	LS	$ 84,500.00	$ 84,500	
	4.08	IRRIGATION	1	LS	$ 40,000.00	$ 40,000	
	4.09	PLANTING AND TURF	1	LS	$ 150,000.00	$ 150,000	
	4.10	RESTROOM		LS		$ -	
5.00		**MISC.**					$ 85,000
	5.01	DISCONNECT AND ABANDON EXISTING 12 WATER LINE		EA	$ 500.00	$ -	
	5.02	12" WATER LINE (Including trenching, sawcutting and hatch patch)		LF	$ 85.20	$ -	
	5.03	12" WATER VALVE		EA	$ 2,154.63	$ -	
	5.04	CONNECT TO EXISTING WATER LINE		EA	$ 5,401.59	$ -	
	5.05	PRESSURE BACKFLOW DEVICE		EA	$ 28,570.00	$ -	
	5.06	TRAFFIC CONTROL	1	LS	$ 75,000.00	$ 75,000	
	5.07	SHORING	1	EA	$ 10,000.00	$ 10,000	
		SUBTOTAL					$ 6,238,531
6.00		**Mobilization and Bonding**					$ 311,927
	6.01	Mobilization (Includes the cost of purchase, installation and maintenance of all proposed erosion control methods shown on the civil plans.)		%	4%	$ 249,541	
	6.02	Bonding		%	1%	$ 62,385	
		CONSTRUCTION SUBTOTAL					$ 6,550,458
		Design Contingency			25.0%	$ 1,637,614	$ 1,637,614
		SUBTOTAL					$ 8,188,072
		Legal, Engineering and Administration			25.0%	$ 2,047,018	$ 2,047,018
		TOTAL					$ 10,235,090

OPINION OF PROBABLE COST

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Project:		**Modesto Area 2**					
Project No:		**2108543**					
Park:		**Roosevelt - Retention**					
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						TOTAL:	**$ 7,121,611**

		DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	EXTENSION	SECTION TOTAL
0.00		**SITE PREPARATION**					$ 78,745
	0.01	PARK DEMOLITION AND REMOVAL	39,897	SF	$ 0.13	$ 5,187	
	0.02	REMOVE EX. RESTROOM	1	LS	$ 16,000.00	$ 16,000	
	0.03	REMOVE EXISTING POOL	1	LS	$ 9,500.00	$ 9,500	
	0.04	TREE REMOVAL 1" DIA OR LARGER	5	EA	$ 822.64	$ 4,113	
	0.05	TREE REMOVAL 1" DIA OR SMALLER	2	EA	$ 328.98	$ 658	
	0.06	REMOVE EXISTING TENNIS COURT AND ELECTROLIERS	1	EA	$ 31,223.00	$ 31,223	
	0.07	REMOVE SIDEWALK	9,352	SF	$ 1.29	$ 12,064	
1.00		**CONVEYANCE SYSTEM**					$ 500,822
	1.01	SAWCUT	5,450	LF	$ 2.23	$ 12,154	
	1.02	ABANDON EX. ROCKWELL	12	EA	$ 300.00	$ 3,600	
	1.03	ABANDON EX. CROSS CONNECTION AND PLUG BOTH ENDS	8	EA	$ 400.00	$ 3,200	
	1.04	REMOVE EX. 6" SANITARY SEWER PIPE	91	LF	$ 9.56	$ 869	
	1.05	REPLACE EX. 6" SANITARY SEWER PIPE	91	LF	$ 30.74	$ 2,794	
	1.06	REMOVE EX. 8" SANITARY SEWER PIPE		LF	$ 9.56	$ -	
	1.07	REPLACE EX. 8" SANITARY SEWER PIPE		LF	$ 35.95	$ -	
	1.08	REMOVE AND REPLACE EXISTING SEWER LATERAL	1	EA	$ 500.00	$ 500	
	1.09	REMOVE EXISTING PUMP STATION		EA	$ 1,000.00	$ -	
	1.10	REPLACE SIDEWALK	60	SF	$ 3.14	$ 190	
	1.11	REMOVE CURB AND GUTTER	12	LF	$ 2.63	$ 32	
	1.12	REPLACE CURB AND GUTTER	12	LF	$ 14.01	$ 168	
	1.13	CONNECT TO EXISTING CATCH BASIN	10	EA	$ 500.00	$ 5,000	
	1.14	CONNECT TO EXISTING MANHOLE	5	EA	$ 500.00	$ 2,500	
	1.15	COLLAR CONNECTION TO EXISTING	3	EA	$ 250.00	$ 750	
	1.16	SEWER DIVERSION (DURING CONSTRUCTION)	3	EA	$ 2,500.00	$ 7,500	
	1.17	PAVEMENT REMOVAL	8,646	SF	$ 0.83	$ 7,176	
	1.18	HOT PATCH	8,646	SF	$ 2.43	$ 21,009	
	1.19	DIP EXISTING WATER LINE	4	EA	$ 2,000.00	$ 8,000	
	1.20	CONSTRUCT CONCRETE SADDLE		EA	$ 500.00	$ -	
	1.19	12" STORM DRAIN	288	LF	$ 43.90	$ 12,648	
	1.21	15" STORM DRAIN		LF	$ 57.78	$ -	
	1.22	18" STORM DRAIN	28	LF	$ 73.20	$ 2,038	
	1.23	24" STORM DRAIN	352	LF	$ 99.53	$ 35,018	

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						TOTAL:	**$ 7,121,611**

		DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	EXTENSION	SECTION TOTAL
	1.24	30" STORM DRAIN	95	LF	$ 134.71	$ 12,843	
	1.25	36" STORM DRAIN	1,957	LF	$ 168.26	$ 329,366	
	1.26	42" STORM DRAIN		LF	$ 186.52	$ -	
	1.27	48" STORM DRAIN		LF	$ 204.78	$ -	
	1.28	48" MANHOLE	12	EA	$ 2,789.00	$ 33,468	
	1.29	60" MANHOLE		EA	$ 5,000.00	$ -	
2.00		**DISPOSAL SYSTEM**					$ 2,660,068
	2.01	RETENTION SYSTEM (Including excavation, filter fabric, bedding, and installation)	511,778	CF	$ 4.50	$ 2,303,001	
	2.02	EARTHWORK (Including excavation, stockpile, off-haul and replace)	511,778	CF	$ 0.60	$ 307,067	
	2.03	PUMP STATION (Includes power connection, control, SCADA)		EA	$ 300,000.00	$ -	
	2.04	SCADA SYSTEM (No pump station)	1	LS	$ 50,000.00	$ 50,000	
	2.05	6" FORCEMAIN		LF	$ 45.32		
	2.06	48" MANHOLE		EA	$ 2,789.00	$ -	
	2.07	36" STORM DRAIN		LF	$ 168.26	$ -	
	2.08	SAWCUT		LF	$ 2.23	$ -	
	2.09	REMOVE CURB AND GUTTER		LF	$ 2.63	$ -	
	2.10	REPLACE CURB AND GUTTER		LF	$ 14.01	$ -	
	2.11	REMOVE SIDEWALK		SF	$ 1.29	$ -	
	2.12	REPLACE SIDEWALK		SF	$ 3.14	$ -	
	2.13	PAVEMENT REMOVAL		SF	$ 0.83	$ -	
	2.14	HOT PATCH		SF	$ 2.43	$ -	
	2.15	OUTLET STRUCTURE		EA	$ 10,000.00	$ -	

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TOTAL: $ 7,121,611

		DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	EXTENSION	SECTION TOTAL
3.00		**TREATMENT SYSTEM**					$ 60,000
	3.01	PRETREATMENT DEVICE	1	EA	$ 30,000.00	$ 30,000	
	3.02	ISOLATION VALVE	1	EA	$ 30,000.00	$ 30,000	
4.00		**PARK IMPROVEMENTS**					$ 853,750
	4.01	SITE DRAINAGE	1	LS	$ 16,500.00	$ 16,500	
	4.02	PAVING AND SURFACING	1	LS	$ 248,500.00	$ 248,500	
	4.03	SITE WALLS	1	LS	$ 10,500.00	$ 10,500	
	4.04	SITE FURNISHING AND EQUIPMENT	1	LS	$ 34,500.00	$ 34,500	
	4.05	TENNIS COURTS, COMPLETE INCLUDING PAVEMENT, STRIPING, LIGHTING, FENCING AND EQUIPMENT	1	LS	$ 175,000.00	$ 175,000	
	4.06	RE-SET EXISTING PLAY STRUCTURE	2	EA	$ 15,000.00	$ 30,000	
	4.07	BASEBALL INFIELD AND BASES		LS		$ -	
	4.08	IRRIGATION	1	LS	$ 58,250.00	$ 58,250	
	4.09	PLANTING AND TURF	1	LS	$ 55,500.00	$ 55,500	
	4.10	RESTROOM	1	LS	$ 225,000.00	$ 225,000	
5.00		**MISC.**					$ 187,407
	5.01	DISCONNECT AND ABANDON EXISTING 12 WATER LINE	2	EA	$ 500.00	$ 1,000	
	5.02	12" WATER LINE (Including trenching, sawcutting and hatch patch)	971	LF	$ 85.20	$ 82,724	
	5.03	12" WATER VALVE	2	EA	$ 2,154.63	$ 4,309	
	5.04	CONNECT TO EXISTING WATER LINE	2	EA	$ 5,401.59	$ 10,803	
	5.05	PRESSURE BACKFLOW DEVICE	1	EA	$ 28,570.00	$ 28,570	
	5.06	TRAFFIC CONTROL	1	LS	$ 50,000.00	$ 50,000	
	5.07	SHORING	1	EA	$ 10,000.00	$ 10,000	
		SUBTOTAL					$ 4,340,791
6.00		**Mobilization and Bonding**					$ 217,040
	6.01	Mobilization (Includes the cost of purchase, installation and maintenance of all proposed erosion control methods shown on the civil plans.)		%	4%	$ 173,632	
	6.02	Bonding		%	1%	$ 43,408	
		CONSTRUCTION SUBTOTAL					$ 4,557,831
		Design Contingency			25.0%	$ 1,139,458	$ 1,139,458
		SUBTOTAL					$ 5,697,289
		Legal, Engineering and Administration			25.0%	$ 1,424,322	$ 1,424,322
		TOTAL					$ 7,121,611

OPINION OF PROBABLE COST

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Project:		**Modesto Area 2**					
Project No:		**2108543**					
Park:		**Roosevelt - Detention**					
		In providing this opinion of probable cost, it is recognized that neither the Client nor RRM Design Group has control over the costs of labor, equipment, or materials, or over the Contractor's methods of determining prices for bidding. This opinion of probable costs is based on RRM Design Group's reasonable professional judgment and experience and does not constitute a warranty, express or implied, that the Contractor's bids or negotiated price of Work will not vary from the Client's budget or from any opinion prepared by RRM Design Group.					
						TOTAL:	**$ 5,604,183**

		DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	EXTENSION	SECTION TOTAL
0.00		**SITE PREPARATION**					$ 78,745
	0.01	PARK DEMOLITION AND REMOVAL	39,897	SF	$ 0.13	$ 5,187	
	0.02	REMOVE EX. RESTROOM	1	LS	$ 16,000.00	$ 16,000	
	0.03	REMOVE EXISTING POOL	1	LS	$ 9,500.00	$ 9,500	
	0.04	TREE REMOVAL 1" DIA OR LARGER	5	EA	$ 822.64	$ 4,113	
	0.05	TREE REMOVAL 1" DIA OR SMALLER	2	EA	$ 328.98	$ 658	
	0.06	REMOVE EXISTING TENNIS COURT AND ELECTROLIERS	1	EA	$ 31,223.00	$ 31,223	
	0.07	REMOVE SIDEWALK	9,352	SF	$ 1.29	$ 12,064	
1.00		**CONVEYANCE SYSTEM**					$ 501,528
	1.01	SAWCUT	5,450	LF	$ 2.23	$ 12,152	
	1.02	ABANDON EX. ROCKWELL	12	EA	$ 300.00	$ 3,600	
	1.03	ABANDON EX. CROSS CONNECTION AND PLUG BOTH ENDS	8	EA	$ 400.00	$ 3,200	
	1.04	REMOVE EX. 6" SANITARY SEWER PIPE	91	LF	$ 9.56	$ 869	
	1.05	REPLACE EX. 6" SANITARY SEWER PIPE	91	LF	$ 30.74	$ 2,794	
	1.06	REMOVE EX. 8" SANITARY SEWER PIPE		LF	$ 9.56	$ -	
	1.07	REPLACE EX. 8" SANITARY SEWER PIPE		LF	$ 35.95	$ -	
	1.08	REMOVE AND REPLACE EXISTING SEWER LATERAL	1	EA	$ 500.00	$ 500	
	1.09	REMOVE EXISTING PUMP STATION		EA	$ 1,000.00	$ -	
	1.10	REPLACE SIDEWALK	60	SF	$ 3.14	$ 188	
	1.11	REMOVE CURB AND GUTTER	12	LF	$ 2.63	$ 32	
	1.12	REPLACE CURB AND GUTTER	12	LF	$ 14.01	$ 168	
	1.13	CONNECT TO EXISTING CATCH BASIN	10	EA	$ 500.00	$ 5,000	
	1.14	CONNECT TO EXISTING MANHOLE	5	EA	$ 500.00	$ 2,500	
	1.15	COLLAR CONNECTION TO EXISTING	3	EA	$ 250.00	$ 750	
	1.16	SEWER DIVERSION (DURING CONSTRUCTION)	3	EA	$ 2,500.00	$ 7,500	
	1.17	PAVEMENT REMOVAL	8,646	SF	$ 0.83	$ 7,176	
	1.18	HOT PATCH	8,646	SF	$ 2.43	$ 21,009	
	1.19	DIP EXISTING WATER LINE	4	EA	$ 2,000.00	$ 8,000	
	1.20	CONSTRUCT CONCRETE SADDLE		EA	$ 500.00	$ -	
	1.19	12" STORM DRAIN	288	LF	$ 43.90	$ 12,648	
	1.21	15" STORM DRAIN		LF	$ 57.78	$ -	
	1.22	18" STORM DRAIN	28	LF	$ 73.20	$ 2,038	
	1.23	24" STORM DRAIN	352	LF	$ 99.53	$ 35,018	

OPINION OF PROBABLE COST

rrmdesigngroup
creating environments people enjoy®

Project:	**Modesto Area 2**
Project No:	**2108543**
Park:	**Roosevelt - Detention**

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TOTAL: $ 5,604,183

		DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	EXTENSION	SECTION TOTAL
	1.24	30" STORM DRAIN	95	LF	$ 134.71	$ 12,843	
	1.25	36" STORM DRAIN	1,962	LF	$ 168.26	$ 330,074	
	1.26	42" STORM DRAIN		LF	$ 186.52	$ -	
	1.27	48" STORM DRAIN		LF	$ 204.78	$ -	
	1.28	48" MANHOLE	12	EA	$ 2,789.00	$ 33,468	
	1.29	60" MANHOLE		EA	$ 5,000.00	$ -	
2.00		**DISPOSAL SYSTEM**					$ 1,724,453
	2.01	DETENTION SYSTEM (Including excavation, filter fabric, bedding, and installation)	250,034	CF	$ 4.50	$ 1,125,155	
	2.02	EARTHWORK (Including excavation, stockpile, off-haul and replace)	250,034	CF	$ 0.60	$ 150,021	
	2.03	PUMP STATION (Includes power connection, control, SCADA)	1	EA	$ 300,000.00	$ 300,000	
	2.04	SCADA SYSTEM (No pump station)	1	LS	$ 50,000.00	$ 50,000	
	2.05	6" FORCEMAIN	34	LF	$ 45.32	$ 1,537	
	2.06	48" MANHOLE	2	EA	$ 2,789.00	$ 5,578	
	2.07	36" STORM DRAIN	529	LF	$ 168.26	$ 89,028	
	2.08	SAWCUT	708	LF	$ 2.23	$ 1,578	
	2.09	REMOVE CURB AND GUTTER	10	LF	$ 2.63	$ 26	
	2.10	REPLACE CURB AND GUTTER	10	LF	$ 14.01	$ 140	
	2.11	REMOVE SIDEWALK	53	SF	$ 1.29	$ 68	
	2.12	REPLACE SIDEWALK	53	SF	$ 3.14	$ 166	
	2.13	PAVEMENT REMOVAL	354	SF	$ 0.83	$ 294	
	2.14	HOT PATCH	355	SF	$ 2.43	$ 862	
	2.15	OUTLET STRUCTURE		EA	$ 10,000.00	$ -	

OPINION OF PROBABLE COST

rrmdesigngroup
creating environments people enjoy®

Project:	**Modesto Area 2**
Project No:	**2108543**
Park:	**Roosevelt - Detention**

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TOTAL: $ 5,604,183

		DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	EXTENSION	SECTION TOTAL
3.00		**TREATMENT SYSTEM**					$ 60,000
	3.01	PRETREATMENT DEVICE	1	EA	$ 30,000.00	$ 30,000	
	3.02	ISOLATION VALVE	1	EA	$ 30,000.00	$ 30,000	
4.00		**PARK IMPROVEMENTS**					$ 853,750
	4.01	SITE DRAINAGE	1	LS	$ 16,500.00	$ 16,500	
	4.02	PAVING AND SURFACING	1	LS	$ 248,500.00	$ 248,500	
	4.03	SITE WALLS	1	LS	$ 10,500.00	$ 10,500	
	4.04	SITE FURNISHING AND EQUIPMENT	1	LS	$ 34,500.00	$ 34,500	
	4.05	TENNIS COURTS, COMPLETE INCLUDING PAVEMENT, STRIPING, LIGHTING, FENCING AND EQUIPMENT	1	LS	$ 175,000.00	$ 175,000	
	4.06	RE-SET EXISTING PLAY STRUCTURE	2	EA	$ 15,000.00	$ 30,000	
	4.07	BASEBALL INFIELD AND BASES		LS		$ -	
	4.08	IRRIGATION	1	LS	$ 58,250.00	$ 58,250	
	4.09	PLANTING AND TURF	1	LS	$ 55,500.00	$ 55,500	
	4.10	RESTROOM	1	LS	$ 225,000.00	$ 225,000	
5.00		**MISC.**					$ 197,407
	5.01	DISCONNECT AND ABANDON EXISTING 12 WATER LINE	2	EA	$ 500.00	$ 1,000	
	5.02	12" WATER LINE (Including trenching, sawcutting and hatch patch)	971	LF	$ 85.20	$ 82,724	
	5.03	12" WATER VALVE	2	EA	$ 2,154.63	$ 4,309	
	5.04	CONNECT TO EXISTING WATER LINE	2	EA	$ 5,401.59	$ 10,803	
	5.05	PRESSURE BACKFLOW DEVICE	1	EA	$ 28,570.00	$ 28,570	
	5.06	TRAFFIC CONTROL	1	LS	$ 50,000.00	$ 50,000	
	5.07	SHORING	2	EA	$ 10,000.00	$ 20,000	
		SUBTOTAL					$ 3,415,883
6.00		**Mobilization and Bonding**					$ 170,794
	6.01	Mobilization (Includes the cost of purchase, installation and maintenance of all proposed erosion control methods shown on the civil plans.)		%	4%	$ 136,635	
	6.02	Bonding		%	1%	$ 34,159	
		CONSTRUCTION SUBTOTAL					$ 3,586,677
		Design Contingency			25.0%	$ 896,669	$ 896,669
		SUBTOTAL					$ 4,483,346
		Legal, Engineering and Administration			25.0%	$ 1,120,837	$ 1,120,837
		TOTAL					$ 5,604,183

Modesto Area 2
Cost Comparison for Stantec Cross Connection Report

Cross Connection	Cross Connection Report Detention Volume	Field Verified Retention Volume	*Cross Connection Report Unit Cost	Cost To Meet City Design Standards
	(CF)	(CF)	($)	($)
Sub-Basin 22				
2	61,107	243,710	$ 27.61	6,728,833
5	29,384	27,687	$ 27.61	764,438
6	10,476	84,768	$ 27.61	2,340,444
7	71,373	120,777	$ 27.61	3,334,653
8	13,263	174,536	$ 27.61	4,818,939
10	53,217	48,639	$ 27.61	1,342,923
15	45,100	79,889	$ 27.61	2,205,735
16	16,483	91,649	$ 27.61	2,530,429
18	28,143	87,939	$ 27.61	2,427,996
19	28,143	69,888	$ 27.61	1,929,608
27	29,533	51,958	$ 27.61	1,434,560
32	27,895	120,382	$ 27.61	3,323,747
33	29,541	43,787	$ 27.61	1,208,959
34	29,541	79,523	$ 27.61	2,195,630
35	59,302	86,089	$ 27.61	2,376,917
36	15,862	115,260	$ 27.61	3,182,329
37	58,224	119,041	$ 27.61	3,286,722
A		69,159	$ 27.61	1,909,480
	606,587	1,714,681		**47,342,342**

Sub-Basin 89				
3	38541	27687	$25.49	$705,742
11	58033	80987	$25.49	$2,064,359
14	56984	129774	$25.49	$3,307,939
	153,558	238,448		**$6,078,040**

Total Area 2 Retention Cost $ 53,420,382

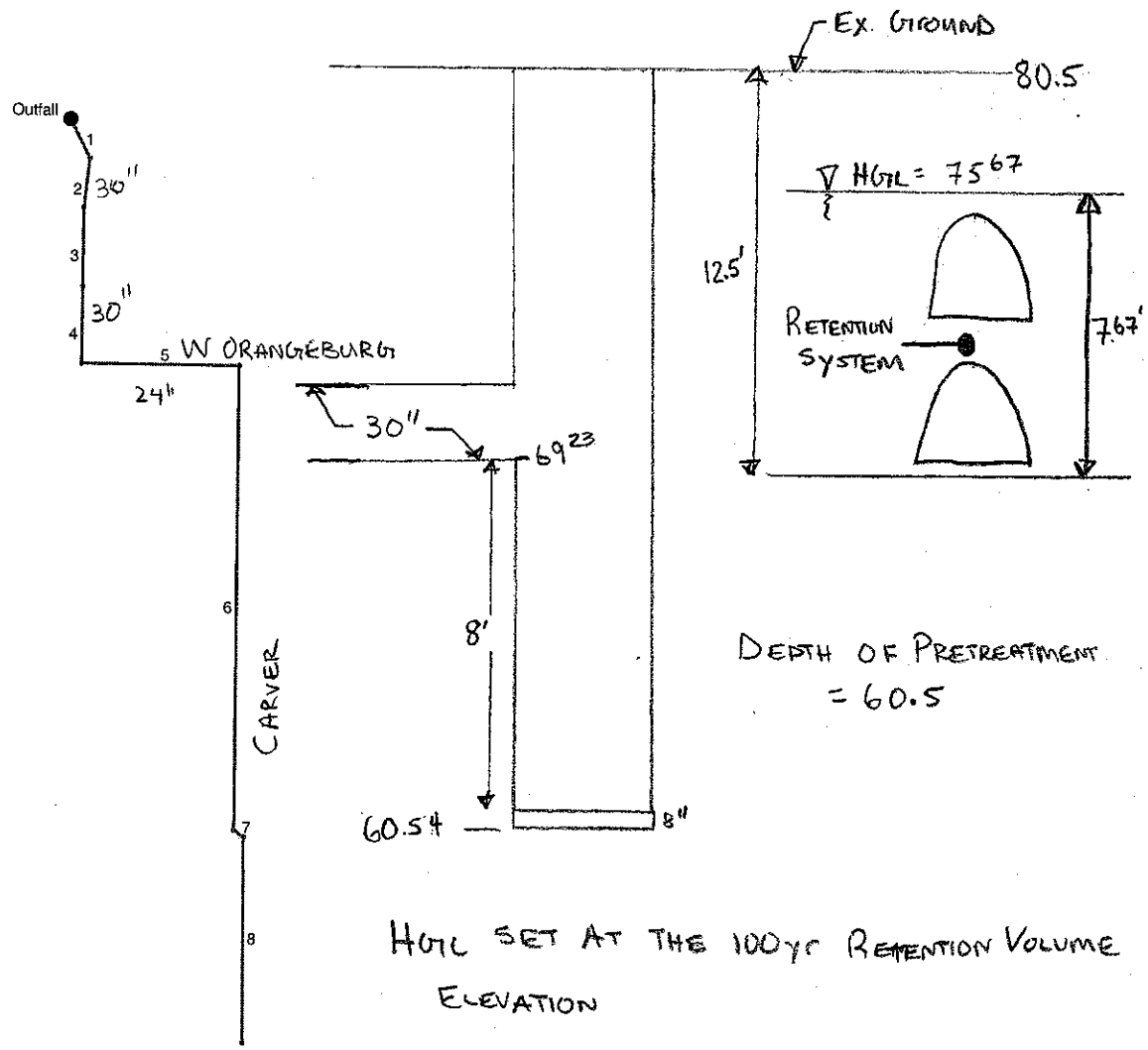
*Cross Connection Report Sub-basin 22 Recommendations Cost $15,408,000 for 558,061 CF or $ 27.61/CF

Cross Connection Report Sub-Basin 89 recommendations cost $10,839,653 for 425,277 CF or $25.49/CF

APPENDIX C

HYDRAULIC ANALYSES

Hydraflow Storm Sewers Extension for AutoCAD® Civil 3D® 2009 Plan



REQUIRED 100 yr RETENTION VOLUME: 5.0 AC-FT
RETENTION SYSTEM = 4.9 AC-FT
PIPE STORAGE = .18 ACFT
TOTAL DESIGN = 5.08 AC-FT

Project File: Garrison Park-11.stm	Number of lines: 8	Date: 10-30-2009

Storm Sewer Tabulation

Station		Len	Drng Area		Rnoff coeff	Area x C		Tc		Rain (I)	Total flow	Cap full	Vel	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line	(ft)	Incr (ac)	Total (ac)	(C)	Incr	Total	Inlet (min)	Syst (min)	(in/hr)	(cfs)	(cfs)	(ft/s)	Size (in)	Slope (%)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	
1	End	87.580	0.00	17.37	0.00	0.00	10.75	0.0	21.6	1.2	12.63	9.80	2.57	30	0.06	69.23	69.28	75.67	75.75	80.50	80.29	
2	1	99.510	0.00	17.37	0.00	0.00	10.75	0.0	21.1	1.2	12.78	10.07	2.60	30	0.06	69.28	69.34	75.81	75.91	80.29	82.30	
3	2	158.000	0.00	17.37	0.00	0.00	10.75	0.0	20.2	1.2	13.02	9.79	2.65	30	0.06	69.34	69.43	75.93	76.09	82.30	80.30	
4	3	155.590	0.00	17.37	0.00	0.00	10.75	0.0	19.4	1.2	13.27	9.86	2.70	30	0.06	69.43	69.52	76.10	76.26	80.30	80.41	
5	4	311.700	9.74	17.37	0.61	5.94	10.75	10.0	17.6	1.3	13.79	6.01	4.39	24	0.07	70.04	70.26	76.38	77.54	80.41	80.38	Area 7
6	5	935.690	0.00	7.63	0.00	0.00	4.81	0.0	12.4	1.5	7.00	6.40	2.23	24	0.08	73.20	73.95	77.84	78.73	80.38	81.00	
7	6	22.980	0.00	7.63	0.00	0.00	4.81	0.0	12.3	1.5	7.02	6.67	2.23	24	0.09	73.95	73.97	78.80	78.82	81.00	81.13	
8	7	413.240	7.63	7.63	0.63	4.81	4.81	10.0	10.0	1.6	7.46	6.39	2.38	24	0.08	73.97	74.30	78.89	79.34	81.13	80.70	Area 5

Project File: Garrison Park-11.stm

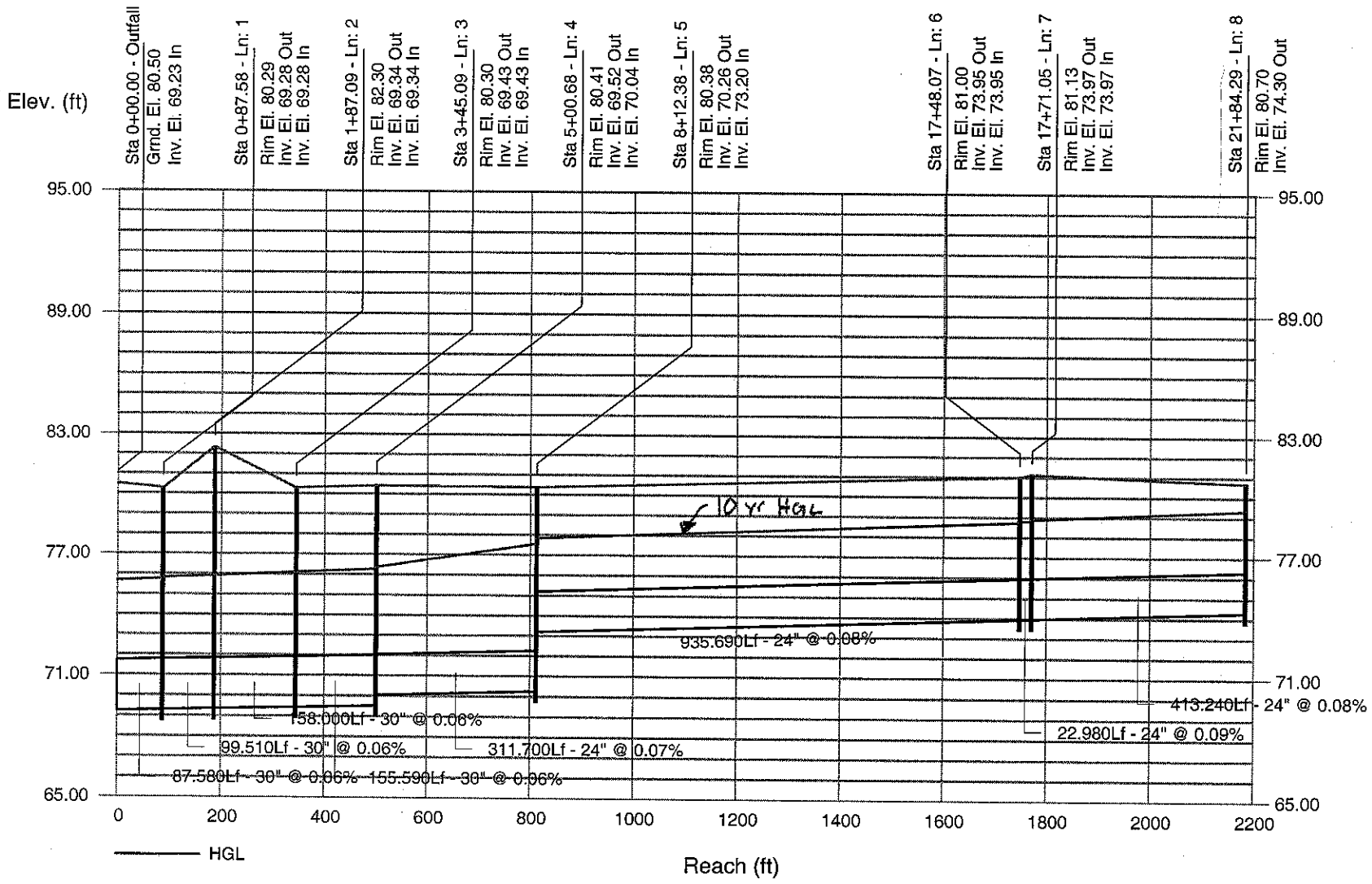
Number of lines: 8

Run Date: 10-30-2009

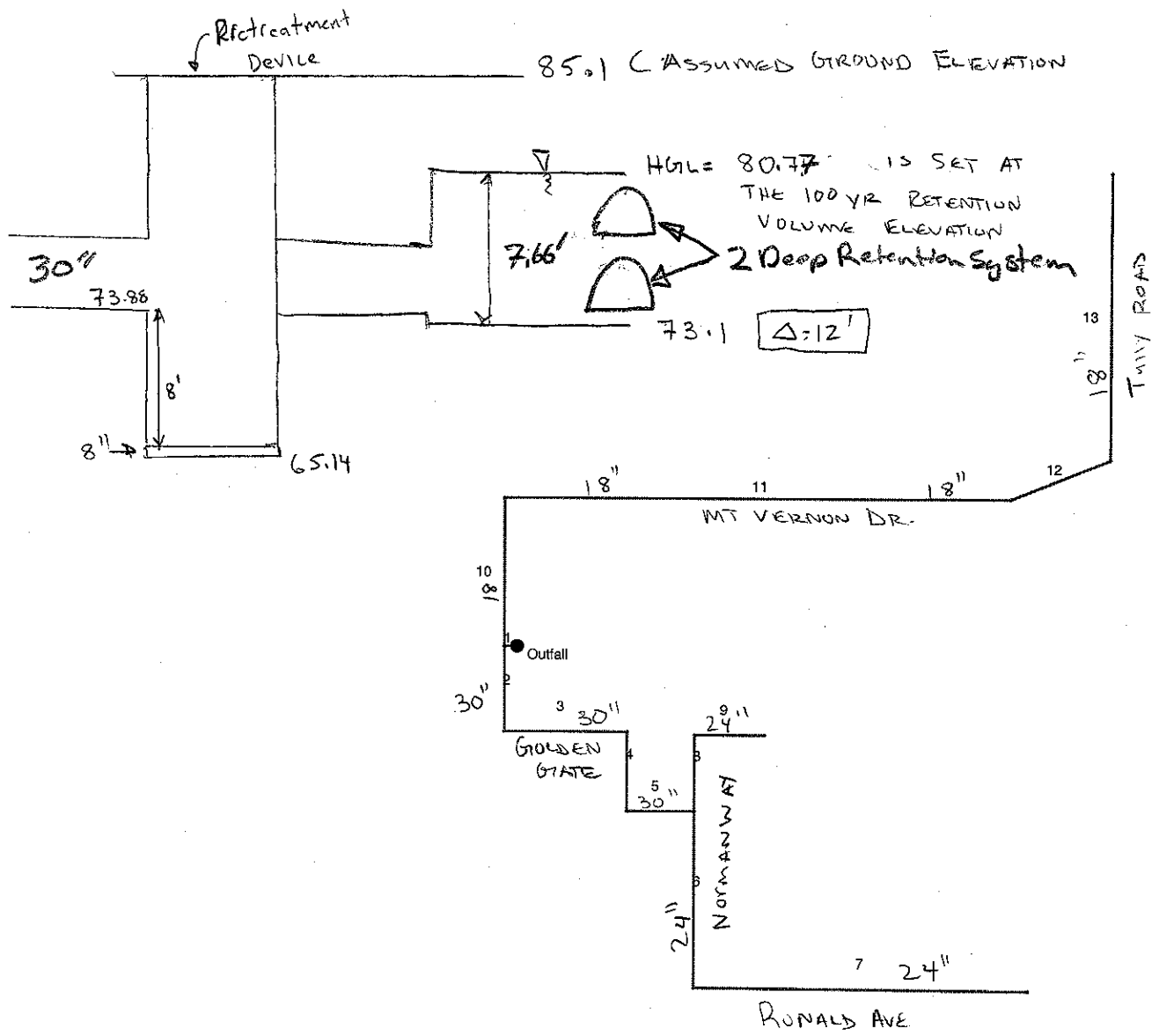
NOTES: Intensity = 61.96 / (Inlet time + 27.10) ^ 1.02; Return period = 10 Yrs. ; c = cir e = ellip b = box

Storm Sewer Profile

Proj. file: Garris Park-11.stm



Hydraflow Storm Sewers Extension for AutoCAD® Civil 3D® 2009 Plan



Volume Required = 5.47 Ac Ft
100-yr Retention
- Retention System = 5.04 Ac-Ft.
- Pipe Storage = .47 Ac-Ft

Total Design Storage = 5.51 Ac Ft

Project File: Catherine Everett-10.stm	Number of lines: 13	Date: 09-18-2009

Storm Sewer Tabulation

Station		Len	Drng Area		Rnoff coeff	Area x C		Tc		Rain (I)	Total flow	Cap full	Vel	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line	(ft)	Incr (ac)	Total (ac)	(C)	Incr	Total	Inlet (min)	Syst (min)	(in/hr)	(cfs)	(cfs)	(ft/s)	Size (in)	Slope (%)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	
1	End	49.670	0.00	19.55	0.00	0.00	11.73	0.0	31.0	1.0	11.52	10.08	2.35	30	0.06	73.88	73.91	80.77	80.81	84.69	84.79	
2	1	309.940	0.00	17.28	0.00	0.00	10.37	0.0	25.7	1.1	11.23	10.15	2.29	30	0.06	76.31	76.50	80.89	81.13	84.79	83.00	
3	2	442.030	0.00	17.28	0.00	0.00	10.37	0.0	23.2	1.1	11.79	9.95	2.40	30	0.06	76.50	76.76	81.21	81.57	83.00	84.49	
4	3	289.800	0.00	17.28	0.00	0.00	10.37	0.0	21.6	1.2	12.19	9.93	2.48	30	0.06	76.76	76.93	81.66	81.92	84.49	84.84	
5	4	242.400	0.00	17.28	0.00	0.00	10.37	0.0	20.3	1.2	12.54	10.20	2.56	30	0.06	76.93	77.08	82.02	82.24	84.84	87.02	
6	5	638.950	0.00	6.64	0.00	0.00	3.98	0.0	16.7	1.3	5.22	6.39	1.66	24	0.08	78.02	78.53	82.34	82.68	87.02	86.43	
7	6	1210.100	6.64	6.64	0.60	3.98	3.98	10.0	10.0	1.6	6.19	6.40	1.97	24	0.08	78.53	79.50	82.73	83.63	86.43	86.37	Area 7
8	5	278.720	0.00	10.64	0.00	0.00	6.38	0.0	11.4	1.5	9.55	6.35	3.04	24	0.08	78.76	78.98	82.34	82.84	87.02	86.50	
9	8	250.290	10.64	10.64	0.60	6.38	6.38	10.0	10.0	1.6	9.91	6.39	3.16	24	0.08	78.98	79.18	82.98	83.47	86.50	85.67	Area 14
10	1	541.400	0.00	2.27	0.00	0.00	1.36	0.0	28.0	1.0	1.41	3.50	0.80	18	0.11	74.31	74.91	80.89	80.99	84.79	85.35	
11	10	1816.690	0.00	2.27	0.00	0.00	1.36	0.0	17.9	1.3	1.74	3.48	0.98	18	0.11	74.91	76.91	81.00	81.50	85.35	87.64	
12	11	387.160	0.00	2.27	0.00	0.00	1.36	0.0	15.8	1.3	1.82	3.46	1.03	18	0.11	77.50	77.92	81.51	81.62	87.64	87.90	
13	12	1040.980	2.27	2.27	0.60	1.36	1.36	10.0	10.0	1.6	2.11	3.49	1.20	18	0.11	77.92	79.07	81.64	82.06	87.90	88.65	Area 3

Project File: Catherine Everett-10.stm

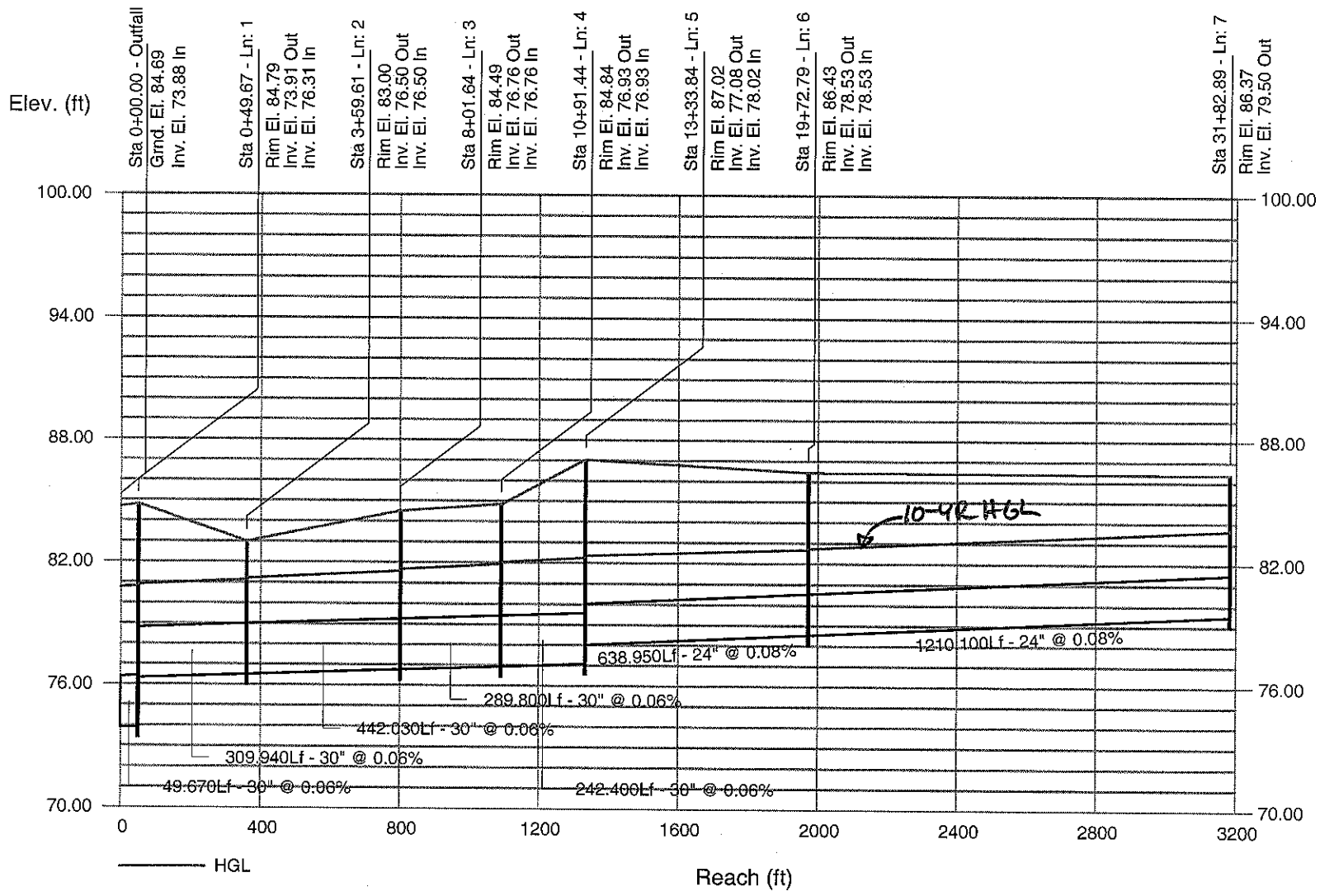
Number of lines: 13

Run Date: 09-25-2009

NOTES: Intensity = 61.96 / (Inlet time + 27.10) ^ 1.02; Return period = 10 Yrs. ; c = cir e = ellip b = box

Storm Sewer Profile

Proj. file: Catherine Everett-10.stm



Storm Sewer Profile

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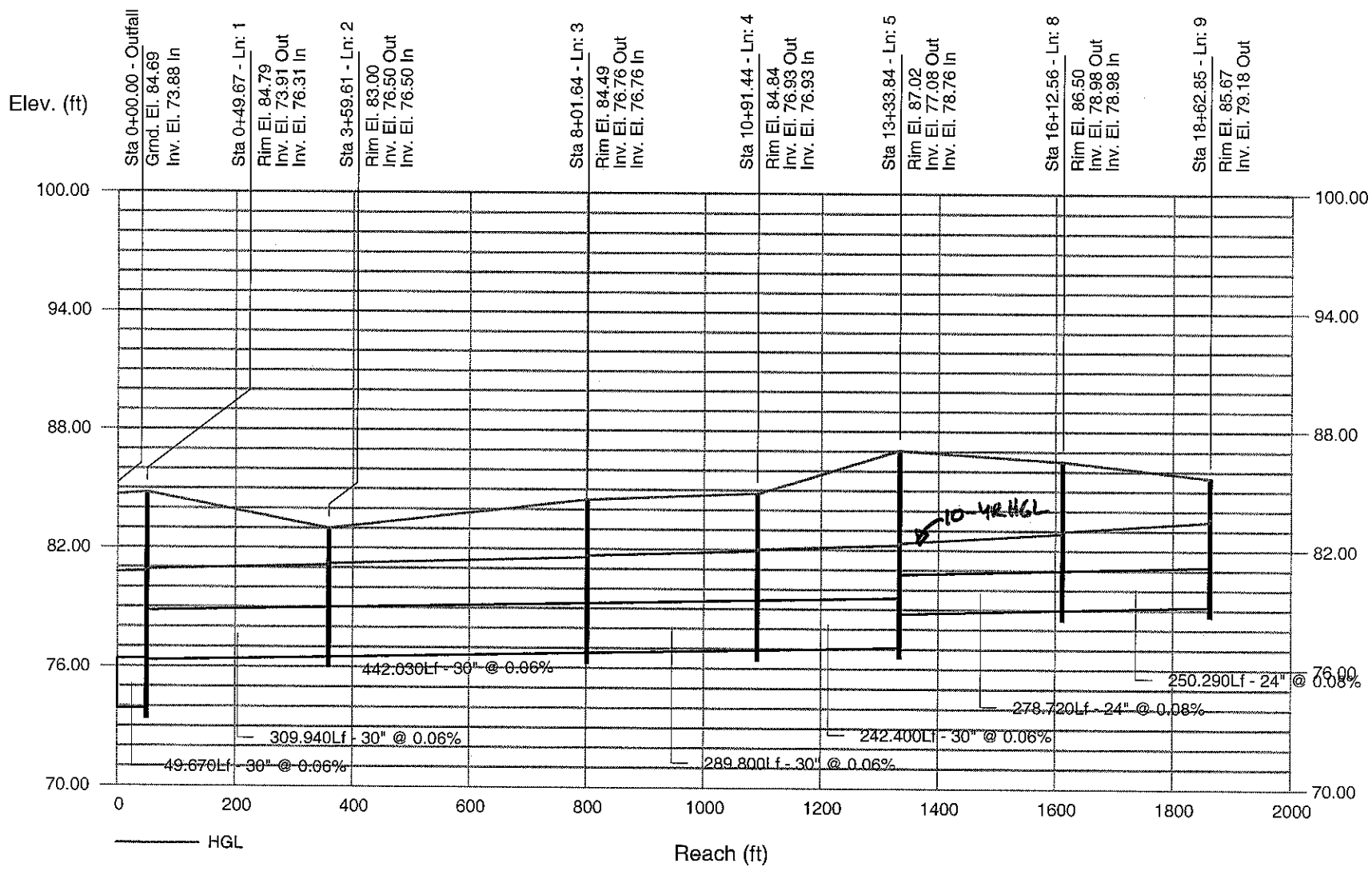
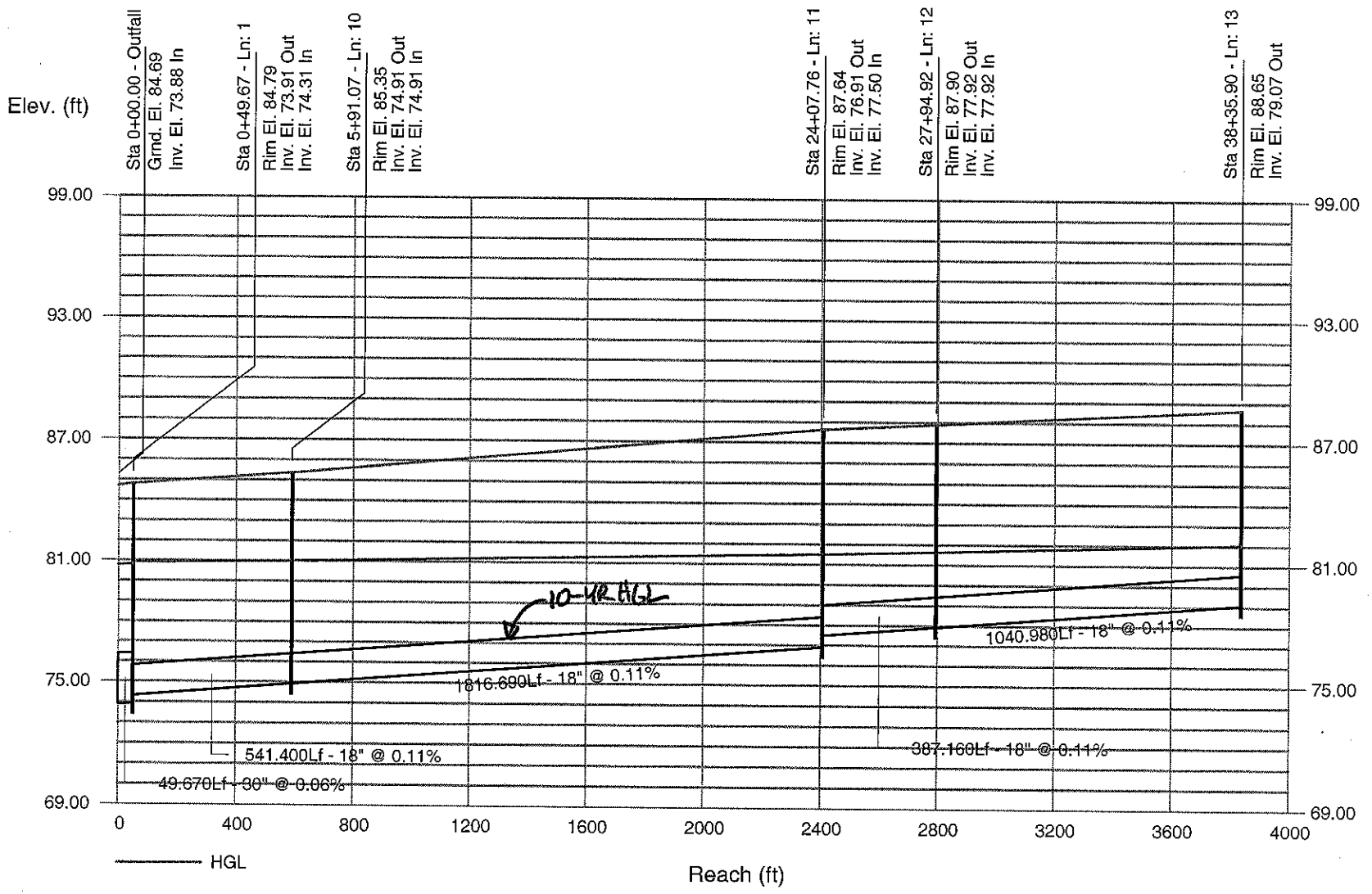
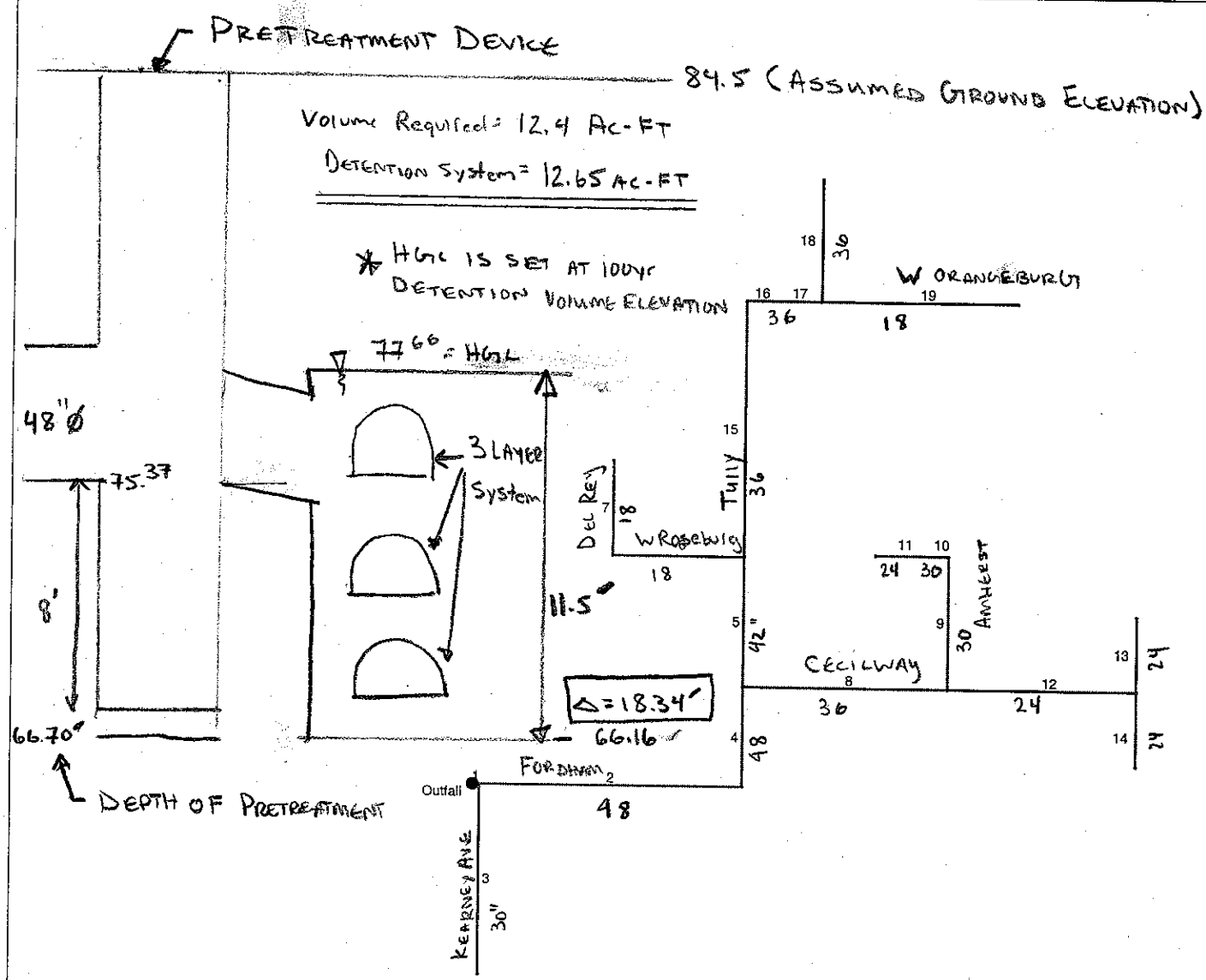


Storm Sewer Profile

Proj. file: Catherine[illegible]erett-10.stm



Hydraflow Storm Sewers Extension for AutoCAD® Civil 3D® 2009 Plan



Project File: JM Pike-17.stm	Number of lines: 19	Date: 10-07-2009

Storm Sewer Tabulation

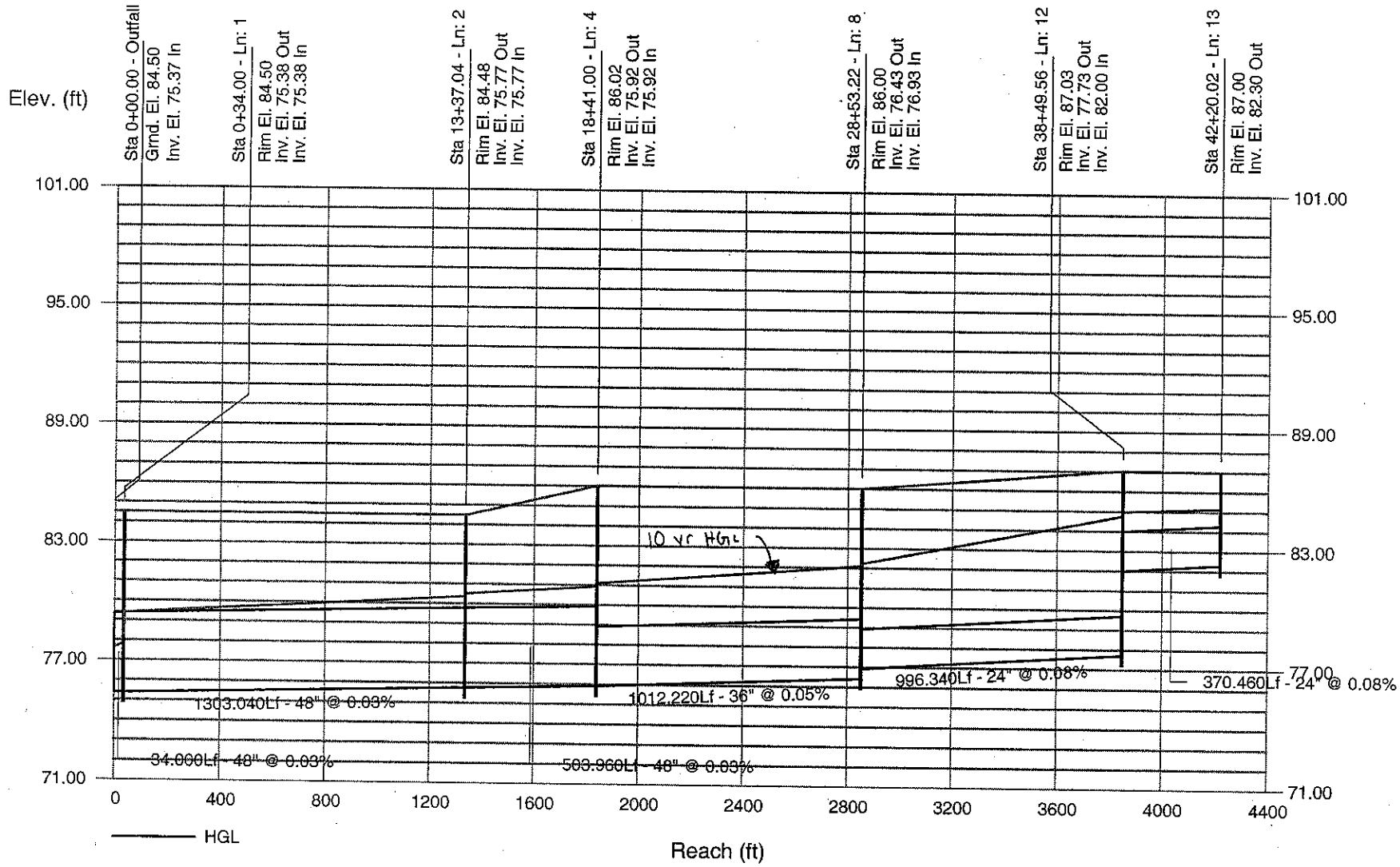
Station		Len	Drng Area		Rnoff coeff	Area x C		Tc		Rain (I)	Total flow	Cap full	Vel	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line		Incr	Total		Incr	Total	Inlet	Syst					Size	Slope	Dn	Up	Dn	Up	Dn	Up	
		(ft)	(ac)	(ac)	(C)			(min)	(min)	(in/hr)	(cfs)	(cfs)	(ft/s)	(in)	(%)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	
1	End	34.000	0.00	78.80	0.00	0.00	51.87	0.0	38.2	0.9	45.21	24.63	5.86	48	0.03	75.37	75.38	77.66	77.82	84.50	84.50	
2	1	303.040	0.00	63.23	0.00	0.00	39.88	0.0	31.0	1.0	39.19	24.85	3.12	48	0.03	75.38	75.77	79.38	80.35	84.50	84.48	
3	1	952.080	15.57	15.57	0.77	11.99	11.99	10.0	10.0	1.6	18.61	10.03	3.79	30	0.06	77.43	78.00	79.93	81.89	84.50	83.50	Area 2
4	2	503.960	0.00	63.23	0.00	0.00	39.88	0.0	28.2	1.0	41.21	24.78	3.28	48	0.03	75.77	75.92	80.50	80.92	84.48	86.02	
5	4	644.940	3.37	36.99	0.71	2.39	23.44	10.0	24.6	1.1	25.93	20.20	2.70	42	0.04	76.66	76.92	81.08	81.51	86.02	84.97	Area 10
6	5	651.230	0.00	4.26	0.00	0.00	2.56	0.0	12.6	1.4	3.70	3.49	2.09	18	0.11	78.26	78.98	81.62	82.43	84.97	85.00	
7	6	475.320	4.26	4.26	0.60	2.56	2.56	10.0	10.0	1.6	3.97	3.47	2.25	18	0.11	78.98	79.50	82.50	83.18	85.00	83.50	Area 27
8	4	1012.220	0.00	26.24	0.00	0.00	16.44	0.0	17.6	1.3	21.10	14.97	2.98	36	0.05	75.92	76.43	81.08	82.10	86.02	86.00	
9	8	661.340	0.00	13.30	0.00	0.00	8.68	0.0	12.0	1.5	12.77	10.09	2.60	30	0.06	78.98	79.38	82.23	82.88	86.00	85.90	
10	9	144.710	6.95	13.30	0.60	4.17	8.68	10.0	11.2	1.5	13.04	10.23	2.66	30	0.06	79.38	79.47	82.98	83.13	85.90	85.45	Area 6
11	10	218.110	6.35	6.35	0.71	4.51	4.51	10.0	10.0	1.6	7.00	6.31	2.23	24	0.08	79.97	80.14	83.14	83.35	85.45	84.40	Area 16
12	8	996.340	0.00	12.94	0.00	0.00	7.76	0.0	12.1	1.5	11.40	6.40	3.63	24	0.08	76.93	77.73	82.23	84.77	86.00	87.03	
13	12	370.460	5.73	5.73	0.60	3.44	3.44	10.0	10.0	1.6	5.34	6.44	1.70	24	0.08	82.00	82.30	84.97	85.18	87.03	87.00	Area 19
14	12	376.180	7.21	7.21	0.60	4.33	4.33	10.0	10.0	1.6	6.72	6.39	2.14	24	0.08	82.10	82.40	84.97	85.30	87.03	86.23	Area 18
15	5	1286.820	0.00	29.36	0.00	0.00	18.49	0.0	17.5	1.3	23.81	14.87	3.37	36	0.05	77.42	78.06	81.62	83.27	84.97	85.36	
16	15	75.590	9.00	29.36	0.63	5.67	18.49	10.0	17.0	1.3	24.04	17.15	3.40	36	0.07	78.06	78.11	83.44	83.54	85.36	85.36	Area 36
17	16	295.600	0.00	20.36	0.00	0.00	12.82	0.0	15.4	1.4	17.33	16.46	2.45	36	0.06	78.11	78.29	83.57	83.77	85.36	86.00	
18	17	610.000	14.31	14.31	0.60	8.59	8.59	10.0	10.0	1.6	13.33	15.03	1.89	36	0.05	78.29	78.60	83.86	84.10	86.00	84.60	Area 8
19	17	972.120	6.05	6.05	0.70	4.24	4.24	10.0	10.0	1.6	6.58	3.48	3.72	18	0.11	79.50	80.57	83.86	87.67	86.00	88.40	Area 35

Project File: JM Pike-17.stm | Number of lines: 19 | Run Date: 10-07-2009

NOTES: Intensity = 61.96 / (Inlet time + 27.10) ^ 1.02; Return period = 10 Yrs. ; c = cir e = ellip b = box

Storm Sewer Profile

Proj. file: Pike-17.stm



Storm Sewer Profile

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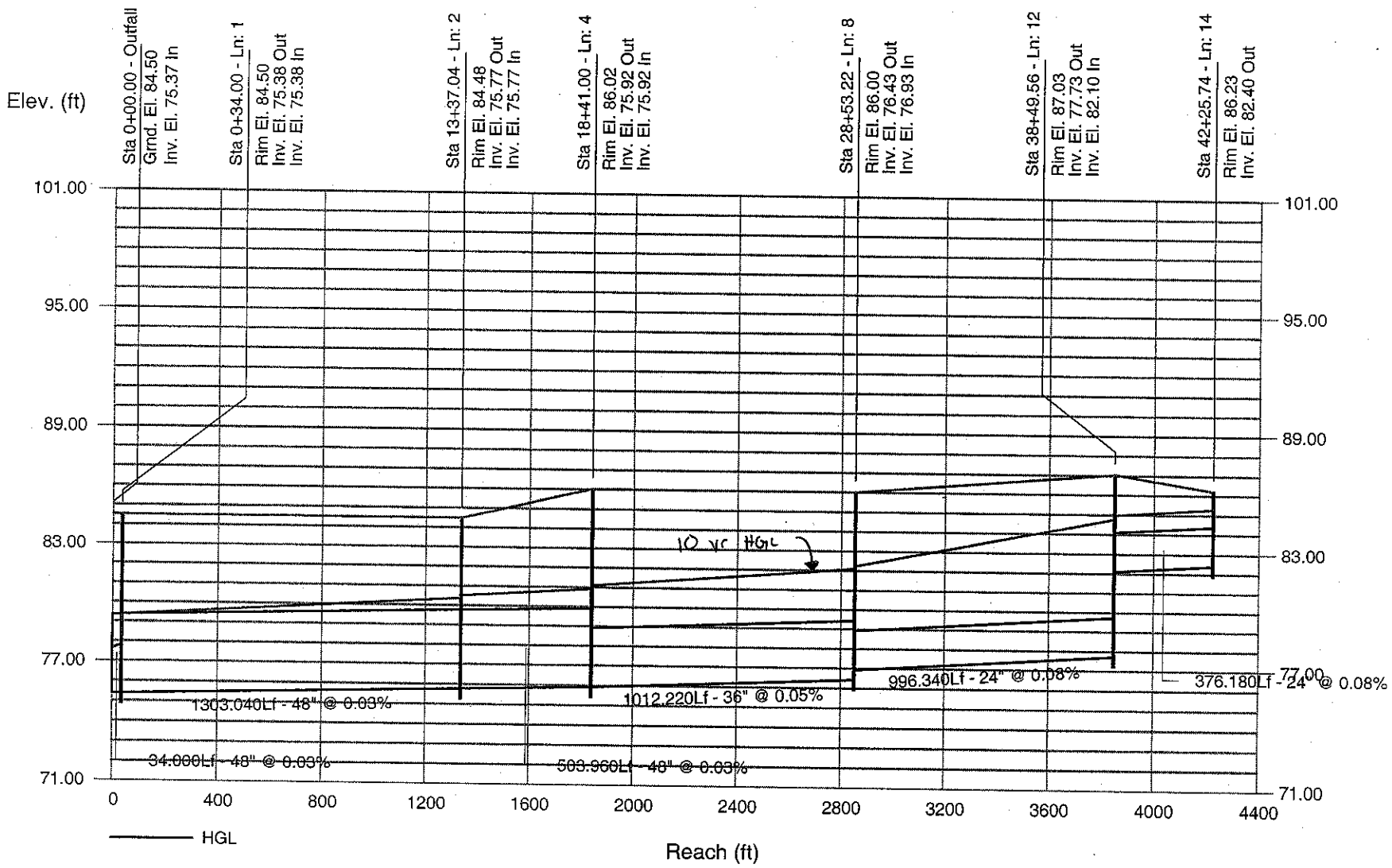

Storm Sewer Profile

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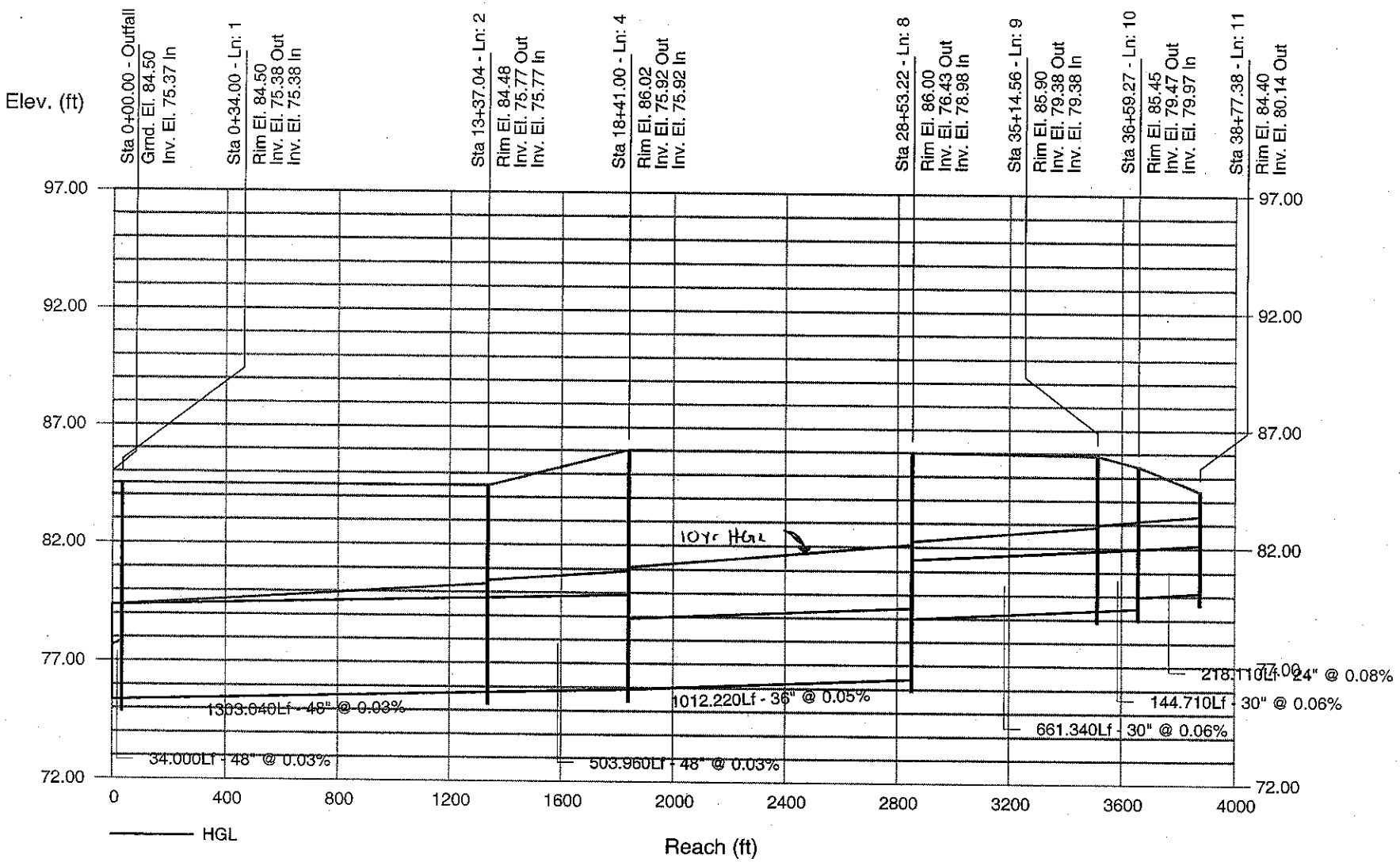
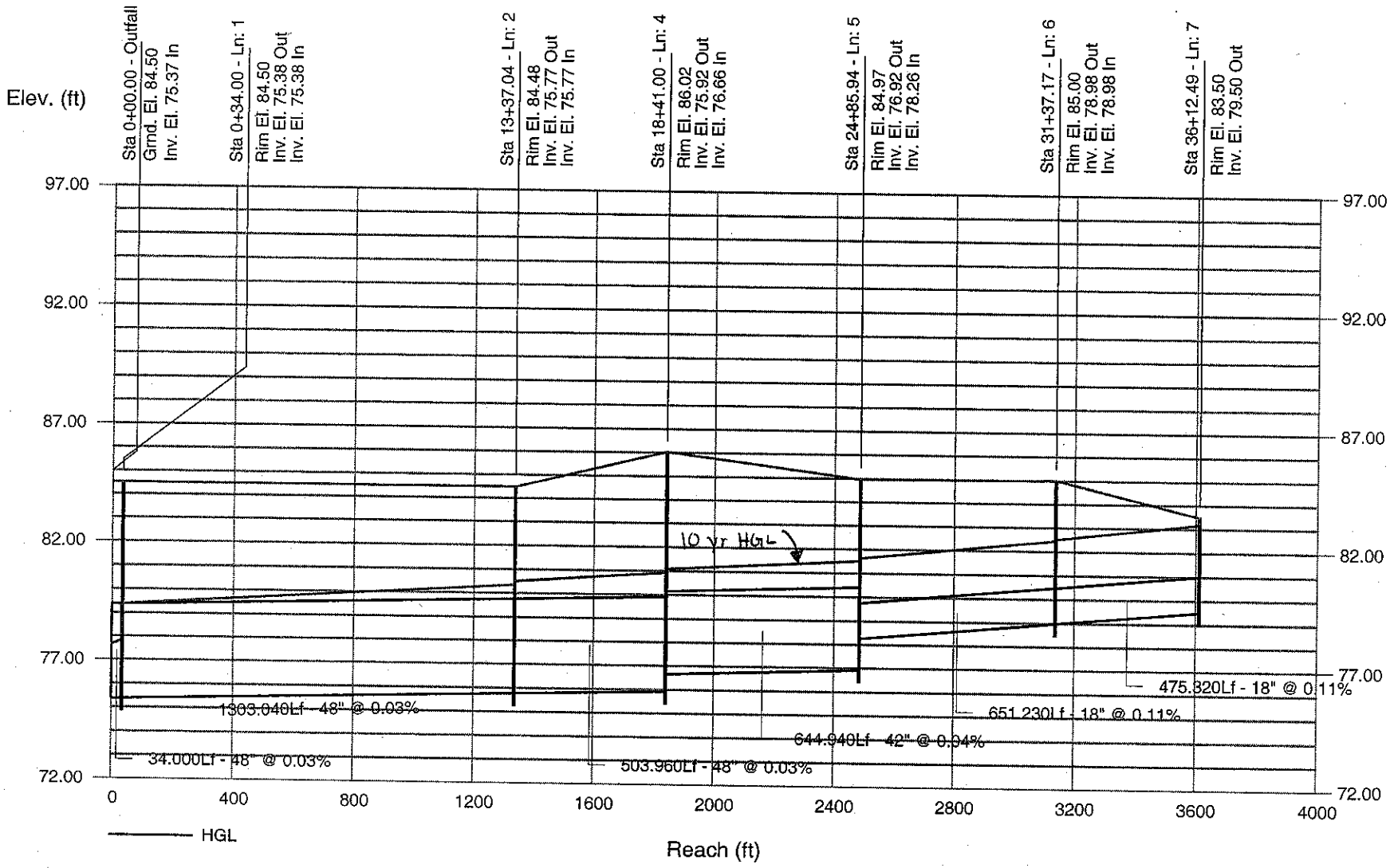


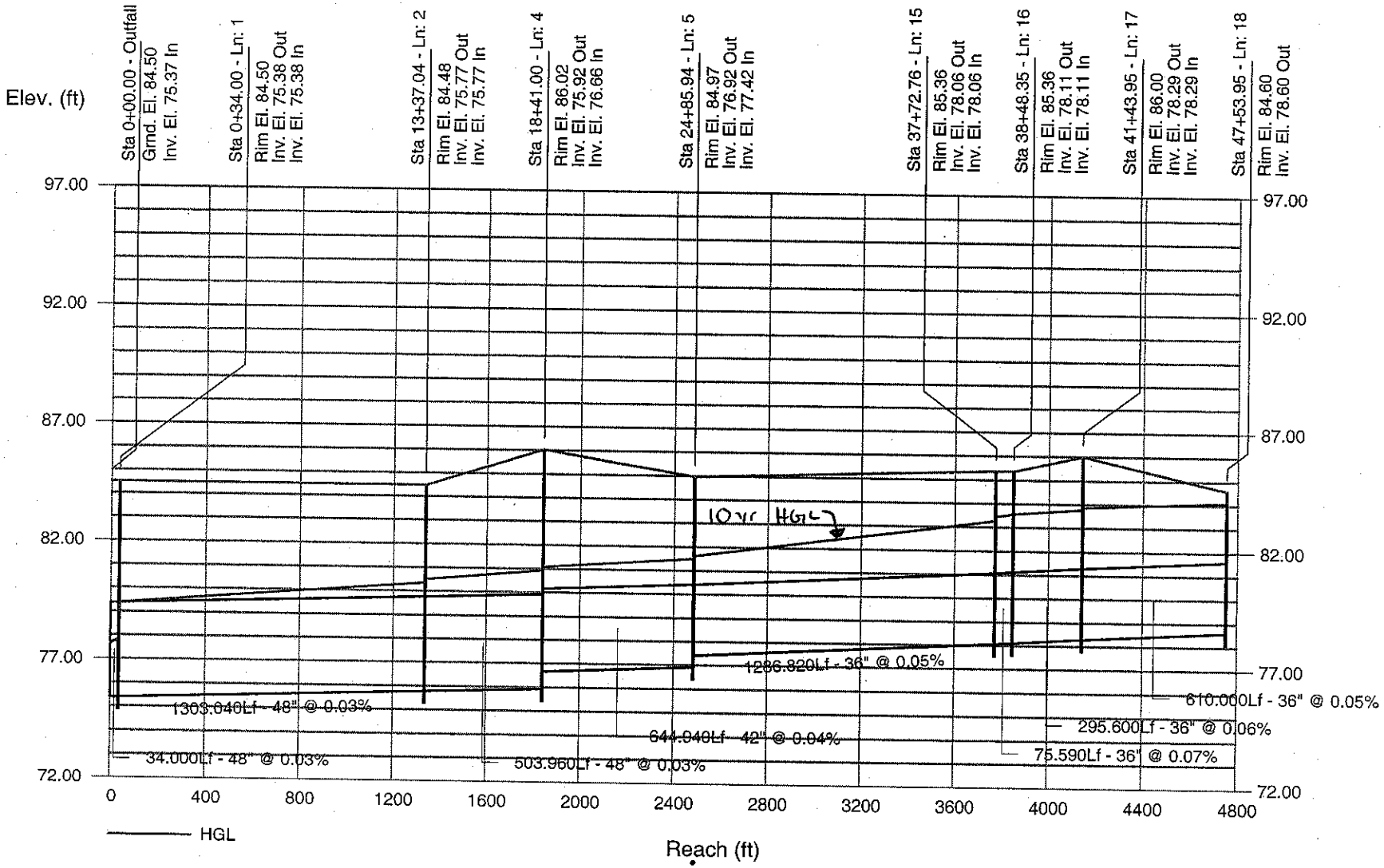
Storm Sewer Profile

Proj. file: Pike-17.stm



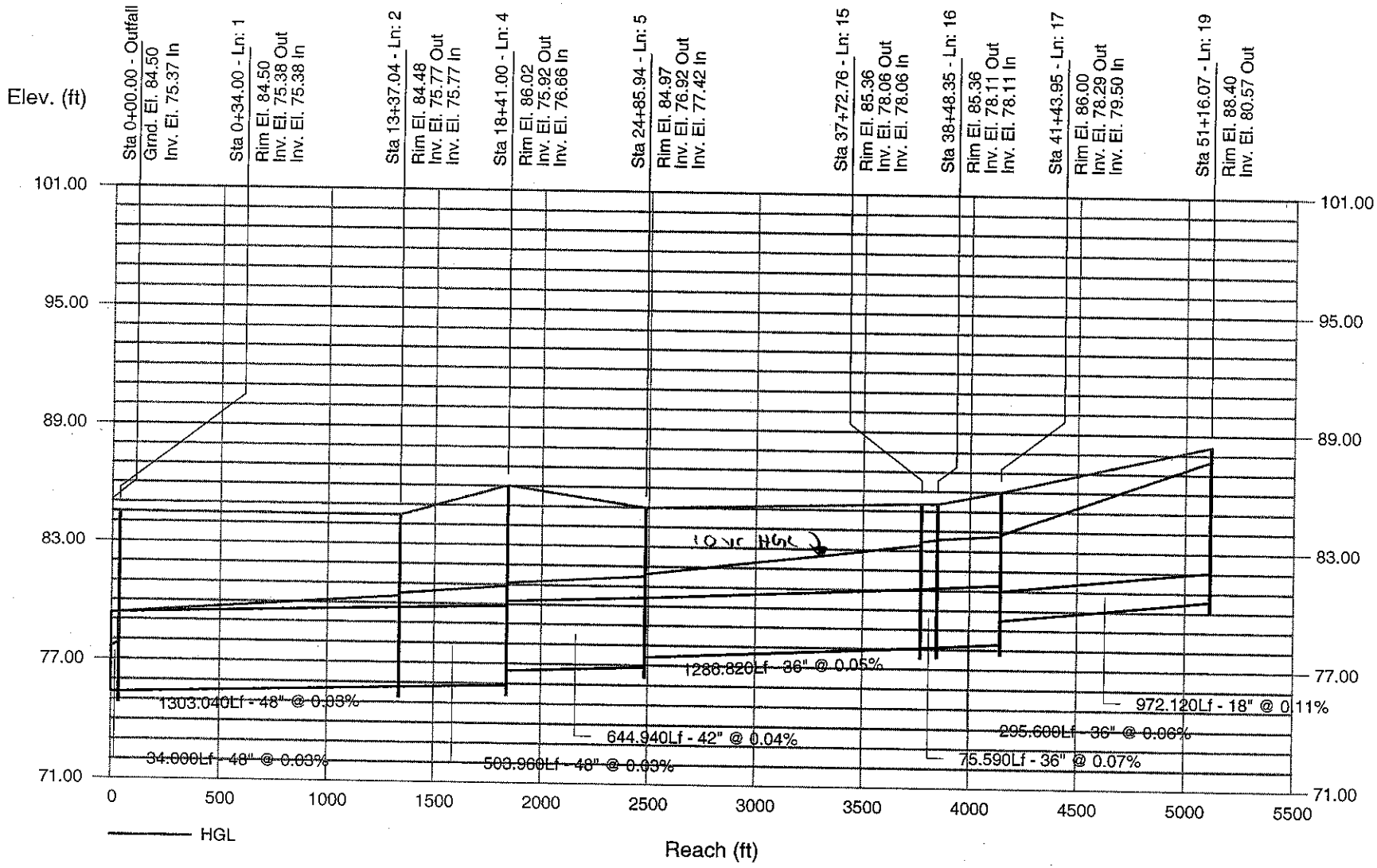
Storm Sewer Profile

Proj. file: Pike-17.stm



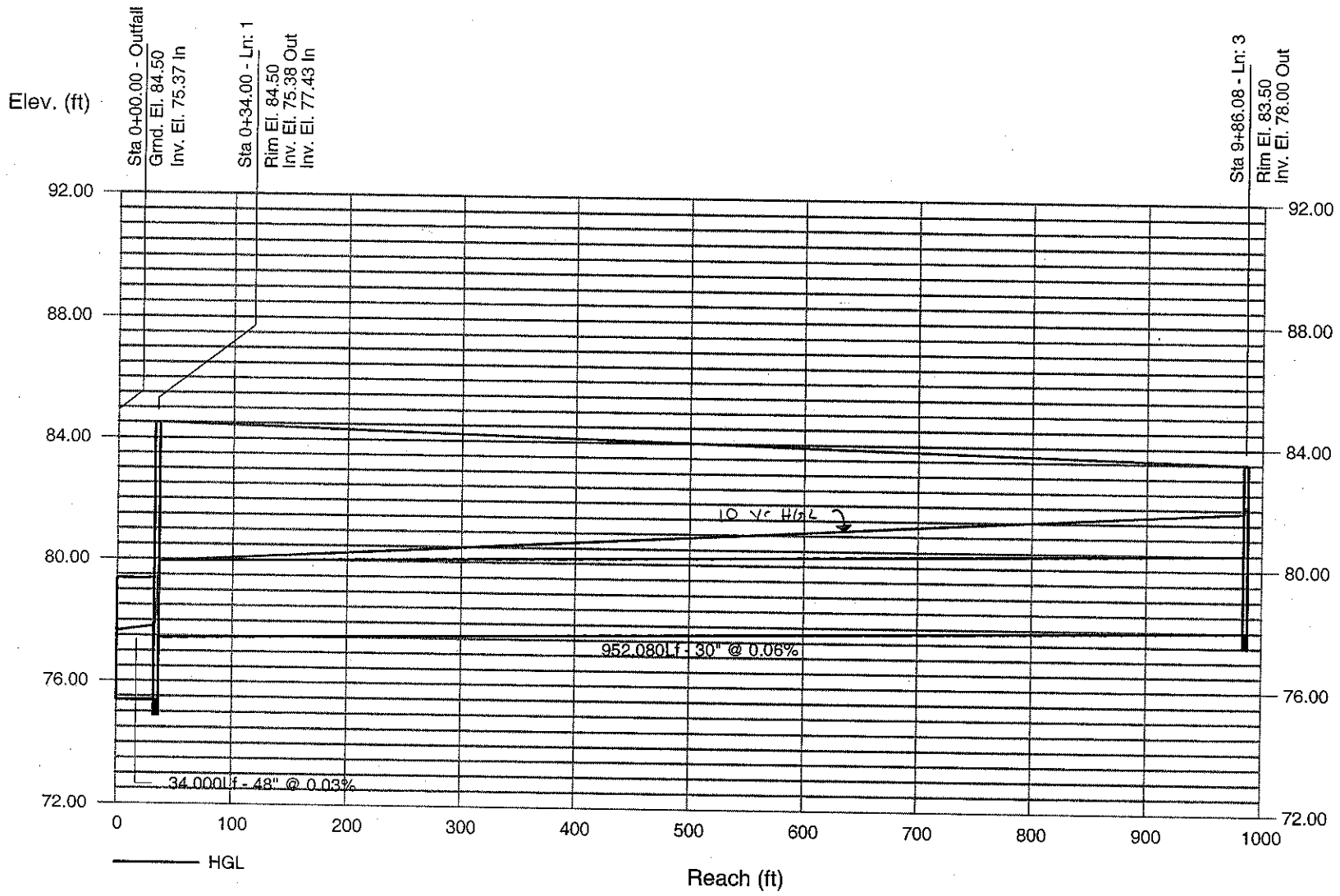
Storm Sewer Profile

Proj. file: Pike-17.stm

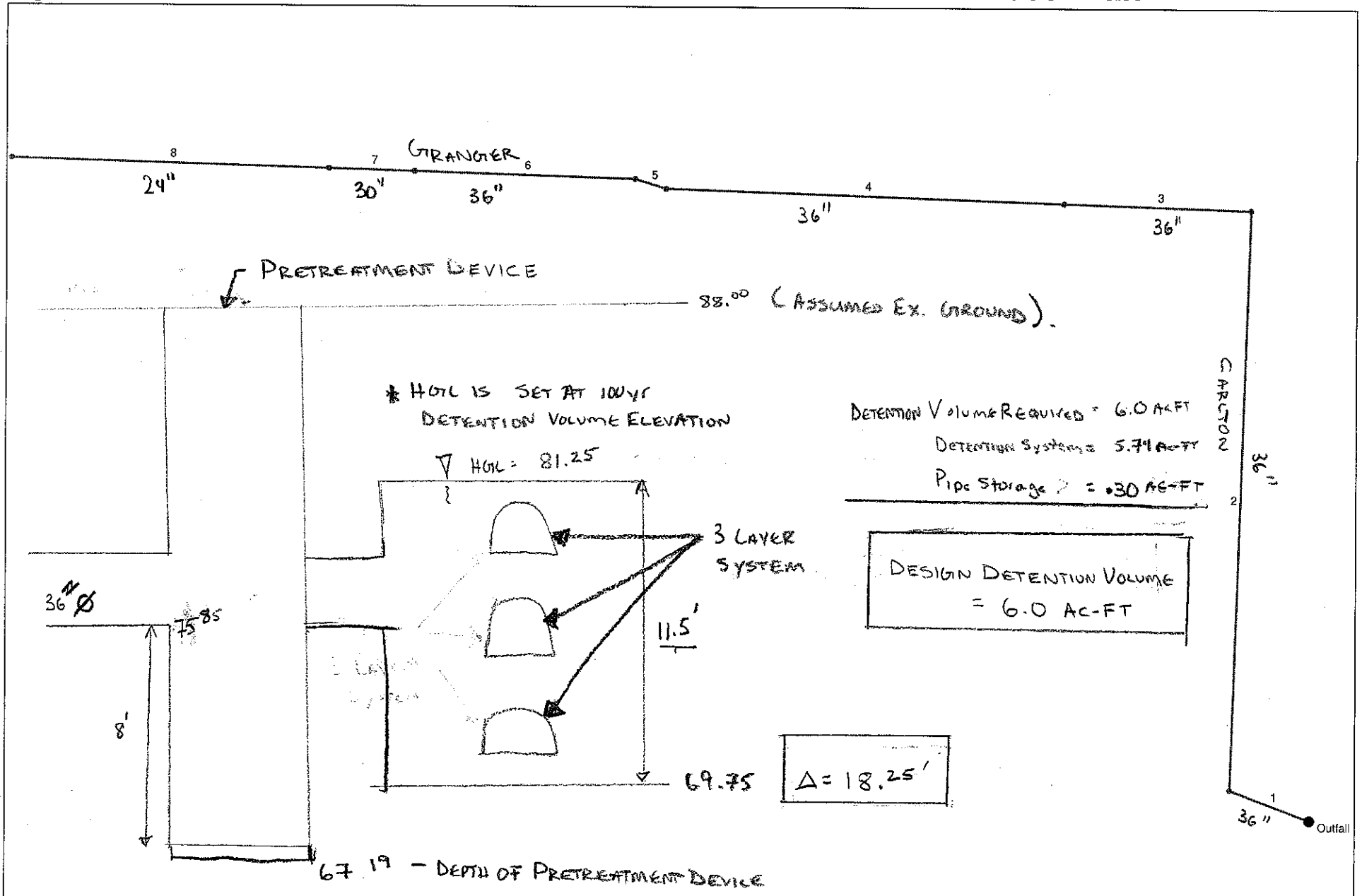


Storm Sewer Profile

Proj. file: Pike-17.stm



Hydraflow Storm Sewers Extension for AutoCAD® Civil 3D® 2009 Plan



Project File: Roosevelt Park-12.stm	Number of lines: 8	Date: 10-08-2009

Storm Sewer Tabulation

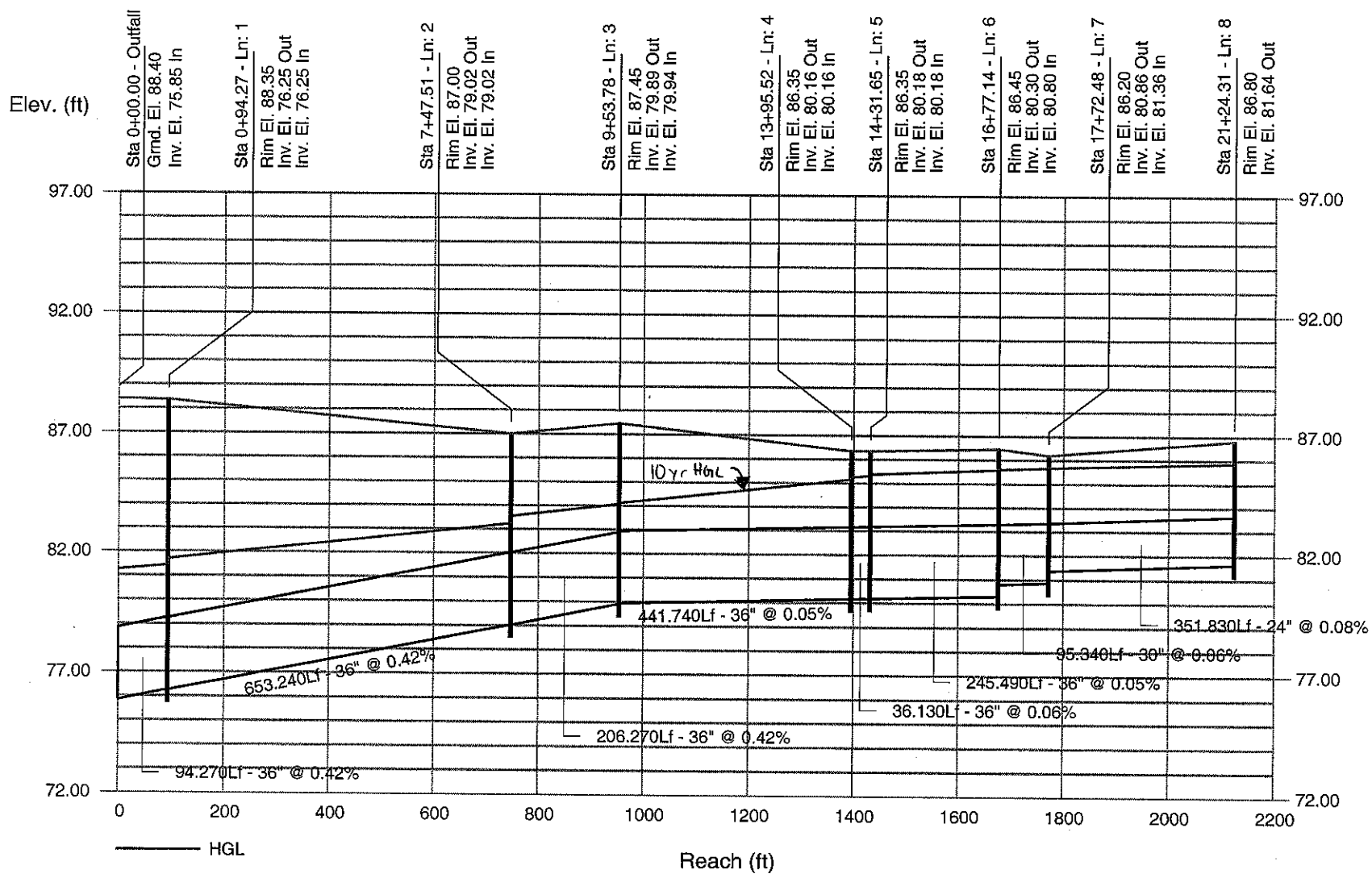
Station		Len	Drng Area		Rnoff coeff	Area x C		Tc		Rain (I)	Total flow	Cap full	Vel	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line	(ft)	Incr (ac)	Total (ac)	(C)	Incr	Total	Inlet (min)	Syst (min)	(in/hr)	(cfs)	(cfs)	(ft/s)	Size (in)	Slope (%)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	
1	End	94.270	0.00	41.96	0.00	0.00	25.18	0.0	21.3	1.2	29.81	43.44	4.22	36	0.42	75.85	76.25	81.25	81.44	88.40	88.35	
2	1	653.240	0.00	41.96	0.00	0.00	25.18	0.0	17.6	1.3	32.28	43.43	4.57	36	0.42	76.25	79.02	81.70	83.23	88.35	87.00	
3	2	206.270	3.59	41.96	0.60	2.15	25.18	10.0	16.5	1.3	33.15	43.29	4.69	36	0.42	79.02	79.89	83.56	84.07	87.00	87.45	Area 33
4	3	441.740	6.52	38.37	0.60	3.91	23.02	10.0	14.0	1.4	32.16	14.88	4.55	36	0.05	79.94	80.16	84.12	85.15	87.45	86.35	Area 34
5	4	36.130	9.87	31.85	0.60	5.92	19.11	10.0	13.8	1.4	26.83	15.69	3.80	36	0.06	80.16	80.18	85.25	85.30	86.35	86.35	Area 32
6	5	245.490	9.76	21.98	0.60	5.86	13.19	10.0	12.5	1.5	19.16	14.75	2.71	36	0.05	80.18	80.30	85.37	85.58	86.35	86.45	Area 37
7	6	95.340	6.55	12.22	0.60	3.93	7.33	10.0	12.0	1.5	10.80	10.29	2.20	30	0.06	80.80	80.86	85.59	85.66	86.45	86.20	Area 15
8	7	351.830	5.67	5.67	0.60	3.40	3.40	10.0	10.0	1.6	5.28	6.38	1.68	24	0.08	81.36	81.64	85.67	85.86	86.20	86.80	Area A

Project File: Roosevelt Park-12.stm | Number of lines: 8 | Run Date: 10-08-2009

NOTES: Intensity = 61.96 / (Inlet time + 27.10) ^ 1.02; Return period = 10 Yrs. ; c = cir e = ellip b = box

Storm Sewer Profile

Proj. file: Roose Park-12.stm



APPENDIX D

INITIAL STUDY CHECKLIST

Environmental Checklist Form

1. **Project title: Modesto Area II Storm Drainage Cross Connection Removal Project**

2. Lead agency name and address:
   City of Modesto
   Public Works Department
   PO Box 642
   Modesto, CA 95353

3. **Contact person and phone number:**
   David Felix, Engineer
   City of Modesto
   Public Works Department
   (209) 577-5488

4. Project location: **Modesto, CA**
   The project is generally bound by Rumble Road to the north, Prescott Road / 9th Street to the west, Coldwell Avenue to the South and the Virginia Corridor (former Union Pacific Railroad) to the east.

5. Project sponsor's name and address:
   City of Modesto
   Public Works Department
   PO Box 642
   Modesto, CA 95353

6. General plan designation:

7. Zoning: **N/A**

8. **Project Description:**

   The City of Modesto is proposing to remove twenty-one (21) stormwater to sewer cross-connections which drain an area of approximately 158 acres. The 21 cross-connections provide stormwater drainage for residents and businesses within the defined 158 acres area. These connections capture excess stormwater which then flows to the City's primary wastewater treatment facility. These storm drain/sanitary sewer connections reduce localized neighborhood flooding and they increase the volume of wet weather flows in the sanitary sewers and treatment plants. During storm events, these connections reduce capacity in the sanitary sewer collection system and wastewater treatment plants. The removal of these 21 cross connections will alleviate some of the wet weather flows experienced by the sanitary sewer system, thereby meeting the intent established by the City's 2007 Wastewater Master Plan to increase the City's sewer capacity.

The cross-connections removal project will eliminate over 35 million gallons of annual run-off that is currently treated at the City's wastewater treatment plant. The project proposes to remove pipes with various sizes that connect to the sewer system. These pipes will be replaced with approximately 24,000 feet of new storm drain lines within existing City road right-of-ways and property.

The City proposes to re-route the storm water runoff to four (4) existing neighborhood parks. The parks affected are Catherine Everett Park, Garrison Park, JM Pike, and Roosevelt Park. The stormwater will be channeled through underground pipes to an underground storage systems located within these parks. These storage systems will provide detention/retention of stormwater for a 100 year storm event Stormwater will be pre-treated to remove trash, sediment, oil, grease, and other substance prior to infiltration and eventual recharge of groundwater for retention systems. Any stormwater flows that are detained will be pumped into existing City of Modesto storm drains through force mains. Roosevelt and JM Pikes are the parks tentatively indicated as parks that will be a detention only facility.

Approximately 6 acres of park land will be affected by this proposed project. The areas affected include the removal of turf areas and irrigation systems. The placement of underground storage facilities may also require the removal of some play structures and trees. Upon completion of the underground detention/retention storage facilities, the parks will be rehabilitated with new turf and irrigation systems. Any play structures that are removed will be replaced. Any trees removed will be replaced on-site with a 1:1 mitigation ratio or another standard established by the city such as the heritage tree ordinance, whichever is greater. Replacement trees shall be consistent with the City's adopted Tree Master Planting List.

The 100-year storm drainage retention volume for Catherine Everett Park is 5.5 acre feet and Garrison Park is 5.0 acre feet. These calculations are based on a rainfall depth of 5.6 inches. The design percolation rate for Catherine Everett Park is 7.6 inches per house and Garrison Park is 4.5 inches per hour.

The 100 year storm design detention volume for Roosevelt Park is 6.0 acre feet and JM Pike Park is 1.4 acre feet. These figures are based on a rainfall depth of 2.88 inches. The design pumping rate to evacuate the detention basins in 48 hours is 1.5 cubic feet per second for Roosevelt Park and 3.1 cubic feet per second for JM Pike.

9. **Surrounding land uses and setting: Briefly describe the project's surroundings:**

Construction activities will take place in surrounding existing residential neighborhoods, parks and schools. The residential land uses are predominately single family residential uses with some duplex and medium density residential uses near some of the existing cross connection removal areas. There is a commercial and industrial area near cross connection #2 south of JM Pike Park.

10. **Other public agencies whose approval is required (e.g., permits, financing approval, or participation agreement.)**

City of Modesto Public Works-approval of permits for each project
City of Modesto Parks and Recreation Division-approval of site plans for park

construction/replacement of turf areas, trees, and any play structures due to removal; National Pollutant Discharge Elimination System (NPDES) permit(s).

ENVIRONMENTAL FACTORS POTENTIALLY AFFECTED:

The environmental factors checked below would be potentially affected by this project, involving at least one impact that is a "Potentially Significant Impact" as indicated by the checklist on the following pages.

☐ Aesthetics	☐ Agriculture Resources	■ Air Quality
☐ Biological Resources	☐ Cultural Resources	☐ Geology /Soils
☐ Hazards & Hazardous Materials	■ Hydrology / Water Quality	☐ Land Use / Planning
☐ Mineral Resources	☐ Noise	■ Population / Housing
☐ Public Services	☐ Recreation	☐ Transportation/Traffic
☐ Utilities / Service Systems	☐ Mandatory Findings of Significance	

DETERMINATION: (To be completed by the Lead Agency)

On the basis of this initial evaluation:

☐ I find that the proposed project COULD NOT have a significant effect on the environment, and a NEGATIVE DECLARATION will be prepared.

☐ I find that although the proposed project could have a significant effect on the environment, there will not be a significant effect in this case because revisions in the project have been made by or agreed to by the project proponent. A MITIGATED NEGATIVE DECLARATION will be prepared.

☐ I find that the proposed project MAY have a significant effect on the environment, and an ENVIRONMENTAL IMPACT REPORT is required.

☐ I find that the proposed project MAY have a "potentially significant impact" or "potentially significant unless mitigated" impact on the environment, but at least one effect 1) has been adequately analyzed in an earlier document pursuant to applicable legal standards, and 2) has been addressed by mitigation measures based on the earlier analysis as described on attached sheets. An ENVIRONMENTAL IMPACT REPORT is required, but it must analyze only the effects that remain to be addressed.

■ I find that although the proposed project could have a significant effect on the environment, because all potentially significant effects (a) have been analyzed adequately in an earlier EIR or NEGATIVE DECLARATION pursuant to applicable standards, and (b) have been avoided or mitigated pursuant to that earlier EIR or NEGATIVE DECLARATION, including revisions or mitigation measures that are imposed upon the proposed project, nothing further is required.

Signature	Date
Signature	Date

EVALUATION OF ENVIRONMENTAL IMPACTS:

1) A brief explanation is required for all answers except "No Impact" answers that are adequately supported by the information sources a lead agency cites in the parentheses following each question. A "No Impact" answer is adequately supported if the referenced information sources show that the impact simply does not apply to projects like the one involved (e.g., the project falls outside a fault rupture zone). A "No Impact" answer should be explained where it is based on project-specific factors as well as general standards (e.g., the project will not expose sensitive receptors to pollutants, based on a project-specific screening analysis).

2) All answers must take account of the whole action involved, including off-site as well as on-site, cumulative as well as project-level, indirect as well as direct, and construction as well as operational impacts.

3) Once the lead agency has determined that a particular physical impact may occur, then the checklist answers must indicate whether the impact is potentially significant, less than significant with mitigation, or less than significant. "Potentially Significant Impact" is appropriate if there is substantial evidence that an effect may be significant. If there are one or more "Potentially Significant Impact" entries when the determination is made, an EIR is required.

4) "Negative Declaration: Less Than Significant With Mitigation Incorporated" applies where the incorporation of mitigation measures has reduced an effect from "Potentially Significant Impact" to a "Less Than Significant Impact." The lead agency must describe the mitigation measures, and briefly explain how they reduce the effect to a less than significant level (mitigation measures from Section XVII, "Earlier Analyses," may be cross-referenced).

5) Earlier analyses may be used where, pursuant to the tiering, program EIR, or other CEQA process, an effect has been adequately analyzed in an earlier EIR or negative declaration. Section 15063(c)(3)(D). In this case, a brief discussion should identify the following:
   a) Earlier Analysis Used. Identify and state where they are available for review.
   b) Impacts Adequately Addressed. Identify which effects from the above checklist were within the scope of and adequately analyzed in an earlier document pursuant to applicable legal standards, and state whether such effects were addressed by mitigation measures based on the earlier analysis.
   c) Mitigation Measures. For effects that are "Less than Significant with Mitigation Measures Incorporated," describe the mitigation measures which were incorporated or refined from the earlier document and the extent to which they address site-specific conditions for the project.

6) Lead agencies are encouraged to incorporate into the checklist references to information sources for potential impacts (e.g., general plans, zoning ordinances). Reference to a previously prepared or outside document should, where appropriate, include a reference to the page or pages where the statement is substantiated.

7) Supporting Information Sources: A source list should be attached, and other sources used or individuals contacted should be cited in the discussion.

8) This is only a suggested form, and lead agencies are free to use different formats; however, lead agencies should normally address the questions from this checklist that are relevant to a project's

environmental effects in whatever format is selected.

9) The explanation of each issue should identify:
   a) the significance criteria or threshold, if any, used to evaluate each question; and
   b) the mitigation measure identified, if any, to reduce the impact to less than significance

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
I. AESTHETICS -- Would the project:				
a) Have a substantial adverse effect on a scenic vista?	❐	❐	❐	■
b) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?	❐	❐	❐	■
c) Substantially degrade the existing visual character or quality of the site and its surroundings?	❐	❐	■	❐
d) Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?	❐	❐	❐	■

Explanation:
a), b) This project is not located within a scenic vista or scenic highway.

c) Removal of cross-connections and the addition of new storm drainage pipelines would be underground. Any new pump station or other facilities will also be placed underground. The use of excavation equipment for construction purposes will be temporary and thus not constitute a significant visual impact.

d) No new above ground structures are proposed, thus no impacts will be generated.

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
II. AGRICULTURE RESOURCES: In determining whether impacts to agricultural resources are significant environmental effects, lead agencies may refer to the California Agricultural Land Evaluation and Site Assessment Model (1997) prepared by the California Dept. of Conservation as an optional model to use in assessing impacts on agriculture and farmland. Would the project:				
a) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?	❐	❐	❐	■
b) Conflict with existing zoning for agricultural use, or a Williamson Act contract?	❐	❐	❐	■
c) Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use?	❐	❐	❐	■

Explanation:
a), b), c) This project on or near agriculture resources. This project is located is considered an infill/utility project. No impacts to agriculture will be created.

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
III. AIR QUALITY -- Where available, the significance criteria established by the applicable air quality management or air pollution control district may be relied upon to make the following determinations. Would the project:				
a) Conflict with or obstruct implementation of the applicable air quality plan?	❐	❐	■	❐
b) Violate any air quality standard or contribute substantially to an existing or projected air quality violation?	■	❐	❐	❐
c) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)?	❐	❐	■	❐
d) Expose sensitive receptors to substantial pollutant concentrations?	❐	❐	❐	■
e) Create objectionable odors affecting a substantial number of people?	❐	❐	❐	■

Explanation:

a),b),c)

PM_{10} and $PM_{2.5}$ emissions are considered by the California Air Resources Board to be the greatest pollutant of concern associated with construction activities. The San Joaquin Valley Air Quality District's approach to CEQA analyses of construction impacts is to emphasize implementation of effective and comprehensive control measures rather than detailed quantification of emissions. The District recognizes that construction equipment emits carbon dioxide and ozone precursors; however, these emissions are accounted for in the PM10 Attainment Demonstration Plan and are not expected to impede attainment of the standard in the SJAVB. From the District's perspective, quantification of construction emissions is not necessary. The District has not developed pollution-specific quantitative threshold values for air emissions from construction activities. If all the PM10 control measures developed by the District are implemented, as appropriate, then the District considers air emissions from construction activities a less than significant impact (mitigation measures G.1. for construction plans for each group of building permits, City of Modesto Wastewater Master Plan Update). However, the City of Modesto considers any net increase in PM10 emissions a significant impact.

The Cross-Connection removal project shall follow the Mitigation Measures developed for the City of Modesto Wastewater Master Plan Air Quality Section, where applicable. Implementation of these mitigation measures would reduce the impacts of construction-related PM10 and impacts of ozone precursors from construction equipment exhaust to the extent possible, for a temporary amount of time. However, this would still result in a net increase in emissions. Therefore, the City's criterion regarding

a net increase in emissions, the impact would remain significant and unavoidable. With the certification of the City's Wastewater Master Plan Master EIR, and the adoption of a statement of overriding considerations regarding air quality, no additional action will be required.

d),e)
The project will not expose receptors to substantial pollutants concentrations nor will create objectionable odors affecting a substantial number of people. With the exception of temporary construction, all facilities will be placed underground and will not emit pollutants or odors.

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
IV. BIOLOGICAL RESOURCES -- Would the project:				
a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?	❐	❐	❐	■
b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the California Department of Fish and Game or US Fish and Wildlife Service?	❐	❐	❐	■
c) Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?	❐	❐	❐	■
d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?	❐	■	❐	❐
e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?	❐	■	❐	❐
f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?	❐	❐	❐	■

Explanation:

a),b),c)

No identified special status species, habitat, riparian areas or wetlands have been identified at or near the project sites, thus no impact.

d)

The cross-connection removal shall implement mitigation measures in E.3 identified in the 2007 Master EIR for the City's Wastewater Master Plan. Implementation ensures that create that are less than significant. Those mitigation measures covered the following:

Mitigation Measure E.3.1
Avoidance of nesting raptors. To the extent practicable, construction shall be scheduled to avoid the nesting season, which extends from January through August.

Mitigation Measure E.3.2
If it is not possible to schedule construction between August and January, then one of the following options shall be implemented:

- With approval of the CDFG, trees containing known or potential raptor nest sites may be removed to discourage future attempts on the condition that no raptor pair is currently utilizing the site; or

- Pre-construction surveys for nesting raptors would be disturbed during project implementation. A pre-construction survey shall be conducted prior to the initiation of demolition/construction activities during the early part of the breeding season (January through April) and prior to the initiation of these activities during the late part of the breeding season (May through August). During this survey, the qualified person shall inspect all trees in and immediately adjacent to the impact areas for raptor nests. If an active raptor nest is found close enough to the construction area to be disturbed by these activities, the ornithologist, in consultation with CDFG, shall be determine the extent of a construction-free buffer zone to be established around the nest.

e)
The City of Modesto currently in the process of adopting a heritage tree ordinance. If construction activities occur after adoption of the ordinance, than the City shall follow the provisions contained in that ordinance regarding existing tree removal. The trees that are removed will be replaced at ratio consistent with City Standards or at a 1:1 ratio, whichever is greater. New trees will be planted on-site consistent with the City's master tree planting list. This impact is considered less than significant with incorporated mitigation.

f)
There are no known habitat conservation plans or similar plan that has been adopted for parcels affected by this project.

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
V. CULTURAL RESOURCES -- Would the project:				
a) Cause a substantial adverse change in the significance of a historical resource as defined in '15064.5?	❐	❐	❐	■
b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to '15064.5?	❐	❐	■	■
c) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?	❐	❐	❐	■
d) Disturb any human remains, including those interred outside of formal cemeteries?	❐	❐	■	❐

Explanation:

a), c)

There are no known significant historical resource(s) within the project area. In addition, there are no known paleontological resources or unique geological feature within the project site. There will be no impact to either of these resources.

b,d)

The project is outside the City's archaeological resource study area. In the event of an accidental discovery of archaeological resources during construction, the City's General Plan Section VII.F.2.f shall apply to the project. Policy Section VII.F.2.f states:

"For all proposed development within an archaeological resource study area a combination of archival research, particularly through the Central California Information Center at Turlock, and preliminary surface field reconnaissance as well as consultations with the Native American Heritage Commission (NAHC) and those individuals and organizations identified by the NAHC shall be employed to identify any areas that may have been used by Native Americans. Areas containing prehistoric deposits shall be recorded and mapped. Only in those areas where proposed development might affect the resources will an evaluation of their significance be necessary (Modesto General Plan)"

Compliance with Section VIIF.2.f of the General Plan would ensure that the project impact to any related archaeological resources would be less than significant.

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
VI. GEOLOGY AND SOILS -- Would the project:				
a) Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:				
i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.	❐	❐	❐	■
ii) Strong seismic ground shaking?	❐	❐	■	❐
iii) Seismic-related ground failure, including liquefaction?	❐	❐	❐	■
iv) Landslides?	❐	❐	❐	■
b) Result in substantial soil erosion or the loss of topsoil?	❐	❐	■	❐
c) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?	❐	❐	■	❐
d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property?	❐	❐	❐	■
e) Have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water?	❐	❐	❐	■

Explanation:

ai)

The project is not located in an known fault zone, thus there is no impact.

aiii), aiv)

No structures are proposed. The project site is not conducive to landslides due the generally level Modesto Area with a regional slope of approximately 0.1 percent. The only active fault is the Telsa-

Ortigalita Fault, located approximately 20 miles southwest of Modesto. The project site is located an area with the maximum intensity MMS level if VII. Since there will be no structures constructed, there is no impact.

a), aii),b),c)
The impact of geology and seismicity on the project were deemed less than significant and no mitigation measures would be necessary based on the adopted 2007 Wastewater Master Plan Master EIR. The statement included the following:

The project facilities would not be subject to landslides, erosion, expansive soils or subsidence. The project would not contribute to any seismic activity nor be subject to landslides induced by seismic activity. Liquefaction induced by seismic activity would be prevented by incorporating site-specific geological data in design of structures, to which this project proposes none. Therefore, the impact of geology and seismicity on the proposed project would be less than significant and no mitigation measures would be necessary.

d)
The project and underground pipes are located on low risk expansive and subsidence soils. (insert soil type) is not classified as expansion, thus no impact.

e)
This project does not involve the use of septic tanks or other waste water disposal systems. No impact.

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
VII. HAZARDS AND HAZARDOUS MATERIALS B Would the project:				
a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?	❒	❒	❒	■
b) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?	❒	■	❒	❒
c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?	❒	❒	❒	■
d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?	❒	❒	❒	■
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard for people residing or working in the project area?	❒	❒	❒	■
f) For a project within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area?	❒	❒	❒	■
g) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?	❒	❒	❒	■
h) Expose people or structures to a significant risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?	❒	❒	❒	■

Explanation:

a)

This project will not create a significant hazard
transport, use, or disposal of hazardous materia

b)
Consistent with the City's adopted Wastewater Master Plan Master EIR, mitigation measures K.1.a-K.1.f, where applicable, shall be followed to reduce the excavation for installation of improvements that could encounter contaminated soil and/or groundwater exposure to workers and the public to hazardous substances to a less than significant threshold. Those policies are listed below.

Mitigation Measure K.1a
Prior to activities involving soil disturbance for the improvements to the wastewater collection and treatment systems, the City shall use reasonable means to determine the presence of soil or groundwater contamination. Those reasonable means may consist of soil gas surveys, soil or groundwater sampling, and/or Phase I environmental Site Assessment conducted by a qualified professional (e.g. a California-registered environmental assessor, Professional Geologist, or Professional Engineer). Any Phase I environmental site assessment shall be performed in conformance with the most recent standard adopted by ASTM Internal for Phase I site assessments, and shall present recommendations for further investigation of the site, if necessary.

Mitigation Measure K.1b
If warranted, conduct soil and groundwater sampling and analysis. If the investigation activities in Mitigation Measure K.1a were to indicate that a release of hazardous materials could have affected the location(s) where soil disturbance would occur, a Soil and/or Groundwater Investigation shall be conducted prior to soil disturbance by a qualified environmental professional to asses the presence and extent of contamination at the site and the potential risk to human health and public safety from the contamination (if any). The soil and/or groundwater investigation shall be conducted in accordance with state and local guidelines and regulation, and the most recent ASTM International Standard for Phase II Environmental Site Assessments, with oversight from a regulatory agency (Stanislaus County Environmental Resources Department). The findings of the investigation shall be documented in a written report and submitted to the regulatory agency and the City.

Mitigation Measure K.1c
If warranted, prepare a site remediation plan and health and safety plan. If the results of the subsurface investigation(s) indicate the presence of hazardous materials, the Stanislaus County Department of Environmental Resources shall be notified and site remediation may be required by the applicable state or regulatory agency or the County Department of Environmental Resources Site Mitigation Unit, Specific remedies would depend on the extent and magnitude of contamination and the requirements of the regulatory agencies. Under the direction of the regulatory agencies and the City, a Site Remediation Plan shall be prepared, as required, by the contractor(s). The Plan shall; 1) specific measures to be taken to protect workers and the public form exposure to the potential site hazards, and 2) certify that the proposed remediation measures would clean up the waste, dispose the wastes, and protect public health in accordance with federal, state and local requirements.

Mitigation Measure K.1.d
Where any activity would be performed at a contaminated site or where hazardous materials are suspected, the City's contractor shall prepare a project-specific Health and Safety Plan prior to any site work. The Health and Safety Plan shall be prepared by the contractor(s) filled with the City and

regulatory agencies (as required). The Plan shall include required worker health and safety provisions for all workers potentially exposed to contraindicated materials at the site, identification of hazardous materials present, monitoring to be performed during the site activities (as appropriate), required training for workers, identification of appropriate personal protective equipment and emergency response procedures, and designation of personnel responsible for Plan implementation.

Mitigation Measure K.1.e
Prepare a waste disposal and hazardous materials transportation plan. The contractor(s) shall prepare a waste disposal and hazardous materials transportation plan prior to construction activities where hazardous wastes or materials requiring off-site disposal would be generated. The plan shall include a description of analytical methods for characterizing wastes and handling methods required to minimize the potential for exposure, and shall establish procedures for the safe storage of contaminated materials, stockpiling of soils, and storage of dewatered groundwater (as appropriate). The required disposal method for contaminated materials (including any lead-based paint, asbestos, or other hazardous materials requiring disposal) and the approved disposal site shall be indicated in the plan. The Plan shall also identify specific routes to bused for transport of hazardous materials and waste to and from the project site, or specific routes to be avoided during transport. Routes shall be selected to minimize proximity to sensitive receptors to the greatest practical degree. Elements of the Plan regarding transportation of hazardous materials wad wastes shall be reviewed and approved by the City Fire Department.

Mitigation Measure K.1.f
In the event that previously unidentified contamination is encountered (e.g. identified by odor or visual staining) during soul disturbance activities or any underground storage tanks, abandoned drums, or other hazardous materials or wastes are encountered during construction, the contractor(s) shall have prepared a contingency plan for sampling and analysis of potentially hazardous substances and coordination with appropriate regulatory agencies. The plan shall be submitted to the City prior to project activities involving soil disturbances. Any site investigations or remedial activities shall be performed in accordance with applicable laws under the direction of a regulatory agency and the City, in accordance with Mitigation Measures K.1.c through K.1.e above.

c)
This project will not emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school. No impact.

d)
The project is not located on any sites included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5. No impact.

e), f)
This project is not located near an airfield, thus no impact.

g)
The cross connection removal project will not affect an emergency response plan or emergency evacuation plan. Improvements are planned for residential streets with multiple neighborhood

connections. No impact.

h)
The project is an infill project with no structures being proposed. The project sites are not located near wildland areas. No impact.

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
VIII. HYDROLOGY AND WATER QUALITY -- Would the project:				
a) Violate any water quality standards or waste discharge requirements?	■	❒	❒	❒
b) Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?	❒	❒	❒	■
c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site?	❒	❒	❒	■
d) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site?	❒	❒	❒	■
e) Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?	❒	❒	■	❒
f) Otherwise substantially degrade water quality?	❒	❒	■	❒
g) Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?	❒	❒	❒	■
h) Place within a 100-year flood hazard area structures which would impede or redirect flood flows?	❒	❒	❒	■
i) Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam?	❒	❒	❒	■

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
j) Inundation by seiche, tsunami, or mudflow?	❒	❒	❒	■

Explanation:

a) With the certification of the City's Wastewater Master Plan Master EIR, and the adoption of a statement of overriding considerations regarding water quality, no additional action will be required. However, the City is still required to follow NPDES permit standards set forth through this permit for discharges into waters of the US. The City currently has additional capacity that allows for additional discharges and shall follow the rules and regulations regarding discharges.

b)
The cross connection removal project will not have any impact on withdrawing from local aquifers. This project proposed will recharge groundwater via the systems that provide retention for stormwater runoff after pre-treatment. Detention systems will carry stormwater runoff to other areas of the City for disposal via the City existing storm drainage system. No impact.

c)
The project will not substantially alter the existing drainage pattern. This project will help alleviate local flooding in the project area where cross-connections will be removed. No natural water course will be affected by the project. No impact.

e),f)
Consistent with the City's adopted Wastewater Master Plan Master EIR, mitigation measures D.1-D.4 shall be followed to reduce the impacts of water runoff and water quality to a less than significant threshold. Those measures include the following:

Mitigation Measure D.1.
The City shall prepare a SWPPP designed to reduce potential impacts to surface water quality through the construction period of all the project components. The SWPPP shall emphasize measures designed to minimize erosion and off-site sedimentation during improvements to the collection system installation. If is not requires that the SWPPP be submitted to the RWCQB, but must be maintained on-site and made available to the RWCQB staff upon request. The SWPPP shall include:

Specific and detailed BMPs designed to mitigate construction-related pollutants. At a minimum, BMPs shall include practices to minimize the contact of construction materials, equipment, maintenance supplies with stormwater. The SWPPP shall specify properly design, centralized storage areas that keep these materials out of the rain.

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
IX. LAND USE AND PLANNING - Would the project:				
a) Physically divide an established community?	❐	❐	❐	■
b) Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?	❐	❐	❐	■
c) Conflict with any applicable habitat conservation plan or natural community conservation plan?	❐	❐	❐	■

Explanation:

a) The cross connection does not include any structures that will physically divide an existing community. No Impact.

b) The cross-connection removal project does not propose any above ground facilities and new facilities would be located underground, therefore would not cause any long-term changes in existing land uses.

c)
The proposed project is not in an adopted habitat conservation planning area nor natural community conversation planning area. No impact.

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
X. MINERAL RESOURCES -- Would the project:				
a) Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?	❐	❐	❐	■
b) Result in the loss of availability of a locally-important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan?	❐	❐	❐	■

Explanation:

a),b)
There are no known mineral resources within the cross-connection removal project area. No impact.

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
XI. NOISE--Would the project result in:				
a) Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?	❐	❐	■	❐
b) Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?	❐	■	❐	❐
c) A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?	❐	❐	■	❐
d) A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?	❐	■	❐	❐
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?	❐	❐	❐	■
f) For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?	❐	❐	❐	■

Explanation:

a), b), c),d)
Consistent with the City's adopted Wastewater Master Plan Master EIR, mitigation measure H.1 shall be followed to reduce the impacts of temporary noise due to construction activities to a less than significant threshold.

Mitigation Measure H.1
In areas where there are sensitive receptors, the City shall ensure that contractors implement the following practices:

- To the extent feasible, construction activities shall be restricted to the hours between 7:00am and 9:00 pm, Monday through Friday, and between 9:00am and 9:00pm, Saturday and Sunday and state or federal holidays; minor construction equipment servicing and maintenance shall be excepted from this restriction.

- Construction equipment and vehicles should be equipped with mufflers, and impact tools

should be equipped with shrouds or shields.

- Stationary noise sources and construction staging areas shall be located as far as possible from existing residences, hospitals, schools, churches, and parks (preferably at least 200 feet), or contractors shall be required to provide additional noise-reducing engine enclosures (with the goal of achieving approximately 10 dBA of reduction compared to uncontrolled engines).

- Construction vehicle access routes shall be designed to minimize the impact on sensitive land uses such as schools and residential areas.

e), f)
The project is not located within an airport land use plan, near a private airfield, or is not within 2 miles of a public airport. No impact.

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
XII. POPULATION AND HOUSING -- Would the project:				
a) Induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?	■	❒	❒	❒
b) Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?	❒	❒	❒	■
c) Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?	❒	❒	❒	■

Explanation:

a)
The project is consistent and an identified project in the 2007 Wastewater Master Plan Master EIR. This project will not result in additional significant impacts related to growth that were not already identified in the City of Modesto's Final Master EIR and adopted statement of overriding considerations.

b),c)
No displacement of existing housing or replacement of housing is proposed by this project. No impact.

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
XIII. PUBLIC SERVICES				
a) Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services:				
Fire protection?	❐	❐	❐	■
Police protection?	❐	❐	❐	■
Schools?	❐	❐	❐	■
Parks?	❐	❐	■	❐
Other public facilities?	❐	❐	❐	■

Explanation:

a)

Four neighborhood parks will be affected in the cross-connection removal project. These parks will either be partially closed or entirely closed for a temporary duration of time to allow for construction of the underground detention/retention storage facilities. Any affected facilities such as turf areas, play structures, etc. that is removed during construction will be moved to a temporary location on-site and be placed back to its original location or other suitable location as determined by the Parks and Recreation Department upon completion of construction of the detention/retention system. Turf areas will be replaced with new turf and vegetation as well. With the replacement of turf areas and any play structures and the closures of parks temporary in nature, this impact is deemed less than significant.

This project will otherwise not affect fire and police protection, schools, or other public facilities. Thus, no impact.

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
XIV. RECREATION --				
a) Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?	❐	❐	■	❐
b) Does the project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?	❐	❐	❐	■

Explanation:

a)

The proposed cross-connection removal project will affect four neighborhood parks that are identified in the project description. These parks will have portions of them excavated to install an underground detention/retention storm drainage system. This excavation will include removal of turf areas and other landscaping, irrigation system and potentially play structures, if warranted. These passive recreation areas are primarily used by neighborhood residents for local recreation opportunities. Upon completion the underground stormwater retention/detention system, new turf, irrigation, landscaping will be constructed restoring parks to their original condition. Any play structures that are removed will be relocated to a temporary, on-site location. Upon completion of the project, any affected play structure will be placed back at its original location, or a location suitable to the City's Parks and Recreation Department that provides for safe play area. The installation of new turf and irrigation systems will extend the life of the affected park facilities. Any affected play structure would be replaced with new, more modern play structures that meet current safety standards established by the City and various other regulatory agencies. Because the closure of these parks is temporary, and any affected portion of these parks will be replaced, this impact is deemed less than significant.

b) No expansion or additional facilities are proposed as a part of this project. No impact.

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
XV. TRANSPORTATION/TRAFFIC -- Would the project:				
a) Cause an increase in traffic which is substantial in relation to the existing traffic load and capacity of the street system (i.e., result in a substantial increase in either the number of vehicle trips, the volume to capacity ratio on roads, or congestion at intersections)?	❒	❒	❒	■
b) Exceed, either individually or cumulatively, a level of service standard established by the county congestion management agency for designated roads or highways?	❒	❒	❒	■
c) Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?	❒	❒	■	❒
d) Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?	❒	❒	❒	■
e) Result in inadequate emergency access?	❒	❒	❒	■
f) Result in inadequate parking capacity?	❒	❒	■	❒
g) Conflict with adopted policies, plans, or programs supporting alternative transportation (e.g., bus turnouts, bicycle racks)?	❒	❒	❒	■

Explanation:

a),b)
This project will not cause an increase in traffic that is substantial in relation to the existing traffic load and capacity. No impact.

c), f)
The proposed cross-connection removal project will have a temporary effect on traffic due to temporary lane closures and limiting the amount of on-street parking within neighborhoods during construction periods. The 2007 Wastewater Master Plan Master EIR identified the City's standard conditions for construction activities in roadways as a way to reduce these impacts to less than significant levels. This project will follow these standard conditions, thus these impacts would be less than significant.

d)
There will be no substantial design feature that affects the existing roadway network. No impact.

e)
This project does not propose structures nor effect emergency access to neighborhoods. No impact.

f)
No additional parking is proposed for this project. This project affects underground utilities. No impact.

g)
This project does not conflict with adopted policies, plans or programs for supporting alternative transportation. No impact.

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
XVI. UTILITIES AND SERVICE SYSTEMS B Would the project:				
a) Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?	❒	❒	❒	■
b) Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	❒	❒	■	❒
c) Require or result in the construction of new storm water drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	❒	❒	■	❒
d) Have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed?	❒	❒	❒	■
e) Result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project=s projected demand in addition to the provider=s existing commitments?	❒	❒	❒	■
f) Be served by a landfill with sufficient permitted capacity to accommodate the project=s solid waste disposal needs?	❒	❒	❒	■
g) Comply with federal, state, and local statutes and regulations related to solid waste?	❒	❒	❒	■

Explanation:

a) The cross-connections removal project will not provide any additional wastewater to existing facilities. It will alleviate existing conditions at facilities. No impact.

b)
The cross-connection removal project will improve the capability of the wastewater treatment plant by removing some of the stormwater flow that currently enters the plant during storm events. This would thereby increase capacity of the wastewater treatment plant and may be a growth inducing impact. This project will not result in additional significant impacts related to growth that were not already identified in the City of Modesto's Final Master EIR and adopted statement of overriding considerations.

c)
The proposed cross-connect removal project will construct new stormwater drainage facilities to accommodate existing stormwater flow from existing neighborhoods and remove its connection with the City's sewer system. The construction of the facilities involves the installation of underground pipes connecting to a detention/retention system below four neighborhood parks. This system will filter out trash, sediment, oil, grease, and other substances prior to any infiltration into ground water on systems that are designed that are retention. Detention systems will also filter out sediments prior to being pumped to the City storm drainage system. This stormwater flow will eventually discharge in the San Joaquin River consistent with the approved NPDES permit obtained by the City of Modesto.

d),e),f),g)
No additional water, wastewater, or solid waste will be generated by this project. No impact.

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
XVII. MANDATORY FINDINGS OF SIGNIFICANCE --				
a) Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?	❐	❐	❐	■
b) Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects)?	■	❐	❐	❐
c) Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?	❐	❐	❐	■

Explanation:

a)

The cross-connection removal project will not degrade or have the potential to degrade habitat, history or pre-history of California, fish and wildlife levels, etc. This project will improve the capability to handle neighborhood flooding, and free up capacity in the City's sewer system. No Impact.

b)

The cross-connection removal project identified in the city's 2007 Wastewater Master Plan is just one of many improvement projects to the City's wastewater treatment system to implement the City's adopted General Plan. The cumulative effects of the General Plan have been examined in the City's Final Master EIR. The City determined that the benefits of growth outweighed the significant environmental effects of and adopted a statement of overriding considerations. This project would not result in any additional significant impacts related to cumulative effects on growth, air quality, hydrology and water that we not identified in the City's Final Master EIR or the Final 2007 Wastewater Master Plan.

c)

The cross-connection removal project will have no substantial adverse effects on human beings either directly or indirectly. No impact.

APPENDIX E

GEOTECHNICAL REPORT

PRELIMINARY GEOTECHNICAL REPORT
INFILTRATION TESTING

For

Area 2 Storm Drain Project

Prepared by:

BLACKBURN CONSULTING
1720 G Street
Modesto, CA 95354

June 2009

For:

RRM Design Group
210 East F Street
Oakdale, CA 95361

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Geotechnical • Construction Services • Forensics

June 12, 2009
BCI File No. 1721.1

Mr. William Strand
RRM Design Group
210 East F Street
Oakdale, CA 95361

Subject: **Preliminary Geotechnical Report - Infiltration Testing**
Area 2 Storm Drain Project
Modesto, California

Dear Mr. Strand,

In accordance with our agreement dated April 27, 2009 and discussions with you, we completed our evaluation of soil conditions and infiltration testing for the City of Modesto, Area 2 Storm Drain to Sanitary Sewer Cross Connections Removal, Preliminary Design Project.

This report summarizes our observation of subsurface soil and groundwater conditions, in-situ infiltration test results, and laboratory testing.

We appreciate the opportunity to provide these services. Please call if you have questions or require additional information.

Sincerely;

BLACKBURN CONSULTING

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PRELIMINARY GEOTECHNICAL REPORT

Area 2 Storm Drain to Sanitary Sewer Cross Connections Removal Project

Modesto, California

TABLE OF CONTENTS

INTRODUCTION **1**

Purpose 1

Scope of Services 1

PROJECT DESCRIPTION **1**

SITE DESCRIPTION **1**

FIELD EXPLORATION **2**

LABORATORY TESTING **2**

SUBSURFACE CONDITIONS **2**

GROUNDWATER **2**

INFILTRATION RATES **3**

CONSTRUCTION CONSIDERATIONS **5**

Excavation Sloping 5

Construction Verification 5

Fill and Compaction 5

LIMITATIONS **6**

FIGURES

Figure 1 – Vicinity Map

Figure 2A to 2D – Boring and Test Location Map

APPENDIX A

Field Exploration Summary

Boring Log Legend

Logs of Borings

APPENDIX B

Laboratory Testing Summary

Laboratory Test Results

INTRODUCTION

Purpose

The purpose of our geotechnical evaluation is to provide RRM Design Group with subsurface data for preliminary design of infiltration basins/trenches at four City of Modesto park sites for the Area 2 Storm Drain to Sanitary Sewer (SDSS) Cross Connections Removal, Preliminary Design Project. The proposed project involves four park sites, Roosevelt, Catherine Everett, Garrison, and JM Pike. The requested geotechnical information for each park site includes soil profiles, groundwater depth, infiltration rates for preliminary design, and construction considerations.

Scope of Services

To provide geotechnical information for preliminary project design, Blackburn Consulting (BCI) completed the following:

- Reviewed available geologic mapping and subsurface data in the project area
- Drilled, logged and sampled at deep borings (31.5 to 41.5 feet) at each park site (total of 5 borings) to determine the general soil profile and depth to groundwater
- Completed infiltration testing at 2 to 4 test locations within each proposed infiltration site (total of 15 tests)

PROJECT DESCRIPTION

In some areas of the City, excess stormwater runoff drains directly into the sanitary sewer collection system by means of cross connections via surface inlets (catch basins). In order to mitigate existing surcharging and potential overflow conditions along a portion of the sewer system (Emerald Trunk Sewer), cross connections within Area 2 (north-central section of the City) would be removed and stormwater would be directed to neighboring City parks for underground storage and infiltration.

SITE DESCRIPTION

The City parks identified for this project are:

- Catherine Everett
- Garrison
- JM Pike
- Roosevelt

The parks are located in the north-central portion of the City of Modesto. We show the location of each park site on Figure 1, Vicinity Map. The infiltration locations within the parks are generally level, grass covered, and/or dirt ball fields. Sidewalk and trees typically border the areas. We show each park site and the proposed infiltration locations, as provided by RRM Design Group, on Figure 2A through 2D.

FIELD EXPLORATION

To characterize the subsurface conditions at the site, BCI drilled and sampled 5 deep exploratory borings and 16 shallow infiltration test locations between May 18 and 26, 2009. We show the boring locations on Figures 2A through 2D and provide detailed information on the borings in Appendix A.

LABORATORY TESTING

BCI performed Grain Size Distribution testing (ASTM D-422) and Plasticity Index testing (ASTM D4318) on selected soil samples retrieved from the borings. We attach laboratory results in Appendix B.

SUBSURFACE CONDITIONS

The soil we encountered during our subsurface exploration are consistent with published geologic mapping[1] that shows the area as underlain by young (Pleistocene age) alluvial sediments of the Modesto Formation. The general soil profile at all parks is similar with loose to medium dense, silty sand (SM) in the upper 6 to 8 feet, underlain by medium dense to dense, fine to medium grained sand and silty sand (SP and SM) to the maximum depth of our exploration (41.5 feet). There are some intervening clays and silts at depth; Catherine Everett, JM Pike, and Roosevelt parks all have a clay layer, 5 to 6 feet thick, at depths greater than 18 feet. Roosevelt Park has additional fine-grained soils (sandy clay) between depths of 11 to 16 feet.

The soil profile we describe above is generalized; therefore, refer to the logs of the borings in Appendix A for the soil conditions that we logged at specific locations. On the logs, we indicate the observed soil type, color, moisture, consistency, and Unified Soil Classification Symbol. Classification of the soils is based on our field representative's estimate of soil properties and results of laboratory tests.

GROUNDWATER

We encountered groundwater in our borings at the following depths and approximate elevations:

TABLE 1

OBSERVED GROUNDWATER IN BORINGS			
Location	**Boring No.**	**Groundwater Depth (ft)**	**Groundwater[2] Approx. Elev. (ft)**
Catherine Everett Park	B-1	28.0	55
J.M. Pike Park	B-2 and B-3	33.0	50
Roosevelt Park	B-4	38.5	51
Garrison Park	B-5	32.0	50

[1] Wagner, D.L., Bortugno, E.J., and McJunkin, R.D., 1990, Geologic Map of the San Francisco-San Jose Quadrangle; California Department of Conservation, Division of Mines and Geology, Regional Geologic Map Series, Map No. 5A.

[2] Mean Sea Level (based on approximate USGS elevations)

The depth to groundwater that we observed is consistent with State of California, Department of Water Resources (DWR) data for groundwater elevation in the area (Modesto Sub-basin). The DWR shows groundwater elevations between 50 to 60 feet in the area of the parks for Spring of 2000, 2005, and 2006. The groundwater gradient is to the west-southwest.

INFILTRATION RATES

Based on potential facility depths of 9 to 15 feet, infiltration at the parks will be primarily into fine to medium grained sands and silty sands. Based on the soil types that we logged and sampled, we would expect infiltration rates of 0.5 to 30+ inches per hour (moderate to very high rates). Roosevelt Park had some shallow fine-grained soils at depths of 11 to 23 feet, which are expected to have slow infiltration rates (on the order of less than 1/8-inch per hour).

We reviewed approximate infiltration rates based on grain size distribution (see Appendix B for laboratory test results). Based on the Hazen equation, which uses the grain size for which 10% of the sample is finer (d_{10}) to estimate hydraulic conductivity, the poorly graded sands (not fine grained soils) at potential facility depths will have infiltration rates ranging between 3.7 to 6.3 inches per hour.

To field test infiltration rates, BCI completed constant head tests in uncased boreholes. We coordinated test depths with RRM Design Group based on proposed facility depths. We used an infiltration test method and calculations based on the US Bureau of Reclamation field manual for gravity testing[3]. The following summarizes the general test method we used:

- Drilled a 6-inch diameter hole to test depth
- Developed (cleaned) the borehole with water and a bailer (using water fed into the hole)
- Placed a layer of coarse gravel at the bottom of the hole (minimum of 6 inches), and set a water feed pipe and an observation pipe (each 2-inch in diameter)
- Saturated the bottom of the hole with approximately 50 gallons or more of water
- Provided a metered supply of water into the feed pipe until a minimum of three successive measurements of the water level, taken at 5-minute intervals, were within 0.2 feet of each other. The water flow rate was adjusted to obtain a stabilized water level within the hole.

Normally, the test water height within the hole is a minimum of 5 times the borehole diameter to reduce influence from the bottom of the hole. We used a reduced height of water to increase bottom of the hole influence and obtain an infiltration rate more representative of the basin bottom (rather than lateral infiltration such as at basin sides). In Table 2 below, we summarize the test data and infiltration values that we obtained.

[3] United States Bureau of Reclamation, 1998, Engineering Geology Field Manual, Second Edition, Vol. 2

TABLE 2

INFILTRATION TEST DATA SUMMARY						
Park Name	**Test Hole No.**	**Hole Btm. Depth (ft)**	**Depth to Test Water (ft)**	**Approx. Boring Diam. (ft)**	**Constant Flow Rate (gpm)**	**Infiltration Rate (inches/hr)**
Catherine Everett	C1	12.5	10.6	0.67*	0.84	5.16
Catherine Everett	C2	12.5	11.0	0.5	2.65	24.29
Catherine Everett	C3	12.4	11.0	0.5	1.0	9.82
Catherine Everett	C3	12.4	8.6	0.5	4.5	11.12
Catherine Everett	C4	12.2	11.0	0.5	0.08	1.03
JM Pike	J1	10.2	9.33	0.5	1.0	17.70
JM Pike	J2	10.2	9.4	0.5	1.65	31.76
JM Pike	J3	10.2	9.4	0.5	0.77	14.82
JM Pike	J4	10.2	9.75	0.5	0.45	15.40
JM Pike	J5	10.2	8.92	0.5	0.04	0.47
JM Pike	J6	10.2	9.3	0.5	1.23	21.05
Garrison	G1	12.2	11.33	0.5	0.16	2.83
Garrison	G2	15.2	14.0	0.5	0.38	4.88
Garrison	G3	12.2	11.25	0.5	0.36	5.84
Garrison	G4	- Hole filled by Parks Dept prior to testing -				
Roosevelt	R1	9.2	8.0	0.5	4.17	53.52
Roosevelt	R2	12.2	10.33	0.5	0.02	0.14

* Some caving at base of hole caused an increase in diameter (estimated) at test depth

Our field tests show generally high to very high infiltration rates (approximately 5 to >14 inches per hour) for most of the sands at proposed facility depth. We also recorded moderate rates (1 to 3 inches per hour) in isolated locations (C4 at Catherine Everett, and G1 at Garrison) that likely reflect higher fines content at or near the test depth. We recorded slow rates (less than 0.5 inches per hour) at JM Pike Park in Test Hole J5, and at Roosevelt Park in Test Hole R2. The slow test results likely represent a soil horizon with substantial amounts of fine grained soil, which we did observe in our borings (silty sand/silt at JM Pike and clayey sand at Roosevelt).

The infiltration rates we provide above can be used in preliminary design of the proposed facilities. Consider the rates as approximate and use an appropriate safety factor in design. Due to the alluvial nature of the soils underlying the sites, there can be significant lateral and vertical variation in soil type and infiltration rates (as shown by isolated locations with significantly lower rates). Consider further evaluation of soil profiles and infiltration rates for final design.

CONSTRUCTION CONSIDERATIONS

Excavation Sloping

Native soil located within 12 to 15 feet of the surface at all sites generally consists of loose to medium dense granular soil. Excavation of these soils can be accomplished with conventional equipment. Excavations greater than 5 feet deep must be sloped or shored to prevent failure. In accordance with sloping guidelines (Federal Register, 29 CFR, Part 1926), we expect the soil to be classified as Type C (granular soils including gravel, sand, and loamy sand). Excavations in Type C soils must be sloped no steeper than a gradient of 1.5:1 (H:V). Surcharge loads such as trench spoils, equipment, etc. should not be placed adjacent to an open excavation (within a distance of ½ the height of the slope).

The above is guideline information only. The excavation contractor is always responsible for site safety and final excavation/shoring design and construction based on actual excavation conditions encountered during construction.

Construction Verification

When the infiltration areas are open to the planned infiltration surface, the soils should be reviewed to for confirmation of anticipated conditions. Infiltration rate verification should be completed at that time. Depending on the outcome of verification testing, design modifications and/or overexcavation of some soils may be necessary.

Fill and Compaction

Minimize equipment travel on the excavated surface of the infiltration area. If the surface becomes compacted prior to placement of drainage materials, thoroughly scarify to a minimum depth of 12 inches.

Native soil will be suitable as excavation backfill. Compact all fill material to a minimum of 90% relative compaction in accordance with ASTM D1557. In open park spaces, the upper 2 feet of fill can be compacted to between 85% and 90% relative compaction to facilitate vegetative growth.

LIMITATIONS

BCI bases this report on current site conditions. We assume the soil and groundwater conditions that we logged are representative of the subsurface conditions at the sites. Actual conditions between subsurface probes can be different.

BCI considers this report of conditions to be preliminary. Additional exploration and testing may be necessary for final design.

BCI performed services in accordance with generally accepted geotechnical engineering principles and practices currently used in this area. We do not warranty our services.

The lines designating the interface between soil materials on the logs are approximate. The transition between materials may be abrupt or gradual. The final logs represent our interpretation of the field logs, laboratory testing, and general knowledge of the area and geologic conditions.

FIGURES

Figure 1 – Vicinity Map
Figure 2A to 2D – Boring and Test Location Map

NO SCALE

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VICINITY MAP

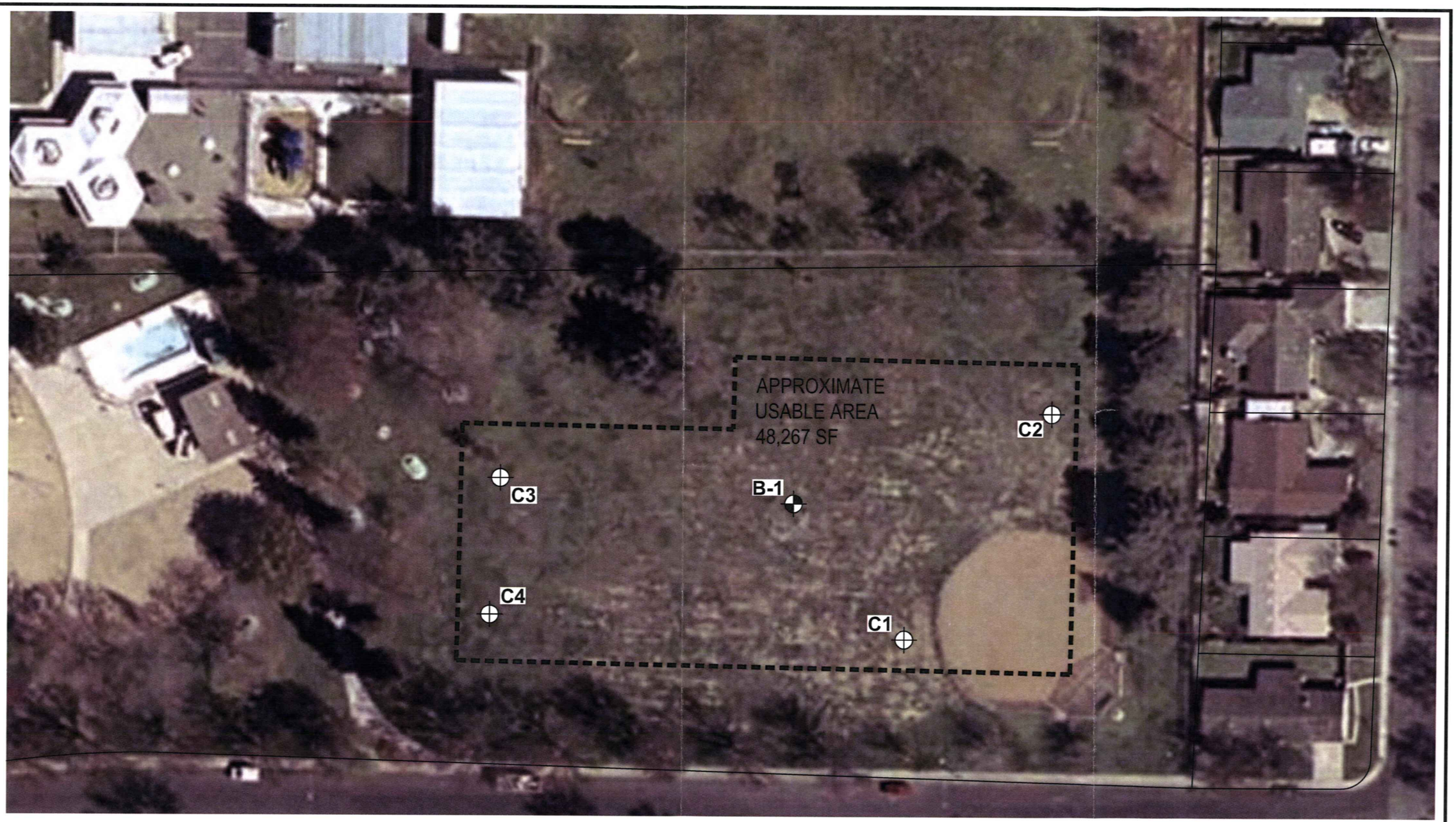
Area 2 Storm Drain Project
Modesto, California

File No. 1721.1

June 2009

Figure 1

6/8/2009 1721.1 Area 2 Storm Drain Project Figure 1.dwg



LEGEND

B-1 Approximate Boring Location

C1 Approximate Infiltration Test Boring Location

Source: Topography and aerial mapping from rrm design group, dated March, 2009.

SCALE: 1"=50'

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BORING AND TEST LOCATION MAP

Area 2 Storm Drain Project
Catherine Everett Park
Modesto, California

File No. 1721.1
June 2009
Figure 2A

6/11/2009 1721.1 Area 2 Storm Drain Project Figure 2.dwg

LEGEND

B-2 Approximate Boring Location

J1 Approximate Infiltration Test Boring Location

N

Source: Topography and aerial mapping from rrm design group, dated March, 2009.

SCALE: 1"=100'

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BORING AND TEST LOCATION MAP

Area 2 Storm Drain Project
JM Pike Park
Modesto, California

File No. 1721.1

June 2009

Figure 2B

6/11/2009 1721.1 Area 2 Storm Drain Project Figure 2.dwg

LEGEND

B-4 ⊕ Approximate Boring Location

R1 ⊕ Approximate Infiltration Test Boring Location

N

Source: Topography and aerial mapping from rrm design group, dated March, 2009.

SCALE: 1"=100'

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BORING AND TEST LOCATION MAP

Area 2 Storm Drain Project
Roosevelt Park
Modesto, California

File No. 1721.1

June 2009

Figure 2C

6/11/2009 1721.1 Area 2 Storm Drain Project Figure 2.dwg

LEGEND

B-5 Approximate Boring Location

G1 Approximate Infiltration Test Boring Location

N

Source: Topography and aerial mapping from rrm design group, dated March, 2009.

SCALE: 1"=100'

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BORING AND TEST LOCATION MAP

Area 2 Storm Drain Project
Garrison Park
Modesto, California

File No. 1721.1
June 2009
Figure 2D

6/11/2009 1721.1 Area 2 Storm Drain Project Figure 2.dwg

APPENDIX A

Field Exploration Summary
Boring Log Legend
Logs of Borings

FIELD EXPLORATION

BCI drilled and sampled 5 deep (31.5 to 41.5 feet) exploratory borings and 16 shallow (9 to 15 feet) test locations between May 18 and 26, 2009. We show the boring locations on Figures 2A through 2D and attach logs of the borings in this Appendix.

The borings were drilled with a truck-mounted drill rig using 6-inch diameter hollow-stem augers. Sampling was accomplished by dropping a 140-pound hammer, 30 inches for each blow. The hammer was used to advance a 2.5-inch I.D., Modified California (MC) sampler lined with 6-inch long brass tubes. We recorded the number of hammer blows required to drive the sampler 18 inches. The final 12 inches is recorded as the field blow count. We retrieved relatively undisturbed soil samples from the borings in the brass liners. We also obtained bulk soil samples from the cuttings as the drilling progressed.

A BCI geologist logged the borings and retrieved samples for laboratory testing. We used plastic caps to seal and label the 6-inch long brass tubes retrieved from MC sampling. We also retrieved bulk soil samples from auger cuttings, placed this material in zip-lock bags, and labeled for laboratory identification.

We located borings in the field by measuring from nearby landmarks and estimating from the aerial base map provided by RRM Design Group. Elevations are estimated from USGS topographic mapping and are considered approximate.

UNIFIED SOIL CLASSIFICATION (ASTM D 2487-06)

MATERIAL TYPES	CRITERIA FOR ASSIGNING SOIL GROUP NAMES			GRAPHIC SYMBOL	GROUP SYMBOL	SOIL GROUP NAMES
COARSE-GRAINED SOILS >50% RETAINED ON NO. 200 SIEVE	GRAVELS >50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	CLEAN GRAVELS <5% FINES	Cu ≥ 4 AND 1 ≤ Cc ≤ 3		GW	WELL-GRADED GRAVEL
			Cu < 4 AND/OR 1 > Cc > 3		GP	POORLY-GRADED GRAVEL
		GRAVELS WITH FINES >12% FINES	FINES CLASSIFY AS ML OR MH		GM	SILTY GRAVEL
			FINES CLASSIFY AS CL OR CH		GC	CLAYEY GRAVEL
	SANDS <50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	CLEAN SANDS <5% FINES	Cu ≥ 6 AND 1 ≤ Cc ≤ 3		SW	WELL-GRADED SAND
			Cu < 6 AND/OR 1 > Cc > 3		SP	POORLY-GRADED SAND
		SANDS WITH FINES >12% FINES	FINES CLASSIFY AS ML OR MH		SM	SILTY SAND
			FINES CLASSIFY AS CL OR CH		SC	CLAYEY SAND
FINE-GRAINED SOILS >50% PASSING NO. 200 SIEVE	SILTS AND CLAYS LIQUID LIMIT <50	INORGANIC	PI>7 AND PLOTS ON OR ABOVE "A" LINE		CL	LEAN CLAY
			PI>4 AND PLOTS BELOW "A" LINE		ML	SILT
		ORGANIC	LL (oven dried)<0.75/LL (not dried)		OL	ORGANIC CLAY OR SILT
	SILTS AND CLAYS LIQUID LIMIT >50	INORGANIC	PI PLOTS ON OR ABOVE "A" LINE		CH	FAT CLAY
			PI PLOTS BELOW "A" LINE		MH	ELASTIC SILT
		ORGANIC	LL (oven dried)<0.75/LL (not dried)		OH	ORGANIC CLAY OR SILT
HIGHLY ORGANIC SOILS		PRIMARILY ORGANIC MATTER, DARK COLOR, ORGANIC ODOR			PT	PEAT

NOTE: $Cu = D_{60}/D_{10}$

$Cc = (D_{30})^2 / D_{10} \times D_{60}$

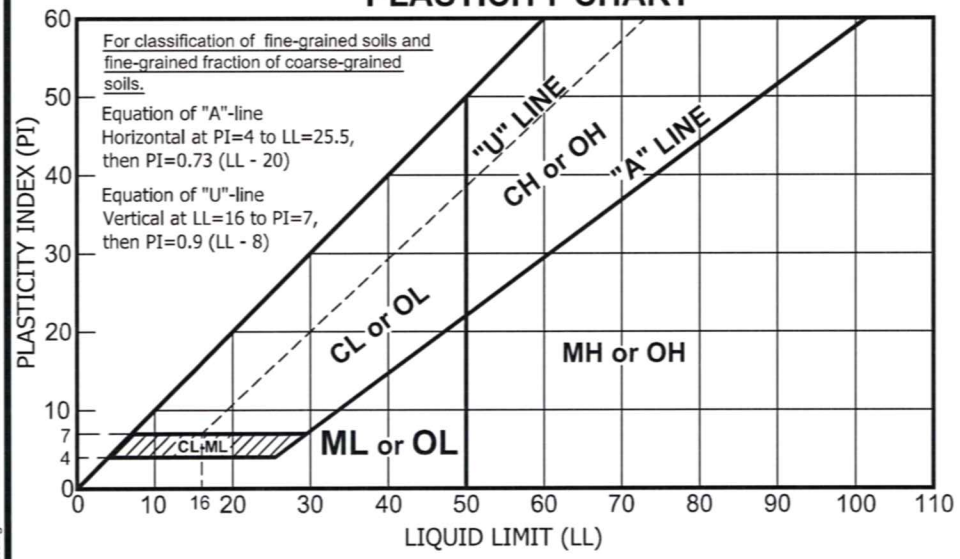
BLOW COUNT

The number of blows of a 140-lb. hammer falling 30-inches required to drive the sampler the last 12-inches of an 18-inch drive. The notation 50/0.4 indicates 4-inches of penetration achieved in 50 blows.

SAMPLE TYPES

- Auger or backhoe cuttings
- Modified California
- Shelby tube
- Rock core
- Standard Penetration (SPT)

PLASTICITY CHART



ADDITIONAL TESTS

C	- Consolidation
CP	- Compaction Curve
CR	- Corrosivity Testing
CU	- Consolidated Undrained Triaxial
DS	- Direct Shear
EI	- Expansion Index
P	- Permeability
PA	- Partical Size Analysis
PI	- Plasticity Index
PP	- Pocket Penetrometer
R	- R-Value
SE	- Sand Equivalent
UC	- Specific Gravity
SL	- Shrinkage Limit
SW	- Swell Potential
TV	- Pocket Torvane Shear Test
UC	- Unconfined Compression
UU	- Unconsolidated Undrained Triaxial

GROUND WATER LEVELS

- Later water level after drilling
- Water level at time of drilling

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BORING LOG / TEST PIT LEGEND AND SOIL DESCRIPTIONS

LOG OF BORING B-1

FILE NO.: 1721.1
PROJECT: Area 2 Storm Drain Project
LOCATION: Modesto
CLIENT: RRM Design Group

DRILLING DATE: 5/18/09
DRILLING METHOD: Hollow-stem Auger
LOGGED BY: AGW
CHECKED BY: BDC

ELEVATION: ±83
DATUM:
WATER DEPTH: 28 feet
READING TAKEN: 5/18/09

FIELD							LABORATORY						
DEPTH (FEET)	SAMPLE	SAMPLE NO.	N-VALUE	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	% <200 SIEVE	PLASTICITY INDEX	DIRECT SHEAR C (PSF)	DIRECT SHEAR ANGLE	ADDITIONAL TESTS
5		B1-1	8			**Silty Sand (SM);** loose, reddish yellow, moist, fine to medium sand							
10		B1-2	13			**Poorly Graded Sand (SP);** medium dense, gray, dry, fine to medium sand color changes to yellowish brown			1				
15		B1-3	26										
20		B1-4	18			color change to gray							
25		B1-5	13			**Sandy Lean Clay (CL);** stiff, gray, wet, fine sand							
30		B1-6	42			**Poorly Graded Sand (SP-SM);** dense, yellowish brown, wet, fine to medium sand with silt							
						Total Depth = 31.5 feet Groundwater Encountered at 28 feet							

LOG OF BOREHOLE 1721.1 AUBURN AREA 2 STORM DRAIN.GPJ BLACKBRN.GDT 6/12/09

Blackburn Consulting

LOG OF BORING B-2

FILE NO.: 1721.1
PROJECT: Area 2 Storm Drain Project
LOCATION: Modesto
CLIENT: RRM Design Group

DRILLING DATE: 5/18/09
DRILLING METHOD: Hollow-stem Auger
LOGGED BY: AGW
CHECKED BY: BDC

ELEVATION: ±83
DATUM:
WATER DEPTH: 33 feet
READING TAKEN: 5/18/09

FIELD							LABORATORY						
DEPTH (FEET)	SAMPLE	SAMPLE NO.	N-VALUE	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	% <200 SIEVE	PLASTICITY INDEX	DIRECT SHEAR C (PSF)	DIRECT SHEAR ANGLE	ADDITIONAL TESTS
5		B2-1	18			**Silty Sand (SM);** medium dense, reddish yellow, moist, fine to medium sand							
10		B2-2	7			**Poorly Graded Sand (SP);** loose to medium dense, yellowish brown, dry, fine to medium sand			3				
15		B2-3	34			medium dense and fine sand							
20		B2-4	46			**Sandy Lean Clay (CL);** hard, strong brown, moist, fine sand							
25		B2-5	70			**Silty Sand (SM);** very dense, olive gray, dry, slightly cemented							
30		B2-6	75			**Poorly Graded Sand (SP);** very dense, medium brown, moist, fine to medium sand with silt slightly cemented							
35		B2-7	62										
						Total Depth = 36.5 feet Groundwater Encountered at 33 feet							

LOG OF BOREHOLE 1721.1 AUBURN AREA 2 STORM DRAIN.GPJ BLACKBRN.GDT 6/12/09

Blackburn Consulting

LOG OF BORING B-3

FILE NO.: 1721.1
PROJECT: Area 2 Storm Drain Project
LOCATION: Modesto
CLIENT: RRM Design Group

DRILLING DATE: 5/19/09
DRILLING METHOD: Hollow-stem Auger
LOGGED BY: AGW
CHECKED BY: BDC

ELEVATION: ±83
DATUM:
WATER DEPTH: 33 feet
READING TAKEN: 5/19/09

FIELD						LABORATORY						
DEPTH (FEET)	SAMPLE	SAMPLE NO.	N-VALUE	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	% <200 SIEVE	PLASTICITY INDEX	DIRECT SHEAR C (PSF)	DIRECT SHEAR ANGLE	ADDITIONAL TESTS
						Silty Sand (SM); loose to medium dense, medium brown, moist, fine to medium sand							
5		B3-1	12			**Poorly Graded Sand (SP);** medium dense, yellowish brown, moist, fine to medium sand							
						sand becomes fine to coarse							
10		B3-2	18						4				
15		B3-3	33										
						Silty Sand (SM); medium dense, yellowish brown, moist, fine sand							
20		B3-4	21										
25		B3-5	13										
30		B3-6	58			**Silty Sand (SM);** dense, dark brown, moist, fine to medium sand, slightly cemented							
35		B3-7	54			**Sandy Silt (ML);** hard, medium brown, moist, fine sand							
						Total Depth = 36.5 feet Groundwater Encountered at 33 feet							

LOG OF BOREHOLE 1721.1 AUBURN AREA 2 STORM DRAIN.GPJ BLACKBRN.GDT 6/12/09

Blackburn Consulting

LOG OF BORING B-4

FILE NO.: 1721.1
PROJECT: Area 2 Storm Drain Project
LOCATION: Modesto
CLIENT: RRM Design Group

DRILLING DATE: 5/19/09
DRILLING METHOD: Hollow-stem Auger
LOGGED BY: AGW
CHECKED BY: BDC

ELEVATION: ±89.5
DATUM:
WATER DEPTH: 38.5 feet
READING TAKEN: 5/19/09

FIELD						LABORATORY							
DEPTH (FEET)	SAMPLE	SAMPLE NO.	N-VALUE	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	% <200 SIEVE	PLASTICITY INDEX	DIRECT SHEAR C (PSF)	DIRECT SHEAR ANGLE	ADDITIONAL TESTS
5		B4-1	45			**Silty Sand (SM);** medium dense to dense, gray, dry, fine sand							
10		B4-2	12			**Poorly Graded Sand (SP);** medium dense, gray, dry, fine sand			3				
15		B4-3	23			**Lean Clay with Sand (CL);** stiff to very stiff, olive gray, moist, fine sand			78	8			
20		B4-4	60			**Clayey Sand (SC);** medium dense, olive gray, moist, fine sand **Sandy Lean Clay (CL);** hard, medium brown, moist, fine sand							
25		B4-5	44			**Poorly Graded Sand (SP);** dense, yellowish brown, dry, fine to medium sand becomes reddish brown and moist							
30		B4-6	62			**Silty Sand (SM);** very dense, dark brown, moist, fine sand							
35		B4-7	37			**Poorly Graded Sand (SP);** dense, yellowish brown, moist, fine to medium sand							
40		B4-8	36										
						Total Depth = 41.5 feet Groundwater Encountered at 38.5 feet							

LOG OF BOREHOLE 1721.1 AUBURN AREA 2 STORM DRAIN.GPJ BLACKBRN.GDT 6/12/09

Blackburn Consulting

LOG OF BORING B-5

FILE NO.: 1721.1
PROJECT: Area 2 Storm Drain Project
LOCATION: Modesto
CLIENT: RRM Design Group

DRILLING DATE: 5/20/09
DRILLING METHOD: Hollow-stem Auger
LOGGED BY: AGW
CHECKED BY: BDC

ELEVATION: ±82
DATUM:
WATER DEPTH: 32 feet
READING TAKEN: 5/20/09

FIELD							LABORATORY							
DEPTH (FEET)	SAMPLE	SAMPLE NO.	N-VALUE	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	% <200 SIEVE	PLASTICITY INDEX	DIRECT SHEAR C (PSF)	DIRECT SHEAR ANGLE	ADDITIONAL TESTS
						Silty Sand (SM); medium dense, yellowish brown, moist, fine sand							
5		B5-1	25										
						Silt (ML); very stiff, olive gray, moist							
						Silty Sand (SM); medium dense, olive gray, moist, fine sand							
10		B5-2	14										
						Poorly Graded Sand (SP); medium dense, yellowish brown, dry, fine sand			2				
						Silty Sand (SM); medium dense, medium brown, moist, fine sand							
15		B5-3	28						38				
						becomes very dense							
20		B5-4	83										
						Clayey Sand (SC); very dense, medium brown, moist, fine to medium sand, slightly cemented							
25		B5-5	108										
						Silty Sand (SM); medium dense to dense, dark yellowish brown, moist, fine sand							
30		B5-6	32										
						Poorly Graded Sand (SP);dense, yellowish brown, moist, fine to coarse sand							
35		B5-7	51										
						Silt (ML); hard, olive gray, moist							
						Total Depth = 36.5 feet Groundwater Encountered at 32 feet							

LOG OF BOREHOLE 1721.1 AUBURN AREA 2 STORM DRAIN.GPJ BLACKBRN.GDT 6/12/09

Blackburn Consulting

LOG OF BORING C1

FILE NO.: 1721.1
PROJECT: Area 2 Storm Drain Project
LOCATION: Modesto
CLIENT: RRM Design Group

DRILLING DATE: 5/26/09
DRILLING METHOD: Hollow-stem Auger
LOGGED BY: AGW
CHECKED BY: PFF

ELEVATION: ±83
DATUM:
WATER DEPTH: none
READING TAKEN:

FIELD						LABORATORY						
DEPTH (FEET)	SAMPLE	SAMPLE NO.	N-VALUE	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	% <200 SIEVE	PLASTICITY INDEX	DIRECT SHEAR C (PSF)	DIRECT SHEAR ANGLE	ADDITIONAL TESTS
						Silty Sand (SM); (loose to medium dense), medium brown, moist, fine to medium sand							
5						**Poorly Graded Sand (SP);** (loose to medium dense), yellowish brown, moist, fine to medium sand							
10													
						Total Depth = 12.5 feet Groundwater not observed							

LOG OF BOREHOLE 1721.1 AUBURN AREA 2 STORM DRAIN.GPJ BLACKBRN.GDT 6/12/09

Blackburn Consulting

LOG OF BORING C2

FILE NO.: 1721.1
PROJECT: Area 2 Storm Drain Project
LOCATION: Modesto
CLIENT: RRM Design Group

DRILLING DATE: 5/26/09
DRILLING METHOD: Hollow-stem Auger
LOGGED BY: AGW
CHECKED BY: PFF

ELEVATION: ±83
DATUM:
WATER DEPTH: none
READING TAKEN:

FIELD						LABORATORY						
DEPTH (FEET)	SAMPLE	SAMPLE NO.	N-VALUE	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	% <200 SIEVE	PLASTICITY INDEX	DIRECT SHEAR C (PSF)	DIRECT SHEAR ANGLE	ADDITIONAL TESTS
						Poorly Graded Sand (SP); (loose to medium dense), yellowish brown, moist, fine to medium sand							
5													
10													
						Total Depth = 12.5 feet Groundwater not observed							

LOG OF BOREHOLE 1721.1 AUBURN AREA 2 STORM DRAIN.GPJ BLACKBRN.GDT 6/12/09

Blackburn Consulting

LOG OF BORING C3

FILE NO.: 1721.1
PROJECT: Area 2 Storm Drain Project
LOCATION: Modesto
CLIENT: RRM Design Group

DRILLING DATE: 5/26/09
DRILLING METHOD: Hollow-stem Auger
LOGGED BY: AGW
CHECKED BY: PFF

ELEVATION: ±83
DATUM:
WATER DEPTH: none
READING TAKEN:

FIELD						LABORATORY						
DEPTH (FEET)	SAMPLE	SAMPLE NO.	N-VALUE	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	% <200 SIEVE	PLASTICITY INDEX	DIRECT SHEAR C (PSF)	DIRECT SHEAR ANGLE	ADDITIONAL TESTS
						Poorly Graded Sand (SP); (loose to medium dense), yellowish brown, moist, fine to medium sand							
5													
10													
						Total Depth = 12.4 feet Groundwater not observed							

LOG OF BOREHOLE 1721.1 AUBURN AREA 2 STORM DRAIN.GPJ BLACKBRN.GDT 6/12/09

Blackburn Consulting

LOG OF BORING C4

FILE NO.: 1721.1
PROJECT: Area 2 Storm Drain Project
LOCATION: Modesto
CLIENT: RRM Design Group

DRILLING DATE: 5/26/09
DRILLING METHOD: Hollow-stem Auger
LOGGED BY: AGW
CHECKED BY: PFF

ELEVATION: ±83
DATUM:
WATER DEPTH: none
READING TAKEN:

FIELD						LABORATORY						
DEPTH (FEET)	SAMPLE	SAMPLE NO.	N-VALUE	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	% <200 SIEVE	PLASTICITY INDEX	DIRECT SHEAR C (PSF)	DIRECT SHEAR ANGLE	ADDITIONAL TESTS
						Silty Sand (SM); (loose to medium dense), yellowish brown, moist, fine to medium sand							
5						**Poorly Graded Sand (SP);** (loose to medium dense), yellowish brown, moist, fine to medium sand							
10													
						Total Depth = 12.2 feet Groundwater not observed							

LOG OF BOREHOLE 1721.1 AUBURN AREA 2 STORM DRAIN.GPJ BLACKBRN.GDT 6/12/09

Blackburn Consulting

LOG OF BORING G1

FILE NO.: 1721.1
PROJECT: Area 2 Storm Drain Project
LOCATION: Modesto
CLIENT: RRM Design Group

DRILLING DATE: 5/26/09
DRILLING METHOD: Hollow-stem Auger
LOGGED BY: AGW
CHECKED BY: PFF

ELEVATION: ±82
DATUM:
WATER DEPTH: none
READING TAKEN:

FIELD						LABORATORY						
DEPTH (FEET)	SAMPLE	SAMPLE NO.	N-VALUE	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	% <200 SIEVE	PLASTICITY INDEX	DIRECT SHEAR C (PSF)	DIRECT SHEAR ANGLE	ADDITIONAL TESTS
						Silty Sand (SM); (loose to medium dense), gray, moist, fine sand							
5													
10													
						Total Depth = 12.2 feet Groundwater not observed							

LOG OF BOREHOLE 1721.1 AUBURN AREA 2 STORM DRAIN.GPJ BLACKBRN.GDT 6/12/09

Blackburn Consulting

LOG OF BORING G2

FILE NO.: 1721.1
PROJECT: Area 2 Storm Drain Project
LOCATION: Modesto
CLIENT: RRM Design Group

DRILLING DATE: 5/26/09
DRILLING METHOD: Hollow-stem Auger
LOGGED BY: AGW
CHECKED BY: PFF

ELEVATION: ±82
DATUM:
WATER DEPTH: none
READING TAKEN:

FIELD						LABORATORY						
DEPTH (FEET)	SAMPLE	SAMPLE NO.	N-VALUE	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	% <200 SIEVE	PLASTICITY INDEX	DIRECT SHEAR C (PSF)	DIRECT SHEAR ANGLE	ADDITIONAL TESTS
						Silty Sand (SM); (loose to medium dense), medium brown, moist, fine sand							
						Poorly Graded Sand (SP); (loose to medium dense), yellowish brown, moist, fine sand							
5													
10													
15													
						Total Depth = 15.2 feet Groundwater not observed							

LOG OF BOREHOLE 1721.1 AUBURN AREA 2 STORM DRAIN.GPJ BLACKBRN.GDT 6/12/09

Blackburn Consulting

LOG OF BORING G3

FILE NO.: 1721.1
PROJECT: Area 2 Storm Drain Project
LOCATION: Modesto
CLIENT: RRM Design Group

DRILLING DATE: 5/26/09
DRILLING METHOD: Hollow-stem Auger
LOGGED BY: AGW
CHECKED BY: PFF

ELEVATION: ±82
DATUM:
WATER DEPTH: none
READING TAKEN:

FIELD						LABORATORY						
DEPTH (FEET)	SAMPLE	SAMPLE NO.	N-VALUE	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	% <200 SIEVE	PLASTICITY INDEX	DIRECT SHEAR C (PSF)	DIRECT SHEAR ◆ ANGLE	ADDITIONAL TESTS
						Silty Sand (SM); (loose to medium dense), yellowish brown, moist, fine sand							
5													
10													
						Total Depth = 12.2 feet Groundwater not observed							

LOG OF BOREHOLE 1721.1 AUBURN AREA 2 STORM DRAIN.GPJ BLACKBRN.GDT 6/12/09

Blackburn Consulting

LOG OF BORING G4

FILE NO.: 1721.1
PROJECT: Area 2 Storm Drain Project
LOCATION: Modesto
CLIENT: RRM Design Group

DRILLING DATE: 5/26/09
DRILLING METHOD: Hollow-stem Auger
LOGGED BY: AGW
CHECKED BY: PFF

ELEVATION: ±82
DATUM:
WATER DEPTH: none
READING TAKEN:

FIELD						LABORATORY						
DEPTH (FEET)	SAMPLE	SAMPLE NO.	N-VALUE	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	% <200 SIEVE	PLASTICITY INDEX	DIRECT SHEAR C (PSF)	DIRECT SHEAR ANGLE	ADDITIONAL TESTS
0						**Silty Sand (SM);** (loose to medium dense), yellowish brown, moist, fine sand							
5													
10													
15						Total Depth = 15.2 feet Groundwater not observed							

LOG OF BOREHOLE 1721.1 AUBURN AREA 2 STORM DRAIN.GPJ BLACKBRN.GDT 6/12/09

Blackburn Consulting

LOG OF BORING J1

FILE NO.: 1721.1
PROJECT: Area 2 Storm Drain Project
LOCATION: Modesto
CLIENT: RRM Design Group

DRILLING DATE: 5/26/09
DRILLING METHOD: Hollow-stem Auger
LOGGED BY: AGW
CHECKED BY: PFF

ELEVATION: ±83
DATUM:
WATER DEPTH: none
READING TAKEN:

FIELD						LABORATORY						
DEPTH (FEET)	SAMPLE	SAMPLE NO.	N-VALUE	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	% <200 SIEVE	PLASTICITY INDEX	DIRECT SHEAR C (PSF)	DIRECT SHEAR ANGLE	ADDITIONAL TESTS
						Clayey Sand (SC); (loose to medium dense), medium brown, moist, fine sand							
5													
						Poorly Graded Sand (SP); (loose to medium dense), reddish brown, moist, fine to coarse sand							
10													
						Total Depth = 10.2 feet Groundwater not observed							

LOG OF BOREHOLE 1721.1 AUBURN AREA 2 STORM DRAIN.GPJ BLACKBRN.GDT 6/12/09

Blackburn Consulting

LOG OF BORING J2

FILE NO.: 1721.1
PROJECT: Area 2 Storm Drain Project
LOCATION: Modesto
CLIENT: RRM Design Group

DRILLING DATE: 5/26/09
DRILLING METHOD: Hollow-stem Auger
LOGGED BY: AGW
CHECKED BY: PFF

ELEVATION: ±83
DATUM:
WATER DEPTH: none
READING TAKEN:

FIELD						LABORATORY						
DEPTH (FEET)	SAMPLE	SAMPLE NO.	N-VALUE	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	% <200 SIEVE	PLASTICITY INDEX	DIRECT SHEAR C (PSF)	DIRECT SHEAR ANGLE	ADDITIONAL TESTS
						Silty Sand (SM); (loose to medium dense), yellowish brown, moist, fine sand							
5						(Trace of clay in upper 7 feet)							
10						Total Depth = 10.2 feet Groundwater not observed							

LOG OF BOREHOLE 1721.1 AUBURN AREA 2 STORM DRAIN.GPJ BLACKBRN.GDT 6/12/09

LOG OF BORING J3

FILE NO.: 1721.1
PROJECT: Area 2 Storm Drain Project
LOCATION: Modesto
CLIENT: RRM Design Group

DRILLING DATE: 5/26/09
DRILLING METHOD: Hollow-stem Auger
LOGGED BY: AGW
CHECKED BY: PFF

ELEVATION: ±83
DATUM:
WATER DEPTH: none
READING TAKEN:

FIELD						LABORATORY						
DEPTH (FEET)	SAMPLE	SAMPLE NO.	N-VALUE	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	% <200 SIEVE	PLASTICITY INDEX	DIRECT SHEAR C (PSF)	DIRECT SHEAR ANGLE	ADDITIONAL TESTS
						Clayey Sand (SC); (loose to medium dense), medium brown, moist, fine to medium sand							
5						**Poorly Graded Sand with Silt (SP);** (loose to medium dense), reddish brown, moist, fine to medium sand							
10						Total Depth = 10.2 feet Groundwater not observed							

LOG OF BOREHOLE 1721.1 AUBURN AREA 2 STORM DRAIN.GPJ BLACKBRN.GDT 6/12/09

Blackburn Consulting

LOG OF BORING J4

FILE NO.: 1721.1
PROJECT: Area 2 Storm Drain Project
LOCATION: Modesto
CLIENT: RRM Design Group

DRILLING DATE: 5/26/09
DRILLING METHOD: Hollow-stem Auger
LOGGED BY: AGW
CHECKED BY: PFF

ELEVATION: ±83
DATUM:
WATER DEPTH: none
READING TAKEN:

FIELD						LABORATORY						
DEPTH (FEET)	SAMPLE	SAMPLE NO.	N-VALUE	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	% <200 SIEVE	PLASTICITY INDEX	DIRECT SHEAR C (PSF)	DIRECT SHEAR ANGLE	ADDITIONAL TESTS
						Silty Sand (SM); (loose to medium dense), brown, dry, fine to medium sand							
5													
10						Total Depth = 10.2 feet Groundwater not observed							

LOG OF BOREHOLE 1721.1 AUBURN AREA 2 STORM DRAIN.GPJ BLACKBRN.GDT 6/12/09

Blackburn Consulting

LOG OF BORING J5

FILE NO.: 1721.1
PROJECT: Area 2 Storm Drain Project
LOCATION: Modesto
CLIENT: RRM Design Group

DRILLING DATE: 5/26/09
DRILLING METHOD: Hollow-stem Auger
LOGGED BY: AGW
CHECKED BY: PFF

ELEVATION: ±83
DATUM:
WATER DEPTH: none
READING TAKEN:

FIELD						LABORATORY						
DEPTH (FEET)	SAMPLE	SAMPLE NO.	N-VALUE	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	% <200 SIEVE	PLASTICITY INDEX	DIRECT SHEAR C (PSF)	DIRECT SHEAR ANGLE	ADDITIONAL TESTS
						Clayey Sand (SC); (loose to medium dense), medium brown, moist, fine to medium sand							
5						**Silty Sand (SM) with interbedded Silt (ML);** (loose to medium dense and soft to stiff), dark gray, moist, fine sand							
10						Total Depth = 10.2 feet Groundwater not observed							

LOG OF BOREHOLE 1721.1 AUBURN AREA 2 STORM DRAIN.GPJ BLACKBRN.GDT 6/12/09

LOG OF BORING J6

FILE NO.: 1721.1
PROJECT: Area 2 Storm Drain Project
LOCATION: Modesto
CLIENT: RRM Design Group

DRILLING DATE: 5/26/09
DRILLING METHOD: Hollow-stem Auger
LOGGED BY: AGW
CHECKED BY: PFF

ELEVATION: ±83
DATUM:
WATER DEPTH: none
READING TAKEN:

FIELD						LABORATORY						
DEPTH (FEET)	SAMPLE	SAMPLE NO.	N-VALUE	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	% <200 SIEVE	PLASTICITY INDEX	DIRECT SHEAR C (PSF)	DIRECT SHEAR ANGLE	ADDITIONAL TESTS
						Silty Sand (SM); (loose to medium dense), yellowish brown, moist, fine to medium sand							
5						**Poorly Graded Sand with Clay (SP-SC);** (loose to medium dense), medium brown, moist, fine to coarse sand							
10						Total Depth = 10.2 feet Groundwater not observed							

LOG OF BOREHOLE 1721.1 AUBURN AREA 2 STORM DRAIN.GPJ BLACKBRN.GDT 6/12/09

LOG OF BORING R1

FILE NO.: 1721.1
PROJECT: Area 2 Storm Drain Project
LOCATION: Modesto
CLIENT: RRM Design Group

DRILLING DATE: 5/26/09
DRILLING METHOD: Hollow-stem Auger
LOGGED BY: AGW
CHECKED BY: PFF

ELEVATION: ±89.5
DATUM:
WATER DEPTH: none
READING TAKEN:

FIELD						LABORATORY						
DEPTH (FEET)	SAMPLE	SAMPLE NO.	N-VALUE	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	% <200 SIEVE	PLASTICITY INDEX	DIRECT SHEAR C (PSF)	DIRECT SHEAR ANGLE	ADDITIONAL TESTS
						Clayey Sand (SC); (loose to medium dense), medium brown, moist, fine to medium sand							
5						**Poorly Graded Sand with Clay (SP-SC);** (medium dense), yellowish brown, moist, fine to medium sand							
						Poorly Graded Sand (SP-SC); (loose to medium dense), yellowish brown, dry, fine to medium sand							
						Total Depth = 9.2 feet Groundwater not observed							

LOG OF BOREHOLE 1721.1 AUBURN AREA 2 STORM DRAIN.GPJ BLACKBRN.GDT 6/12/09

Blackburn Consulting

LOG OF BORING R2

FILE NO.: 1721.1
PROJECT: Area 2 Storm Drain Project
LOCATION: Modesto
CLIENT: RRM Design Group

DRILLING DATE: 5/26/09
DRILLING METHOD: Hollow-stem Auger
LOGGED BY: AGW
CHECKED BY: PFF

ELEVATION: ±89.5
DATUM:
WATER DEPTH: none
READING TAKEN:

FIELD						LABORATORY						
DEPTH (FEET)	SAMPLE	SAMPLE NO.	N-VALUE	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	% <200 SIEVE	PLASTICITY INDEX	DIRECT SHEAR C (PSF)	DIRECT SHEAR ANGLE	ADDITIONAL TESTS
						Lean Clay (CL); (soft), dark brown, moist							
						Clayey Sand (SC); (loose to medium dense), yellowish brown, moist, fine sand							
5						**Poorly Graded Sand (SP);** (loose to medium dense), yellowish brown, dry, fine to medium sand							
10						**Clayey Sand (SC);** (loose to medium dense), yellowish brown, dry, fine sand							
						Total Depth = 12.2 feet Groundwater not observed							

LOG OF BOREHOLE 1721.1 AUBURN AREA 2 STORM DRAIN.GPJ BLACKBRN.GDT 6/12/09

Blackburn Consulting

APPENDIX B

Laboratory Testing Summary
Laboratory Test Results

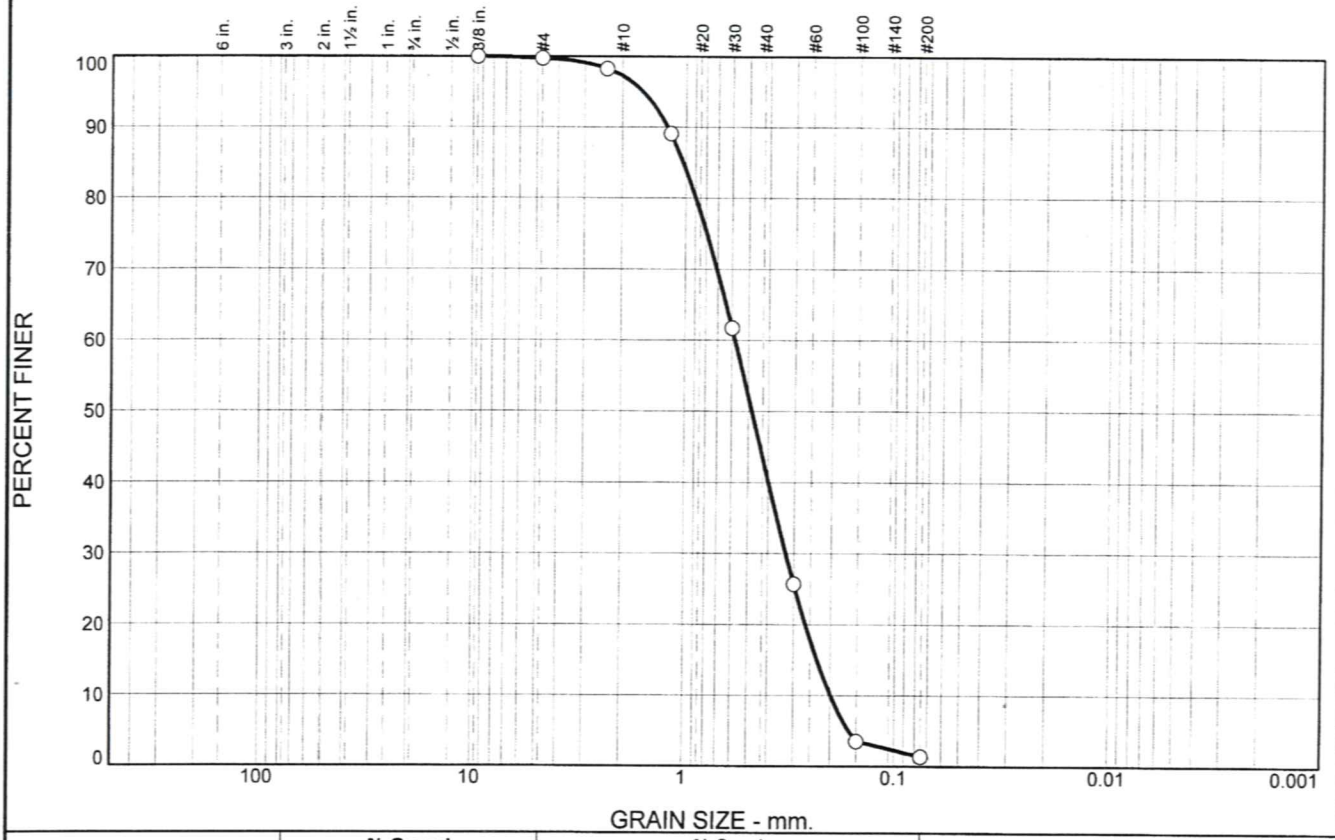
LABORATORY TESTING

Samples obtained from the field exploration were contained in sealed brass tubes or bulk sample bags depending on the technique used during sampling. These samples were shipped to our laboratory for testing. The following tests were performed on selected samples:

Laboratory Soil Classification

Our field classification is verified in the laboratory by visual examination and by ASTM methods, in accordance with the Unified Soil Classification System. Classification tests performed are Particle-Size Analysis (ASTM D422) and Liquid Limit, Plastic Limit, and Plasticity Index of Soils (ASTM D4318). We show the final soil classification on the logs of the borings and attach test results.

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.3	2.4	53.9	42.0	1.4	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/8"	100.0		
#4	99.7		
#8	98.2		
#16	89.1		
#30	61.7		
#50	25.7		
#100	3.5		
#200	1.4		

* (no specification provided)

Material Description

Yellowish Brown Poorly Graded SAND

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 1.2217 D_{85}= 1.0281 D_{60}= 0.5804
D_{50}= 0.4807 D_{30}= 0.3283 D_{15}= 0.2318
D_{10}= 0.1992 C_u= 2.91 C_c= 0.93

Classification

USCS= SP AASHTO=

Remarks

Sample Number: B1-2C **Depth:** 11.0-11.5

Date: 6-11-09

Blackburn Consulting

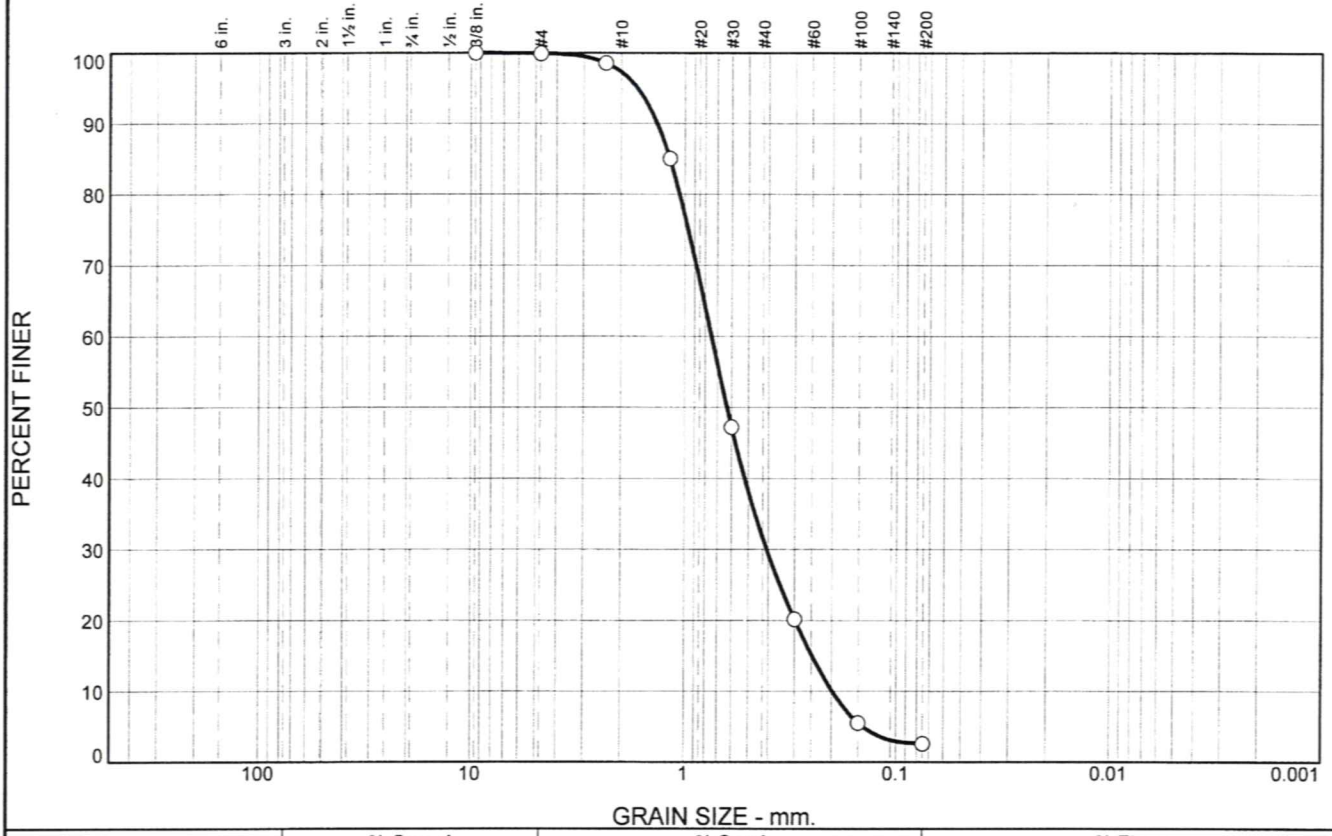
Auburn, CA

Client: RRM Design Group
Project: Area 2 Storm Drain

Project No: 1721.1 **Figure**

Tested By: KLC **Checked By:** KLC

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.1	2.6	65.7	29.0	2.6	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/8"	100.0		
#4	99.9		
#8	98.6		
#16	85.1		
#30	47.2		
#50	20.2		
#100	5.5		
#200	2.6		

* (no specification provided)

Material Description

Brownish Yellow Poorly Graded SAND

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 1.3528 D_{85}= 1.1783 D_{60}= 0.7478
D_{50}= 0.6310 D_{30}= 0.4071 D_{15}= 0.2479
D_{10}= 0.1986 C_u= 3.76 C_c= 1.12

Classification

USCS= SP AASHTO=

Remarks

Sample Number: B2-2C **Depth:** 11.0-11.5

Date: 6-11-09

Blackburn Consulting

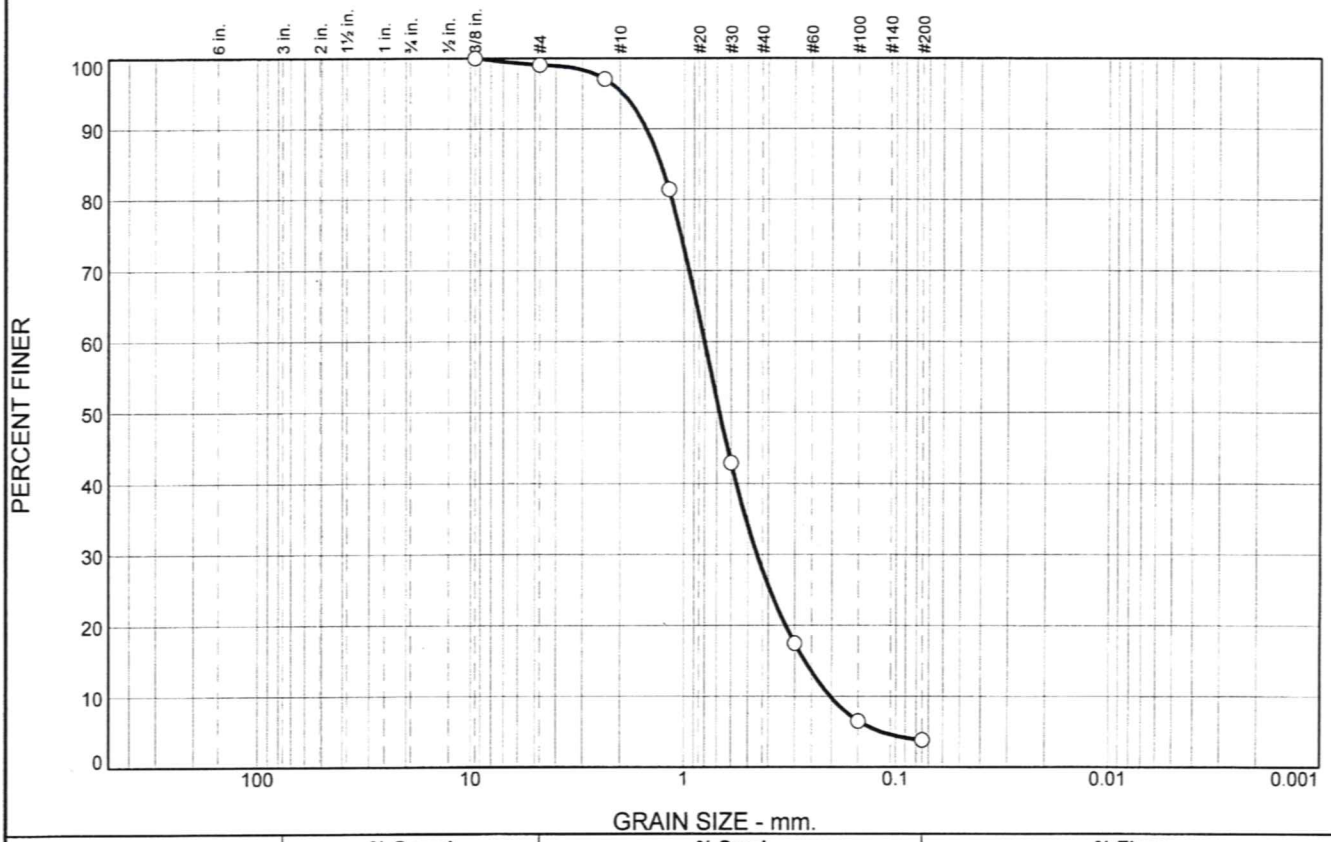
Auburn, CA

Client: RRM Design Group
Project: Area 2 Storm Drain

Project No: 1721.1 **Figure**

Tested By: KLC **Checked By:** KLC

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.9	3.7	67.7	23.9	3.8	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/8"	100.0		
#4	99.1		
#8	97.0		
#16	81.4		
#30	42.9		
#50	17.5		
#100	6.5		
#200	3.8		

* (no specification provided)

Material Description

Yellowish Brown Poorly Graded SAND

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 1.5057 D_{85}= 1.2874 D_{60}= 0.8023
D_{50}= 0.6803 D_{30}= 0.4517 D_{15}= 0.2688
D_{10}= 0.2033 C_u= 3.95 C_c= 1.25

Classification

USCS= SP AASHTO=

Remarks

Sample Number: B3-2C **Depth:** 11.0-11.5

Date: 6-11-09

Blackburn Consulting

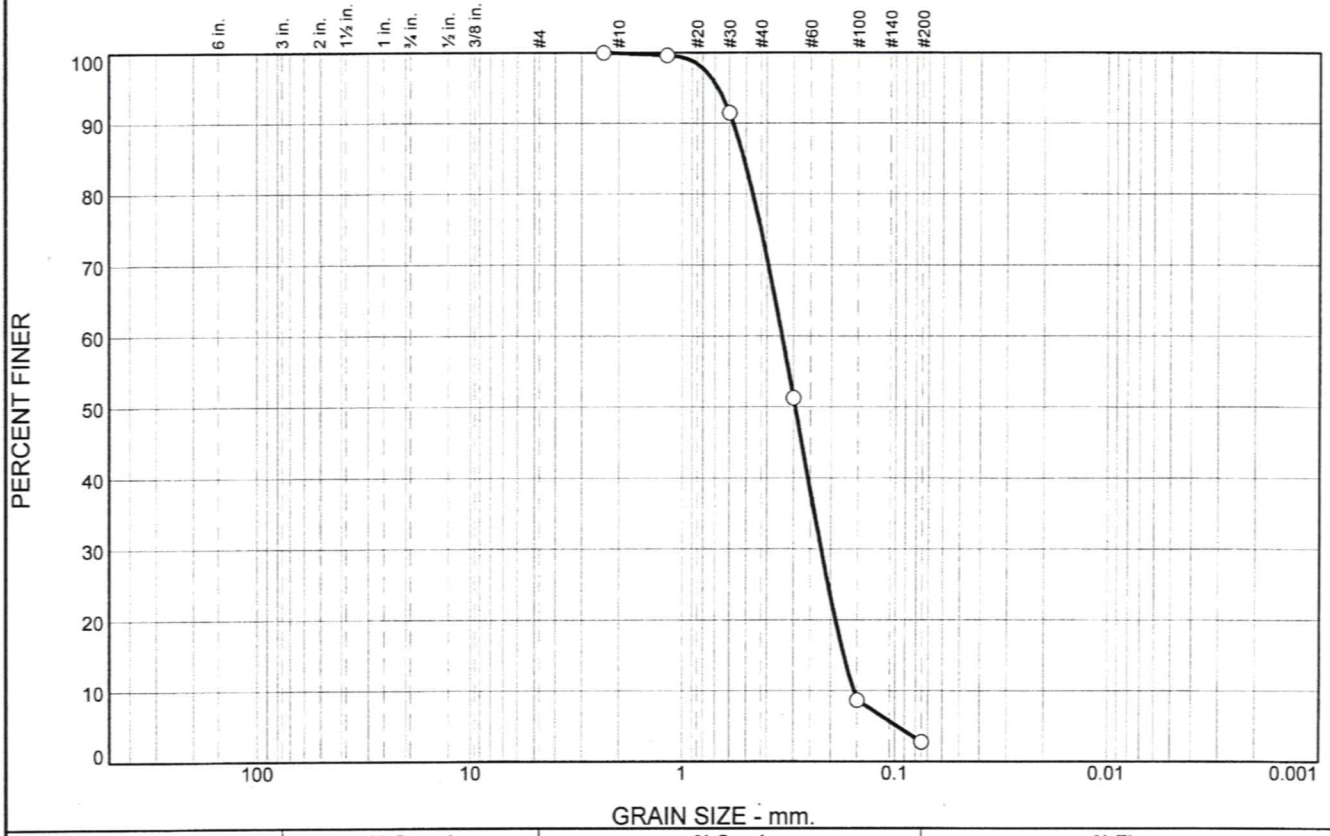
Auburn, CA

Client: RRM Design Group
Project: Area 2 Storm Drain

Project No: 1721.1 **Figure**

Tested By: KLC **Checked By:** KLC

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.1	25.1	72.0	2.8	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#8	100.0		
#16	99.6		
#30	91.5		
#50	51.3		
#100	8.7		
#200	2.8		

* (no specification provided)

Material Description

Light Gray and Brown Poorly Graded SAND

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.5761 D_{85}= 0.5129 D_{60}= 0.3392
D_{50}= 0.2948 D_{30}= 0.2226 D_{15}= 0.1735
D_{10}= 0.1554 C_u= 2.18 C_c= 0.94

Classification

USCS= SP AASHTO=

Remarks

Sample Number: B4-2B **Depth:** 10.5-11.0

Date: 6-11-09

Blackburn Consulting

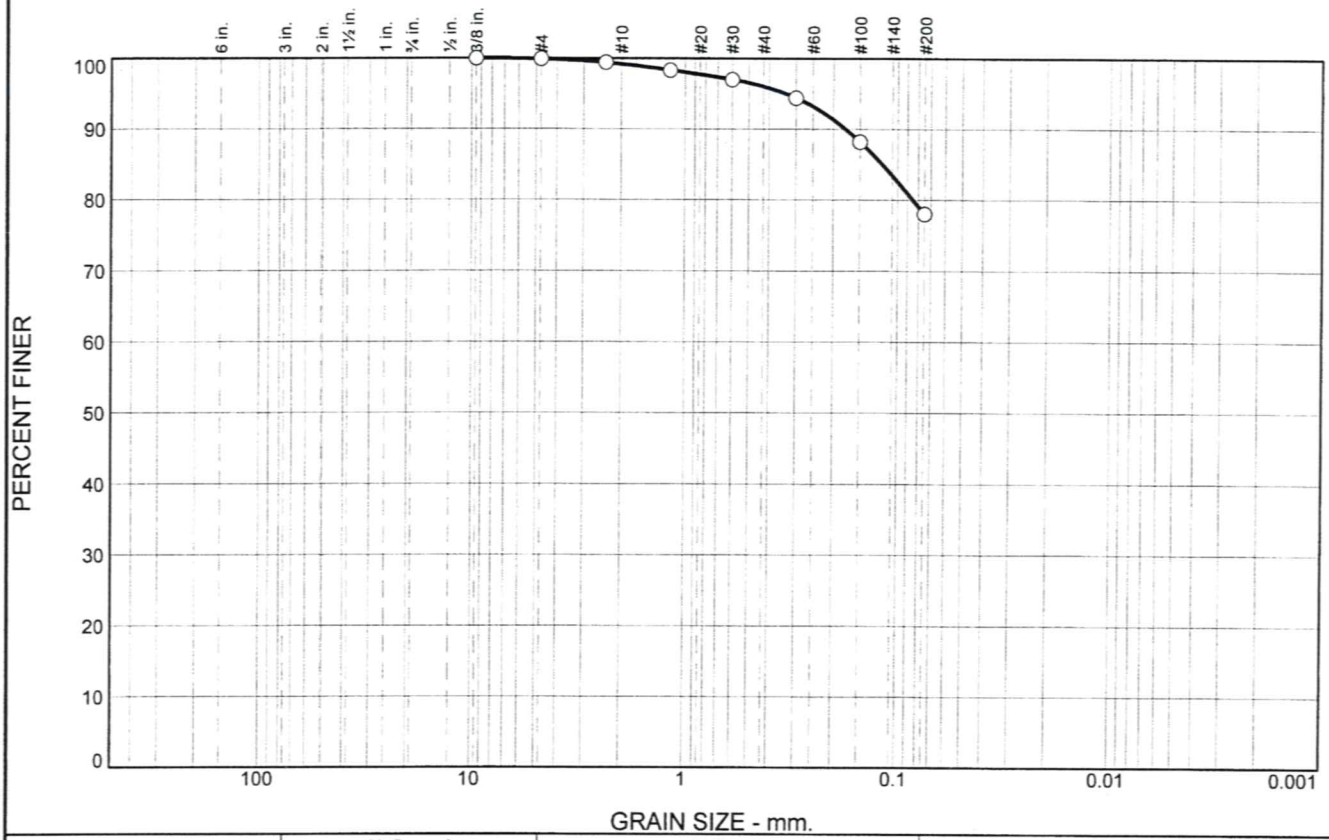
Auburn, CA

Client: RRM Design Group
Project: Area 2 Storm Drain

Project No: 1721.1 **Figure**

Tested By: KLC **Checked By:** KLC

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.1	0.7	3.2	18.0	78.0	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/8	100.0		
#4	99.9		
#8	99.4		
#16	98.3		
#30	97.0		
#50	94.4		
#100	88.2		
#200	78.0		

* (no specification provided)

Material Description

Light Gray Lean CLAY with Sand

Atterberg Limits

PL= 21 LL= 29 PI= 8

Coefficients

D_{90}= 0.1754 D_{85}= 0.1181 D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= CL AASHTO= A-4(5)

Remarks

Sample Number: B4-2C **Depth:** 11.0-11.5

Date: 6-11-09

Blackburn Consulting

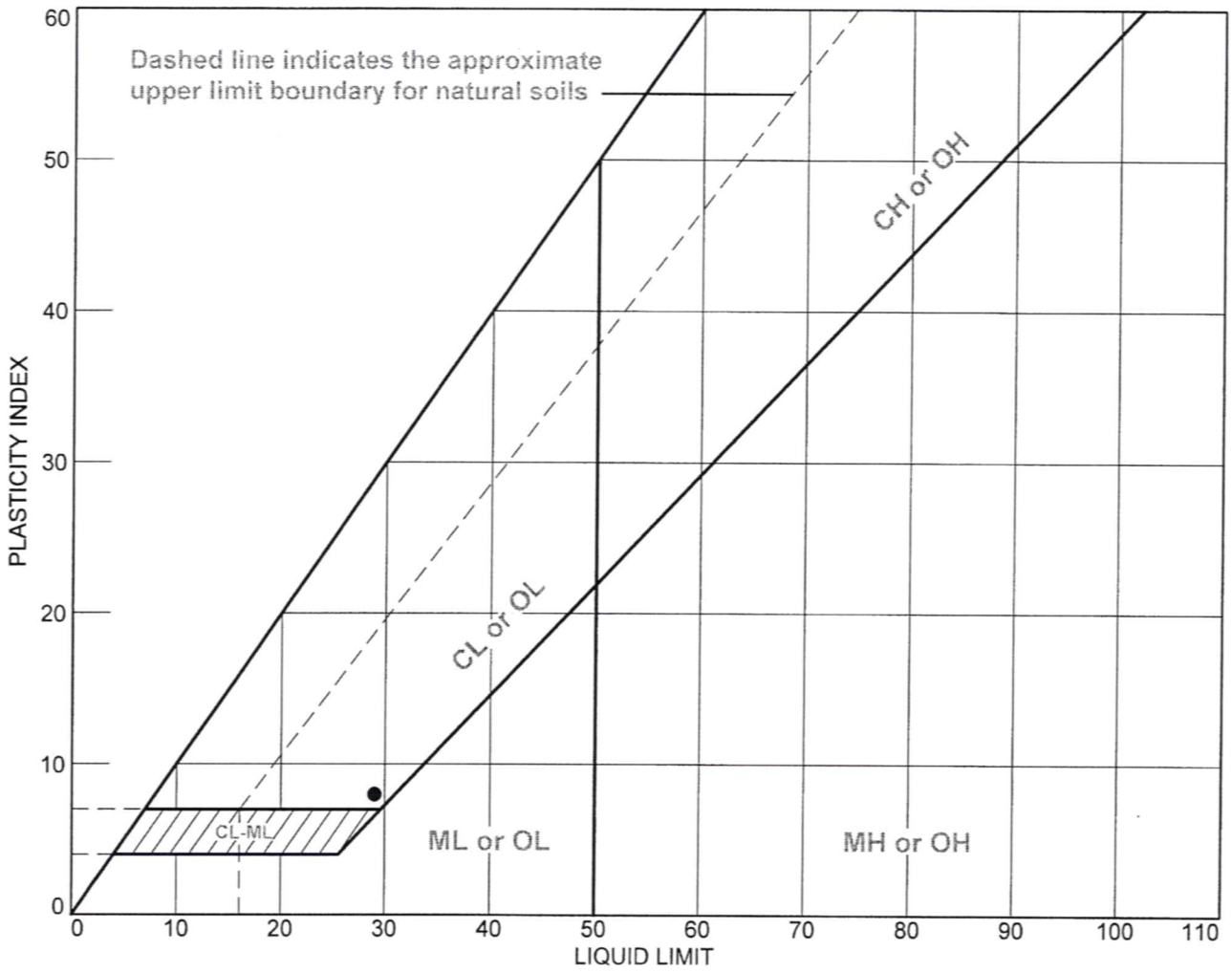
Auburn, CA

Client: RRM Design Group
Project: Area 2 Storm Drain

Project No: 1721.1 **Figure**

Tested By: KLC **Checked By:** KLC

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA								
SYMBOL	SOURCE	SAMPLE NO.	DEPTH	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●		B4-2C	11.0-11.5		21	29	8	CL

Blackburn Consulting

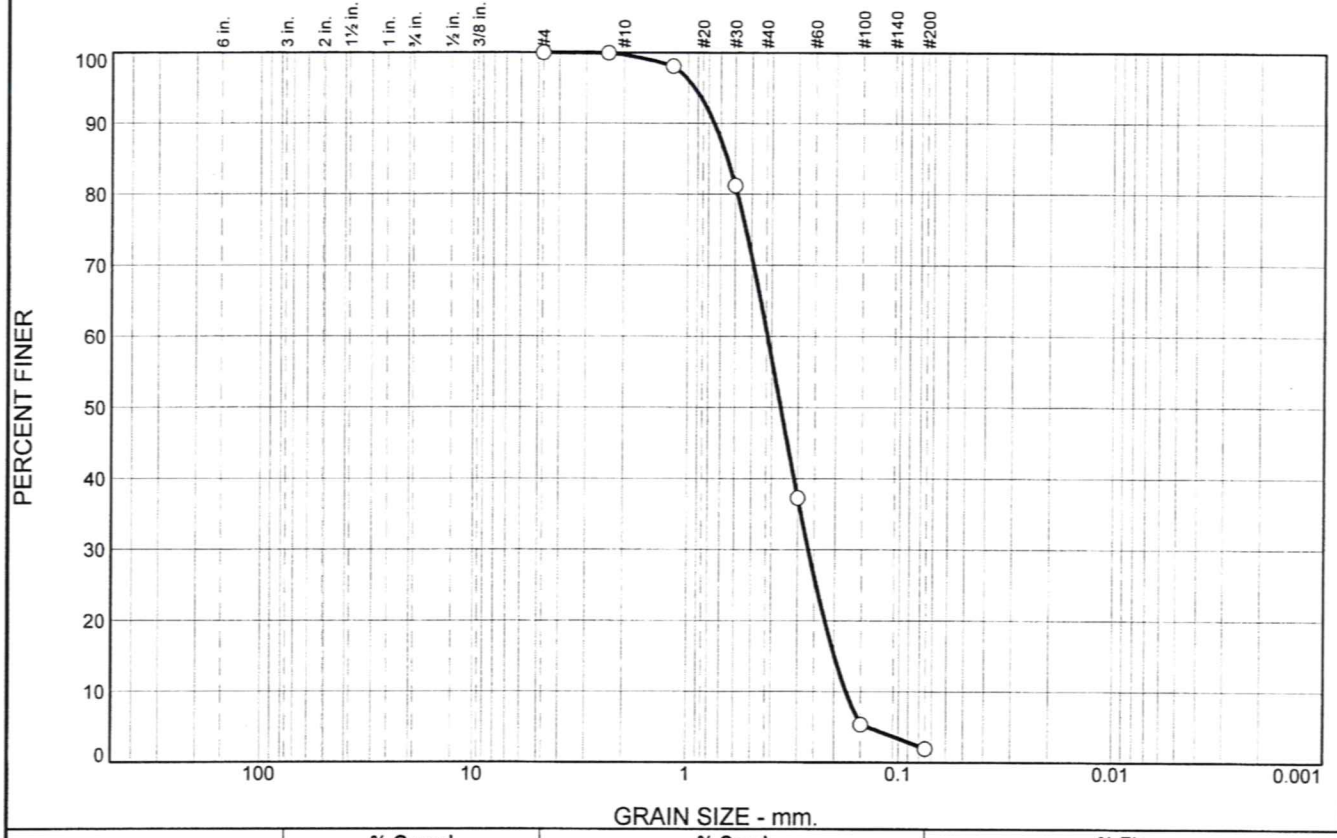
Auburn, CA

Client: RRM Design Group
Project: Area 2 Storm Drain

Project No.: 1721.1 **Figure**

Tested By: KLC **Checked By:** KLC

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.3	38.9	58.8	2.0	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100.0		
#8	100.0		
#16	98.1		
#30	81.2		
#50	37.3		
#100	5.4		
#200	2.0		

* (no specification provided)

Material Description

Light Brownish Gray Poorly Graded SAND

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.7529 D_{85}= 0.6533 D_{60}= 0.4199
D_{50}= 0.3627 D_{30}= 0.2667 D_{15}= 0.1997
D_{10}= 0.1758 C_u= 2.39 C_c= 0.96

Classification

USCS= SP AASHTO=

Remarks

Sample Number: B5-2C **Depth:** 11.0-11.5

Date: 6-11-09

Blackburn Consulting

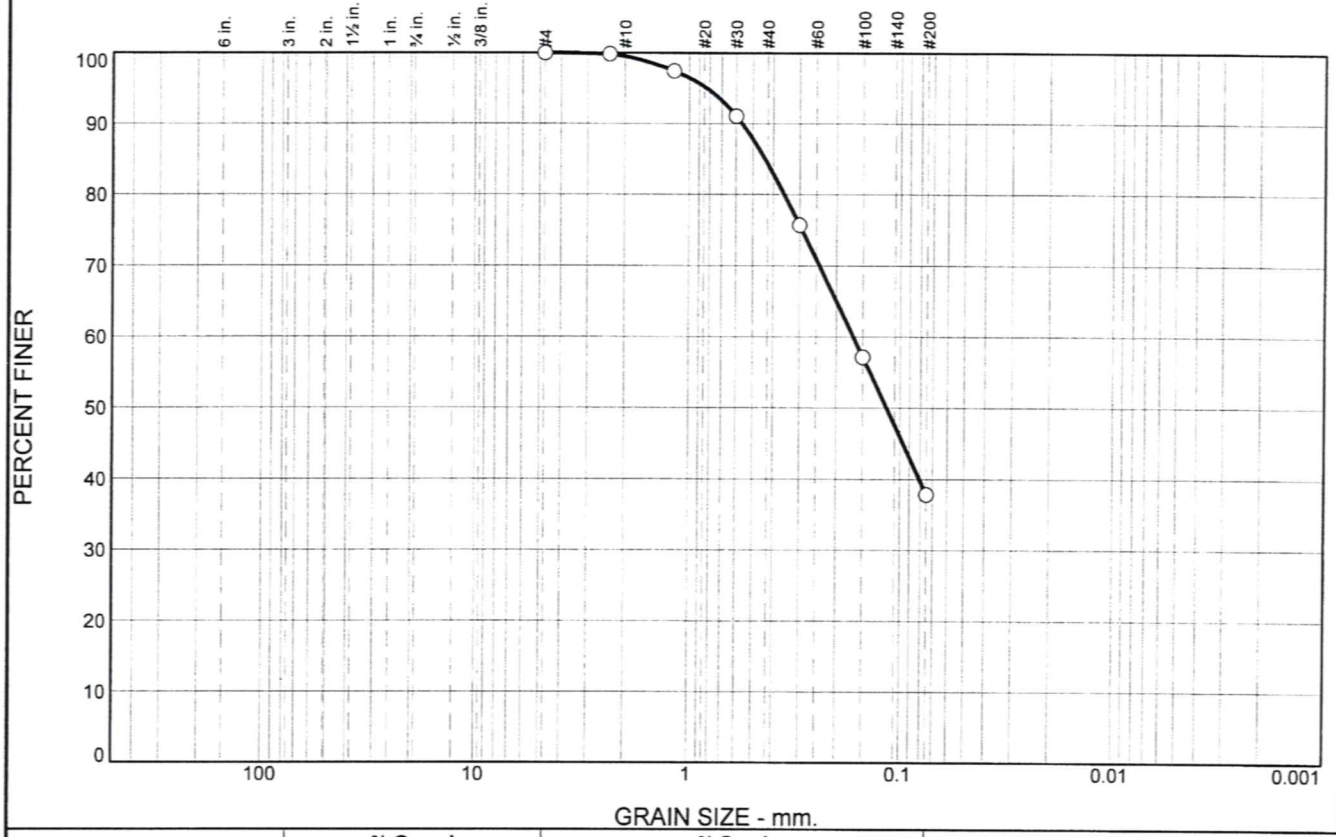
Auburn, CA

Client: RRM Design Group
Project: Area 2 Storm Drain

Project No: 1721.1 **Figure**

Tested By: KLC **Checked By:** KLC

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.5	15.2	46.5	37.8	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100.0		
#8	99.9		
#16	97.4		
#30	91.1		
#50	75.7		
#100	57.2		
#200	37.8		

* (no specification provided)

Material Description

Light Gray Silty SAND

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.5616 D_{85}= 0.4380 D_{60}= 0.1663
D_{50}= 0.1157 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= SM AASHTO=

Remarks

Sample Number: B5-3C **Depth:** 16.0-16.5

Date: 6-11-09

Blackburn Consulting

Auburn, CA

Client: RRM Design Group
Project: Area 2 Storm Drain

Project No: 1721.1 **Figure**

Tested By: KLC **Checked By:** KLC

APPENDIX F

PRETREATMENT PRODUCT LIST AND REFERENCES

Modesto Area 2
List of Potential PreTreatment Options
Compiled June 9,2009

Company	Product
Americast	Filtera
AquaShield, Inc.	Aqua-Swirl
	Aqua-Filter
	Aqua-Auardian
Baysavor Technologies inc	Bay Separator
Best Management Products	Snout
Bio Clean	Nutrient Separating Baffle Box
Contech	StormFilter
	MFS
	Storm Vault
	Vortechs
	CDS
	VortSentry
	VortSentry HS
	Stormscreen
	Envirogaurd
Environmental 21	V2B1
	Puristorm
	Unistorm
Fabco	Storm Basin
Fresh Creek Technologies	Trashmaster
	Sitesaver
Hydro-International	Up-Flo Filter
Hydroscreen, LLC	Screens
Imbrium Systems	Jellyfish
Ipex, Inc.	Envir Stream
KriStar	FloGard Dual Vortex
	Perk Filter
	Up-Flow Filter
	FloGard
Modular Wetlands	MWS Linear Underground Vault
Rotondo	Sand Filter
Suntree Technologies, Inc.	Grate Inlet Skimmer Box
	Curb Inlet Basket
n/a	Grassy Swale
n/a	Sand Filter

* Note - List developed from internet search for stormwater treatment systems and product advertisements in stormwater publications

Modesto Area 2
List of Potential Disposal Options
Compiled June 9,2009

Manufacturer	Product
ADS	HDPE Pipe
Brentwood	Storm Tank
Contech	Corrugated Metal Pipe
	Plate System
	Chamber Max
	Con/Storm Vault
	Con/Span Vaults
	Storm Vault
Hydrologic Solution	Storm Chamber
Invisible Structure	Rainstore 3
Kristar	CUDO
LandSavor	HDPE Arches
Layfield Group	Atlantis D
Prinsco	HDPE Pipe
Rinker	Stormceptor Max
Rotondo Environmental Solutions	Precast Conc. Vaults
Stormtech	MC3500
	SC-740
Triton Environmental Solutions	Stormwater Chambers

* Note - List developed from internet search for detention and retention systems and product advertisements in stormwater publications

Project Name: Modesto Area 2 Storm Drain Cross Connection Removal
Project Number: 2108543
Date 29-Oct-09
By: R. Camacho
Checked By: W. Strand

PRETREATMENT REFERENCE SHEET

	Unit			Unit			Unit		
	VortSentry HS			BaySaver			CDS		
Company Name	BKF Engineers	BKF Engineers	Landset Engineers	Haaland Group	Haaland Group	Haaland Group	MCR Engineering	MCR Engineering	MCR Engineering
Designer / Engineer	Anh Nguyen	Anh Nguyen	Charles Potter	Dale Oritman	Dale Oritman	Dale Oritman	Dan Evanenson	Dan Eavenson	Dan Eavenson
Contact Number	1-408-467-9155	1-408-467-9155	1-831-443-6970	1-805-497-4554	1-805-497-4554	1-805-497-4554	1-209-239-6229	1-209-239-6229	1-209-239-6229
Project Site	Mowry Retail Center	Sunnyvalle Town Center	Commons at Rogge Road Residential	Office Complex (In Thousand Oaks)	Simivalley Hospital	BMW Dealership	Yosemite Ave Business Park	Rodoni Estates Subdivision	Cozad Trailer
Treatment Type	Roof top and Parking lot run-off	Roof top and Parking lot run-off	Roof tops and street run-off	Roof top and Parking lot run-off	Roof top and Parking lot run-off	Roof top and Parking lot run-off	Roof top and Parking lot run-off	Roof tops and street run-off	Roof top and Parking lot run-off
Satisfied with units ability to treat run-off	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of rainy seasons in operation	1	1	1	1	5	1	1	3.5	> 1
Maintenance Interval	1 / year	1 / year	1 / year	1 / year (w/ 2 observations)	1 / year (w/ 2 observations)	1 / year (w/ 2 observations)	1 / year (w/ 2 observations)	1 / year (w/ 2 observations)	1 / year (w/ 2 observations)
Any known Problems	No	No	No	No	No	No	No	No	No
Is the Unit performing to advertised abilities	* Yes	* Yes	* Yes	* Yes	* Yes	* Yes	* Yes	* Yes	* Yes
Is the unit removing sediment	* Yes	* Yes	* Yes	* Yes	* Yes	* Yes	* Yes	* Yes	* Yes
Would you Promote this unit	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes